

# The Impact of Online Behavioral Advertising on Consumer Attitude and Impulse Buying: The Moderating Role of Privacy Concerns

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## Abstract

Online Behavioral Advertising (OBA), a recently emerging format of internet advertising, targets users based on their past online behaviors. This study examines the impact of OBA on consumer attitudes and impulse buying behavior, while exploring the moderating influence of privacy concerns, a crucial factor given that OBA relies on personal data collection. To test our conceptual model, we conducted surveys in Korea and France, to further analyze the potential cultural distinctions. Our findings, derived from a series of linear regression models, reveal that OBA significantly affects consumers' impulse buying, with this effect mediated by consumers' attitudes toward OBA. Moreover, consumers' privacy concerns weaken the positive effect of OBA on attitudes. Notably, we observe significant cultural differences, with these effects primarily manifesting in the Korean sample. Our study provides valuable insights for creating effective online advertising strategies that contribute to consumers' purchase funnel, ultimately leading to purchases, while addressing privacy concerns and cultural variations.

**Keywords:** Online behavioral advertising, Impulse buying, Consumer privacy, Cultural difference

## 1. Introduction

In today's digital age, the number of Internet users are 5.3 billion (Statista 2023), and the number of social media (including Facebook, Instagram, and X) users in 2023 is estimated at 4.9 billion people across the world (Forbes). The substantial number of Internet users has led to online personalized advertising becoming an omnipresent element of the consumer experience, making the Internet the ideal platform for marketers to advertise their products and services. On social media, the most popular communication channel among young people, firms deliver paid advertisements and connect with consumers quickly and effectively, making it an efficient way to target a specific audience and convert them into customers (De Keyser, Dens, and De Pelsmacker 2015).

According to Statista (August 2023), the digital advertising market is expected to reach a total ad

spending of US\$679.80 billion in 2023. We can observe several types of advertising, including personalized and non-personalized advertising. Non-personal ads refer to those displayed randomly on a user's computer or mobile phone, without relying on the user's personal information. In opposition, personalized advertising, also known as one-to-one marketing, is a strategy frequently used by marketers to improve their performance (Vesanen 2007). In this process, advertisers imply that the advertisement is designed 'for you', by making the information more relevant and meaningful to the user (Hawkins et al. 2008).

Personalization originated from the concept of segmentation (Moore et al. 2015), and advertisers utilize individuals' data, including demographic characteristics (such as age and gender), geographic location, and personal interests in order to effectively reach the relevant audience. Although challenging to implement (Vesanen 2007), different forms of

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personalization can lead to various perceptions of personalization and, consequently, be more persuasive in capturing consumer attention, shaping attitudes, and influencing behavioral intentions (De Keyser, Dens, and De Pelsmacker 2021). Overall, personalization is considered an effective marketing strategy, though past studies have identified both positive and negative outcomes (Masłowska, Smit, and Putte 2016).

In this paper, we specifically focus on Online Behavioral Advertising (OBA), a sub-category of personalized advertising but with a more limited focus. Online Behavioral Advertising is characterized by advertisers utilizing consumers' information based on their online behavior, tracked by cookies and navigation data. This data includes visited websites, watched videos, and any research conducted through search engines (Boerman, Kruikemeier, and Borgesius 2017). For example, following a search for plane tickets, it is frequent to come across travel-related advertisements on other websites or social media platforms. OBA might take personalization too far. Personalization has undeniably proven its effectiveness in engaging consumers and tailoring content to their preferences. However, we can wonder whether the extensive use of OBA could potentially push personalization to its limits. By using a complex network of user information and tracking online actions, OBA may risk making personalization ineffective.

The goal of this paper is to investigate how OBA influences consumer attitudes and if it influences impulse purchase behavior. To create accurately personalized advertisements, advertisers need to collect user's personal data. Due to this data collection, consumers may feel uncomfortable knowing that their private information is being collected and used for marketing purposes. Therefore, we will also investigate about how privacy concerns moderate the relationship between online behavioral advertising and consumer attitudes toward the advertisement, using data collected from two very different countries in terms of the continent and culture, South Korea and France.

## 2. Literature review and hypothesis development

### 2.1. Online behavioral advertisement

Online advertising has evolved significantly since the debut of the first online banner ad in 1994 (Liu-Thompkins 2019). This evolution encompasses various milestones, including the era of pop-up ads, the introduction of video advertisements on YouTube

following its launch in 2005, the emergence of social media advertising, and the shift towards more precise and targeted ad campaigns.

OBA has emerged, and the ability to track consumer behavior is facilitated by advertisers placing a cookie with a unique identifier on an individual's computer, thereby associating browsing activities with that unique identifier (Ur et al. 2012). The rise of artificial intelligence and machine learning techniques has facilitated the creation of pertinent advertisements for users, drawing upon contextual information or pre-existing user data (Choi and Lim 2020). Indeed, due to these technological advancements, relevant online advertisements can be generated immediately as users browse the internet, sometimes even before the page has fully loaded (Varnali 2019).

Similar to personalized advertising, OBA causes contrasting reactions from consumers: on the positive side, it can enhance usefulness and credibility; but on the negative side, it can lead to concerns about privacy (Aiolfi, Bellini, and Pellegrini 2021). Moreover, transparency is an important part of OBA. It has been shown that consumers feel more vulnerable regarding their privacy when enterprises do not clearly state that they are collecting personal information about users. In opposition, perceived vulnerability is not affected when firms are overt about data collection (Boerman, Kruikemeier, and Borgesius 2017).

### 2.2. Online behavioral advertisement and consumer attitudes

In their purchase decisions and activities, consumers can show various attitudes. Consumer's behavior in online, such as attention, interest, and click are considered as potential attitudes toward an advertisement. First, people tend to be attracted to what is relevant to them. Perceived personal relevance is defined as an object or behavior that is associated with a consumer's lifestyle, value or self-image (Delieva and Eom 2019). In the context of advertising, an advertisement's relevance refers to how closely it matches the consumer's needs or the search keywords used online. A good way for an advertisement to be relevant and therefore be successful among consumers is to be personalized. According to previous research in the domain of social media, it has been shown that when people feel like an advertisement is personally relevant, they are more likely to pay attention to the ad (Jung 2017).

This can be associated with the self-referencing effect, a cognitive process defined by the fact that people tend to remember information linked to themselves more easily. Moreover, according to previous research on online and social media, as long as the

advertisement is perceived as personalized by the consumers, it induces positive effects regarding their attitude toward the advertisement (De Keyser, Dens, and De Pelsmacker 2015) and the degree to which consumers connect information to their own experiences has a beneficial impact on their attitudes (Hawkins et al. 2008), and therefore have a positive effect on their attention towards the advertisement. Previous research findings suggest that a personalized advertisement's relevance, and the emotions they can induce have a positive effect on consumer's attention, click (Wu, Wu, and Hsin-Chung 2020), and purchase intention (Abid 2021).

Rational thinking plays an important role in the process of purchase decision-making. For example, a consumer is being rational when they prioritize their needs over their wants by focusing on essential items rather than non-essential items. Rational shopping also includes being careful about prices and potential discounts. However, humans are naturally emotional, and emotional thinking seems to have a crucial role in purchase decision-making as well. Indeed, it is said that emotional thoughts and reactions are 3,000 times faster than rational thoughts (Tang et al. 2012). For example, when buying food or clothes, despite being primary needs, we tend to buy food that we enjoy eating and clothes that make us feel good-looking. In addition, unlike rational thinking, which helps us avoid unplanned purchases, emotional thinking tends to strongly influence impulsive buying behavior. Further exploration of impulse buying behavior will be covered in the next section.

Moreover, emotions have the capacity to persuade and influence consumers, as we are often drawn to people, products or brands that we feel an emotional connection with (Lau-Gesk and Meyers-Levy 2009). According to Matic, Pielot, and Oliver (2017), it has been found that a high relevance in the advertisement causes positive emotions. During their experiment, they created advertisements based on their 17 participant's online browsing history, location, and personal traits. When combining the three sources of data, the advertisements were considered the most relevant (94.1%) and induced the biggest part of positive reactions (70%), such as surprise or enthusiasm. Therefore, highly personalized advertisements based on past online behaviors are perceived as more valuable for consumers (Matic, Pielot, and Oliver 2017). The enjoyment and pleasure (positive emotions) procured by a product bring more emotional value, which has an important effect on consumer's willingness to buy (Sweeney and Soutar 2001).

Generally, personalized advertisements (that are created depending on gender or age, for example) are known to be able to influence consumer attitudes.

OBA is generated depending on real browsing behavior and showing products or services that the user already searched online. Therefore, if generally personalized advertisements positively influence consumer attitudes, we can expect that behavioral advertising will also have those positive influences on consumer attitudes, as it is a narrower aspect of personalization. Therefore, we hypothesize that:

**H1.** *Advertisements related to past online behaviors will have positive effect on consumer attitudes.*

### 2.3. Online behavioral advertisement and online impulse buying behavior

Impulse buying is defined as the sudden and unplanned purchase of products or services. In Stern's study (1962), "the impulse mix", composed of four types of impulse buying has been identified. First, pure impulse buying occurs when a consumer buys a product without any prior intention when they are shopping for something else. For example, buying candy displayed near the checkout can be considered as pure impulse buying. Second, reminder impulse buying is a situation in which the consumer wasn't planning to buy the product but seeing it reminded them of a need or want they had forgotten. Third, suggestion impulse buying is when the consumer does not need the product but ends up buying it because he or she is influenced by in-store displays, promotions, or recommendations. Lastly, planned impulse buying occurs when a customer enters a store with a specific shopping list but while anticipating and expecting to make other purchases depending on potential discounts, offers, or sudden appeal for a product. Consumers may experience one of these four types of impulse buying depending on their specific situation.

According to a survey conducted by OnePoll and commissioned by Slickdeals in 2023, the 2000 American survey respondents, on average, make around six impromptu purchases per month, spending approximately \$151 on these transactions. This represents a notable decline compared to previous years when, in 2021 and 2022, they were respectively spending \$276 and \$314 on impulse purchases. Despite this decrease mostly due to inflation, this still represents a consequent part of a budget. In the online context, 40% of total online consumer spending is believed to come from impulsive purchases (Chan, Cheung, and Lee 2017). Furthermore, online shopping liberates consumers from the restrictions they might encounter in offline stores, thereby raising the probability of impulsive purchases (Chan, Cheung, and Lee 2017). Indeed, impulse buying tends to be more common

in an online context because online shopping is more flexible, transactions are easier, and consumers have access to a wider range of similar products at competitive prices (Lina and Ahluwalia 2021).

As we previously saw, personalization positively impacts advertising value. In Lina and Ahluwalia (2021), advertising value influences impulse buying. Therefore, if the personalized ad is perceived as interesting and aligns with the consumer's preferences, they will consider the advertisement as more valuable and will be encouraged to make impulse purchases. Moreover, several types of research proved the positive relationship between personalized advertisements and perceived relevance. When the advertisement is related to the person watching, the chances for impulse buying to occur increase (Aslam, Rashid, and Chaudhary 2021). Setyani et al. (2019) investigated about how personalized advertisement value influences hedonic click-through motivation and utilitarian click-through motivation; and how those click-through motivations increase impulse buying intentions. It is argued that humans' modes of consumption are either cognition seeking or sensation and novelty seeking. Cognitive senses are linked with utilitarian click-through motivations and affective (sensation and novelty) senses are connected with hedonic click-through motivations (Noreen and Han 2015). Setyani et al. (2019) found that both click-through motivations were significantly associated with impulse buying intention because personalized advertisements are capable of triggering needs that the consumer is not aware of.

Following this logic, as behavioral advertising arises from past online purchases and browsing history, being exposed to these types of personalized advertisements can trigger Stern's "reminder impulse buying", out of the four types. Indeed, a consumer might have searched for a product without purchasing it and being exposed to an advertisement for that same product serves as a reminder, leading to an impulsive purchase even if the consumer hadn't originally planned to buy it right then. In other words, online behavioral advertising enhances the possibility of consumers' impulsive online buying behavior, and the positive effect is mediated by consumers' favorable attitude toward the advertisement. Therefore, we propose:

**H2.** *Advertisements related to past online behaviors will have positive effect on impulse buying behavior.*

**H3.** *Consumer attitudes will mediate the relationship between online behavioral advertising and impulse buying behavior.*

#### 2.4. *The moderating role of privacy concerns*

Despite the effectiveness of personalized advertising, findings in previous studies also show a negative side due to customer data collection, inducing privacy concerns.

Privacy concerns are defined as a feeling of fear and anxiety about privacy loss or invasion and the negative consequences that could occur (Taylor, Lewin, and Strutton 2011). Therefore, consumers might tend to avoid these advertisements. In Tran's research (2017), and in the context of social media (Facebook), ad avoidance could be measured on three different levels. First, the affective level in which people show distaste towards the ad; second, the cognitive level in which people ignore the ad; and lastly, the behavioral level in which people install ad blockers such as AdBlock.

Indeed, people who are worried about their privacy being exposed and aware that their personal information is collected for marketing purposes are more likely to avoid those advertisements if they contain personally relevant information (Jung 2017). In opposition, the more information about consumers is collected by marketers, the more accurate the targeting will be and consumers will feel that the advertisement has been made for them (Lina and Setiyanto 2021). This can be quite a paradox because a personalized advertisement's purpose is to target the appropriate consumers and to that end, an amount of personal information needs to be collected. However, having too much personally relevant information inside the ad might enhance privacy concerns. In Moore and colleagues's study (2015), they investigated about creepy marketing and annoying marketing. Among the factors considered creepy, "invasive tactics" such as the use or gathering of personal information and cookie tracking were listed. In other words, marketing that knows your interests based on your previous purchases or browsing history can be considered invasive and uncomfortable due to the lack of control you might have over your privacy, as they can make consumers more aware of advertisers' tracking activity (Kim and Huh 2017).

As online behavioral advertising is based on tracking consumers' online activities mainly through third-party cookies and is therefore highly personalized, the enhanced feeling of invasion may cause unfavorable consumer attitudes towards online behavior-based personalized advertisements (Kim and Han 2022). However, starting in the first quarter of 2024, Google plans to disable third-party cookies for 1% of Chrome users due to the increasing privacy concerns (Lardinois 2023).

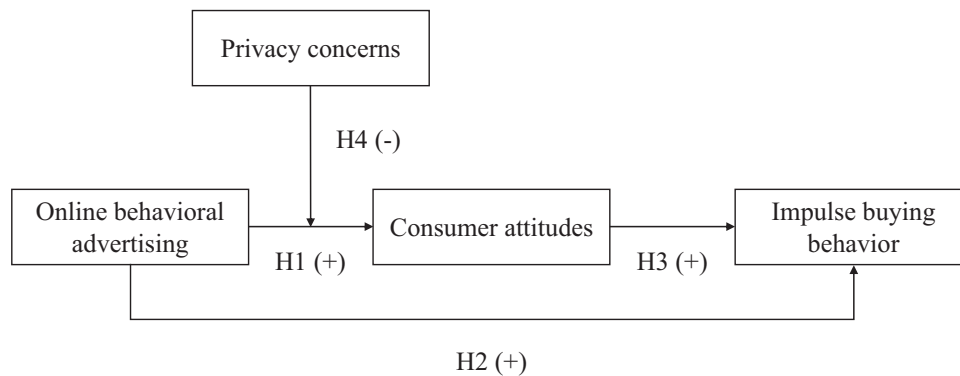


Fig. 1. Conceptual framework.

While it marks a positive beginning and reflects advertisers' concern for user privacy, the question arises: does this translate to a reduction in personalized advertising? The efficacy of personalized advertising is well-established. Even in the absence of third-party cookies, advertisers may still employ alternative means to gather consumer personal data, like using IP addresses or information provided during website sign-ups. In other words, even with the removal of third-party cookies, advertisers are likely to find ways to acquire personal information to create tailored advertisements (Kim and Choi 2022). This emphasizes the significance of incorporating privacy concerns into our model. Therefore, we can hypothesize:

**H4.** *As privacy concerns increase, the effect of behavioral advertisements on customer attitudes decreases.*

A summary of our proposed conceptual framework is presented in Fig. 1.

### 3. Research methodology

#### 3.1. Data collection

We conduct a survey to investigate the interplay between OBA and consumer behavior and attitudes among active users of internet and social media platforms. The survey has four questions measuring respondents' online past experiences related to behavioral advertisements, including the frequency of exposure and awareness of past browsing-based, prior search-based, demographic-based, and interests-based online ads. We also measure respondents' attitudes towards these advertisements with five questions and their impulse buying intentions and experiences with five questions. In addition, respondents indicate their concerns regarding their online privacy by responding to five questions. Finally, respondents

rate their online shopping frequencies, along with their age, gender, and socio-economic status as essential control variables. Except demographic and sociographic questions, every question is a 5-point scale. Detailed measurements as well as survey questions are available upon request from the authors.

The survey was administered to 125 participants from Korea and 50 participants from France, all aged between 20 and 50 years old. The samples were composed of 53.6% females and 46.4% males for Korea, and 28% of males and 72% of females for France. By collecting responses from two countries, we aim to provide crucial insights into how cultural differences shape consumer behavior in behavioral advertising and unplanned purchases. These two countries present a stark contrast in Hofstede's cultural dimensions, especially in individualism-collectivism and indulgence-restraint scales. In individualistic societies, personal aspirations and self-reliance take precedence, with a strong emphasis on individual rights and autonomy. Conversely, collectivist cultures place greater importance on group harmony and shared goals, often prioritizing the welfare of family and community over individual interests. Cultures on the indulgent end of the spectrum tend to prioritize personal enjoyment, leisure, and the pursuit of individual desires. In contrast, cultures leaning towards restraint typically place less emphasis on personal gratification and maintain stricter social norms. France, with its high individualism score (71) and balanced indulgence score (48), could reveal a population more sensitive to privacy issues and ad avoidance, yet prone to impulse buying. In contrast, Korea's strong collectivist orientation (individualism score of 18) and competitive society structure may result in different attitudes towards advertising and privacy. We believe this comparison offers valuable perspectives on the interplay between cultural norms, advertising effectiveness, and consumer decision-making processes in diverse markets.

Table 1. Reliability analysis.

Variable	Cronbach's alpha	
	Korea	France
OBA	0.714	0.755
Consumer Attitudes	0.818	0.766
Privacy Concerns	0.503	0.523
Impulse Buying	0.642	0.647

Table 2. Descriptive statistics of variables.

Variable	Korea		France	
	Mean	SD	Mean	SD
OBA	3.680	0.734	4.175	0.788
Consumer Attitudes	3.270	0.821	2.565	0.914
Privacy Concerns	3.616	0.855	3.747	0.835
Impulse Buying	3.278	0.751	2.853	1.017
Gender	1.46	0.501	1.28	0.454
Age	1.85	1.008	2.12	1.335
Income	2.04	0.884	1.96	0.570
Shopping habits	2.71	1.046	2.16	1.095

### 3.2. Analysis and results

Before testing the hypotheses, we measured every variable's reliability. Table 1 summarizes the reliability coefficients regarding the four main constructs, OBA, consumer attitudes, privacy concerns, and impulse buying. By combining answers on questions regarding each construct, we create the four variables. Despite being acceptable and good for OBA and consumer attitudes, Cronbach's Alpha coefficient appears to be on the lower level (<.7) in specific dimensions of our questionnaire. It indicates a potential issue with the internal consistency of the items within those constructs for the two samples. Although having a higher reliability would have been more appropriate, because the lowest coefficient is around 0.5, which represents 50% of reliability, we can consider that this percentage is enough to conduct the hypothesis testing.

With the supporting result of the reliability analysis, we calculate the mean value of all the measurements under each variable for testing hypothesis. Table 2 shows the means and standard deviations of main and control variables of each country.

We first analyze the effect of OBA on consumer attitudes with Korean sample with linear regression and show the result in the first column under "Model 1" of Table 3. In the Korean sample, the first examination focused on the effect of OBA on consumer attitudes, revealing a standardized coefficient ( $\beta$ ) of .388 with a highly significant p-value < .001, which suggests a positive relationship between the two variables and therefore confirms Hypothesis 1. Furthermore, the inclusion of control variables such as age, gender, in-

come, and shopping habits revealed that only income is statistically significant in this relationship ( $\beta = .200$ ; p-value = .025), implying that income also influences consumer attitudes toward OBA.

Subsequently, we investigated the direct effect between OBA and impulse buying behavior with Korean sample using linear regression, resulting in a  $\beta$  value of .356 and a p-value < .001 (see "Model 2" of Table 3). This result suggests that OBA has a positive effect on impulse buying behavior when consumer attitudes are not implied, supporting Hypothesis 2. In this case, none of the control variables appeared statistically significant. Therefore, given the established relationship between OBA and impulse buying behavior, we can now proceed to analyze whether there is a mediation effect of consumer attitudes between OBA and impulse buying behavior, to test H3.

Next, Model 3 of 3 Table 3 indicates that when we analyze the effect of OBA and consumer attitudes on impulse buying of Korean respondents with linear regression, the  $\beta$  coefficient for consumer attitudes is .494 and the p-value is <.001. However, the effect of OBA becomes insignificant in this situation ( $\beta = .165$ , p-value = .058). Since the relationship between OBA and impulse buying behavior does not exist anymore, this outcome signifies a mediation of consumer attitudes in the relationship between OBA and unplanned purchase behavior. Thus, we can conclude that H3 is supported.

Lastly, regarding privacy concerns we proceed to investigate whether its moderation effect would be significant. As the last column of Table 3 show, with a  $\beta$  value of  $-.276$  and a p-value = .004 <.01, we can observe that privacy concerns negatively moderate the relationship between OBA and consumer attitudes while controlling other factors. The significant negative moderation effect is also observed in Fig. 2, in that the effect of OBA decreases (i.e., gets flat) when privacy concerns to up. Therefore, these findings provide support for Hypothesis 4.

Among control variables, only income has a statistical significance ( $\beta = .172$ ; p-value = 0.047 <.05). To rule out alternative explanations from income, we split the sample into "low income" and "high income" groups and ran independent sample t-tests to check for a significant difference between them concerning consumer attitudes and privacy concerns. The t-tests do not show statistically significant differences, with which we can conclude that the level of income does not have a statistically significant impact on consumer attitudes (the complete results of t-tests are available from the authors upon request).

In case of the French sample, the initial testing of Hypothesis 1 (see the first column of Table 4) using linear regression showed statistically non-significant

Table 3. Results of the regression analyses: Standardized  $\beta$  (Korean sample).

	Model 1	Model 2	Model 3	Model 4
Dependent variable				
Consumer attitudes	✓	–	–	✓
Impulse buying behavior	–	✓	✓	–
Independent variable				
OBA	0.388(0.099)***	0.356(0.093)***	0.165(0.088)	0.270(0.115)**
Consumer attitudes	–	–	0.494(0.075)***	–
Privacy concerns	–	–	–	0.002(0.092)
OBA×Privacy concerns	–	–	–	–0.276(0.048)**
Control variable				
Gender	0.045(0.145)	–0.017(0.136)	–0.039(0.119)	0.045(0.141)
Age	–0.018(0.073)	0.073(0.069)	0.082(0.060)	0.030(0.072)
Income	0.200(0.081)*	–0.034(0.076)	–0.133(0.068)	0.172(0.080)*
Shopping habits	–0.136(0.071)	0.003(0.066)	0.070(0.059)	–0.156(0.069)
<b>Adjusted R<sup>2</sup></b>	<b>0.145</b>	<b>0.105</b>	<b>0.309</b>	<b>0.194</b>

(Note: N = 125. Standardized regression coefficients are reported together with standard errors in parentheses. \* p < .05, \*\* p < .01, \*\*\* p < .001, significance levels are two-tailed.)

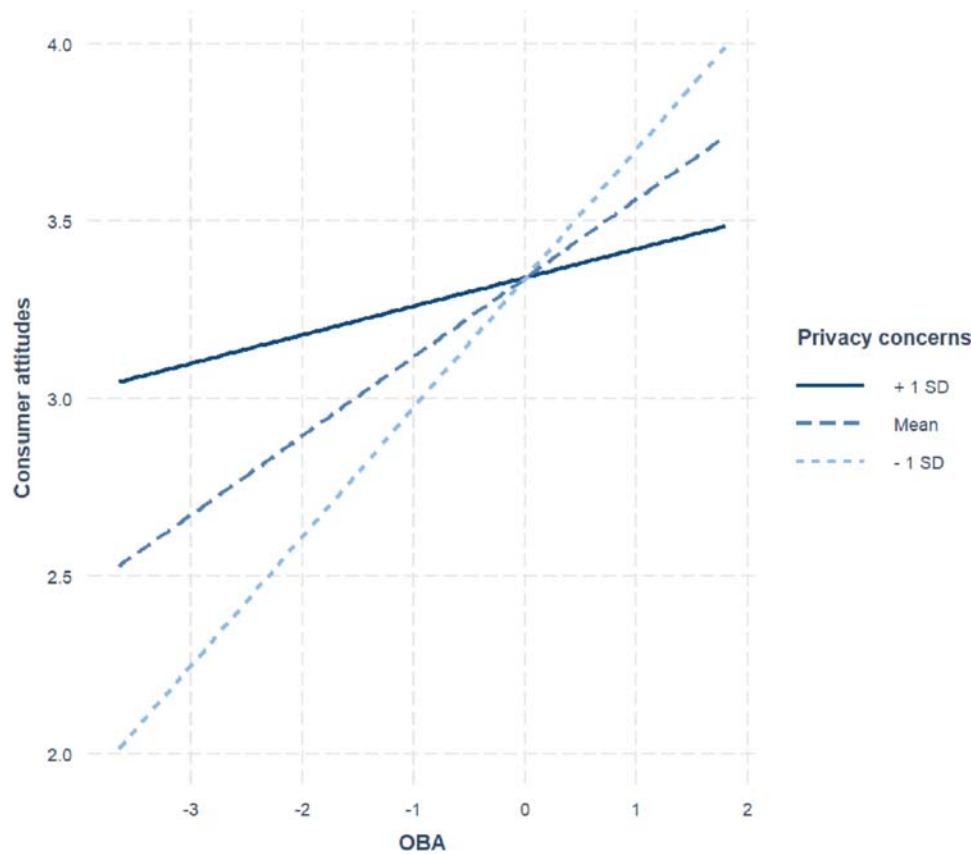


Fig. 2. Interaction plot of OBA and privacy concerns (Korean sample).

results ( $\beta = .223$ , p-value = .141) regarding the effect of OBA on consumer attitudes. Moreover, in this case, when including our control variables, none of them were significant. Therefore, for French people, hypothesis 1 cannot be supported.

Before conducting mediation testing, we analyzed the direct relationship between OBA and impulse buying behavior. Model 2 of Table 4 displays the re-

sults, indicating that OBA has no significant impact on impulse behavior ( $\beta = .104$ , p-value = .472) as well, rejecting hypothesis 2. However, when including control variables, we can observe that shopping habits affect impulse buying ( $\beta = .323$ , p-value = .041).

Despite the absence of a direct relationship between OBA and impulse buying behavior, we decided to proceed with mediation testing to explore other

Table 4. Results of the regression analyses: Standardized  $\beta$  (French sample).

	Model 1	Model 2	Model 3	Model 4
Dependent variable				
Consumer attitudes	✓	–	–	✓
Impulse buying behavior	–	✓	✓	–
Independent variable				
OBA	0.223(0.173)	0.104(0.185)	0.012(0.173)	0.248(0.186)
Consumer attitudes	–	–	0.411(0.147)**	–
Privacy concerns	–	–	–	0.102(0.156)
OBA×Privacy concerns	–	–	–	–0.069(0.171)
Control variable				
Gender	–0.203(0.302)	–0.240(0.323)	–0.157(0.302)	–0.187(0.315)
Age	0.130(0.120)	–0.047(0.128)	–0.100(0.118)	0.142(0.127)
Income	0.055(0.272)	–0.128(0.291)	–0.151(0.266)	0.040(0.279)
Shopping habits	–0.114(0.133)	0.323(0.143)	0.276(0.131)	0.112(0.136)
<b>Adjusted R<sup>2</sup></b>	<b>0.050</b>	<b>0.122</b>	<b>0.266</b>	<b>0.022</b>

(Note: N = 50. Standardized regression coefficients are reported together with standard errors in parentheses. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , significance levels are two-tailed.)

potential effects. The third column of Table 4 shows that OBA's effect is still not significant but consumer attitudes independently influence unplanned purchase behavior ( $\beta = .411$ ;  $p$ -value = .003). While there is a significant effect of consumer attitudes on unplanned purchase behavior, it does not appear to operate through mediation. Therefore, hypothesis 3 is also rejected.

Finally, the moderating role of privacy concerns on OBA and consumer attitudes (Model 4 of Table 4) is not supported. Specifically, the effects are turned out to be insignificant both independently and when control variables were included. The insignificant effect is also visually illustrated in Fig. 3. Hence, we can conclude, hypothesis 4 cannot be supported in the French sample.

Next, given the importance of privacy concerns in consumers' lives and the observed differences in results between the two samples, we also wanted to determine whether Korean or French individuals were more affected by privacy concerns. To investigate this, we conducted another independent samples  $t$ -test to assess potential differences between the means of the two groups. The results of the  $t$ -test are summarized in Table 5 below. The results indicated that Korean respondents (mean = 3.62, SD = .85) have significantly lower privacy concerns than France (mean = 4.23, SD = .88), as corresponding  $t$ -test statistics show ( $t = -4.25$  and  $p$ -value =  $<.001$ ). Therefore, the mean difference of privacy concern across two groups is statistically confirmed.

Lastly, in the survey, we included a question addressing factors that induce privacy concerns in the context of advertisements. In both countries, respondents expressed concerns when their names and locations were mentioned or when ads were tailored based on their browsing activities. Furthermore, we

Table 5. Results of the independent samples  $t$ -test: Differences between Korea and France regarding privacy concerns.

	Korea (N=125) Mean (SD)	France (N=50) Mean (SD)	t	P
Privacy concerns	3.62 (0.85)	4.23 (0.88)	–4.25	<0.001

also find difference on the source of privacy concerns from the two countries. In Korea, the primary concern was the mention of names, followed by location and browsing history. In France, both location and browsing history equally elicited privacy concerns, with the mention of their names closely following.

## 4. Conclusion

### 4.1. General discussion

This paper explores Online Behavioral Advertising that uses cookies and navigation data to personalize advertisement shown to consumers. Specifically, we delve into the effect of OBA on consumers' attitude and impulse buying behavior as well as investigating the moderation effect of privacy concerns which is undetachable from tracking-based advertising. Based on previous literature, we set up four hypotheses and a conceptual framework and test them using survey data from two different countries, Korea and France.

The analysis reveals notable distinctions between the two samples, across all hypotheses. The four hypotheses were confirmed only for the Korean sample but not for the French sample. The Korean sample demonstrates a positive effect of OBA on consumer attitudes. Aligned with the broader trend of personalized advertising, Korean consumers show an attraction towards content that seems to be tailored to their preferences, leading to increased attention, click



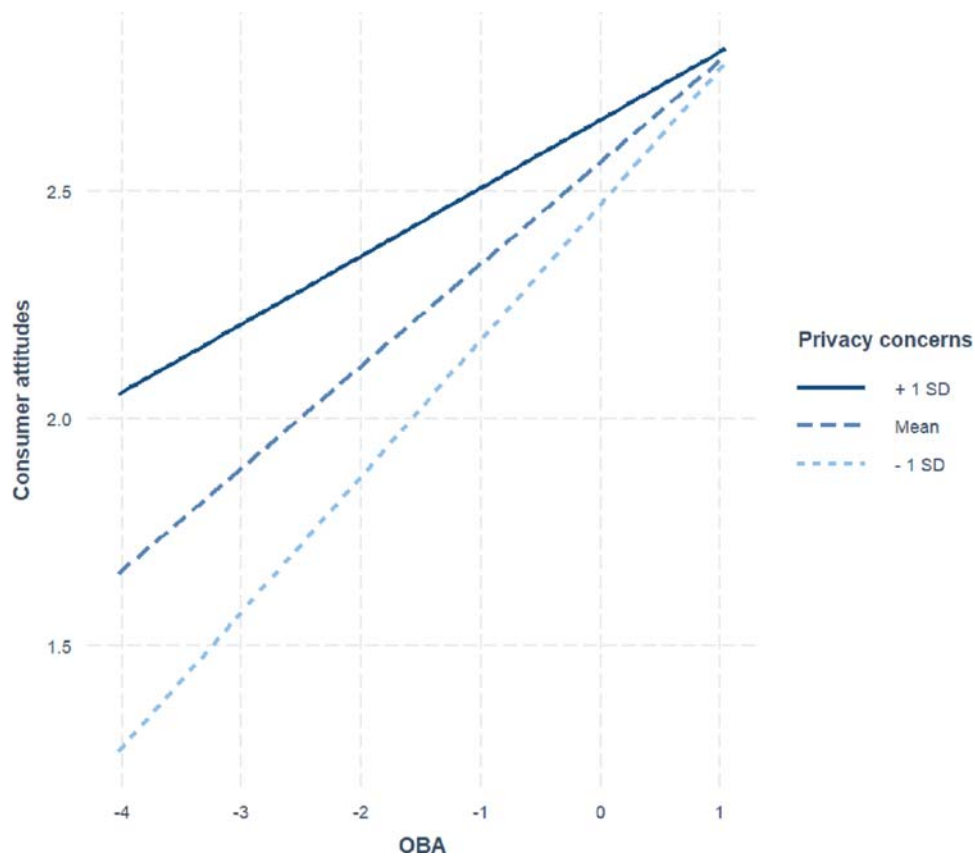


Fig. 3. Interaction plot of OBA and privacy concerns (French sample).

behavior, and, consequently, spontaneous purchase behavior. OBA also has a direct effect on spontaneous purchase behavior: instead of giving attention to the advertisement itself or clicking on it, the consumer may directly search for the product and buy it through another website after seeing the advertisement. Privacy concerns still affect Korean respondents as it negatively moderates the relationship between OBA and consumer attitudes. They will still interact with the advertisements but remain cautious about the potential impact on their personal information and preferences.

In addition, we observed that income impacted consumer attitudes and privacy concerns. Although not statistically significant when comparing low-income and high-income categories, these results still may be meaningful, given that higher income implies a greater purchase power. Therefore, consumers with higher incomes may be more receptive to advertisements aligned with their economic situation. Moreover, a higher income means having better access to technologies and connected devices, signifying increased data collection. Access to these types of technologies might enhance privacy concerns as individuals become more aware of the data being col-

lected and shared. People with higher incomes might also have a higher value of their privacy due to the potential consequences of identity theft or financial fraud that could occur online.

In France, people are well aware of advertising and behavioral advertising but less inclined to interact with it or even pay attention to it. This suggests a form of aversion towards advertising, with nearly 37% of French people using ad-blockers, compared to 29.6% of Koreans (Vibetrace 2022). The percentage of people using ad-blocking programs is mainly due to the overwhelming number of ads which disturbs consumers' browsing activity. This implies that being exposed to too many ads, even if they are personalized, does not necessarily lead to positive reactions. However, we observed that consumer attitudes have an impact on impulse purchase behavior independently of advertisements for French respondents. It suggests that French consumers tend to avoid advertisements but still do not hesitate to purchase when something catches their attention, even if it was not originally planned. During the analysis of the French sample, we observed that shopping habits had an impact on impulse buying behavior. Even if the results were not statistically significant

when comparing low-shopping frequency and high-shopping frequency, shopping habits still may be meaningful regarding impulse buying behavior. First, this can be explained by the logical fact that someone who is used to shopping online will be more tempted to purchase when seeing a product they like. This can also be explained by the 'indulgent vs. restrained' culture in Hofstede's model. Indulgent cultures are defined as cultures that enjoy life, like having fun and fulfilling desires. In opposition, restrained cultures are less focused on leisure and the society is more tight. With an indulgence score of 48, we can tell that France is as indulgent as it is restrained (Hofstede, Hofstede, and Minkov 2010). Being a country that gives high importance to freedom and pleasure, shopping habits and impulse buying may be explained by France's indulgent side.

Regarding privacy concerns in the French sample, although the results are not statistically significant, likely due to a limited and non-representative sample size, there is a noticeable apprehension regarding data collection and the use of private information. To investigate how both groups respond to privacy concerns, we analyzed whether Korea or France was more affected by such concerns than the other country. Our findings revealed that the French population was more sensitive to privacy issues compared to Korea. This difference can be explained by the cultural contrast between the two countries. Hofstede's cultural dimensions theory, which also includes the individualism-collectivism dimension, observed that individualistic cultures prioritize personal needs and goals, emphasizing independence and autonomy. In contrast, collectivist cultures prioritize the needs of the group, valuing family and community over the individual. France, with an individualism score of 71, is considered highly individualistic, while South Korea, with an individualism score of 18 (Hofstede and Bond 1988), exhibits a strong collectivist orientation. These cultural differences may explain certain behaviors. Indeed, French people, influenced by their individualistic culture tend to be more sensitive to privacy concerns compared to Korean people.

These cultural differences could explain the fact that French people are more careful about their privacy. They are more likely to want to keep private information for themselves and maintain their personal space, even online. Along with the collectivism/individualism dimension, in the context of advertising, French people's feeling of distaste towards advertisements can also be explained by the fact that advertisements that seem intrusive or that disturb users' browsing activities can be negatively perceived because they interfere with personal space and autonomy. Korea is still affected by privacy

concerns but not on the same level as France. As mentioned before, Koreans may feel concerned about their privacy when it implies their identity or potential risks of financial fraud as income is important to them. Hofstede's cultural dimensions also include masculine vs. feminine dimensions. Masculinity represents a desire for achievement and success whereas femininity is more modest and focused on quality of life. Despite being qualified as a feminine society (masculine score of 39), Korea is still a very competitive and hard-working society, including high inequalities (Lee 2020). This may explain why income holds a crucial place in the lives of Koreans.

Lastly, as previously mentioned, we observed the potential factors that make an ad invasive. In the Korean context, behavioral advertising attracts attention and clicks but it has been observed that if some details such as the user's name, location, or information from their browsing history were included, they would perceive the advertisement as intrusive. These findings imply that the inclusion of such factors in advertisements could highly influence their effectiveness.

#### 4.2. Limitations and future research directions

Throughout this research, we encountered several limitations. First, the two samples used have a notable difference in size, resulting in an imbalance in the outcomes between the two groups. Especially, the participants in France have potential issues, in terms of the size (French sample size=50; Korean sample size=125) and the skewness (the percentage of French female respondents=72%; the percentage of Korean female respondents=53.6%). The small size and unbalanced proportion could drive the insignificant statistical results from the French sample. For example, female consumers could be more sensitive to impulse buying behavior than male consumers. In future research, to enhance the accuracy of the results and rule out alternative explanations, it would be appropriate to obtain balanced samples on size and composition.

Our conceptual model offers numerous avenues for expansion through the inclusion of additional mediating and moderating factors. For example, OBA strengthens consumers' personal relevance that triggers positive emotions, potentially leading to impulsive buying behaviors. This suggests a possible serial mediation pathway worth exploring. Furthermore, external factors such as the use of ad-blocking software or the type of device used for browsing (mobile vs. desktop) could influence the likelihood of impulsive purchases in response to OBA exposure. To advance this research, it would be valuable to incorporate measures that capture consumers' emotional

and cognitive thinking processes and the nuances of online shopping and browsing behaviors. Expanding the conceptual model in these directions not only contributes significantly to the existing literature but also yields rich insights for managerial applications.

Lastly, combining a survey and an experiment would provide more insights into real consumer behavior, and therefore more precise and reliable results. Moreover, the combination with experiments would allow us to compare behavioral advertising and regular advertising's impact on consumer attitudes and spontaneous purchase behavior, while also enhancing our understanding of the moderating effect of privacy concerns. Also, despite not being effective in measuring every variable of this model such as privacy concerns, it would be appropriate to use web analytics to measure click-through rates on particular websites.

### Conflict of interest

The authors declare that there is no conflict of interest.

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