

MEET THE BLOCKERS:
A QUANTITATIVE ANALYSIS OF AD BLOCKER USAGE

by

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ABSTRACT

This study seeks to ascertain whether or not previous research on ad annoyance and ad avoidance in traditional media can be applied to ad blocker usage. Although there is extensive research on the negative reactions people have to advertising, viewer annoyance with advertising and viewer avoidance of advertising, scholarly research on ad blocking is quite limited. The researcher explored 3 hypotheses: (H1) Ad blocker use will be highest among younger people, males, and people on the higher end of the socioeconomic spectrum; (H2) greater frequency of Internet use will be positively correlated to ad blocker usage; (H3) people who report a higher level of annoyance with Internet advertising will be more likely to use ad blockers. Using a multiple regression analysis of a sample of Internet users from the United States and the United Kingdom ($N = 3997$) support for the hypotheses was mixed, suggesting that some, but not all, of what ad annoyance and avoidance research, as well as what logic would suggest, is readily applicable to ad blocking.

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INTRODUCTION

Each person has a unique relationship with advertising. Sometimes, people view advertisements as roadblocks to be bypassed as quickly as possible; other times, people enjoy advertising, even going as far as to seek it out. This type of active engagement with advertising can be observed when people turn to YouTube to see Super Bowl commercials before or after they air live. Additionally, magazines are sometimes purchased because the reader enjoys the ads; there are also movie-goers who make sure to arrive to the theater early enough to see the trailers. While in these cases and others people enjoy ads for their intrinsic entertainment or informative value, the primary purpose for advertising has traditionally been to either supplement or completely cover the cost of the media audiences consume. In the words of Noam Chomsky (1997):

Take the *New York Times*. It's a corporation and sells a product. The product is audiences. They don't make money when you buy the newspaper. They are happy to put it on the worldwide web for free. ... You have to sell a product to a market, and the market is, of course, advertisers (that is, other businesses). Whether it is television or newspapers, or whatever, they are selling audiences. Corporations sell audiences to other corporations.

As Chomsky said, publishers such as the *Times* make money from advertising, so that they can offer their content to audiences for free. This formula of using advertising to cover the costs of "free" media also worked well with some newspapers and network television. Internet advertising initially seemed to offer both website publishers and audiences the same symbiosis; audiences received the content they enjoyed for free, and

websites attempted to use advertising to monetize, with varying degrees of success. However, web browser extensions known as *ad blockers* now allow Internet users to prevent advertising content in a web page from loading. Once an ad blocker is enabled, almost all websites appear completely free from advertising to the Internet user.

Ad blocker usage has increased steadily since the numbers began to be tracked in 2010; in January of that year, 21 million people reported being active users, a number which increased to 181 million by January of 2015 (Pagefair & Adobe, 2015). This led to more industry and academic studies, though ad blocking and its determinants are not yet among the most researched topics in the study of advertising. That said, the following areas of research may aid in understanding the types of people who choose to use ad blockers, and what factors lead to that decision. First, research on perception of advertising; this literature focuses on the unique characteristics of media consumers and the advertisements themselves that contribute to annoyance with advertising, and the resulting “ad avoidance” (Speck and Elliott, 1997, pg. 61). Second, the impact of technological advancements such as the remote control and Digital Video Recorder, or DVR, which made ad avoidance increasingly easy in the medium of television.

Once the Internet developed into a viable medium for advertising, online advertising began to receive attention from researchers. Despite early optimism about the Internet’s advertising potential, a slew of problems such as banner blindness, spam emails, and pop-up ads prompted research on Internet ad annoyance and avoidance, which generally found that Internet advertising led to high levels of ad annoyance and ad avoidance compared to other media (Benway, 1999; Edwards, Li, and Lee, 2002; Baek and Morimoto, 2012). However, *ad blocking* has not yet garnered a

significant body of research, leaving those interested in the topic with many unanswered questions.

As ad blocking continues to grow in popularity and influence, research on the topic, and on the people who use ad blockers, will no doubt begin in earnest. The question which needs to be addressed is whether the knowledge already gained from research on consumer perceptions of advertising and on advertising avoidance can be applied to the study of the new and unique phenomenon of ad blocking. After reviewing the literature on perceptions of advertising, ad avoidance, and the limited research on ad blocking itself, the researcher developed hypotheses and analyzed survey data to test for relationships between ad blocker usage and demographics, frequency of Internet use, and reported levels of general ad annoyance.

LITERATURE REVIEW

Ad Annoyance

There is evidence that people are generally not opposed to the institution of advertising. For their influential 1968 report *Advertising in America: The Consumer View*, Bauer and Greyser analyzed interviews from a sample of 1,846 consumers to gauge, among other things, the feelings of the American public towards advertising. Among their key findings was that Americans generally approved of the role advertising played in society; 78 percent of those interviewed felt that advertising was essential, 71 percent felt that advertising raises our standard of living, and 73 percent felt that advertising results in better products for the public (pg. 159). For example, researchers observed similarly positive attitudes toward the institution of advertising in more recent studies as well; between 1960 and 1978, students enrolled in introductory advertising

courses at the Universities of Illinois at Urbana-Champaign, Iowa, and Georgia rated advertising more favorably as an institution than they rated state government, religion, and labor unions (Sandage and Leckenby, 1980), though some bias may be reflected in these results due to the sample being comprised of advertising students.

Despite this evidence that people understand the necessity for advertising in the abstract and appreciate how it benefits them, studies have shown that ads observed in everyday life tend to be perceived in a negative manner. Speck and Elliott (1997) defined ads as “noise” in a medium’s environment, with noise defined as “all communication elements that affect the availability, cost or value of desired content” (pg. 65). Thinking of advertising as “noise” in a medium helps to explain the fact that audiences often have negative perceptions of advertising when they encounter it, regardless of the content of the ads themselves. For example, Cronin and Menelly (1992) conducted an experiment which found that 89 percent of the time, subjects chose to avoid commercials before seeing their content for more than five seconds, as opposed to avoiding with “discrimination,” meaning on the basis of the ad’s characteristics (pg. 3). In a similar experiment, Van Meurs (1998) found that television ad characteristics did not seem to influence participants’ decision to switch channels or not, suggesting once again that people may not want to view advertising regardless of its content.

Despite the evidence that people often avoid ads regardless of their content, studies found that some characteristics of ads prompt negative reactions. For example, even product category alone seems to influence attitudes towards an ad. Bauer and Greyser (1968) determined that print ads for liquor and motion pictures were most likely to be categorized as offensive at the time of the study. Respondents considered

underwear, cigarette, and beer advertising offensive as well, but to a lesser extent. Advertising for soaps and detergents, dental supplies, mouthwashes, deodorants, medicine and remedies, shaving goods and lotions, cleaners and polishes, and hair dressings fell into the category of “annoying” (pg. 305). In a similar study, Aaker and Bruzzone (1985) found that simply being a non-user of a product category caused audiences to score on average about 9 percentage points higher on the study’s measure of irritation.

In addition to product category, the tactics advertisers use can influence audience attitudes toward ads. Intrusive ads, such as “television commercials during an exciting scene in a program or an airplane dragging a sign over a beach on a sunny day,” are cited as a cause of ad annoyance by Li, Edwards, and Lee (2002, pg. 37). The researchers established a scale to determine “ad intrusiveness,” the degree to which ads interrupt the goals of viewers. This scale asked viewers to rate the ads according to whether or not they found them “*distracting, disturbing, forced, interfering, intrusive, invasive, and/or obtrusive*” (pg. 42).

Though advertisers may like intrusive tactics for the obvious reason that they garner people’s attention, these types of ads tend to elicit negative responses.¹ Similarly to Li et al (2020)’s study of intrusiveness, the previously mentioned Aaker and Bruzzone (1985) study analyzed questionnaire data to discover determinants of “irritation,” or

¹ Intrusiveness in cases like these is sometimes caused less by the content of the ad itself and more by the time and place of its presentation; while there is a distinction between these two things and either can be the cause of annoyance independently of the other, they work together to build up annoyance in the viewers and are therefore discussed together in many studies of audience perceptions of advertising (Bauer and Greyser, 1986; Aaker and Bruzzone 1985; Li et al, 2002).

“displeasure and momentary impatience” (pg. 48). They found that ads perceived as informative were considered less irritating, along with ads featuring a general positivity (e.g. words like “love” and “light,” happy story lines). Irritation level tended to be higher when ads presented situations participants thought were “phony” or unbelievable, situations in which important relationships appeared to be threatened, or situations of general discomfort, though they did find evidence that irritation was concentrated on a “relatively small proportion of commercials” (pg. 49).

The research discussed so far illustrates that audience attitudes toward ads can be influenced by the fact that an ad is present at all, the product category of an ad, or a perception that an ad is intrusive and/or irritating. Additionally, research shows that consumers feel different about advertising based on the medium in which it is present. Speck and Elliott (1997) conducted a national survey on ad avoidance which yielded several insights on avoidance differences between media; viewers avoided television ads more than those in any other medium, they avoided magazine ads more than either newspaper or radio ads, and people who sampled a wide breadth of media seemed more likely to avoid ads. Avoiding ads also appears to be a behavior that is consistent for consumers as they move between various media. Bellamy and Walker (1996) found that avoiding television commercials is associated with avoiding ads in print media, i.e. magazines and newspapers. Heeter and Greenberg (1985) found that people who avoid television commercials also tended to avoid radio commercials by changing the channel during commercial breaks, turning down the volume or other means of avoidance.

Ad Avoidance

Literature on ad avoidance in traditional media may provide some understanding of Internet users' desire to block ads. Speck and Elliott's 1997 study provided the groundwork for much of the research on ad avoidance that would follow. They used a national survey of 946 adults to examine the predictors of ad avoidance in magazines, newspapers, radio, and television. They found that advertising avoidance can be achieved through three strategies: cognitive, behavioral and mechanical (pg. 61-62). Television commercials, for example, can be ignored (cognitive), viewers can leave the room (behavioral), or the channel can be changed during commercials (mechanical). Radio commercials can be ignored (cognitive), or avoided by switching stations (behavioral and mechanical). The researchers also noted the "background" nature of radio; in other words, people performed other activities while the radio was on, making it easier to ignore (pg. 62). Newspaper ads can be ignored (cognitive), or readers can turn the page or set aside an advertising section (behavioral). Magazine ads can be ignored (cognitive), the page can be turned, or a promotional insert can be discarded (behavioral).

While research on ad avoidance in print media and radio exists, the majority of ad avoidance literature focuses on television, probably because a significant portion of the money spent in advertising is still devoted to the medium. As mentioned previously, Speck and Elliott (1997) observed that television ads were considered more "offensive and annoying" (pg. 65) than ads in other media, and therefore seemed to be avoided more. Much of the concern about TV ad avoidance focused on zapping (changing the channel or leaving the room) and zipping (fast-forwarding through commercials), as ad avoidance studies primarily examined these two strategies. These two forms of

mechanical avoidance provide easier and more effective advertising avoidance than was possible for consumers of previous media. The same factors that lead to annoyance seem to predict zapping, such as previous exposure to a commercial (Siddarth and Chattopadhyay, 1998), perceived intrusiveness (Abernethy, 1991; Clancey, 1994), and lack of informative and/or entertainment value in the ad (Woltman Elpers, Wedel, & Pieters, 2003).

The first instances of zipping were facilitated by VCRs, the first tool that allowed people to watch recorded programs and fast-forward through the commercials. Stout and Burda (1989) found that exposures to ads that were zipped via VCR were much less effective than non-zipped ad exposures in producing brand name recall, product recall, and brand name recognition among a sample of undergraduates (pg. 30). While zipping began with VCRs, Digital Video Recorders, or *DVRs*, took TV ad avoidance to yet another level of convenience. Pearson and Barwise (2006) found in their ethnographic study of 22 individuals in eight households that DVR users zipped 68 percent of commercials in recorded programming. Google and DISH Network collected anonymous second-by-second data of live TV viewer behavior, finding that as many as 70 percent of the ads in recorded programming appear to be zipped (Zigmond et al, 2009).

While zapping and zipping have garnered much TV ad avoidance literature, it is important to note that there are observations of high rates of avoidance via other means. For example, Krugman, Cameron, and White's (1995) in-home observation found that subjects avoided watching the screen 67 percent of the time during commercial breaks. Tse and Lee (2001) called TV viewers after commercial breaks, finding that 81 percent avoided those ads in some manner, including engaging in conversation.

Demographics

As previously stated, research shows that ad characteristics, attitude towards advertising, and personal characteristics influence consumer relationships with ads and advertising. Demographic characteristics, however, are a mixed bag in terms of their correlation to ad annoyance and avoidance, though the following studies illustrate that ad annoyance and avoidance tend to be correlated to being younger, more affluent, and male, especially when magazines (a somewhat idiosyncratic medium) are taken out of consideration.

Younger people seem more likely to zap TV and radio ads (Danaher 1995; Heeter and Greenberg 1985; Krugman et al, 1995; Zufryden, Pedrick, and Sankaralingam 1993); suggested reasons for this include less planned viewing or listening in younger audiences, as well as greater familiarity with zapping technologies from a younger age (Heeter and Greenberg, 1985, pg. 15-16). Younger people may also exhibit higher zapping because they are more strongly opinionated; Aaker and Bruzzone (1985) found that people under the age of 40 exhibited stronger opinions about a selection of ads, and that younger people tended to be more irritated by certain product categories. Older respondents seem more likely to avoid print advertising, but less likely to avoid broadcast media, i.e. tv and radio (Magazine Publishers of America, 1991; Speck and Elliott, 1997).

Moving from age to socioeconomic indicators, the literature suggests that higher socioeconomic indicators (education, employment and income) tend to correlate with ad annoyance and avoidance. Speck and Elliott (1997) suggest that this may be because affluent individuals have more access to a wide variety of media and therefore are more accustomed to avoiding ads in search of the content they are seeking. Speck and Elliott

(1997) also suggest that affluent audiences “can better afford electronic devices that facilitate ad avoidance,” (pg. 73). Television zappers tend to be more affluent (Danaher 1995; Heeter and Greenberg 1985; Krugman et al, 1995; Zufryden et al, 1993), as well as those who avoid TV ads by means other than zapping (Clancey 1994). Higher socioeconomic segments also tended to be the most irritated by ads (Aaker and Bruzzone, 1985). Despite a majority of evidence suggesting that higher socioeconomic indicators correlate to negativity towards ads, print ads once again seem to buck the trend. One study found that magazine readers were more likely to avoid ads if they were less affluent (Magazine Publishers of America, 1991), while another suggested that race, income, and education may not be significant predictors of newspaper ad avoidance (Newspaper Advertising Bureau 1973).

In most studies, men seem more prone to higher ad annoyance and greater amounts of avoidance. TV zappers tend to be male (Danaher 1995; Heeter and Greenberg 1985; Krugman et al, 1995; Zufryden et al, 1993). Men also seem to pay less attention to magazine ads (Magazine Publishers of America 1979) and newspaper ads (Newspaper Advertising Bureau 1973) than women, and in general, men reported being more annoyed with advertising women (Bauer and Greyser, 1968; Aaker and Bruzzone, 1985).

It should be noted that several studies found evidence that avoided ads, or at least ads that consumers attempt to avoid, may still have some value to advertisers. For example, one study found that as many as 85 percent of those who zipped commercials on VCR reported seeing some of the visual elements of the ad (Metzger, 1986). Studies also found that when audiences previously viewed commercials, zipped exposures remained effective in producing recall and recognition (Gilmore and Secunda, 1993;

Bellman, Shweda, and Varan, 2010). It may also encourage those with financial stakes in the future of advertising that not all researchers express the same level of concern over zipping; for example, the previously mentioned report from Google and DISH suggested that, “given the average DVR user still spends over 90 percent of their viewing time watching live TV, DVR-based ad avoidance would seem to account for at most a 7% reduction in total ad impressions” (Zigmond et al, 2009, pg. 3). Finally, ads could simply be re-imagined to retain some effectiveness in recall and brand recognition despite being zipped, though this may not do as much to reverse the harms of avoidance as advertisers would like; for example, Stout and Burda (1989) found that increasing “brand dominance,” (making a product or image appear on the screen for an extended period of time) in a TV ad produced a slight effect on memory of brand name and commercial content, though results were inconclusive.

Internet Advertising

While TV advertising has commanded the focus of advertising annoyance and avoidance researchers in the past, Internet advertising may attract even more discussion and research as it grows in importance. The potential for advertising online was evident even in its formative years, with observers recognizing how the Internet as a medium could allow for more effective audience targeting; in 1996, Ducoffe correctly predicted that as networks (in particular, the Internet) proliferated, “audiences will increasingly segment themselves into smaller groups offering advertisers greater ability to target interested prospects” (pg. 24). Ducoffe called for cautiousness to go with optimism, though, foreshadowing future problems by saying, “Consumers will more actively choose from a greater range of programming, and they will have better technology with which to

both select as well as screen out programming and advertising they do not want” (pg. 25).

Unlike with previous media, the Internet looked poised from its start to empower the consumer-end of advertising interactions.

Unfortunately, Internet advertising quickly became problematic for consumers. Internet “scam” advertising for (often illegal) money-making schemes has plagued the medium since its earliest days. Some products commonly marketed in what could be considered scams were watches, pharmaceuticals and male enhancement pills, including Viagra (Anderson, Fleizach, Savage, & Voelker, 2007). It is certainly possible that some Internet users’ negativity towards online advertising came from associating online ads with scams, as well as with advertising for pornography, which often appeared in Internet advertising and featured aggressive and intrusive tactics in addition to harmful viruses or malware (Wondracek, Holz, Platzer, Kirda, & Kruegel, 2010) Even when Internet advertising *is* legitimate, the sheer amount of advertising exposure on websites contributed to Internet users becoming narrowly focused when navigating web sites, causing many to not only avoid advertising, but also skip through welcome messages and other large chunks of text. Banner ads, the rectangular ads appearing on the top or sides of a web page, have been avoided to the extent that “banner blindness” has become an area of focus in online advertising research, with evidence suggesting these ads go almost completely unnoticed when consumers are attempting to accomplish a task (Benway, 1999). Privacy concerns also tarnished the reputation of online advertising; many Internet users are concerned that their personal information, purchase history and general surfing activity can be tracked, sold, and purchased among a network of third parties parties without their knowledge or consent (Rapp et al, 2009).

One of the Internet's problematic forms of advertising led to the creation of the medium's first form of mechanical ad avoidance: spam filters. As email inboxes became flooded with spam, or unwanted email advertising, consumers sought to find a quick and easy way to remove the unwanted messages. In response, email services began to provide spam-filtering services which recognized the characteristics of spam email and placed them into a separate folder other than one's inbox (Baek and Morimoto, 2012). After spam filters came pop-up blockers, an even more advanced method for mechanical avoidance of Internet advertising with more technical similarities to modern-day ad blocking. These pop-up ads, along with pop-unders, automatically open in new browser windows upon visiting certain sites. Because of their inherent intrusiveness, these ads tended to frustrate users; Edwards et al (2002) examined the perception of pop-up ad intrusiveness and found it to be highest for ads that appeared between web pages and pop-unders (pg. 89). Subjects perceived higher intrusiveness when an ad's content was incongruent with a site's content; the cognitive intensity with which consumers were navigating the site also raised perception of intrusiveness. Finally, pop-ups play a major role in audience perception of "ad clutter," which seems to be associated with ad avoidance on the Internet (Cho and Cheon, 2004). It is interesting to note that pop-up blockers, once purchased as software on CD-ROMs, now come standard in most web browsers.

Ad Blocking

In an attempt to reduce the ad clutter found on the Internet, programmers devised ad blocking software to reduce the amount of advertising the user sees. One of the first was Adblock Plus, which remains extremely popular today (Pagefair and Adobe, 2015,

pg. 14). Figure 1) is an illustration of AdBlock Plus' removal of traditional banner advertising from a website.



Figure 1. *AdBlock Plus Screenshot*. Retrieved from <https://addons.opera.com/en/extensions/details/opera-adblock/?display=rui>

As the image shows, ad blockers prevent ads from loading at all, leaving the Internet user with an ad-free website. Also observable from the right side of the image is a slight modification of the site's layout which occurs because ad blockers target and delete portions of a website's code. The non-advertising content of the site will sometimes slide into a new position to fill these gaps, though other times there is simply a blank space on a site which shows where the blocked ad would have been displayed.

Noam Cohen (2007) wrote with intrigue in *The New York Times* that AdBlock Plus was an “easy-to-use free addition to the Firefox Internet browser that deletes

advertisements from websites” (para. 2). Though he noted the plug-in’s potential for “menace to the online advertising business” (para. 6) Cohen considered Adblock Plus more of a curiosity than a threat. He reasoned that Adblock Plus only had 2.5 million users at the time and therefore was not a huge concern for ad services like Google or media outlets like CNN.com.

It is now clear with the benefit of hindsight that Adblock Plus, along with the other ad blocking options now widely available to Internet users, should have been treated with more concern by not only Google and CNN, but all parties with a stake in online advertising. According to one report, as of June 2015 there were 198 million monthly active users for the major ad blockers (Pagefair & Adobe, 2015) out of the 3.1 billion Internet users globally (Internet World Stats, 2015), representing 41 percent ad blocker usage growth from Q2 of 2014 to Q2 2015. It was estimated that \$21.8 billion in global revenue was lost due to blocked advertising in 2015 (Pagefair & Adobe, 2015).

While ad blockers allow lowered data usage and increased privacy from trackers for their users, they have caused the content publishers and advertisers on the other side of the screen to suffer. The complete details of online ad purchase models are beyond the scope of this paper, but it is important to note that publishers such as Huffington Post are typically only compensated based on site visitors interacting with ads in some way, whether that be “Cost Per Click,” (CPC) “Cost Per Thousand Impressions,” (CPM), or some other model (Singh and Potdar, 2009). That means that ad blockers endanger not only the advertisers whose ads are never seen, but also the websites that make up the core of the Internet’s news/entertainment infrastructure. While the mobile web was thought for a time to be a potentially blocker-free refuge for ads, the newly enabled mobile ad

blocking capabilities of Apple's iOS 9 have brought concerns to new heights (Yglesias, 2015).

There are arguments to be made both in favor of, and in opposition to, ad blocking. In the simplest argument against the practice, its detractors assert that ads support the creators of the content people read (Patel, 2015). This line of reasoning leads to the conclusion that blocking ads from loading prevents content creators from being able to monetize, which makes ad blocking tantamount to stealing.²

Supporters of ad blocking claim that it is justified for several reasons according to Farhad Manjoo, *New York Times* technology columnist, and Marco Arment, a web and software developer who made one of the first mobile ad blockers.³ Among ad blocking's chief justifications according to Manjoo (2015) is that ads often make up a grossly disproportionate amount of the data required for a website to load; Internet users pay for the data they use, and therefore should not feel obligated to allow their web browser to load every piece of code from a website. Internet ads also run code on your computer and send data about your behavior back to advertisers and publishers, creating an unreasonable lack of privacy and justifying ad blocking according to Arment (2015, August 11).

² Mid-sized publications stand to lose the most from this; the popular blog *The Awl* estimates that 75 to 85 percent of its ad-revenue can be completely cut off by most ad blockers (Johnston, 2015, para. 10). The internet landscape of the past few years has been hospitable to sites like this, but ad blocking may see these sites die out while larger sites that are able to sustain more sophisticated sales operations survive (Yglesias, 2015). Some ad block enthusiasts argue that they're willing to support publications through subscribers models, but in the words of Nicole Cliffe, one of the founders of a popular blog called *The Toast* (which, coincidentally, is shutting down on July 1st of 2016), "Adblocker [sic] is brutal for us. And people always break out the 'Subscribers model! I donate twenty bucks a year!' thing [sic] but it doesn't add up" (Johnston, 2015, para. 10).

³ It should be noted that Arment took his ad blocking app "Peace," off the market after only two days, explaining his reasoning in a blog post titled "Just doesn't feel good" (Arment, 2015, September 18).

The sheer inconvenience of ads is amplified when the Internet experience is moved to mobile devices. Ads can make web pages nearly impossible to navigate, especially on mobile devices where screen space is already limited, and accidental clicks can be extremely frustrating, disrupting the entire web experience (Murphy, 2015b). Finally, ad blocking is thought by many to be justified because it will force publishers and advertisers to adapt. They will have to use ads that are less invasive of privacy and intrusive on user experience; in the words of Manjoo (2015), “For better ads tomorrow, block ads today” (para. 20). Users will, one can assume, whitelist sites that behave in this manner.⁴

Yglesias’ (2015) Vox.com “explainer” piece on ad blocking suggests that the growing influence of ad blockers will influence a shift away from the traditional web into mobile app platforms that are not susceptible to ad blockers in their current iteration, which only blocks ads on web browsers; Yglesias describes this as content “flee[ing] to the apps” (para. 24). This trend appears to be picking up, with Snapchat’s “Discover” channels providing an advertising means for legacy media like CNN, ESPN, and *Cosmopolitan*, as well as digital-born publishers like Vice; while these ads can still be avoided in the more traditional sense, they cannot be *blocked* from even appearing at all. Facebook remains the most popular social media platform, and its new “Instant” feature provides article distribution from inside the Facebook platform, while even offering its

⁴ To fully address the complexities of whitelisting would be beyond the scope of this study. Put simply, whitelisting can either be accomplished by individual internet users manually selecting sites that they want allow ads to run on, or by sites adhering to certain non-intrusive standards set by the ad blockers. AdBlock Plus, for example, allows ads that meet their criteria for size, images, placement, and other characteristics to be shown to AdBlock Plus users who leave the default “allow acceptable ads” setting enabled after installing the plug-in (AdBlockPlus.org)

own advertising service to publishers. Another interesting shift mentioned by Yglesias is a move away from typical display ads in favor of “native” ads, which do not stand out editorially from a website’s regular content (para. 12). More importantly for advertising, they do not differ from regular content technologically either, meaning that ad blockers allow them to display alongside regular content. Although native ads seem like an effective compromise between publishers and audiences, some people feel that it can blur the line between advertising and editorial to the extent that journalistic ethics are compromised.

Literature Review Conclusion

In retrospect, ad blocking feels like it was inevitable given consumers’ reactions to advertising over the years. Over time, advances in technology consistently led to more sophisticated mechanical avoidance, especially in the case of television; just as remote controls paved the way for DVRs, so have spam filters and pop-up blockers paved the way for ad blockers. The Internet as a medium also embodies characteristics that were predictive of annoyance with, and avoidance of, advertising. More dynamic media like television and radio seem to foster greater ad annoyance than more static media, i.e. print (Speck and Elliott, 1997). This ad annoyance may transfer to the Internet as well, given that the Internet is more easily accessible to people from higher socioeconomic backgrounds, who seem more likely to avoid ads (Aaker and Bruzzone, 1985; Speck and Elliott, 1997; Danaher 1995; Heeter and Greenberg 1985; Krugman et al, 1995; Zufryden et al, 1993; Clancey 1994). Also, the Internet could be considered the most goal-oriented medium; that is, many people use the Internet as a search mechanism or to accomplish tasks. Perception of “search hindrance” has been shown to be a very strong indicator of

ad avoidance (Speck and Elliott, 1997), while perceived goal impediment may be the most significant antecedent to advertising avoidance on the Internet (Cho and Cheon, 2004). Studies have shown that personalized messages, once considered an advantage of online advertising, elicit negative reactions from consumers (Johnson, 2013; Okazaki, Li, and Hirose, 2009; White et al, 2008; Tsang, Ho, and Liang, 2004). Finally, and perhaps most importantly despite being overlooked in much of the literature, Internet users are concerned with speed of data access and retrieval, which is less of a concern in traditional media (Cho and Cheon, 2004); ads quite literally slow down Internet connections (Murphy, 2015b), creating a clear benefit for those who choose to use ad blockers.

There is still research to be conducted on ad blocking. Ad blocking is not without precedent, but it is a much more advanced method of ad avoidance than has been previously available to consumers. It may very well be that ad blocking does not even belong in the category of ad avoidance at all, as installing an ad blocker into one's web browser is a one-time transaction which eliminates even inadvertent exposure to almost all advertising in the medium. It needs to be determined whether or not researchers can apply what has been discovered about general ad annoyance and ad avoidance and apply that knowledge to the new and unique phenomenon of ad blocking. With that goal in mind, the following hypotheses are put forth.

HYPOTHESES

Both logic and the previously discussed research informed the following hypotheses:

H1: Ad blocker use will be highest among younger people, males, and people on the higher end of the socioeconomic spectrum.

H2: Greater frequency of Internet use will be positively correlated to ad blocker usage.

H3: People who report a higher level of annoyance with Internet advertising will be more likely to use ad blockers.

METHODOLOGY

The market research firm YouGov collected the data used for this analysis for the Reuters Institute for the Study of Journalism at the University of Oxford using an online questionnaire administered at the “end of January/beginning of February of 2015” (Newman, Levy, & Nielsen, 2015, pg. 5). YouGov conducted the research for the 2015 edition of the Reuters Institute *Digital News Report*, an annual report that “looks to map the changing ecology of news across countries” (pg. 4). YouGov collected data from a sample of each country intended to be reflective of the population that has access to the Internet.

Though the report analyzed and reported on data from 12 countries, only respondents from the United States and the United Kingdom received the ad blocking questions used in this paper’s analysis. Because the survey’s purpose was to study news consumption, respondents who said that they had not consumed any news in the past month were not included (this should be kept in consideration, and is discussed further in the Discussion section). This eliminated 11 percent of YouGov’s starting U.S. sample and 7 percent of the starting U.K. sample, leaving a total sample of 4444 (pg. 5).

Of this final sample, 2295 were from the United States (51.6 percent), and 2149 were from the United Kingdom (48.4 percent). Females made up 53.1 percent of the sample, while 46.9 percent were male. The mean age of respondents was 49.5 ($SD =$

16.5). When asked to indicate highest level of education, 5.8 percent of respondents indicated that they did not finish high/secondary school, 38.7 percent finished high/secondary school, 15.3 percent completed a professional qualification/degree program, 24.9 percent completed a Bachelor's or similar degree, and 10.6 had received a Master's or doctoral degree. Responses indicating that respondents are currently in school were recoded as missing values, as this response made it impossible to determine which level of education was being pursued (4.6 percent of the sample had missing values for education level).

To measure ad blocker usage, the researcher created a new variable which divides the number of devices respondents stated that they used ad blockers on by the total number of devices they said they regularly use. The logic behind the creation of this new variable was that the information provided in the original dataset on "total number of devices ad blockers are used on" would not be equivalent across the range of respondents. For example, a respondent who blocks ads on one of his or her devices but regularly uses three devices to access the Internet should not be counted as equal to a respondent who blocks ads on one device, and only uses one device regularly to access the Internet. In the new variable, these two respondents would have values of 33.3 percent and 100 percent, respectively. This variable was named "ad block rate." A small number of respondents (46) reported ad block rates over 100 percent, indicating paradoxically that they used ad blockers on more devices than they regularly used. These results (accounting for only 1 percent of the sample) were reported as invalid, missing values.

A majority of the sample, 60.4 percent, reported that they did not use ad blockers on any of their devices, resulting in an ad block rate of zero. Of the remaining respondents, 9.6 percent had a 33.3 percent ad block rate, 11.9 percent had a 50.0 percent ad block rate, and 1.0 percent had a 66.7 percent ad block rate; 16.1 percent of the sample had a 100 percent ad block rate, making 100 percent the most common ad block rate among those who use ad blockers on at least one of their devices. The sample's mean ad block rate was 26.1 percent ($SD = 37.3$ percent).

The researcher conducted a multiple regression analysis to assess the relationship between selected independent variables and ad block rate. The new ad block rate variable was the dependent variable. The independent variables selected for inclusion in the multiple regression (outside of the basic demographic information described above) were "Internet usage frequency," to explore H2, and "banner advertising view," to explore H3.

The researcher created a variable for Internet usage frequency using responses to the survey question *How often do you access the Internet for any purpose (i.e. for work/leisure etc.)? This should include access from any device (desktop, laptop, tablet or mobile) and from any location (home, work, Internet café or any other location)*. Of those who answered this question, 0.3 percent said they accessed the Internet less often than once a week, 0.4 percent said once a week, 1.1 percent said 2-3 days per week, 2.5 percent said 4-6 days per week, 8.8 percent said once a day, and 86.5 percent said several times per day. When these response options are listed as categories 1 through 6: $Mean = 5.8$, $SD = 0.6$. The responses as listed here were re-ordered from their order in the survey so that lower Internet-use frequency would have a lower value and higher Internet-use

frequency would have a higher value. “Don’t know” responses were reported as missing values.

The researcher created a variable for annoyance with Internet advertising using responses to the question *Which of the following statements best sums up your view of traditional banner advertising on news websites?*⁵ Of those who answered this question, 9.3 percent said that they do not mind banner ads and find some helpful, 35.1 percent said they mainly ignore them and they do not distract them too much, 20.0 percent said they find them distracting but put up with them, and 31.1 percent said they find them distracting and will actively avoid sites where they interfere with the content too much. When these response options are listed as categories 1 through 4: *Mean = 2.8, SD = 1.0*. The responses as listed above were re-ordered from their order in the survey so that lower values would indicate lower annoyance with banner advertising and higher values would indicate higher annoyance with banner advertising. “Don’t know” responses were reported as missing values.

RESULTS

The researcher conducted a multiple regression analysis of the data for the following variables:

IVs: Age, gender, highest level of education, Internet frequency, and Internet ad annoyance.

DV: Ad block rate

⁵ Banner ads are taken here as representative of people’s general thoughts on internet advertising. The implications of this are addressed further in the Discussion section.

H1: Ad blocker usage will be highest among younger people, males, and people on the higher end of the socioeconomic spectrum.

Older individuals tended to report using ad blockers less ($\beta = -0.100, p < .01$). Men ($\beta = 0.117, p < .01$) had a higher ad block rate than women. These results supported H1, however, people with higher levels of education used ad blockers at a lower rate ($\beta = -0.037, p < .05$), in opposition to H1's prediction.

H2: Greater frequency of Internet use will be positively correlated to ad blocker usage.

People who reported using the Internet more frequently actually tended to report using ad blockers relatively less ($\beta = -0.050, p < .01$); the results do not support H2.

H3: People who report a higher level of annoyance with banner advertising will be more likely to use ad blockers.

People who reported higher levels of annoyance with banner ads were more likely to use ad blockers ($\beta = 0.128, p < .01$).

Table 1
Summary of Multiple Regression Analysis for Variables Predicting Ad Block Rate

	Model 1 β	Model 2 β	Model 3 β
Age	-0.093**	-0.094**	-0.100**
Male	0.119**	0.120**	0.117**
Education	-0.036*	-0.030	-0.037*
Internet Frequency		-0.050**	-0.050**
Banner Ad Annoyance			0.128**
Adjusted R ²	0.029**	0.031**	0.047**

($N = 3997$)

* $p < .05$. ** $p < .01$ (asterisks in the Adjust R² indicate the p value of the R² change of that model)

DISCUSSION

The goal of this study was to see if ad annoyance and ad avoidance knowledge could be applied to ad blocking. The results supported H3, but did not support H2 or all of H1. Though there was only mixed support for the hypotheses, it does appear that some characteristics of ad blocker users are similar to those of people who experienced high ad annoyance and tended to avoid ads. However, the lack of support for H2 and part of H1 suggests that all of what researchers have learned about ad annoyance and ad avoidance, as well as expectations about users of ad blockers that logic might suggest, may not be readily applicable to ad blocking.

Much of what logic and the literature would lead one to predict about the demographic characteristics of people who use ad blockers turned out to be true in this sample. Compared to the media-related variables of H2 and H3, the effect of all three of

the sample's demographic indicators on ad block rate were lower than banner ad view; the effect of gender and age were greater than the effect of Internet usage frequency, but the coefficient (β) for Internet usage frequency was higher than education, making the effect of education level smallest in the entire analysis.

As expected, men had a higher ad block rate than women. The coefficient for gender was the second largest in the analysis ($\beta = 0.117$), and the most predictive demographic indicator. For the most part, the authors of previous research did not offer explanations for this gender difference, though some (Krugman et al, 1995; Rojas-Mendez, 2009) found evidence that females exhibit higher levels of *behavioral* avoidance, while males are more prone to *mechanical* avoidance. Rojas-Mendez (2009) suggested that mechanical avoidance may be more common with males because of cultural expectations that males take on a decision-making role. If this gender difference in avoidance techniques seen in traditional media also proves to be the case with Internet advertising, advertisers will want to keep in mind that their female target audience may be effectively avoiding their ads despite the fact that they are not *blocking* them. Males, on the other hand, may be more likely to *block* ads, especially given the pronounced gender difference in blocking observed in this study. However, if they do *not* block ads they may be less likely than females to exhibit behavioral ad avoidance.

Older people were less likely to block ads ($\beta = -0.100$), though based on the results of previous studies, the researcher expected that the effect of age on ad blocker usage might have been even more pronounced. This was based on an assumption that younger people who are digital natives would be much more aware of ad blockers, and also much more likely to have the tech-savvy required to seek out and install plug-ins like

ad blockers into their web browser. This could be something for publishers and advertisers to keep in mind moving forward; for example, if advertisers had assumed that their older target audiences would be much less likely to block ads than young people, the evidence of this study may cause them to reconsider their strategies.

Finally, people with higher levels of education blocked ads at a lower rate ($\beta = -0.037$), in opposition to H1. Though this part of the hypothesis was not supported, education level had the smallest effect on ad blocking of any variable in the analysis. One potential, if slightly over-optimistic, explanation is that people with higher levels of education may develop a more nuanced understanding of the role advertising plays in providing them with the web content they enjoy, and therefore choose not to use ad blockers. However, this is only one potential explanation; the reasons why this may be the case can not be determined from the results of this analysis alone.

The small coefficient for education level was not unexpected. On the contrary, it was somewhat unexpected that the coefficients for the other two variables (gender and age) in the demographic model of the multiple regression analysis were as high as they were. Past ad annoyance and avoidance literature often suggested that demographics, despite their significance, were not consistently the most important predictors (Heeter and Greenberg, 1985; Danaher, 1995; Krugman et al, 1995). The results of this study suggest that researchers may expect to find more pronounced effects of demographics, or at least gender and age, in relation to ad blocking than they would have expected based on ad avoidance research in traditional media.

H2 predicted that frequency of Internet use would be positively correlated to ad blocker usage, but the analysis showed the opposite to be true ($\beta = -0.050$). As few ad

annoyance and avoidance studies seemed to consider frequency or volume of medium use as a potential predictor of annoyance or avoidance, this prediction was not exclusively informed by the literature. The researcher believed that greater familiarity with the medium would make Internet users more aware of ad blockers, and that awareness would lead to adoption. However, that does not appear to be the case based on the results of this analysis. As suggested in the previous discussion of education level, it may be that people who use the Internet more frequently are more aware of the role advertising plays in providing them with free content, and therefore make a conscious decision to not use ad blockers. A more likely explanation could be that people who use the Internet more frequently become less annoyed by ads because they have grown used to them, and have potentially learned to avoid them behaviorally, leaving them with no need for ad blockers. However, it should again be noted that these are only potential explanations, and that the results of this study do not offer any conclusive explanations for these relationships.

H3 predicted that people who reported a higher level of annoyance with banner advertising would be more likely to use ad blockers. The results of the analysis supported the hypothesis, and “banner ad annoyance” was the variable with the strongest relationship to ad block rate ($\beta = 0.128$). Strong support for the hypothesis is the result that the literature would lead one to expect. It seems logical that annoyance with one of the most common types of Internet advertising would correlate with ad blocker usage, and research has shown that negative perception of ads is clearly linked to ad avoidance (Aaker and Bruzzone, 1985; Speck and Elliott, 1997; Edwards et al, 2002; Baek and Morimoto, 2012).

Weaknesses and Limitations

Access to the 2015 Digital News Report's raw survey data allowed for an unusually large sample (4444 at the onset, $N = 3997$ after the listwise deletion of missing cases). However, some characteristics of the sample should be taken into careful consideration, and perhaps viewed as a weakness of this study, when analyzing the results. The sample is by nature not representative of all Internet users; because the true purpose of the 2015 Digital News Report was to study news consumption, survey respondents who said that they had not consumed any news in the past month were not included in the data set. For this reason, 11 percent of the starting U.S. sample and 7 percent of the starting U.K. sample were eliminated. Therefore, the results can only be considered representative of people who use the Internet for news-gathering purposes. However, the fact that this sample only included new-users may have benefits for online news publishers, as its insights are tailored to their audience and may help them to better understand the ad blocking behaviors of their readers.

Data for people who reported being in school unfortunately had to be recoded as missing values because the response options did not make it possible to determine which level of education was being pursued. This led to a loss of 4.6 percent of the sample. The results, therefore, should not be considered as representative of current students.

The survey question used to measure annoyance with Internet advertising may have questionable validity; it should be considered a weakness of this study's Internet ad annoyance measure that it is limited to banner advertising, as there are other forms of online advertising (e.g. pop-ups, video pre-roll ads) that may be a greater source of Internet users' annoyance with online advertising.

An income variable would have assisted in putting education level into context by helping to ascertain the overall socioeconomic standing of individuals. Education level is a strong indicator for socioeconomic standing, but the fact that peculiarities of the data set did not allow for the inclusion of an income variable in the analysis should be seen as a weakness in this study's socioeconomic measure.

CONCLUSION

In conclusion, it is clear that ad blocking on the world wide web is a unique phenomenon. Ad blocking eliminates almost all exposure to Internet ads with ease and efficiency not seen in the ad avoidance behaviors or technologies of the past. Moving forward, advertisers will need ad blocking research in order to determine which types of people are unlikely to see their ads because of ad blocker use. For example, if the target audience of a campaign seems likely to use ad blockers, ad dollars may be better utilized in a medium other than the Internet.

Ad blocking has implications for more than just advertisers. Publishers already feel its consequences, and the user-base of ad blockers is growing (Newman & Nielsen, 2015). Web-based media companies that are sustained by online advertising will want to appeal to their audience to consider not using ad blockers, or at the very least to whitelist their sites, so that they are able to monetize and stay in business. Research on the users of ad blockers may help these groups to craft persuasive messages to audiences.

Of course, online advertising as it has come to be known may simply fade away. Advertisers have become accustomed to accessing the audiences of websites with relative ease through programmatic banner advertising. However, if ad blocking continues to grow in popularity, they may have to put more of their time and resources into other

means of reaching audiences. That could mean shifting their attention and dollars to sponsoring native ads on traditional websites, advertising directly within social media platforms, or, as mentioned before, simply choosing a medium other than the Internet for their buys.

Future Research

Both U.S. and U.K. data were included in the study, but the majority of the research included in the literature review was conducted in the United States. Future research may gain insight from analyzing the two countries separately, as despite their similarities, there could be differences in Internet use and views on advertising between them that prove significant. For example, a U.K law requires websites to alert visitors if they use cookies to track user activity (Kobie, 2015), but no such law yet exists in the United States.

This study's analysis did not include the student population of the sample for reasons explained in the weaknesses and limitations section, but the Internet advertising views and ad blocker usage of current students would no doubt be of interest to researchers, publishers, and advertisers. This population would make an excellent subject for future studies, given the availability of student populations to academics.

This study sought to examine a few relatively simple hypotheses, but because of the wide range of survey question responses included in the data set, many other findings from past ad annoyance and avoidance studies could be tested to examine their applicability to ad blocking. For example, Speck and Elliott (1997) found that people who sampled a wide breadth of media seemed more likely to avoid ads. The YouGov survey asked respondents how many mediums (e.g. TV, Internet, newspapers) they used

to access news in the past week; these responses could be used to assess whether people who reported using more types of media to access news were more likely to use ad blockers. Additionally, Heeter and Greenberg (1985) found that television ad zappers tended to be familiar with more channels; Speck and Elliott (1997) also found that people who watched many television channels or listened to many radio stations were more likely to avoid ads. The YouGov survey asked respondents how many different Internet news sources they used in the past week; these responses could be used to assess whether people who reported accessing more Internet news sources were more likely to use ad blockers.

The high correlation between banner ad annoyance and ad block rate in this study should encourage further research on predictors of Internet ad annoyance. Though there has been research on aspects of Internet advertising like perceived intrusiveness (Edwards et al, 2002) and ad clutter (Cho and Cheon, 2004), more could be done to examine the factors which lead to annoyance with online advertising. For example, the developer of the mobile ad blocking app Crystal, Dean Murphy, administered a survey to people signed up for that app's launch newsletter, which received over 800 replies (Murphy, 2015a, para. 11). Responses indicated that "limit[ing] visual clutter" was the most common reason for wanting to block mobile ads, even higher than increasing browsing speed, controlling privacy, reducing bandwidth, and reducing battery use. These were the results of a personally administered, and somewhat informal, online survey, but future research could build on this line of inquiry. One interesting method for testing Internet user reactions to various web-design strategies for content, sizes, and

placement of ads would be eye-tracking technology, which has been used in the past to measure banner blindness (Benway, 1999).

In summary, this study suggests that *some* of the knowledge gained from years of ad annoyance and ad avoidance research may be applicable to ad blocking, but only additional research will determine to what extent that may be true. Though replicating studies are often suggested by researchers, they would be especially useful in the case of this study, as the rapid rate of ad blocker adoption could lead to important year-to-year changes in the types of people who choose to use, or not use, ad blockers. The adjusted R^2 for the third model of the multiple regression analysis was 4.7 percent; this is an encouraging R^2 for this type of analysis, especially when coupled with the fact that most of the results were significant at the $p < .01$ level, although it does indicate that 95.3 percent of the variation in ad block rate was unexplained by demographics, Internet usage frequency, and annoyance with banner ads. Though some valuable insight is available from this study, future research should aim to include additional variables that yield even higher R^2 in order to develop a clearer picture of the predictors of ad blocker usage.

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