



User Perceptions of Targeted Advertising on Social Media: Evidence from Instagram Users

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Abstract

Social media has become an integral part of everyday life, influencing how users engage with content and encounter advertisements. Despite the widespread adoption of targeted ads, research has largely focused on business outcomes, while user perceptions is a less explored area. This study examines how Instagram users perceive the relevance, frequency, and search alignment of targeted ads. It is based on a controlled browsing experiment with 20 participants, followed by a survey rating ad relevance and alignment with recent searches. Behavioral variables, including daily Instagram usage and online shopping frequency, were also collected. Analysis using descriptive statistics and nonparametric tests revealed distinct patterns: Android users rated ads as more relevant than iOS users, and users with moderate Instagram engagement experienced the highest ad exposure. Search-targeting turned out to be consistent across gender, device type, and usage levels suggesting that Instagram's algorithm delivers a uniform targeting experience. These findings indicate that user experience with targeted ads is influenced by platform and engagement patterns, highlighting opportunities for refining ad algorithms to enhance relevance, satisfaction, and user trust in data handling practices. This study contributes novel empirical evidence on the user perspective of targeted social media advertising which is a critical consideration for marketers and platform designers.

Keywords: *Experiment; Instagram; Social Media; Targeted Advertisements; User Perception*

1. Introduction

Advertising has a long and intriguing history starting from ancient methods like town criers and signage to modern day digital advertising campaigns. It has transformed from simple announcements and visual cues, gradually evolving into print, radio, television, and now, digital and social media advertising which are personally tailored and targeted campaigns. Digital Marketing is a transition from the traditional methods of marketing to marketing using the internet (websites, social media, online forums, emails, etc.). Social media advertising is a subset of digital marketing, focusing specifically on advertising

campaigns within social media platforms like Instagram, X, Facebook etc. According to reports, there were 5.41 billion social media users around the world at the start of July 2025, equating to 65.7 percent of the total global population. And these numbers continue to grow with 241 million new users joining social media since this time last year (Global Social Media Statistics)

This upwards usage trend is also indicative of the increased social media advertisement spends. Digital channels now account for 72.7 percent of worldwide ad investment, with online spend exceeding US\$790 billion in 2024 out of total ad spends of US\$1.09 trillion. This represents an increase of 50% in total ad spending from 2019 and digital ads represent the bulk of this increase. Of this, social media spends were around US\$244 billion in 2024. This represents a huge 150% increase from the 2019 spend on social media ads which stood at US\$97.5 billion (Moorthi & Moorthi, 2025).

People use social media for varied reasons ranging from staying connected to friends and family (50.8%), entertainment (39%), news (34.55%), following trends (29.2%) and even to find products to purchase (27.3%). And with people averaging 2 hours 20 minutes daily on social media, the importance of social media advertising is undeniable (Chaffey, 2025). Social media advertising is a paid marketing approach (pay-per-click) where businesses allocate a certain portion of their marketing budget to create and run ads on social platforms. These ads can be highly customized to reach specific audience segments. The ad comes up organically in the target audience's social media feeds as a post or Story and has a "sponsored," "promoted," "boosted," or any similar label attached to disclose the post is an ad. The ads can be of various types with common ones being image ads, video ads, carousel ads, and story ads. They leverage targeting and retargeting techniques to reach specific audiences with personalized content. The personalization and targeting is done by analyzing data.

Social media platforms gather vast amounts of information about their users including Demographics data (like age, gender, location, education, income, etc.), Interests (like pages liked, groups joined, content engaged with, topics searched), Behaviours (online activity, purchase history, app usage, device information) and Other data (relationship status, language, job title, etc). Advertisers use this data to create specific target audiences. The target can be based on demographics, browsing history, interests or online behaviour. This type of personalized advertising has many benefits. Firstly, increased relevance in terms that the ad is likely to be seen by users who have a genuine interest in the advertised product or service. 71% of users prefer personalized ads (Lau, 2024). It leads to higher engagement as well. The relevance of the ad makes it more likely that the user will engage either by sharing, clicking or purchasing. Data shows 5.3 times increase in click-through rates when targeted ads are used, and around 37% of social media users make purchases from these ads (Singh, 2025). Targeted ads also increase brand recall and search by up to 51% (Galov, 2025). Higher engagement leads to a better return of investment on the cost of running and executing the ads (Morreale, 2025). As the ads are more targeted, the resources are focused on the most rewarding audience group. Automation is also possible to publish the ads. This leads to it being a more cost-effective tool as compared to traditional advertising.

Facebook, Instagram, YouTube, WhatsApp, LinkedIn are the top platforms in terms of number of users with Instagram being the preferred platform of choice amongst men and women 45 years and younger (Lama & Lama, 2025). Due to such huge advantages, a lot of research and analysis of data is done by companies. However, there is very little research on the impact of these ads on the users and their behaviour patterns. This study aims to bridge that gap by conducting an experiment with Instagram users and deriving insights from their usage patterns. The next section elaborates on the existing research in this area.

2. Literature Review

An extensive review of literature has been conducted to gain an understanding of existing research in the field of targeted advertisements. A large-scale field experiment with an automobile manufacturer tested combinations of contextual targeting and retargeting strategies, measuring website visits, engagement, and soft conversions. The study found that combining contextual and retargeted advertising outperformed either strategy alone across outcome metrics. Ads that encouraged users to customize offerings were especially effective, showcasing that integrating multiple targeting techniques with tailored content enhances ad performance (Albert, 2022).

A randomized field experiment in partnership with BuildDirect.com showed that activating retargeted ads increased user return rates by 14.6% over four weeks. The effects were strongest immediately after initial exposure, and re-engagement has enhanced with timely and sustained retargeting. Effectiveness turned out to diminish over time, but early and repeated exposure had complementary effects on engagement (Sahni et al., 2017). Another study where a 21-month randomized field experiment on Pandora was conducted, demonstrated that additional ad load per hour led to declines in listening time, active days, and return probability. However, higher ad frequency also increased paid subscription upgrades, indicating a trade-off between engagement and monetization (Huang et al., 2018).

In another study, celebrity, blogger, and e-commerce streamer endorsement strategies were tested with 1,200 participants in Shanghai. The findings suggested that advertisements by commerce streamers had the strongest effect on purchase intention, with variations influenced by participant thinking style. This highlights that ad content source is a significant modulator of targeted ad effectiveness (Han & Du, 2023). Another study, using the dual-privacy framework, shows that behavioral targeting is perceived as most invasive, while contextual targeting i.e. no tracking one significantly reduces perceived privacy violations. New privacy-preserving technologies may reduce concerns only marginally, suggesting that tracking extent drives privacy perceptions along with technical implementation (Jerath, 2024).

Another study conducted in-depth interviews with participants from Bangladesh and India. The findings revealed unique perceptions of targeted ads, including emerging ad types (e.g., influencer-based and soft ads), a preference for ad control over explanation, and novel mental models tied to app permissions and AI usage. Participants often prioritized discounts over product quality but expressed concerns about fraud and privacy, mainly due to device sharing (Sharma et al., 2023). Across studies, targeted advertising is seen to be effective but there is a limit to the extent of personalization. It improves engagement, purchase intention, and return visits. Its effectiveness depends on multiple factors like timing, frequency, content, and cultural context and even the source of the ad. Excessive or opaque targeting increases resistance, and privacy concerns. Consumers value control, relevance, and trust over pure personalization.

Social media advertising has a complex impact on consumer purchasing behaviour as it influences several aspects such as awareness, perceptions, engagement, and purchase decisions at different stages of the customer journey. Brands that successfully utilise social media can have a beneficial influence on consumer attitudes and actions. It is essential for businesses to carefully consider and manage the various aspects of social media advertising in order to create successful plans that are in line with their objectives and intended audience. Consistent assessment and adjustment to changing consumer behaviours and platform dynamics are crucial for achieving success in the dynamic realm of social media advertising.

Based on the review of literature, certain research gaps have been identified. Few studies examine advertising effectiveness alongside long-term trust, well-being, and ethical outcomes. However, advanced targeting models are rarely evaluated from the consumer's perspective. More research is needed on how repeated exposure to targeted ads affects acceptance over time. There is a lack of empirical research on how user-controlled personalization affects engagement and trust.

3. Methodology

This section elaborates on the methodological framework of the study, detailing the objectives, research design and sampling population. It also discusses the data collection period, experiment setup and survey procedures, followed by ethical considerations and analytical framework.

3.1 Objectives of the Study

1. To examine how users, perceive targeted advertisements on Instagram in terms of relevance and search alignment.
2. To analyze whether advertisement frequency and user perceptions vary across device operating systems, gender, and Instagram usage levels.

3.2 Research Design

The study adopts a mixed-method experimental research design, that combines a controlled browsing experiment with a structured survey. This approach allows for direct observation of advertisement exposure while also takes into account subjective user perceptions immediately after exposure. It ensures internal validity and reduced recall bias.

3.3 Sampling and Sample Population

A convenience sampling method was used to select the participants. The final sample consisted of 20 active Instagram users, including both male and female participants, using either Android or iOS devices. Participants varied in their daily Instagram usage intensity and online shopping frequency, which enabled comparative analysis across behavioral groups. The sample represents regular social media users rather than a particular specific demographic cohort.

3.4 Data Collection Period

Data were collected over a three-week period, during which participants were approached individually and participated in the experiment under similar conditions to ensure consistency was there across all observations.

3.5 Experiment Setup and Survey Procedure

The data collection process was based on two integrated stages i.e. controlled browsing experiment followed by a structured survey. Participants were instructed to record their screen and scroll through Instagram Reels for two minutes under the researcher's supervision. This ensured standardized exposure time across participants. Screen recordings captured the advertisements encountered during browsing. Following the browsing session, participants completed a structured survey capturing demographic information, device operating system, daily Instagram usage, and online shopping frequency. The researcher extracted screenshots of the first five advertisements appearing in each participant's recording. These ads were then shown individually to participants, who rated them on Perceived Relevance and Alignment with recent search behavior. Advertisement frequency was subsequently recorded by the researcher through manual review of the screen recordings to ensure accuracy and reduce participant burden.

3.6 Ethical Considerations

Participation in the study was entirely voluntary, and informed consent was obtained prior to data collection. Participants were informed about the purpose of the study, data usage, and their right to

withdraw at any time. No personally identifiable information was included in the analysis, and all screen recordings were used solely for academic purposes. Data were handled confidentially and anonymized during analysis to protect participant privacy.

3.7 Analytical Framework

Three key outcome variables were constructed for analysis i.e. Average Ad Relevance Score (AARS), Average Search-Targeting Score (ASTS) and Frequency of Ads. Descriptive statistics were used to summarize participant characteristics and key variables. Group comparisons were conducted across device operating systems, gender, and Instagram usage levels. Due to the small sample size and non-normal data distribution, non-parametric tests were applied. The Mann–Whitney U test was used for two-group comparisons, while the Kruskal–Wallis H test was applied for comparisons across three usage categories, followed by post-hoc analysis where relevant. The analysis focused on identifying comparative patterns in user experience, rather than making population-level generalizations.

4. Results and Findings

This section presents the findings of the study on Instagram ad relevance, search-targeting, and ad frequency, analyzed across three grouping variables: Device Operating System (OS), Gender and Daily Instagram Usage. Each participant rated the first five Instagram ads, and averages were computed for each user.

4.1 Demographic Profile of the Respondents

Table 1: Demographic Profile of the Respondents

Variable	Category	n	%
Gender	Male	8	40%
	Female	12	60%
Device OS	Android	10	50%
	iOS	10	50%
Daily Instagram Usage	Low (<30 min)	3	15%
	Medium (30–120 min)	10	50%
	High (>120 min)	7	35%
Online Shopping Frequency	Once a month	8	40%
	Bi-weekly	3	15%
	Weekly	5	25%
	Daily	2	10%
	Once in two weeks	2	10%

The sample consisted of 20 participants, split between males (40%) and females (60%). Ages ranged from 14 to 73 years (Mean \approx 29.7 years, SD \approx 15.6), reflecting a broad span of adolescent, adult, and older adult users. Device usage was balanced in the sample, with 10 Android users (50%) and 10 iOS users (50%), ensuring that OS-related trends could be meaningfully compared. Participants represented diverse occupations, including students, professionals, and retirees, which adds variety to their Instagram engagement patterns. Daily Instagram usage varied widely across the participants. Out of the sample, 15% were classified as Low (<30 minutes), 50% as Medium (30–120 minutes), and 35% as High (>120 minutes), indicating differences in potential ad exposure. Online shopping frequency also varied across the participants, with most participants shopping once a month (40%), followed by weekly (25%), bi-weekly (15%), daily (10%), and once in two weeks (10%).

Overall, the demographic profile of respondents demonstrates a balanced and heterogeneous sample in terms of gender and device type, along with variability in Instagram engagement and shopping behavior. These differences provide context for understanding variations in ad relevance, search-targeting, and ad frequency among participants.

4.2 Descriptive Statistics

Descriptive statistics (mean, standard deviation, minimum, and maximum) were calculated for the main variables: Average Ad Relevance Score (AARS), Average Search-Targeting Score (ASTS), and Frequency of Ads. Tables 2, 3 and 4 below elaborate on the descriptive statistics.

Table 2: Descriptive statistics of AARS by Device OS, Gender and Instagram usage

Grouping Variable	Category	n	Mean	SD	Min	Max
Device OS	Android	10	3.68	0.61	2.8	4.6
	iOS	10	2.80	1.07	1.0	4.2
Gender	Female	12	3.03	1.14	1.0	4.6
	Male	8	3.55	0.54	2.8	4.4
Instagram Usage	Low (<30 min)	5	2.72	1.61	1.0	4.4
	Medium (30–120 min)	10	3.51	0.65	2.6	4.6
	High (>120 min)	5	3.27	0.62	2.6	4.2

From the given table 2, we can observe that Android users, on average, tend to have more relevant ads than Apple users. The statistics reveal that men receive ads that are more relevant to them. This can be attributed to the fact that they may search for more precise things on average. Furthermore, for both cases where the average relevancy is higher, the standard deviation is lower. Interestingly, people with a moderate amount of Instagram usage (moderate being 30–120 minutes) tend to have the most accurate relevancy, surpassing those with a rather high usage by 0.24 which is a minor margin.

Table 3: Descriptive statistics of ASTS by Device OS, Gender and Instagram usage

Grouping Variable	Category	n	Mean	SD	Min	Max
Device OS	Android	10	3.52	0.62	2.6	4.6
	iOS	10	3.80	0.42	3.0	4.4
Gender	Female	12	3.75	0.55	2.8	4.6
	Male	8	3.53	0.52	2.6	4.2
Instagram Usage	Low (<30 min)	5	3.80	0.35	3.2	4.0
	Medium (30–120 min)	10	3.56	0.68	2.6	4.6
	High (>120 min)	5	3.70	0.45	3.2	4.4

Through this table 3, it is shown how related ads are to different people. Unlike the prior table, people with iOS who were female had a higher ASTS as compared to those who had an Android and were male. These differences were by a smaller margin, especially in the case of the female–male dynamic. Like the table measuring AARS, users with a moderate amount of Instagram usage had a higher relevance score, slightly above those with a high amount of Instagram usage.

Table 4: Descriptive statistics of Frequency of Ads by Device OS, Gender and Instagram usage

Grouping Variable	Category	n	Mean	SD	Min	Max
Operating System	Android	10	18.00	8.11	8	29
	iOS	10	16.00	10.19	0	29
Gender	Female	12	16.00	9.53	0	29
	Male	8	18.50	8.60	9	29
Instagram Usage	Low	5	5.80	5.40	0	11
	Medium	9	23.22	4.89	16	29
	High	6	17.00	7.24	9	29

From table 4, it is seen that users with Android have more frequent ads than users with iOS. This can be attributed to the fact that Android manages advertising and data in a different manner, through which more ads can be seen on social media apps, like Instagram in this case. This can also be seen in the general day-to-day usage of Android by users, as Android allows more free apps, which push more advertisements. Like AARS, men appear to have more frequent ads than women, despite the fact that both genders have the same number of maximum ads. In a rather interesting statistic, people with low Instagram usage have a much lower frequency of advertisements as compared to those with medium and high Instagram usage, and once again, those with usage in the range of 30–120 minutes have a higher mean than those with usage upwards of 120 minutes. The standard deviation is much higher for all parameters in this statistic.

4.3 Inferential Analysis

Inferential analysis was conducted to examine whether the observed differences in Average Ad Relevance Score (AARS), Average Search-Targeting Score (ASTS), and Frequency of Ads were statistically meaningful. This section elaborates on the analysis which would provide deeper insights into how user perceptions of targeted advertising is influenced.

4.3.1 Average Ad Relevance Score (AARS)

i. Device Operating System and Gender

Mann-Whitney U tests were conducted to examine differences in Average Relevance Score (AARS) between Android and iOS users, as well as between female and male users. The results are summarized in Table 5 below:

Table 5 : Mann-Whitney U Tests

Grouping Variable	U	z	Asymptotic p	Exact p	Effect size (r)
Device OS (Android vs iOS)	24.00	-1.97	0.048	0.052	0.44
Gender (Female vs Male)	36.50	-0.89	0.373	0.384	0.20

The results indicated a marginally significant difference in AARS by Device OS, with Android users perceiving ads as more relevant than iOS users. The effect size ($r = 0.44$) represents a medium practical effect. No significant difference was observed by Gender ($r = 0.20$), indicating that male and female users perceived ad relevance similarly.

ii. Instagram Usage Category

A Kruskal-Wallis H test was conducted to examine whether AARS differed across three Instagram usage categories (Low, Medium, High). The results are presented in Table 6 below:

Table 6: Kruskal-Wallis H Test

Grouping Variable	Chi ²	df	p
Average Relevance Score	0.58	2	0.747

The test indicated no statistically significant difference in AARS across Instagram usage levels ($p = 0.747$), suggesting that daily time spent on Instagram does not significantly influence users' perception of ad relevance.

4.3.2 Average Search Targeting Score (ASTS)

Mann-Whitney U tests and a Kruskal-Wallis H test were conducted to examine differences in Average Search Targeting Score (ASTS) by Device Operating System, Gender, and Instagram usage category. The results indicated no statistically significant differences for any grouping variable (Device OS: $p > 0.05$; Gender: $p > 0.05$; Instagram Usage: $p > 0.05$). This suggests that perceived ad targeting relevance was similar across Android and iOS users, male and female users, and users with different levels of Instagram usage. These findings may indicate that Instagram's ad-targeting algorithm delivers a relatively uniform targeting experience regardless of these user characteristics.

4.3.3 Frequency of Ads

i. Device Operating System and Gender

Mann-Whitney U tests were conducted to examine differences in ad frequency by Device OS and Gender as shown in Table 7 below.

Table 7: Mann-Whitney U Tests

Grouping Variable	U	z	Asymptotic p	Exact p	Effect size (r)
Device OS (Android vs iOS)	47.50	-0.19	0.850	0.853	0.04
Gender (Female vs Male)	43.00	-0.39	0.699	0.735	0.09

The results indicated no significant difference in ad frequency by Device OS, with Android users (M = 18.00) experiencing slightly more ads than iOS users (M = 16.00). The effect size (r = 0.04) was very small, indicating a negligible practical effect. Similarly, no significant difference was observed by Gender (r = 0.09), suggesting that male and female users experienced ad frequency at comparable levels.

ii. Instagram Usage Category

A Kruskal-Wallis H test examined differences in ad frequency across Instagram usage categories. The results are shown in Table 8 below.

Table 8: Kruskal-Wallis H Test

Grouping Variable	Chi ²	df	p
Instagram Usage (Low, Medium, High)	11.71	2	0.003

The Kruskal-Wallis test indicated a significant difference in ad frequency across Instagram usage groups ($\chi^2(2) = 11.71, p = 0.003$), suggesting that at least one group differed from the others. Because the Kruskal-Wallis test does not identify which specific groups differ, a post-hoc Dunn-Bonferroni test was conducted. The results of post-hoc test are depicted in Table 9 below.

Table 9: Dunn-Bonferroni Post-hoc Comparisons

Comparison	Std. Test Statistic	p	Adj. p (Bonferroni)
Low vs High	-1.89	0.059	0.176
Low vs Medium	-3.42	0.001	0.002
High vs Medium	-1.44	0.149	0.446

Post-hoc tests revealed that medium-usage respondents experienced significantly more ads than low-usage respondents (Adj. p = 0.002), while differences between low vs. high and high vs. medium were not statistically significant. These results suggest that daily Instagram usage intensity is a key predictor of ad exposure, with medium users encountering the highest ad frequency.

4. Discussion

This study examined user perceptions of targeted advertising on Instagram, focusing on ad relevance, search-targeting alignment, and ad frequency across operating system, gender, and Instagram usage levels. The findings suggest that operating system plays a modest role in shaping perceptions of ad relevance, with Android users perceiving slightly higher relevance than iOS users. Other user characteristics, such as gender and usage intensity, turned out to have minimal impact, highlighting the algorithmic consistency of Instagram's ad-targeting mechanisms across different user groups.

The uniformity of search-targeting scores across groups indicates that Instagram's ad algorithms deliver a relatively consistent targeting experience, regardless of user demographics or engagement patterns. This aligns with prior research suggesting that perceived personalization and usefulness are key determinants of user experience on social media platform (Qudah et al., 2020). While variability in ad relevance was observed among female users, iOS users, and low Instagram users, these differences were marginal and did not turn out into statistically significant differences for search-targeting alignment or ad frequency.

The analysis on ad frequency revealed that medium Instagram users experienced the highest exposure, whereas low and high usage groups did not differ significantly. This finding suggests that daily engagement intensity influences ad exposure, possibly reflecting the platform's optimization for moderately active users who are more likely to engage with promoted content. Overall, the average number of ads observed in a 2-minute period was 17, with low-usage users being the primary outliers, which is consistent with prior research showing that platform engagement influences ad visibility but not necessarily perceived relevance (Jerath et al., 2019). These results are consistent with the broader literature on targeted digital advertising. Studies indicate that perceived ad relevance positively affects user attitudes and engagement, while uniformity in ad delivery can enhance trust in platform algorithms (Chen et al., 2023). Furthermore, relevance and search-target alignment can reduce ad avoidance and consumer scepticism, reinforcing the role of tailored content in fostering user acceptance (Jung, 2017).

The study highlights that Instagram's ad-targeting algorithms operate consistently across gender and usage levels, with operating system showing minor effect on perceived ad relevance. These insights contribute to the understanding of digital advertising dynamics and suggest that user experience is primarily shaped by platform-level optimization and algorithm design rather than individual user characteristics. They also highlight the importance of transparency and user trust, as perceptions of targeted ads may be influenced by how platforms handle personal data.

5. Conclusion

This study examined user perceptions of targeted advertising on Instagram, focusing on ad relevance, alignment with recent searches, and ad frequency across different user groups. A controlled browsing experiment was conducted with 20 participants where, a 2-minute Instagram reel scrolling session was recorded and shared. The ads that came across were then analyzed and rated for relevance and search alignment. Findings indicate that Android users perceived ads as more relevant than iOS users, while search-target alignment was generally consistent across gender, operating systems, and usage levels. Medium-level Instagram users experienced the highest ad frequency, whereas gender and overall usage patterns had minimal impact on perceived ad relevance. Overall, participants considered targeted ads generally useful and relevant, although iOS and female users may benefit from improved algorithmic targeting. These findings have practical implications for marketers and social media platforms. The advertisers can optimize engagement by tailoring strategies to platform-specific user experiences, while platform developers may enhance user satisfaction by adjusting targeting algorithms for underperforming

groups. The study also provides a methodological framework for evaluating user perceptions through controlled experiments combined with surveys. Limitations include the small sample size and localized participant pool, which may restrict generalizability. Future research could expand to larger and more diverse populations, examine additional demographic and behavioral factors, and explore the influence of content type, recency of search, culture, or user perceptions of privacy and data handling on ad relevance to offer deeper insights into engagement and trust.

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