

MOBILE ADVERTISING STUDY

MEASURING AD-BLOCKING USERS' PERCEPTIONS OF ADVERTISING TYPES ON MOBILE BROWSERS

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1. ABSTRACT

The purpose of this study was to gain insight into how users perceive the disruption of different types of online advertising, specifically on mobile browsers. Participants used mobile devices to complete an online survey to determine the level of disruptiveness of 12 common mobile ad types. The study found that screen-filling and animated ads, such as pre- and postitial ad formats, are generally perceived as more disruptive by ad-blocking users. Respondents indicated that both native ad experiences (such as recommendation tiles, search and in-feed experiences) as well as a few industry standard ad formats, such as the static 1x1 tile (rectangle) and the 6x1 horizontal banner, were generally not disruptive.

2. INTRODUCTION

After the Interactive Advertising Bureau (IAB) announced in 2015 that “**they screwed up**”¹ by losing track of the user experience, the online advertising industry started to work on initiatives to improve online ads. Shortly following this paradigm shift, the Coalition for Better Ads was born, and the **IAB’s own LEAN initiative**² was inceptioned. This group bore some similarities to the **Acceptable Ads Committee**³, a diverse group of relevant stakeholders of the web, with the goal of creating ad standards that improve the user experience for ad-blocking users while delivering value to publishers and online advertisers. Although these are all initiatives which deserve praise, one particular user segment has not been thoroughly researched.

In early 2017, **Pagefair found**⁴ that there are globally 615 million devices with an ad blocker, which is roughly 11% of the world’s online population. (In)famously, Doc Searls – a widely respected internet thought leader – called ad blocking the “**biggest boycott in human history**”⁵. It is generally assumed that ad-blocking users have **different demographics**^{6,7} and **attitudes**⁸ towards online advertising; these users are widely neglected when it comes to measuring their perceptions of online advertising.

In addition to the wide global usage of ad blocking, a clear trend can be witnessed on mobile devices. **According to Pagefair**⁹, mobile ad blocking is one of the main drivers of global growth, where mobile usage grew from 108 to 380 million devices. Meanwhile, current standards for mobile advertising are limited and based on average internet users.

This study aims to contribute new data to the discussion by investigating how ad-blocking users, in particular, perceive common mobile ad types. The Acceptable Ads Committee commissioned the study and uses the framework provided by a **study performed by IPSOS**¹⁰, which proposes a “level

¹ <http://adage.com/article/digital/iab-advertisers-content-providers-messed/300919>

² <https://marketingland.com/the-iab-takes-on-ad-blocking-by-first-admitting-the-industry-screwed-up-147235>

³ <https://acceptableads.com/en/committee/>

⁴ <https://pagefair.com/blog/2017/adbblockreport/>

⁵ <https://blogs.harvard.edu/doc/2015/09/28/beyond-ad-blocking-the-biggest-boycott-in-human-history/>

⁶ <https://marketingland.com/ad-blocker-usage-highest-among-key-advertiser-demos-millennials-and-high-earners-143546>

⁷ <http://insight.globalwebindex.net/hubfs/The-State-of-Mobile-Ad-blocking-in-2017.pdf?t=1503572637418>

⁸ <https://www.iab.com/wp-content/uploads/2016/07/IAB-Ad-Blocking-2016-Who-Blocks-Ads-Why-and-How-to-Win-Them-Back.pdf>

⁹ <https://pagefair.com/blog/2017/adbblockreport/>

¹⁰ <https://adbblockplus.org/blog/global-research-study-of-ad-formats-confirms-what-you-already-knew-disruptive-ads-don-t-work>

of disruption” based on how internet users perceive the disruptiveness of various common online ad types on desktop¹¹.

This study attempts to accomplish a similar goal to the IPSOS study, but measures how disruptive mobile browser advertisements are to ad-blocking users, exclusively. As user experiences differ greatly between mobile and desktop (e.g. smaller screens, different ad formats, responsive website designs), we anticipated some differences in perceptions, though we hypothesized that size and placement would still similarly influence ratings. We have analyzed the data in such a way that it might be leveraged to design a new standard for mobile advertising while acknowledging limitations and offering suggestions for further studies.

3. LITERATURE REVIEW

As early as 2008, researchers like Park et al.¹² and Nadeem, Rodríguez and Pérez-Vega¹³ claimed there was a relative lack of research regarding the attitudes towards mobile advertising, although consumers’ general advertising avoidance is widespread¹⁴. In 2005, Bauer et al.¹⁵ also stressed the importance of understanding the attitudes of consumers towards mobile advertising since it is key to improve the relevance of these type of advertisement. While researchers have delved into mobile advertising since then, the field is wide, and studies have so far been limited in topics.

In 2013, Chen, Liu and Dai¹⁶ found in a Chinese study that survey participants understand advertising “is unavoidable in the modern society” and that the participants showed “a relatively negative attitude toward mobile advertising”. However “for other types of advertising, such as apps, mobile advergaming, and product placement, the participants displayed a more positive attitude and were more inclined to accept them.” In addition they showed that participants of the survey “constantly compare their smartphone experience with their computer usage experiences and all the barriers of mobile marketing on smartphones come from the comparison.”

Similarly, in 2012 Persaud and Azhar¹⁷ found that Canadian consumers had positive attitudes towards innovative marketing on mobile devices. In addition, there is some evidence that hindrance to experience the app caused by ads is one of the major factors causing negative attitudes towards in-app advertisements (Bhave et al.¹⁸; Wayne¹⁹).

¹¹ Because this study is commissioned by the Acceptable Ads Committee, it is bound to the guidelines and restrictions as phrased in its bylaws: <https://acceptableads.com/pdf/acceptable-ads-committee-bylaws.pdf>

¹² Park, T., Shenoy, R., & Salvendy, G. (2008). Effective advertising on mobile phones: a literature review and presentation of results from 53 cases studies, *Behaviour & Information Technology*, 27(5), pp. 355--373.

¹³ Nadeema, S., Rodríguez, L. C., & Pérez-Vegaa, R. (2015). A scale of hindrance in mobile in-app advertising.

¹⁴ Kelly, L., Kerr, G., & Drennan, J. (2010). Avoidance of Advertising in Social Networking Sites: The Teenage Perspective, *Journal of Interactive Advertising*, 10(2), pp. 16-27.

¹⁵ Bauer, H.H., Barnes, S.J., Reichardt, T., Neumann, M.M., 2005. Driving consumer acceptance of mobile marketing: a theoretical framework and empirical study. *Journal of electronic commerce research*, 6, 181-192.

¹⁶ Chen, H., Liu, F., & Dai, T. (2013). Chinese consumers’ perceptions toward smartphone and marketing communication on smartphone, *International Journal of Mobile Marketing*, 8(1).

¹⁷ Persaud, A., Azhar, I., (2012). Innovative mobile marketing via smartphones: are consumers ready? *Marketing Intelligence and Planning*, 30, 418-443

¹⁸ Bhave, K., Jain, V., Roy, S., (2013). Understanding the Orientation of Gen Y Toward Mobile Applications and in-App Advertising in India. *International Journal of Mobile Marketing*, 8, 62-74.

¹⁹ Wayne, H., 2007. *Global Mobile Commerce: Strategies, Implementation and Case Studies*. IGI Global

In 2015, Nadeem, Rodríguez and Pérez-Vega²⁰ found that “if consumers perceive in-app advertisements as something that hinder their activities within an app and/or their overall app experience, negative attitudes are formed.”

Most recently, Çiçek, Eren-Erdoğan and Daştan²¹ explored how the awareness of in-app mobile banner ads is influenced by banner location, application type and orientation. They found that users remembered “the banner and its contents better when the context was landscape game and the banner was located at the top.”

In 2017 the Coalition for Better Ads released their **research whitepaper**²² detailing their determination of better ads standards. This research was based on an **experimental methodology**²³ with a unique **ranking analysis**²⁴ they researched and developed in 2016, which allows them to rank many different types of ads by distributing the work across many participants. Based on this research, they identified eight different mobile ad types (in addition to four desktop types) as the least preferred user experiences. These **standards**²⁵ are currently in the process of being enforced via their **Better Ads Experience Program**²⁶.

The field of mobile advertising technologies is relatively new, so besides the sources cited above, the available literature is scarce, especially regarding modern mobile ad types. This study aims to contribute to the literature in that it takes the perspective of ad-blocking users’ perception to mobile advertising types. This is a unique contribution to the literature, and we hope that more studies will be conducted to identify how certain ad types and its variables affect the user experience on mobile devices.

4. METHODOLOGY

To acquire data, representatives of the online consumer population completed a series of questions. Respondents had to be ad-blocking users and own a mobile phone. Responses were collected through self-completed online questionnaires, accessible only via mobile phones.

A. SURVEY VENDOR

The Acceptable Ads Committee (AAC) commissioned this study, and eyeo was chosen as the responsible party to spearhead the study. We considered a total of four companies for data collection and surveying: GlobalWebIndex (GWI), HubSpot Research, Respondi and IPSOS. After a consultation between eyeo and the AAC Research Subcommittee, we determined that HubSpot Research would conduct the study and Survey Sampling International (SSI) would serve as the survey vendor.

²⁰ Nadeema, S., Rodríguez, L. C., & Pérez-Vega, R. (2015). A scale of hindrance in mobile in-app advertising. In Proceedings of International Conference on Organization and Management.

²¹ Çiçek, M., Eren-Erdoğan, İ., and Daştan, İ. (2018). How to increase the awareness of in-app mobile banner ads: exploring the roles of banner location, application type and orientation, International Journal of Mobile Communications, 16(2), 153-166

²² <https://www.betterads.org/research/standardpaper/>

²³ <https://www.betterads.org/research/perceptionpaper/>

²⁴ <https://www.betterads.org/research/rankingpaper/>

²⁵ <https://www.betterads.org/standards/>

²⁶ <https://www.betterads.org/coalition-for-better-ads-to-introduce-better-ads-experience-program/>

B. PARTICIPANT DEMOGRAPHICS

A total of 2,001 mobile users participated in this study: 1,000 in the US, 500 in France and 501 in Germany²⁷. The survey consisted of mobile ads, and survey responses were collected via mobile devices. Most participants were young; about 70 percent were between the ages of 18 and 34. This is largely in line with the **audience demographics**^{28,29}, usually associated with ad blockers. While the survey aimed for an even gender distribution, the final results were skewed slightly in favor of males. This is largely due to the lack of available French- and German-speaking female respondents using an ad blocker provided by the survey vendor. Even though this is undesirable, it is in line with the generally accepted **demographics of ad-blocking users**³⁰. The vast majority of respondents owned either an Android and/or an iOS device.

C. STUDY DESIGN

To avoid participant fatigue, this study focused on 12 ad types to maintain a setup in which the same participant could review all ad types. We selected these 12 ad types because, as a group, they cover the most common forms of mobile advertising used today (e.g. **IAB new standard ad unit portfolio** version 1.1³¹, **Better Ads Standard**³² and **MobileAds.com**³³). Ad types included banner ads, tile ads, native ads, interstitial ads and expandable ads. In the case of banner and tile ads, the survey included multiple size and placement options to provide more context around why a particular ad may be more or less disruptive. Due to time constraints and scope, this study excluded all video ads. However, it should be noted that video ads are often indicated by users as one of the most annoying ad types: “Modal ads, ads that reorganize content, and autoplaying video ads were among the most disliked. Ads that are annoying on desktop become intolerable on mobile” (**Nielsen Norman Group**³⁴). Findings in an **IPSOS study**³⁵ confirmed this sentiment.

Based on the previously outlined research and the current mobile ad standards (**IAB New Standard Ad Unit Portfolio**³⁶, **Initial Better Ads Standard**³⁷), **we identified almost 100 potential ad types**³⁸ we could have tested when taking into account size, placement, and animation variations. Of these, we prioritized and selected 12 mobile ad types because they provided an accurate reflection of the mobile online advertising experience.

To help identify potential content bias, we created two fictional companies: bet563, a fake sports betting company; and Klim, a fake milk alternative. The ad sets differed in content matter, as well as their overall look and feel. The design of each ad fit its respective subject matter, mimicking real

²⁷ Additional graphs can be found in the appendix.

²⁸ <https://marketingland.com/ad-blocker-usage-highest-among-key-advertiser-demos-millennials-and-high-earners-143546>

²⁹ <http://insight.globalwebindex.net/hubs/The-State-of-Mobile-Ad-blocking-in-2017.pdf?t=1503572637418>

³⁰ <https://pagefair.com/blog/2017/adbblockreport/>

³¹ https://www.iab.com/wp-content/uploads/2017/08/IABNewAdPortfolio_FINAL_2017.pdf

³² <https://www.betterads.org/research/>

³³ <https://www.mobileads.com/blog/best-mobile-ad-formats-sizes-display-ad-campaigns/>

³⁴ <https://www.nngroup.com/articles/most-hated-advertising-techniques/>

³⁵ <https://adbblockplus.org/blog/global-research-study-of-ad-formats-confirms-what-you-already-knew-disruptive-ads-don-t-work>

³⁶ https://www.iab.com/wp-content/uploads/2017/08/IABNewAdPortfolio_FINAL_2017.pdf

³⁷ <https://www.betterads.org/standards/>

³⁸ <https://docs.google.com/spreadsheets/d/1bg2RpAlapw8NCu1KUub9Vof4g2k6-JCZwdWcwvG5UNkg/edit#gid=1612473646>

life ads while avoiding real life brand bias. See **Table 1** and the visual overview of all shown ad types below.

Table 1 : *List of tested ad types*

Internal Type ID³⁹	Type	Unit name	Animation	Location
A1/B1	Tile	1x1	animated	mid-content
A2/B2	Tile	1x1	static	mid-content
A3/B3	Horizontal	6x1	static	bottom sticky
A4/B4	Horizontal	6x1	animated	bottom sticky
A5/B5	Expanding Ad	Expanding Ad	animated	bottom sticky
A6/B6	Horizontal	6x1	static	above content
A7/B7	Native	Suggested Tiles	static	below content
A8/B8	Fullscreen	Postitial	animated	after content
A9/B9	Fullscreen	Prestitial	animated	before content
A10/B10	Native	Search	static	top
A11/B11	Horizontal	6x1	static	mid-content
A12/B12	Native	In-feed	static	in-feed

To further limit the impact of an ad’s content on the respondents, the texts and visuals for both campaigns remained consistent throughout the different advertising types, with minor additions when appropriate for the ad type (in A7/B7 and A10/B10, shown below). The organic content, or the article pages, remained the same throughout the two ad campaigns for nine of the twelve ad types. The native suggested tiles ad (A7/B7, shown below) remained identical in both sets because it included ads from both the Klim and bet563 campaigns. Since the ad creatives were the same, this ad type could act as a control variable.

The remaining two ads, native search and native in-feed (A/B10 and A/B12, shown below), each had contextualized native frames. For search, while the ad type is the same for both campaigns, the search results text had been contextualized for each subject matter to accurately represent the native environment. With native in-feed, the frames were the same in both creatives.

Refer to the screenshots of the visuals below. Please note that ads A1/B1, A4/B4, A5/B5, A7/B7, A8/B8 and A9/B9 all include animations, and as such, the images below are only representative.

³⁹ “A” stands for the Klim ad set. “B” stands for the bet563 ad set.

The full set of ads displayed to participants, including English, French and German versions, as well as all animations, can be found [here](#)⁴⁰.

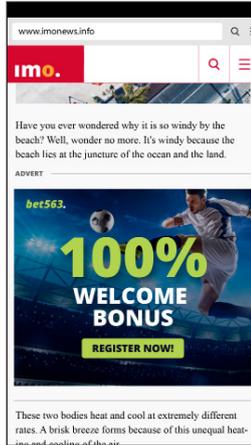
Figure 1: Images of the shown ad types

SET A: BET563

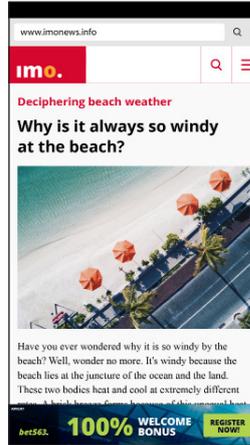
A1:



A2:



A3:



A4:



A5:



A6:



A7:



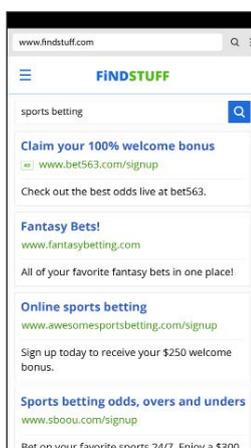
A8:



A9:



A10:



A11:



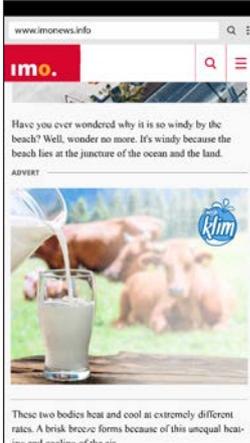
A12:



⁴⁰ https://drive.google.com/drive/folders/1R2vYxa1x_2Pw5iFhrjbc0k-Hpo6iUSQM

SET B: Klim

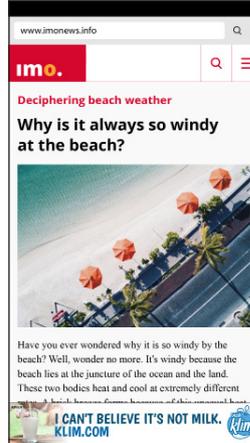
B1:



B2:



B3:



B4:



B5:



B6:



B7:



B8:



B9:



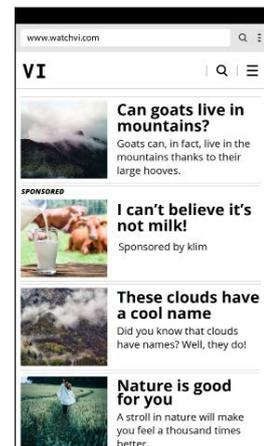
B10:



B11:



B12:



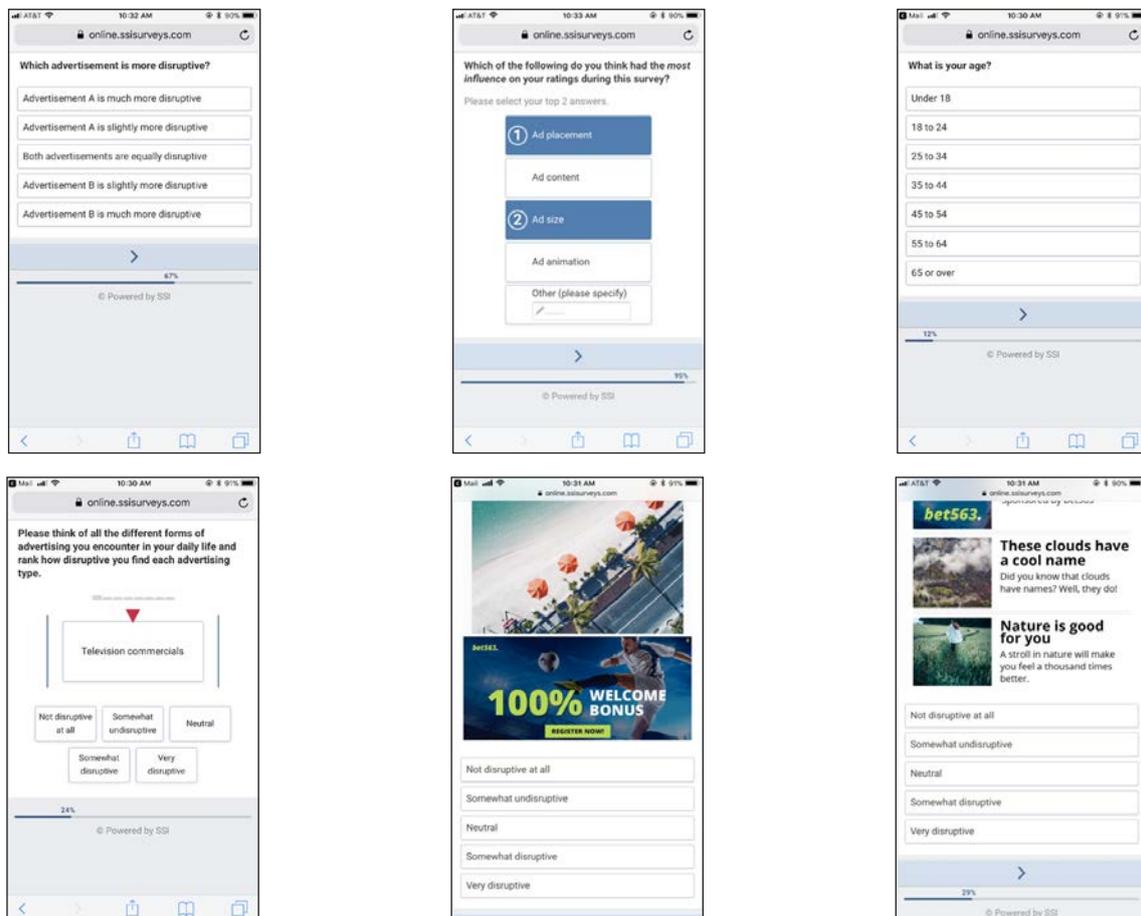
In the study, we asked participants to assess ads in two different ways. First, participants viewed each ad experience individually and provided an independent rating. Next, participants compared two ad experiences, picking which was most disruptive, or indicating if they found them equally disruptive.

To compare the ad creatives equally, 50 percent of participants were shown one set in the individual rating, and the other set in the competitive comparison. The remaining 50 percent were shown the ad sets in the reverse order. We randomized the order of ads within each section to mitigate the effects of user fatigue and to exclude the perception that the ads might have been linked to their ordering.

D. SURVEY TOOL

In the study, participants were asked to assess ads in two different ways. First, ads were presented alone, and participants were asked to assess them individually. Next, participants were asked to compare two ads head-to-head, picking which was more annoying or intrusive. To compare the ad creatives equally, 50% of participants were shown one set in the individual comparison, and the other set in the head-to-head comparison. The remaining 50% were shown the ad sets in the reverse order. The order of ads within each section was randomized to mitigate the effects of user fatigue and to generally exclude that the perception of the ads are linked to their ordering.

Figure 2: Screenshots from the survey



E. SURVEY SCALE

To determine each respondent's level of disruption towards different ad types, the survey utilized a five-point scale for individual ad ratings (see **Chapter 4.b.a.**). Respondents indicated for each of the 12 different ad types their level of disruption by choosing any of the following five positions, shown to the participants in text-format only. These were then translated into the following ordinal scale:

Table 2: *Ratings*

Perception of the ad	Not disruptive at all	Somewhat undistruptive	Neutral	Somewhat disruptive	Very disruptive
Ordinal	-2	-1	0	1	2

A few other methodological arguments outlined by the Coalition for Better Ads were also considered when opting for the five-point scale. According to **their literature review**⁴¹, a five-point scale is optimal for respondents because it reduces their response time and makes it easier to cognitively process in contrast to (e.g.) a seven-point scale. Finally, a five-point scale allows the respondents to remain “neutral”.

⁴¹ Ad Experience Group (April 2016), An experimental methodology to measure consumers' perceptions of online ad experiences (p.8), Coalition for Better Ads, retrieved from: <https://www.betterads.org/research/perceptionpaper/>

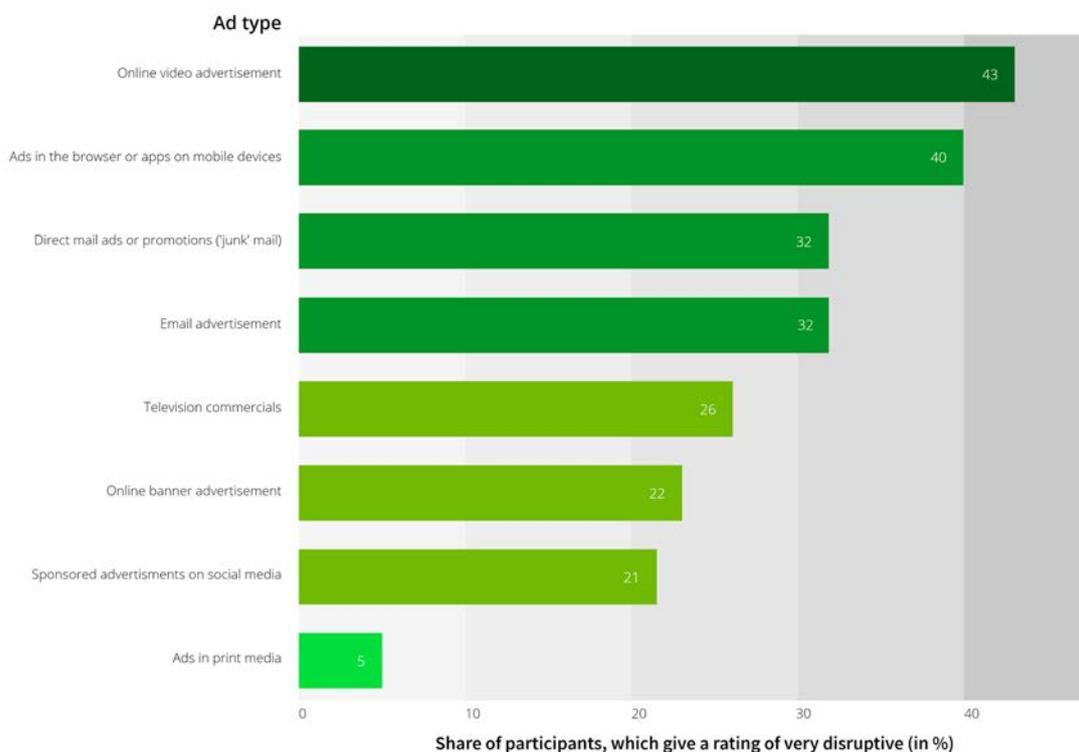
5. PRESENTATION OF RESULTS

This section outlines the results of the study.

A. GENERAL PERCEPTION OF ADS

This section describes the results of the study regarding the general perception towards (online) ads. To begin the study, we asked participants to “Please think of all the different forms of advertising you encounter in your daily life and rank how disruptive you find each advertising type is.” with the following answer choices: Not disruptive at all, Somewhat undistruptive, Neutral, Somewhat disruptive, and Very disruptive.

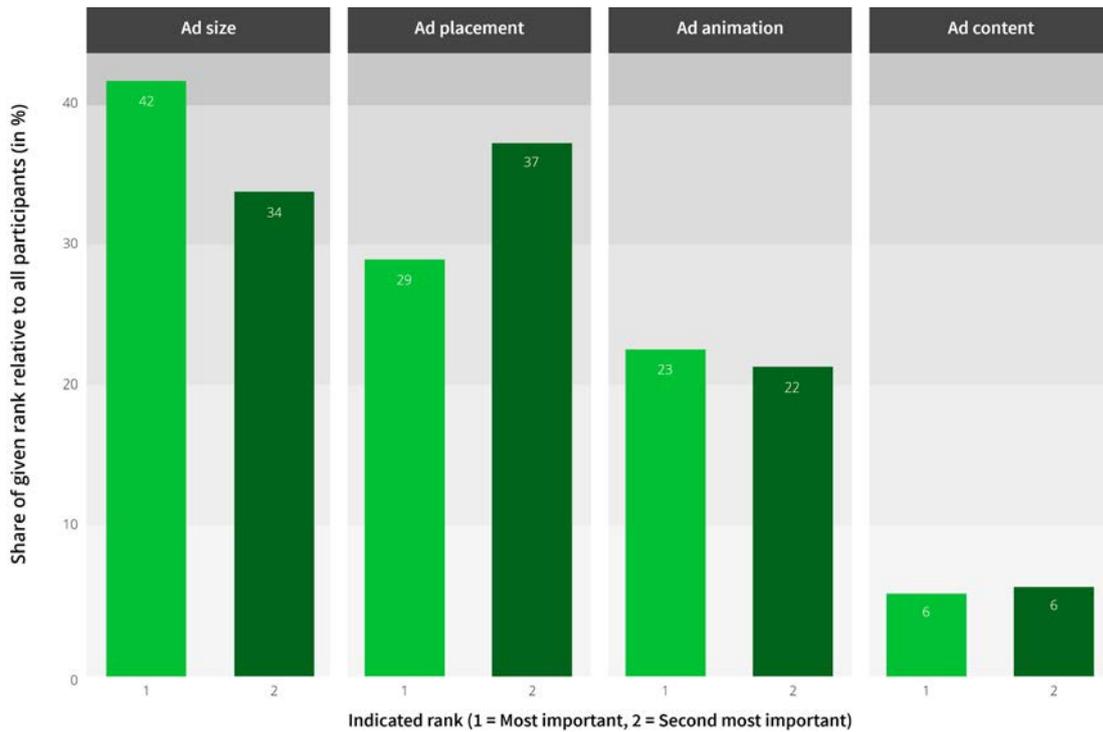
Figure 3: How participants perceive different advertising experiences



This question offers a baseline understanding of how participants perceive ads on their mobile device in relation to other traditional ad types. As you can see in **Figure 3**, ads on mobile devices ranked second most disruptive only to online video advertisements. This indicates that establishing criteria for acceptable ad types on mobile devices is necessary and relevant.

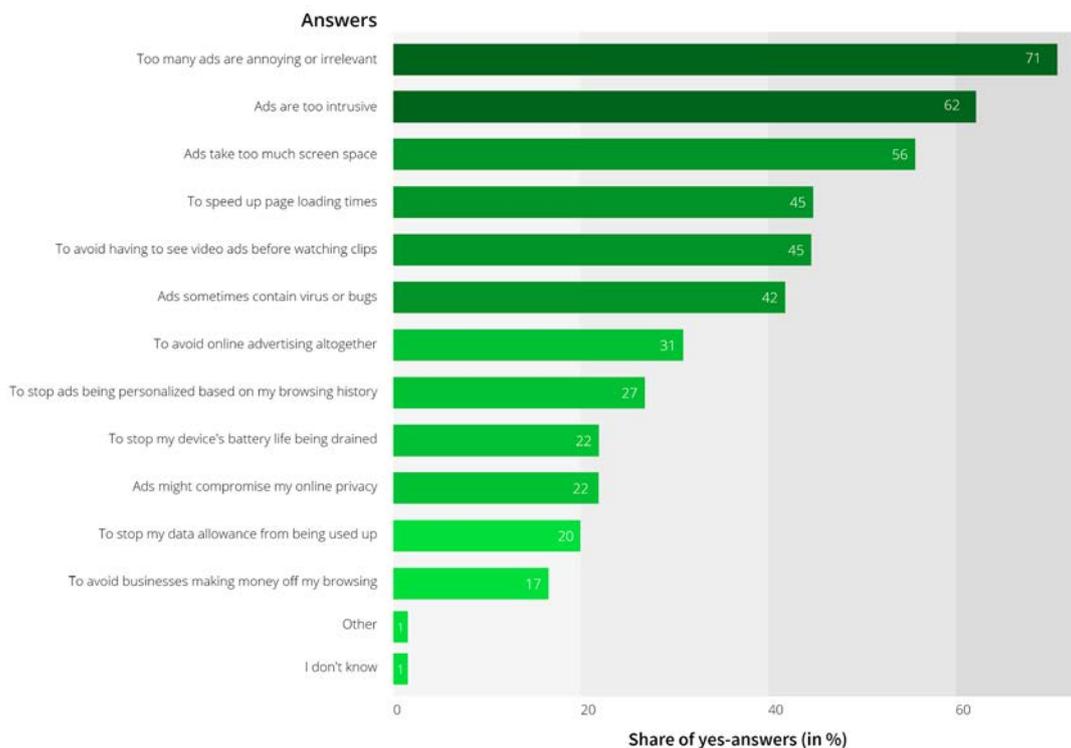
To provide additional context to participants views, at the end of the study, after participants had rated all images, we asked, “Which of the following do you think had the most influence on your ratings during this survey?” with the following answer choices: Ad size, Ad placement, Ad animation, Ad content, or Other (please specify).

Figure 4: Factors respondents found most important when judging ads



According to participants, the size and placement of an ad indicated the two most important factors when judging the ad’s disruptiveness (see Figure 4). Whether an ad was animated or not also rated as important by the respondents. The ad content does not appear to play an important role, which could be expected as the ad content is the only constant during the comparison.

Figure 5: Why participants use an ad blocker



When asked the underlying reasons as to why they use an ad blocker, the majority of participants indicated that many ads are “annoying” or “irrelevant” (71 percent), are too intrusive (62 percent) and take up too much screen space (56 percent) (see **Figure 5**). This seems to be in line with the findings presented in **Figure 4** where the participants indicated that the format of online ads (size, placement, animations) was the main driver for using an ad blocker.

When it comes to the effect of online advertising on security, 42 percent of respondents indicated that they installed an ad blocker because ads can sometimes serve viruses.

Of the respondents, 45 percent indicated that increased browsing speed was a major reason for them to use an ad blocker. An additional 22 percent said that they use an ad blocker to decrease battery usage. This is in line with previous **claims**⁴², which have shown that ad blockers can have a positive impact on speed and battery life.

One of the use cases for installing and configuring an ad blocker is to protect one’s online privacy by **blocking trackers**⁴³. Twenty-two percent of the respondents in this study indicated that they installed an ad blocker to protect their online privacy while 27 percent indicated that they installed an ad blocker to stop seeing personalized ads. Finally, only 17 percent of the participants wanted to avoid businesses that make money off of their browsing **activity**⁴⁴.

⁴² <https://lifehacker.com/ad-blockers-on-mobile-can-reduce-battery-drain-by-up-to-1764344384>

⁴³ <https://www.eff.org/deeplinks/2012/04/4-simple-changes-protect-your-privacy-online>

⁴⁴ This could be an indicator that the majority of participants acknowledge that online content cannot be “free.” Supporting this assumption, the survey revealed that only 31 percent of participants block ads to avoid online advertising altogether, implying that other almost 70 percent do not think that it is necessary to avoid online advertising altogether. In addition, these findings are also supported by the first survey that was taken by **Adblock Plus in 2011**, where 71 percent of the respondents indicated that they would agree to allow some nonintrusive ads in order to support websites.

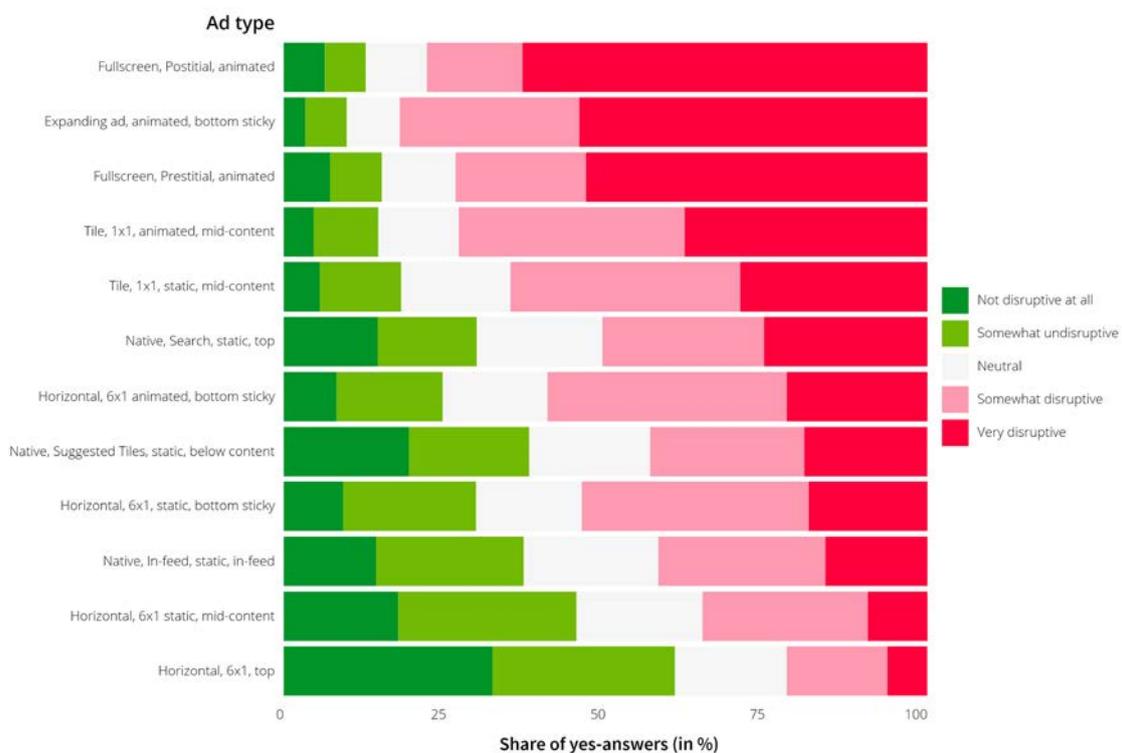
B. MAIN RESULTS

This section describes the results of the questions regarding the tested ad types.

a. Individual ad type ratings

Figure 6 shows the individual ratings of the different ad types. It shows the share of ratings given between “Not disruptive at all” and “Very disruptive.” We can conclude that ad types which have characteristics such as animation and large size (e.g. fullscreen and expanding ads) are generally rated as very disruptive. Ad types with characteristics such as no animation (static) and small size (e.g. horizontal banners, native ads) are given better ratings.

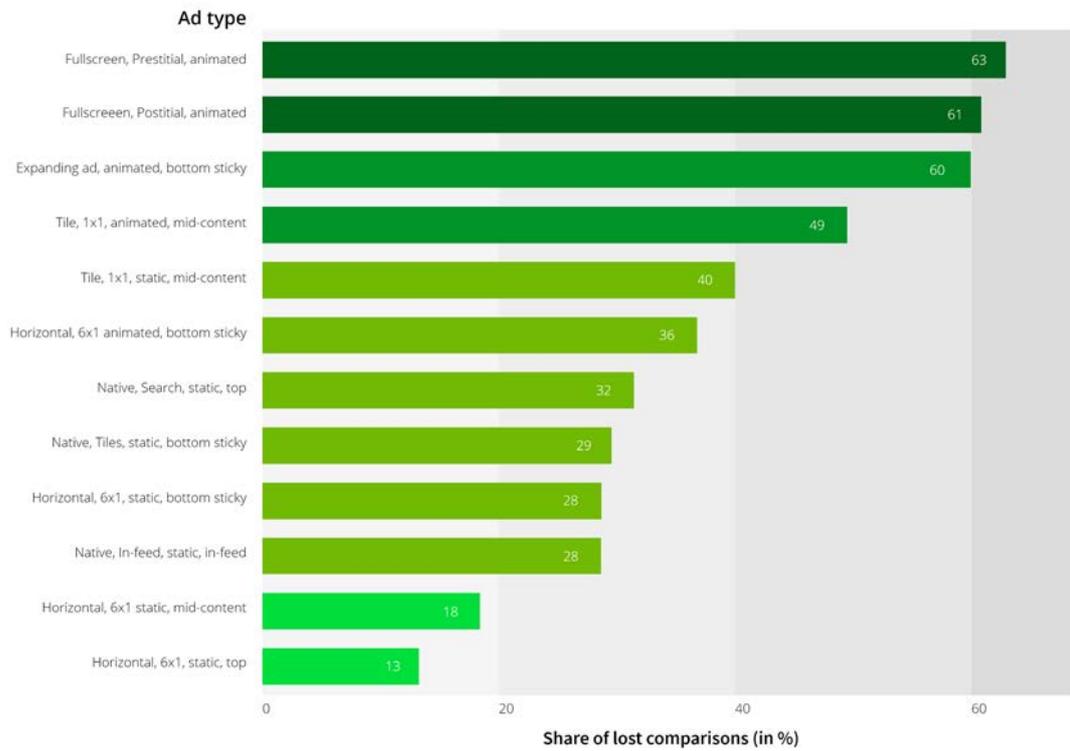
Figure 6: All individual ad type ratings



b. Comparison of ad type ratings

Participants compared different ad types against each other. To achieve this, the survey tool distributed the 12 ad types randomly into six pairs from the same ad set. This was done for all participants. Participants then rated the more disruptive ad on a bipolar five-point ranking. We can see the comparisons as “matches” and one metric to rank the ad type would be to count the share of lost matches, i.e. the times where an ad type was ranked as more annoying than its opponent.

Figure 7: Comparison of ad types



Arguably, since the “opponents” were selected at random, this ranking could be skewed if the matches were not evenly distributed. However, the occurrence of the pairs were approximately uniformly distributed. Calculating a ranking out of pairwise comparison is a complex statistical problem. The most common real-world practice is to rank players/teams in a tournament. Many leagues, e.g. soccer, have fixed, evenly distributed competing pairs. In this study, the pairs were drawn randomly, which is more similar to chess scores. Because of this, we decided to run comparisons through algorithms that are used to rank chess players.

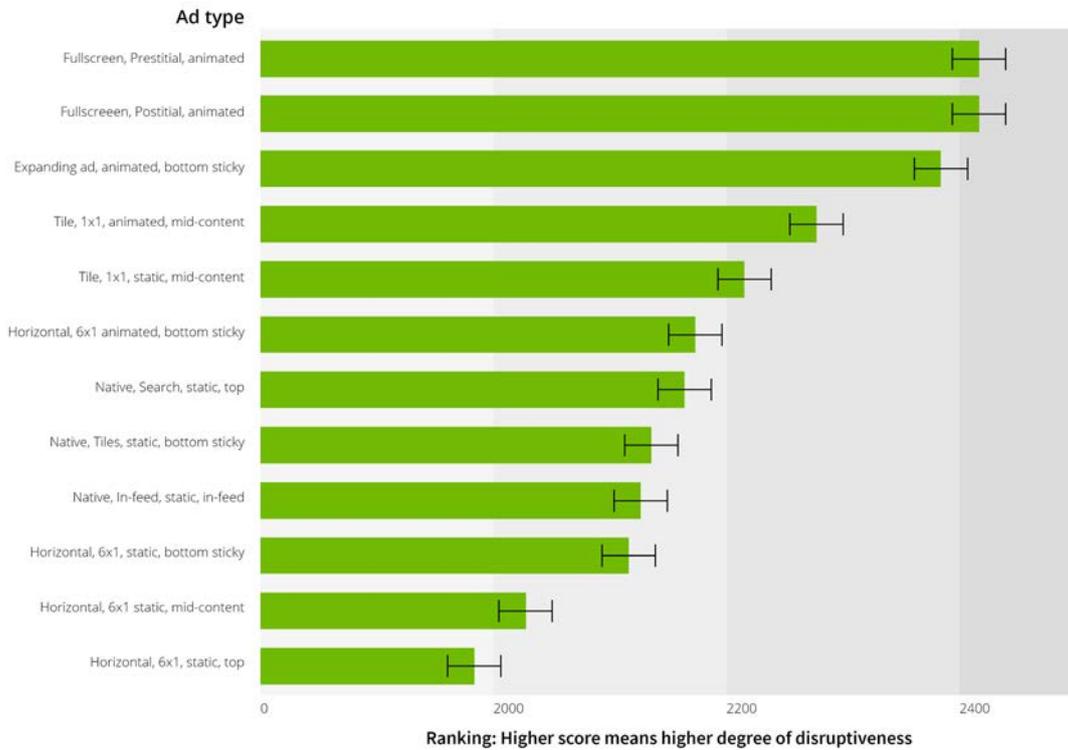
The most famous ranking algorithm is the Elo ranking system, but there are more modern and robust algorithms such as **Glicko**⁴⁵ and Stephenson Ranking, which won the **Deloitte/FIDE Chess Rating challenge**⁴⁶. In all of these metrics, the absolute score is not properly interpretable, but can be used to rank the ad types. A higher rating means that the ad is ranked on average more disruptive in comparison to the ones with a lower rating. It is possible to calculate confidence intervals to test if an ad is significantly more disruptive than another one. It is important to note that conclusions about the absolute level of disruptiveness are not possible based on rankings derived from the pairwise comparison.

In this case, both metrics (share of lost matches and the Stephenson Ranking (see **Figure 7** and **Figure 8**) where the error bars represent 95 percent confidence intervals) of the pairwise comparisons produced almost the same ranking as the individual ratings, which is a strong indication that the participants demonstrated their aversion to certain ad formats consistently throughout the survey, also shown in the next chapter.

⁴⁵ <http://www.glicko.net/glicko/glicko.pdf>

⁴⁶ <http://blog.kaggle.com/2012/03/20/could-world-chess-ratings-be-decided-by-the-stephenson-system/>

Figure 8: Stephenson Ranking Metric - Comparison of ad types



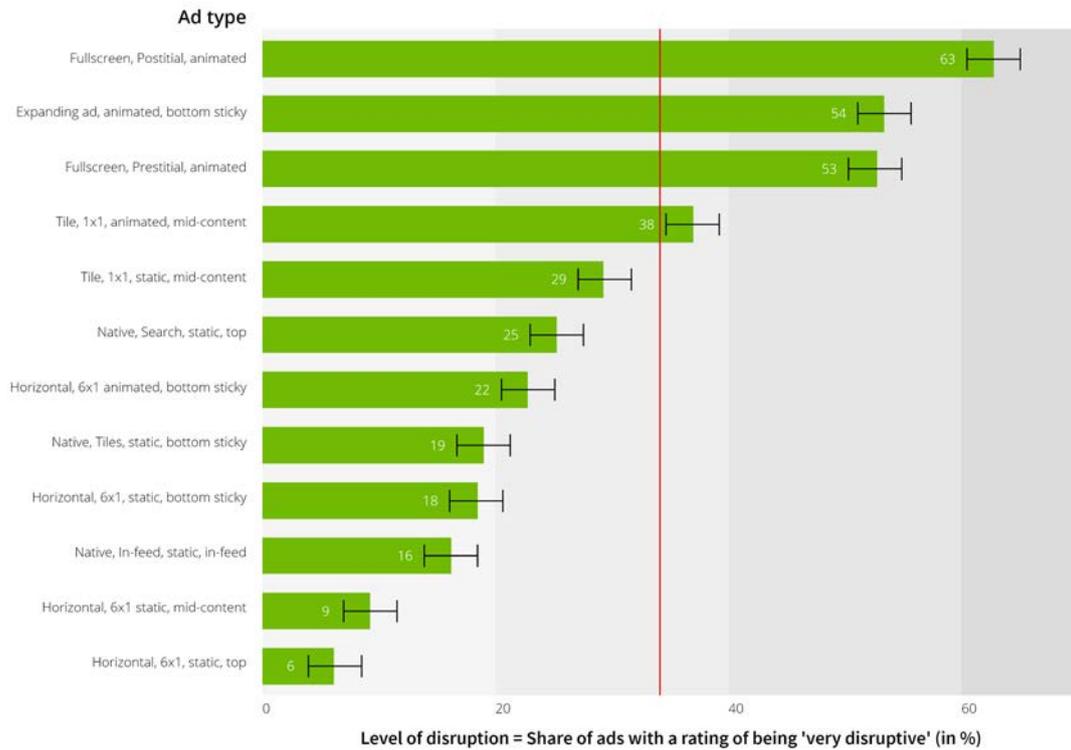
c. Level of disruption

The level of disruption from all selected mobile ad types is presented in Figure 9 below. This is a presentation of the results based on the participants' ratings of the individual ads (see more in Chapter 4.b.a.). The vertical red line is drawn at 35 percent, which is defined in the **Acceptable Ads Committee bylaws**⁴⁷ as the maximum level of accepted disruption. Four out of the 12 ad types fall beyond that threshold.

- A1/B1 Tile, 1x1, animated, mid-content
- A5/B5 Expanding ad, animated, bottom sticky
- A8/B8 Fullscreen, postitial, animated
- A9/B9 Fullscreen, prestitial, animated

⁴⁷ <https://acceptableads.com/pdf/acceptable-ads-committee-bylaws.pdf>

Figure 9: Level of disruption - individual ad types



C. ANALYSIS

To check if the respondents behaved consistently, the participants were split into two cohorts: one with a high general ad aversion and the other with a lower general ad aversion. Ad aversion is measured by the answers given to the question “How participants value different advertising experiences”. Participants belonged to the first cohort if they rated (1) online video advertisements (2) ads in the browser or apps on mobile devices (3) online banner advertisements and (4) sponsored advertisements on social media, on average, as very disruptive.

For both cohorts, we individually calculated the mean rating for the 12 ad types. The mean individual rating of the cohort with an above average ad aversion was 0.88 and the rating of the cohort with a below average ad aversion was 0.23. The difference between both means is significantly different from zero⁴⁸. Thus, it can be concluded that the participants rated the 12 different ad types consistently according to their own general ad aversion.

Additionally, another consistency test was performed by checking whether the individual rating was in line with the comparison rating. As we used two comparison metrics, we compared the resulting ranking of both metrics with the resulting ranking of the individual rating. The following table summarizes the results.

⁴⁸ Welch Two Sample t-test with p-value < 2.2e-16.

Table 3: Ad ranking according to different metrics (bold italic numbers indicate a difference in the ranks between the three metrics)

Ad type	Metric: lost games	Metric: individual	Metric: Stephenson
Horizontal, 6x1, static, above content	1st	1st	1st
Horizontal, 6x1 static, mid-content	2nd	2nd	2nd
Native, In-feed, static, in-feed	<i>3rd</i>	<i>3rd</i>	<i>4th</i>
Horizontal, 6x1, static, bottom sticky	<i>4th</i>	<i>4th</i>	<i>3rd</i>
Native, Suggested Tiles, static, below content	5th	5th	5th
Native, Search, static, top	<i>6th</i>	<i>7th</i>	<i>6th</i>
Horizontal, 6x1 animated, bottom sticky	<i>7th</i>	<i>6th</i>	<i>7th</i>
Tile, 1x1, static, mid-content	8th	8th	8th
Tile, 1x1, animated, mid-content	9th	9th	9th
Expanding ad, animated, bottom sticky	<i>10th</i>	<i>11th</i>	<i>10th</i>
Fullscreen, Postitial, after content	<i>11th</i>	<i>12th</i>	<i>11th</i>
Fullscreen, Prestitial, before content	<i>12th</i>	<i>10th</i>	<i>12th</i>

Table 4: Spearman correlation matrix

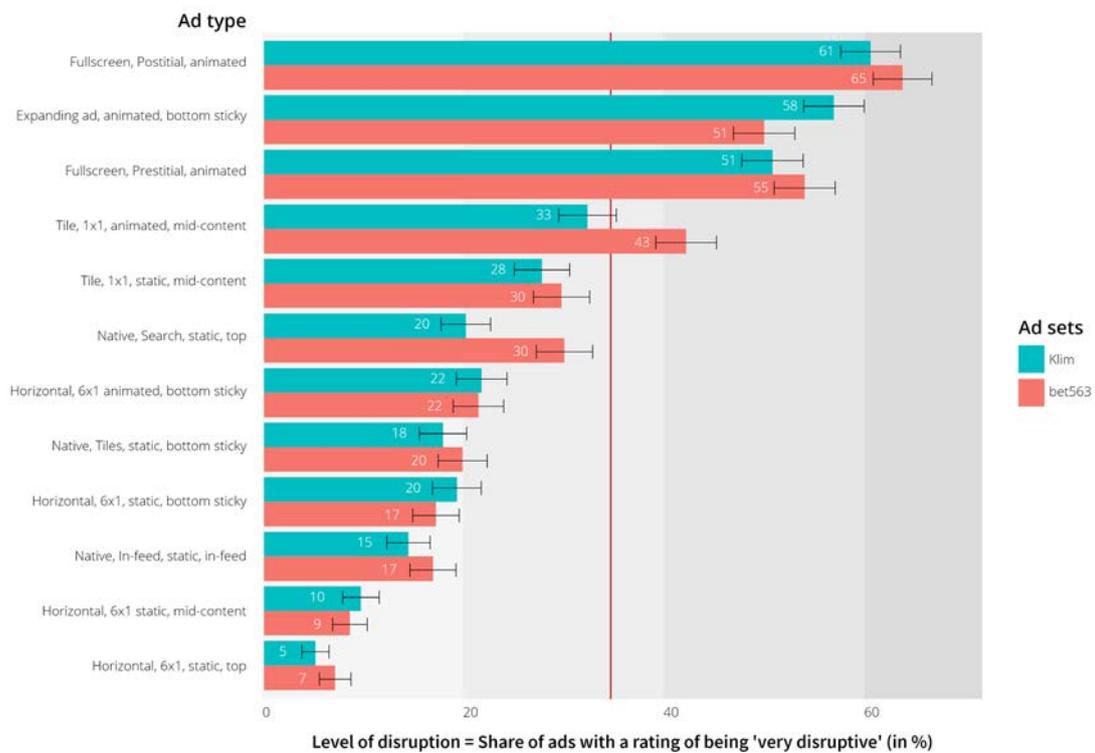
	Metric: lost games	Metric: individual	Metric: Stephenson
Metric: lost games	1.000	0.972	0.993
Metric: individual	0.972	1.000	0.965
Metric: Stephenson	0.993	0.965	1.000

The tables indicate that the ranking of the 12 ad types does not differ much according to the different metrics used. In addition, the Spearman correlation is very high between all three metrics indicating that the three metrics lead to similar rankings. This leads to the conclusion that the participants indeed behaved consistently during the survey, underlining the trustworthiness and reliability of the study.

In addition to testing the consistency, we checked the robustness of the results by investigating if and how the results differed regarding ad set, gender, origin and age.

In general, the overall ranking of the ad types did not differ much between the ad sets, indicating that the rankings were only somewhat affected by the ad set shown. However, there are some differences that can be seen in the graph below.

Figure 10: Individual ad type's ranking grouped by ad sets



As **Figure 10** demonstrates, “Expanding ad, animated, bottom sticky”, “Tile, 1x1, animated, mid-content” and “Native, search, static, top” all have significant differences between ad sets. This leads to the conclusion that the ad content may have affected the rating of these three ad formats⁴⁹. This means that while individual rankings did not always differ greatly, the average difference between the mean rating of “Klim” (0.4) and the mean rating of “bet563” (0.5) is still statistically significant⁵⁰. This implies that the ad content did influence the overall disruptiveness of the shown ads somewhat, particularly in the cases mentioned above, although the participants stated that ad content was not the driving factor for the ad ranking. The reason for this discrepancy stems from the study design, as the participants had to judge different ad types in a single ad set and not between different sets.

Since this study focused on many ad formats, there is no clear indicator of how content affected individual participants. For example, the expanding animated ads and the animated tile ads used extremely similar designs within their respective ad sets, but the contrast of the ads differs greatly between sets, creating the hypothesis that perhaps a higher contrast ad creates more disruption; however, in practice bet563 was rated less as disruptive in the expanding version and more disruptive in the mid-content tile version, suggesting contrast may not be the reason.

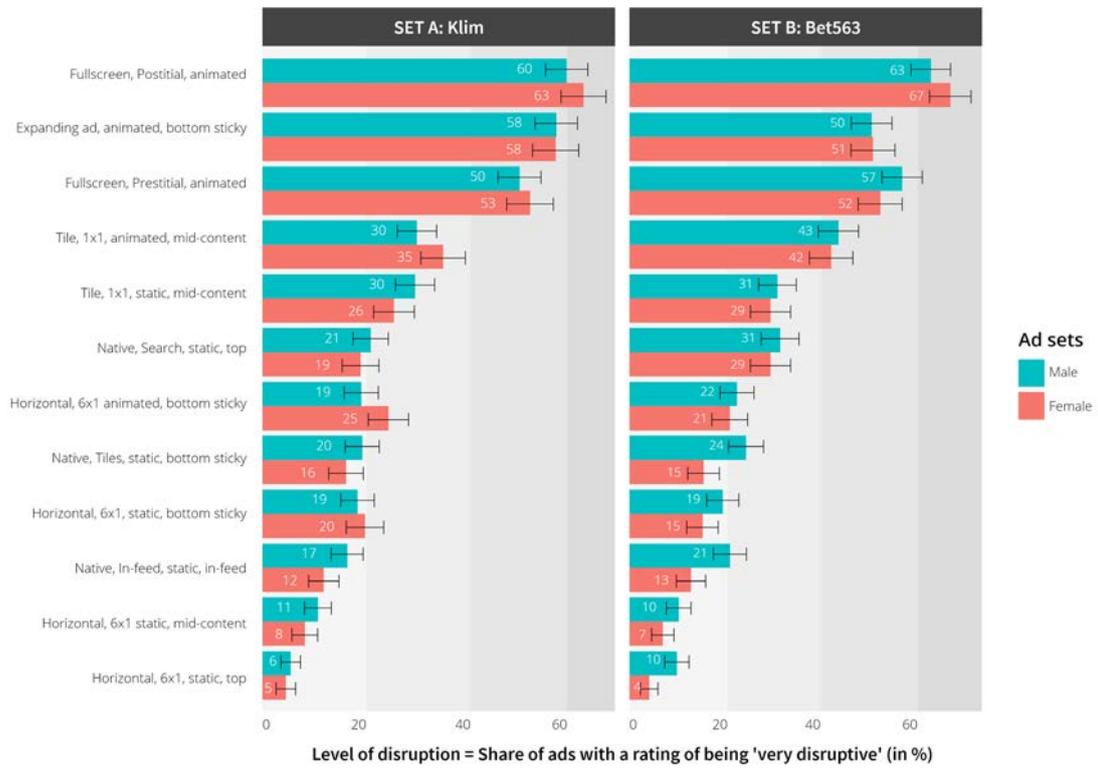
Next, we tested the robustness of the results by controlling for gender. As **Figure 11** shows, there are no significant differences in the ratings of male and female in the Klim ad set. However, in the bet563 ad set, three ad types received significantly different ratings: “Native, suggested tiles, static, below content”, “Native, in-feed, static, in-feed” and “Horizontal, 6x1, static, above content”. In all three ads, men indicated higher disruption levels than women. In addition, we see that men rated ad types as more disruptive than women on average: men’s average rating was 0.5 while women’s average rating was 0.4, which is statistically significant⁵¹. Despite this, overall the relative ranking between the different ad types were generally small, thus we can infer that the ad rankings are mostly independent of gender.

⁴⁹ However, as multiple testing are performed, the results have to be taken with caution as increasing the number of tests increases the number of type 1 errors.

⁵⁰ Welch Two Sample t-test with p-value < 1.862e-06.

⁵¹ Welch Two Sample t-test with p-value = 0.001.

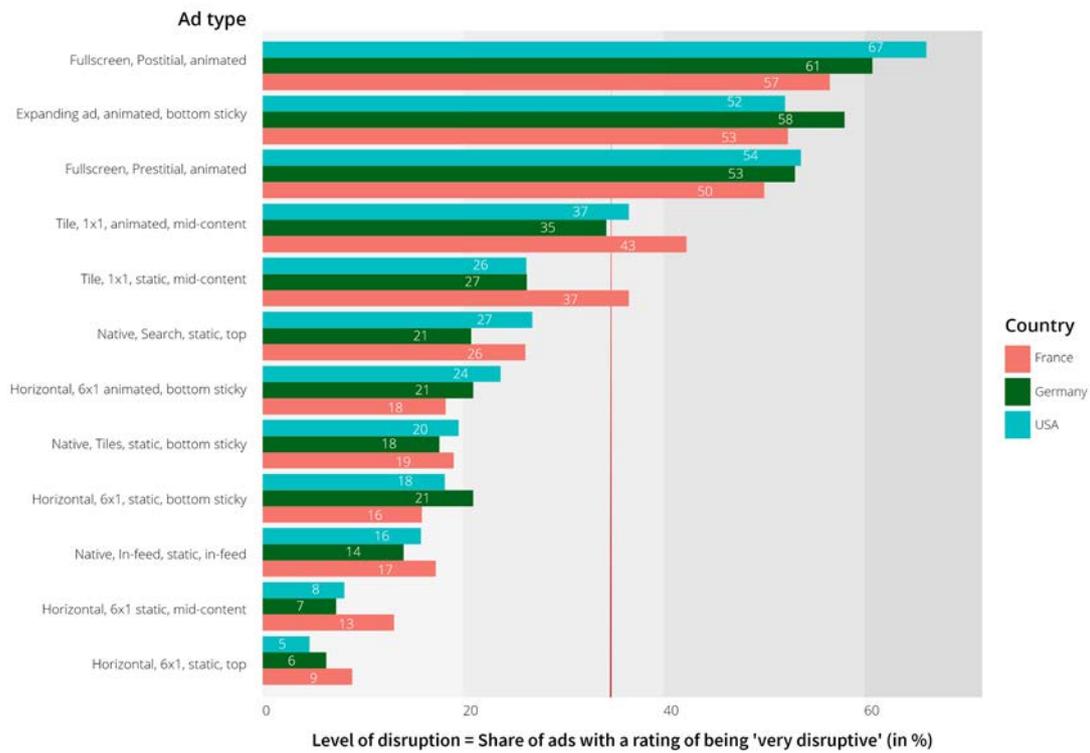
Figure 11: Individual ad type's ranking grouped by ad sets and gender



Additionally, we also checked the robustness of the results by controlling for origin of the participants. Three ad types show statistically significant differences between the genders: “Fullscreen, Postitial, animated”, “Tile, 1x1, animated, mid-content” and “Horizontal, 6x1, static, mid-content”. In general, French participants chose on average a statistically significant⁵² higher disruptiveness rating than American and German participants (see **Figure 12**).

⁵² Welch Two Sample t-test for USA versus France with p-value = 2.228e-06 and Welch Two Sample t-test for Germany versus France with p-value = 2.978e-05.

Figure 12: Individual ad type's ranking grouped by origin



We also checked the robustness of the results by controlling for the age of the participants. However, as only a few participants fell into the age group older than 45, we excluded these in the analysis as, for example, calculating reasonable confidence intervals was no longer possible. We can see that the older the participant, the higher the ad aversion. The mean rating of the different age groups is listed below.

Table 5: Average ranking by age

Age Group ⁵³	Metric: individual
18 to 24	0.41
25 to 34	0.46
35 to 44	0.51

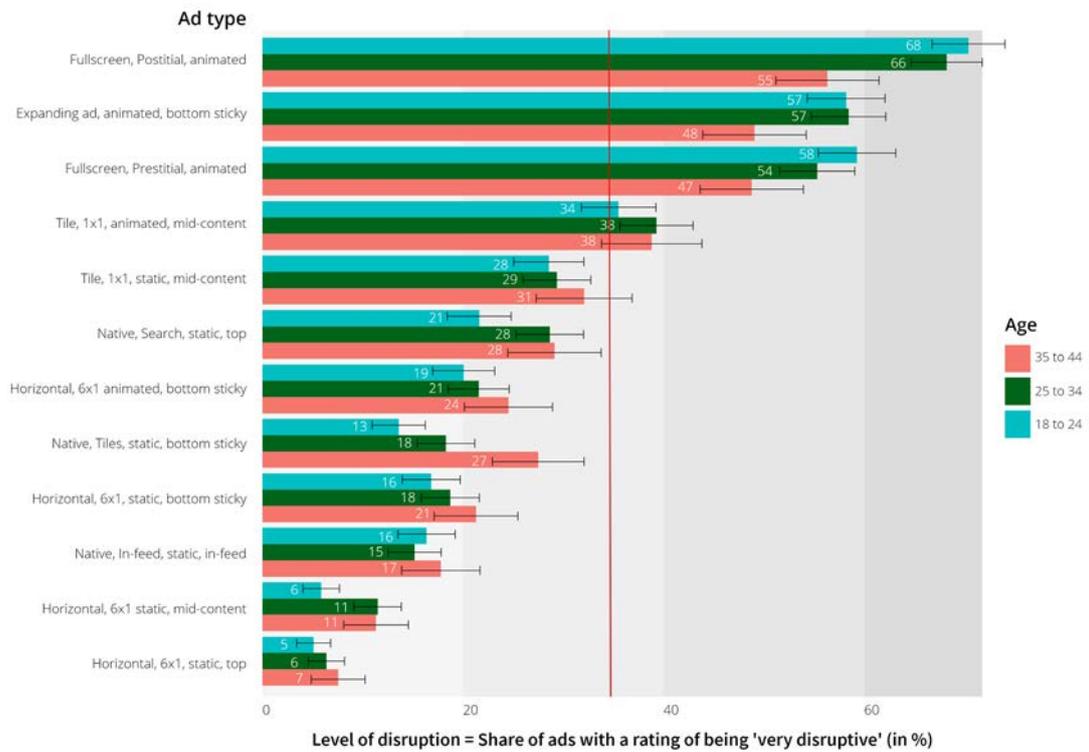
The differences between mean ratings across age groups are all statistically significant⁵⁴. From the graph below, one can see that, in general, the ranking was not influenced by age. However, the perception of some ads differed across the age groups. Participants from younger generations perceived three of the four most annoying animated ads as more disruptive than participants from older generations.

⁵³ Exclude higher age groups as these groups contain only a few participants. See demographics section.

⁵⁴ Welch Two Sample t-test for "18 to 24" versus "25 to 34" with p-value = 0.0266; Welch Two Sample t-test for "18 to 24" versus "35 to 44" with p-value = 0.0001; Welch Two Sample t-test for "18 to 24" versus "25 to 34" with p-value = 0.05.

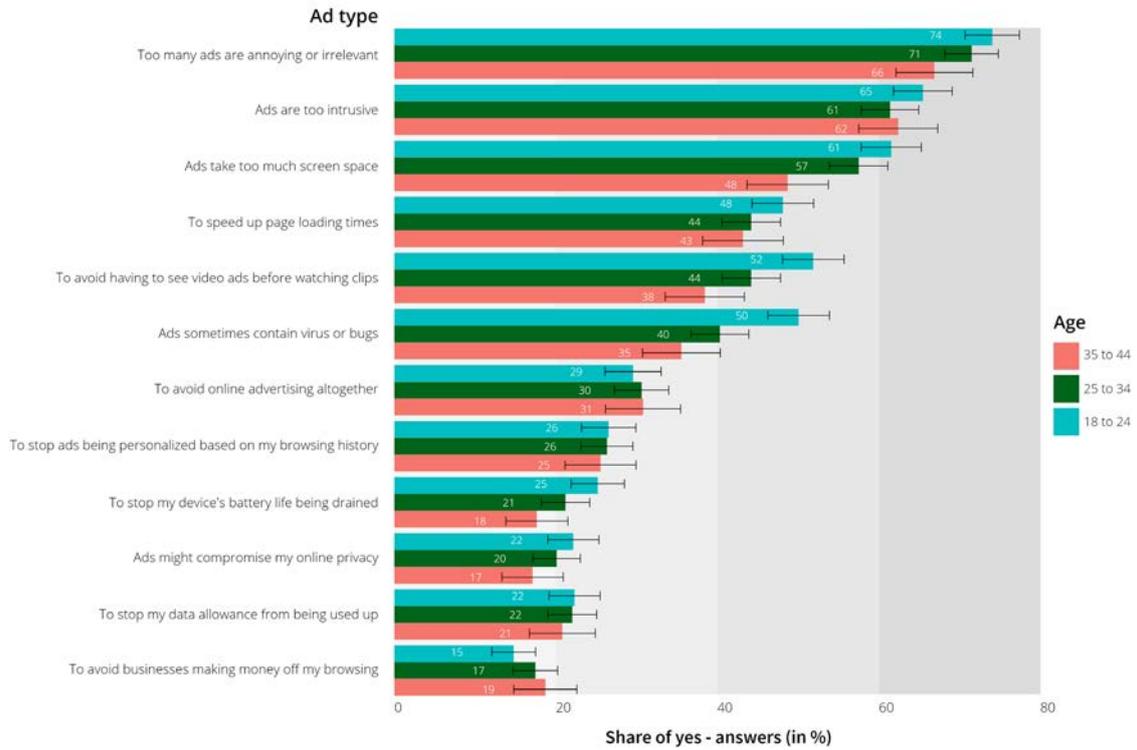
There is no significant statistical difference between the levels of disruption of most smaller and native ads. In contrast to older participants, younger participants find ads that take up a smaller amount of the screen less disruptive than the older generation. However, ads that take up a bigger amount of the screen are more disruptive for the younger generation than for the older (see **Figure 13**).

Figure 13: Individual ad type's ranking grouped by age



The difference in perception of ads can be also found in the given answers regarding why participants use an ad blocker (see **Figure 14**).

Figure 14: Reasons for using an ad blocker grouped by age



Statistically significant differences can be found between the “18 to 24” group and the “35 to 44” group for the answers: “Ads take up too much screen space”, “To avoid having to see video ads before watching clips” and “Ads sometimes contain virus or bugs”. This explains why younger participants rated larger ads as more disruptive than older participants. In addition, it seems that the younger generation was more aware of virus contamination by ads. Also, it appears that the younger generation had a higher awareness of ad blockers being used to prevent video advertisements before watching a clip.

The results indicated that static ads, smaller animation ads and search result ads are clearly not seen as very disruptive ad formats. However, large ads, animated ads, ads that are both large and animated, and screen-filling ads were overwhelmingly rated as very disruptive by the participants.

6. LIMITATIONS & FURTHER RESEARCH

While the study reached its goals, there were a few unavoidable limitations.

First, ideally the study would encompass more countries, distributed across all continents. This would provide a more thorough and global perspective on the level of disruption when it comes to online advertising experiences on mobile devices.

Second, one could argue that the 12 selected ad types are an incomplete set of advertisements. As with most studies, the scope of the study needed to be practical. Naturally, the amount of different ad experiences to test can be practically infinite when you account for variations of color usage, content, language, labeling, size, placements, space, fonts, contrast, page-load times etc. By selecting ad types which are part of a widely-used industry standard, and increasing the scope by accounting for variables such as placement and animation, we are confident the findings of this study are valid.

Third, it can be argued that the content of the two ad sets are not “neutral.” It is safe to assume that some of the respondents would have some kind of bias (positive or negative) against either milk or drinks in general, or gambling and sports.

Fourth, since we only tested one fairly standard animation, we cannot exclude the possibility that our particular animation was not perceived as very disruptive compared to other possibilities, which also would support that the Coalition for Better Ads only classifies **z**⁵⁵ as disruptive. This suggests exploring alternative types of animation in future studies would glean valuable information when judging online ad types.

Finally, there is no control group in this study to compare the ad-blocking audience with. While the study does gain some unique insight into why this audience may find some ad types more or less disruptive, it does not provide insight into whether they find the ads more or less disruptive than other groups. This could also be remedied with a repeat performance of the study considering different audiences.

Based on the limitations outlined above, it is recommended to further explore the impact of different variables (e.g. the content of ads, animations) within ad types. Further expanding on the existing (but limited) research on online advertising formats could heavily benefit stakeholders in the industry.

⁵⁵ <https://www.betterads.org/mobile-flashing-animated-ad/>

7. CONCLUSIONS

The goal of this study was to investigate how ad-blocking users' perception of mobile advertisement varies across different ad types. Moreover, we were interested if there would be some differences in the results for mobile ads in contrast to older studies focusing on desktop ads.

When focusing on the ratings of the ad types, our hypothesis is verified. Among all cohorts we can see similar rankings of the disruptiveness, though some demographic groups react stronger to certain ad types than others. When applying the rated ad types to the presented framework, four ad types could be classified as too disruptive (>35 percent).

- A1/B1: "Tile", 1x1, animated, mid-content
- A5/B5: "Expanding" ad, animated, bottom sticky
- A8/B8: "Fullscreen", postitial, animated, after content
- A9/B9: "Fullscreen", prestitial, animated, before content

These findings are largely in line with a Coalition for Better Ads [study](#)⁵⁶ and their [standards](#)⁵⁷.

In addition, large animated ads such as the expanding ad and the animated 1x1 tile ad in the middle of the content also fall above the 35-percent-threshold. This also aligns with the standards of the Coalition for Better Ads, although it should be noted that their definition of large animated ads is not binary, i.e. they use different levels of [animations](#)⁵⁸.

Considering the same framework mentioned above, eight ad types would not be classified as too disruptive (<35 percent) by the respondents:

- A2/B2: "Tile", 1x1, static, mid-content
- A3/B3: "Horizontal", 6x1, static, bottom sticky
- A4/B4: "Horizontal", 6x1 animated, bottom sticky
- A6/B6: "Horizontal", 6x1, static, above content
- A7/B7: "Native", Suggested Tiles, static, below content
- A10/B10: "Native", Search, static, top
- A11/B11: "Horizontal", 6x1 static, mid-content
- A12/B12: "Native", In-feed, static, in-feed

In the case of the three 'native' ads (search, tiles and feed), the findings are unsurprising in the sense that they align with findings from the [IPSOS study](#)⁵⁹ focusing on desktop experiences. Similar to desktop, these ad types are all static, and usually blend in relatively well in the design, leading to less disruption for users. In addition, they are clearly labeled as ads, making them distinguishable from the [main content](#)⁶⁰ of the website.

⁵⁶ <https://www.betterads.org/research/#mae>

⁵⁷ <https://www.betterads.org/standards/>

⁵⁸ <https://www.betterads.org/mobile-flashing-animated-ad/>

⁵⁹ <https://adblockplus.org/blog/global-research-study-of-ad-formats-confirms-what-you-already-knew-disruptive-ads-don-t-work>

⁶⁰ <https://developer.mozilla.org/en-US/docs/Web/HTML/Element/main>

Of the ad types that fall below the level of disruption of 35 percent, two findings stand out in contrast to the existing **Acceptable Ads criteria**⁶¹, as well as the IPSOS study:

First, two mid-content ad types (A2/B2 and A11/B11) that disrupted the reading flow were not considered to be very disruptive by many respondents. When assuming that ads that are located within the content are more disruptive than ads located above or below the content, one could perceive these findings as somewhat contradictory considering that 66 percent of the respondents indicated that the “ad placement” is the first or second most important factor when judging ad types. Alternatively, one could draw a contrasting conclusion by noting that the participating respondents may not mind ads in the content as much, as long as the ad format is not too disruptive. Another possible explanation is that mobile users have become especially prone to **banner blindness**⁶², as is supported by the fact that small banner (horizontal 6x1) ads were typically ranked as less disruptive than other ads, with the static non-sticky banners being the two least disruptive ad types overall. That the static mid-content tile ad (A2/B2) fell below the 35-percent-threshold suggests that banner blindness on mobile may now include larger common static ad types such as the tiles. This could be due to the fact that users are able to scroll past these static tiles fairly quickly, regardless of placement, and have become accustomed to doing so.

Second, most participants did not find the the animated version of the small banner (horizontal, 6x1, animated, bottom sticky) very disruptive. This contrasts existing desktop standards, which suggest all animated ads are unacceptably disruptive. In this ad type, size, animation and placement all come into play. As can be inferred by the low disruptive ranking of other small banner ads, the relative small size of this particular ad format (6x1) has some influence on its lower ranking. This is supported by the fact that 76 percent of the respondents indicated that the size of the ad was the first or second most important factor in their answers. Overall, the data suggests that both animation and placement (sticky vs static) have negative influences on rankings in the case of banners, while the small size of the banners, as well as their ubiquity, is a benefit.

In conclusion, very disruptive ad types are disliked both on desktop and mobile, whereas native ads are largely considered to be nonintrusive. In addition, ad-blocking users did not seem to classify all animated ads and some in-content placed ads as very disruptive on mobile.

The findings of this study present a representative overview of the perceptions of ad-blocking users regarding selected ad types on their mobile browser. We hope that this contribution to the literature will enable others to further research the impact of online advertising on ad-blocking users.

⁶¹ <https://acceptableads.com/en/about/criteria> (2018-03-25)

⁶² <http://journals.sagepub.com/doi/abs/10.1177/154193129804200504>

APPENDIX

Appendix A: Survey questions

All survey questions, answers, and ad text, along with translations available [here](#)⁶³.

Appendix A: Survey questions

What country are you based in?

United States

United Kingdom

Germany

France

Mexico

Brazil

Russia

India

Spain

Japan

China

Hong Kong

South Korea

Indonesia

Australia

New Zealand

Italy

Poland

Other, please specify

What is your age?

Under 18

18 to 24

25 to 34

35 to 44

45 to 55

55 to 64

65 or over

What is your gender?

Male

Female

Prefer not to say.

⁶³ <https://docs.google.com/spreadsheets/d/1PNElue0eyjHsgwTXj9ZudPu1npyh2BuKdYuROzf9b-M/edit#gid=381318829>

What kinds of technologies do you currently own or use? (Select all that apply)

- Home assistant (Google Home, Amazon Echo, etc.)
- Smart watch (Apple Watch, Pebble, etc.)
- Ad blocking software (Adblock Plus, AdBlock, uBlock Origin, etc.)
- VPN (virtual private network)
- Streaming TV service (Netflix, Hulu, etc.)
- Mobile phone with internet access (iPhone, Galaxy, etc.)

What type of mobile device do you own?

- Android (Galaxy, HTC)
- iOS (iPhone)
- Windows phone (Lumia)
- Other

SURVEY QUESTIONS

SECTION 1: BASELINE

Please think of all the different forms of advertising you encounter in your daily life and rank how disruptive you find each advertising type.

Rating choices:

- Not disruptive at all
- Somewhat undisruptive
- Neutral
- Somewhat disruptive
- Very disruptive

Advertising forms:

- Direct mail ads or promotions (mailers, 'junk mail', credit card offers)
- Email advertisements (promotional or sale announcements)
- Online banner advertisements
- Online video advertisements
- Sponsored advertisements on social media
- Television commercials
- Ads in newspapers or magazines
- Ads in the browser or app on mobile devices

SECTION 2: INDIVIDUAL RATINGS

Please rate each mobile ad type.

SECTION 3: COMPARISON RATINGS

In this next section, you will see two websites one after the other, each with an advertisement. You will then be asked to select which ad you find most disruptive, or if they are equally disruptive.

Which advertisement is more disruptive?

Advertisement A is much more disruptive

Advertisement A is slightly more disruptive
Both advertisements are equally disruptive
Advertisement B is slightly more disruptive
Advertisement B is much more disruptive

SECTION 4: CONTEXT

Which of the following do you think had the most influence on your ratings during this survey?

Ad size
Ad placement
Ad animation
Ad content
Other (please specify)

Why do you use an ad blocker? (Select all that apply)

Ads are too intrusive.
Ads might compromise my online privacy.
Ads sometimes contain viruses or bugs.
Ads take up too much screen space.
Too many ads are annoying or irrelevant.
To speed up page loading times.
To avoid having to see video ads before watching clips/shows.
To avoid businesses making money off my browsing.
To avoid online advertising altogether.
To stop ads being personalized based on my browsing history.
To stop my data allowance from being used up.
To stop my device's battery life being drained.
Other (please specify)
I don't use an ad blocker anymore.
I don't know.

Appendix B: Additional Figures

Figure 15: Age distribution of the participants

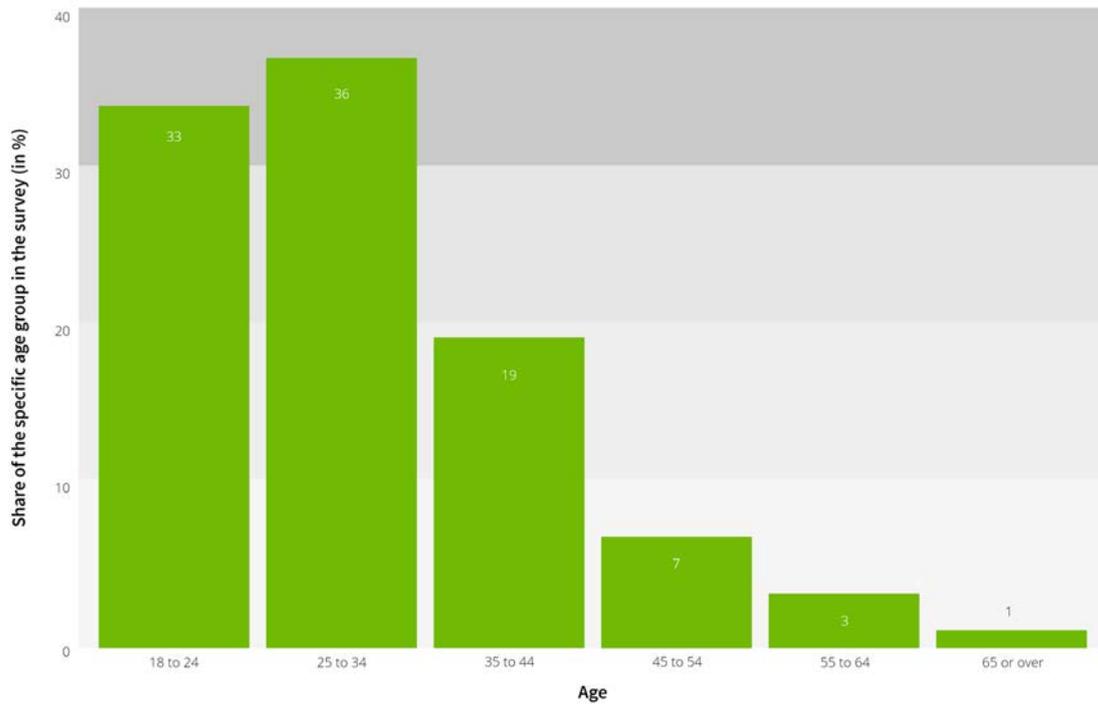


Figure 16: Gender distribution of the participants

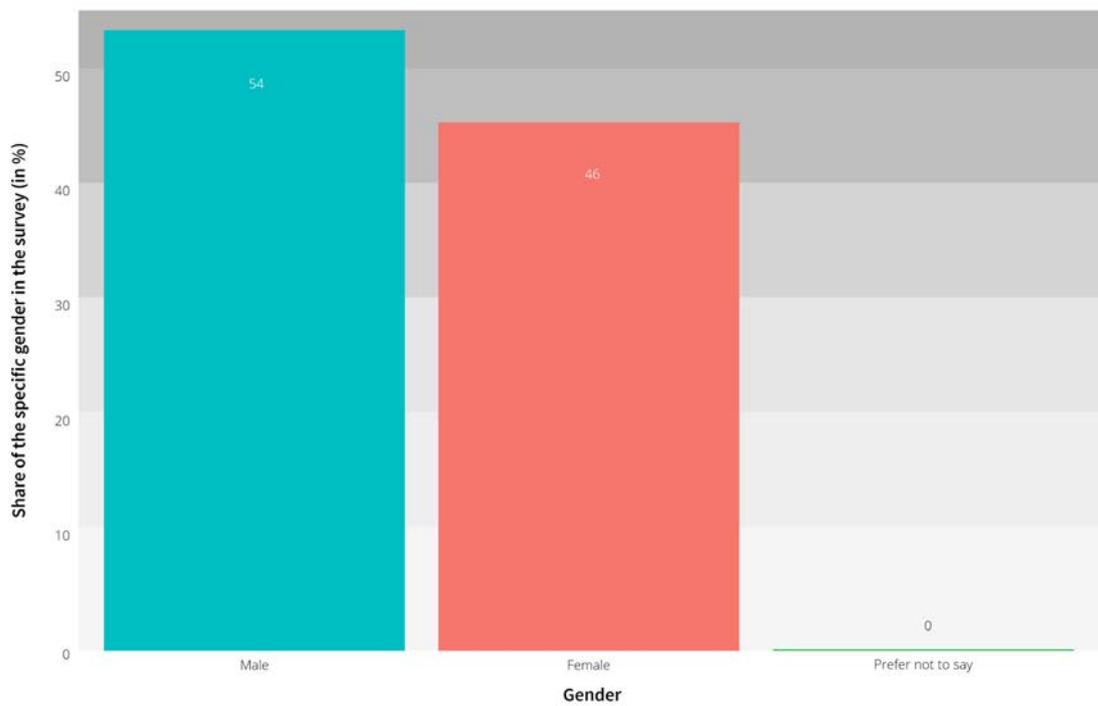


Figure 17: Use of technologies distribution of the participants, by country

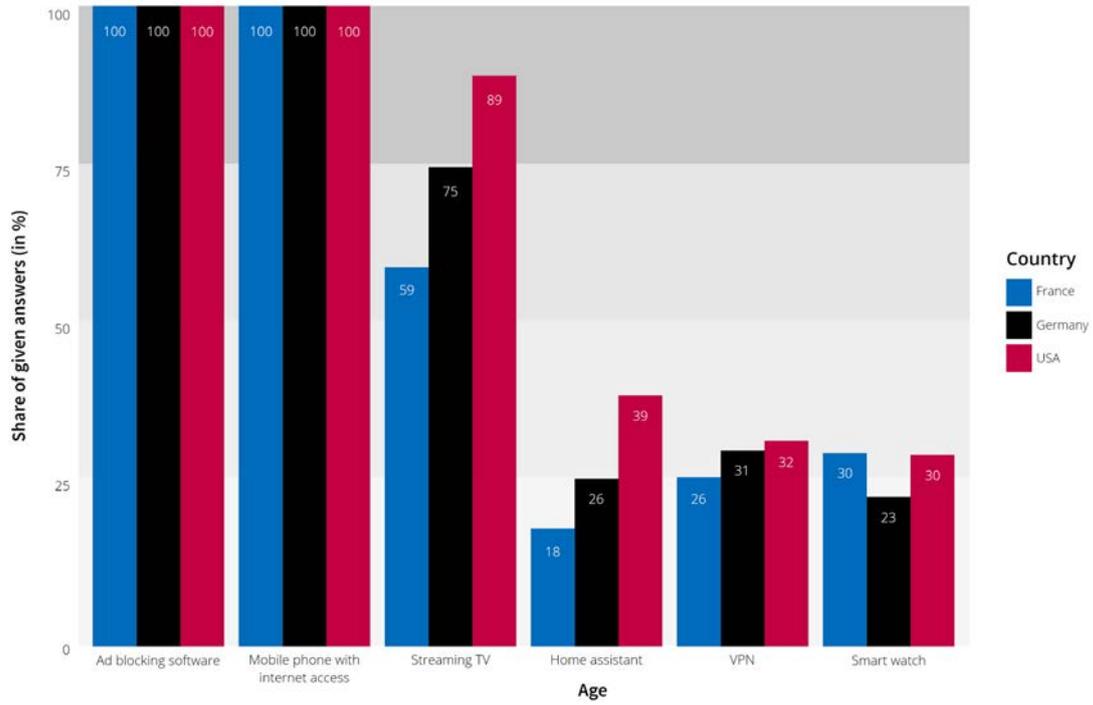


Figure 18: Mobile device usage distribution of the participants, by country

