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Perceived Consumer Discomfort of Online Video Advertising: Analysis of Characteristics by Consumer Cluster

Minjung Shon[1] and Daeho Lee[2]*

[1] Software Policy & Research Institute, South Korea
[2]Department of Interaction Science, Sungkyunkwan University, South Korea

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Various online video platforms provide abundant advantages and benefits; however, consumers are found to be getting uncomfortable with the proliferation of online video advertising. Some have already availed of adblocking services or subscribed to paid services, in an attempt to reduce the discomfort of online video advertising. Using the mediating effect of the structural equation model, this study proves the factors that cause discomfort to consumers when online video advertisements are streaming. In addition, this study uses the clustering method to resolve behavioral differences according to consumers' traits, comprising content consumption, advertising, and online shopping. Consequently, consumers are divided into two clusters: cluster 1 identified as an active searching and careful consideration group and cluster 2 as an active watching and shopping group. It was only in cluster 2 that the mediating effect shows that if long advertising is interesting, its discomfort decreases.

Keywords: Ad avoidance, Advertising discomfort, K-means clustering, Mediating effect, Structural equation model

Introduction

As the number of online video platforms and content increases, so is the amount of online video advertisements, and consumers are experiencing difficulty in recognizing the advertisements. However, too many advertisements can cause ad clutter, which can result in deteriorated consumer's attitude toward advertisements and ad avoidance. Advertising can get injected to online content for free, which contributes to diversification of content, but the problem is that its value has seen a decrease due to excessive expansion.

Online advertising has been growing explosively, much higher than traditional media broadcast advertising revenue. In particular, social media platforms, e.g., YouTube, Facebook, and Instagram, are driving the rapid growth of online marketing. And, video-oriented content heavily replaces to the text and image-oriented content. The latter generally requires consumers to watch a video ad for a certain amount of time before viewing their chosen video content; this is currently considered the fastest growing online advertising format.[1,2]

Recently, online streaming platforms have been bombarded with platform operators' indiscriminate advertising; consumers are spending increasingly more time on watching advertisements and accordingly become tired of them. Consumers become uncomfortable with advertising and avoid or even block it.[3]

If the platform identifies and addresses the factors that contribute to the negative perception of consumers, it can not only increase advertising efficiency, but also increase consumers' positive awareness of advertising and products. Kelly *et al.*[4] have emphasized the need to provide advertising with improved quality and clearer rules to change the consumer's uncomfortable perception of advertising.

According to related studies[5,6], factors, including length, location, and frequency of advertising, can significantly bring forth consumer discomfort. Hence, this study examines these specific factors. In addition, according to Ducoffe's study[5], discomfort can be reduced if the ads are interesting or informative. Therefore, this study also examines the mediating effects of perceived enjoyment and informativity on perceived discomfort of advertising, and we also set a model using the structural equation method (SEM).

Further, this study adds new implications by classifying clusters according to the consumers' characteristics and analyzing the difference in discomfort.

*Author for Correspondence
E-mail: daeho.lee@skku.edu

Literature Review

Advertising is the main driving force of online platform economy. A social media platform, a representative two-sided market, links content providers and consumers, where they provide a structure that allows advertisers to provide advertisements to consumers in exchange for free services. Internet marketing is considered a more effective medium compared to traditional one, because it is less regulated and can be viewed by consumers anytime, anywhere. Indeed, online marketing is booming in the advertising market at large.[7] Advertisers should give consumers with something that can appeal to them, such as information or enjoyment.[5] Internet advertising is immediately accessible, repeatable, and timely delivered.[5] In addition, it can be combined with various advanced technologies and customized depending on the interests of consumers.[5] However, such adclutter makes it difficult to attract consumers' attention, and adblocking is becoming a trend.[8]

Companies need to be aware of what makes consumers uncomfortable with, and try to avoid, products or services; determining and addressing the cause of the problems are both necessary. Previous research on company innovation has focused that companies must respond carefully to consumer reactions.[9] In addition, efforts to innovate from the perspective of non-major and new customers are important to the company innovation.[9]

Advertising discomfort is increasing on the over-the-top (OTT) platform, an online streaming media service provided directly to consumers.[10] Consumers have avoided or blocked online video advertisements independently, and some OTT platforms have already offered paid or premium services to block ads. If the OTT platform is informed of the degree to which consumers feels discomfort, it will be possible to increase advertising revenue while reducing consumer discomfort.

According to utility theory[11], consumers will decide to trade when the expected utility of something is greater than others. Because the content consumption utility is greater than the discomfort of advertising, customers are found to consume advertisements for a certain period of time within or preceding free content. Additionally, according to the two main types of motivation for consumers from self-determination theory[12], the internal motives are what consumers select to enjoy themselves, and the external ones are selected to avoid external punishment or, conversely, to receive rewards. The discomfort of the ad may cause to avoid or block them, or opt them. In the theory of reasoned action (TRA)[13], behavior can be predicted by taking into account the effect of attitudes on behavioral intentions. If this study can identify the degree of discomfort of advertising, it is thought that it will be possible to infer the actual adblocking behavior or the attitude of moving to another platform. In addition, the theory of planned behavior[14], an extension of TRA, was judged to be a more appropriate theory by adding perceptual behavior control that affects behavioral intentions. The perception of behavioral control is what consumers judge, whether advertising is pleasurable or helpful in providing information.

The K-means clustering method is an analysis technique that measures the similarity between objects with given data without prior information and assigns them to the nearest group.[15] K-means clustering method can be used to analyze behavioral differences based on consumer characteristics. A study focused on increasing advertising efficiency through behavioral targeting based on the K-means clustering[16], while another used this method to identify the main goals of selecting the search engine.[17] Therefore, if clusters can be grouped according to the consumers' traits, the discomfort factors of advertising can be distinguished.

Therefore, in this study, the K-means clustering method divides groups according to consumption pattern of online video contents, compares consumer preferences, and analyzes factors that cause consumer discomfort in online video advertising using SEM.

Research Model

This research model essentially intends to focus the relationship between the advertising factors and the consumer discomfort with advertising. Based on the relevant theory and literature, the variables are explained in Table 1.

Based on existing theories, the advertising's location, length, and frequency are independent variables, and the degree of discomfort of advertising area dependent variable, and the advertising's entertainment and informativity are used as mediators to measure discomfort. It is assumed that advertising functions, including location, length, and frequency, will directly increase consumer discomfort, but if advertising is interesting or profitable, discomfort can be reduced.

Table 1 — Variables description

	Variables	Explanation
Perceived behavioral control[14]	Perceived advertisements' entertainment[5,18]	Personal belief that advertisements provide entertainment
	Perceived advertisements' informativity[5,18]	Personal belief that advertisements provide information
Attitude[13]	Perceived advertisements' location[19]	The degree of advertisements' location that consumers perceive
	Perceived advertisements' length[20]	The degree of advertisements' length that consumers perceive
	Perceived advertisements' frequency[21]	The degree of advertisements' frequency that consumers perceive
Behavioral intention[13,21,11]	Perceived discomfort of advertisements[22]	The degree of discomfort in advertising that consumers feel

Additionally, it is assumed that the perceived discomfort of advertising will differ depending on the type of consumer. Based on the survey on consumer characteristics, consumers were classified and analyzed through the K-means clustering method.

If the video advertising along with video content, it is difficult for consumers to avoid it during the advertising period, and it will interfere with viewing if it is displayed as a pop-up that covers the screen.[5,18] If the online platform offers free content, consumers are typically watching the advertising for more than five seconds at the moment. Which is relatively inconvenient if the advertising is long and there is no "skip"' or "X" buttons.[22] In addition, if similar or identical advertisement is repeated, the consumer's discomfort increases.[21] However, if the promotion is interesting or useful, the discomfort of advertising reduces.[5,18]

Therefore, this study has assumed that determining the degree of advertising discomfort perceived by consumers can affect the consumer's "behavioral intention". In addition, the functions of advertising can affect the perceived "attitude". Additionally, the degree of advertising discomfort depends on the degree of perceived information or enjoyment, which affects the "perceived behavioral control". Following are the hypotheses of the study.

H1 As the discomfort from the location of the video advertisement increases, the discomfort of the advertising rises.

H2 As the length of the video advertisement increases, the discomfort of the advertising rises.

H3 As the frequency of the video advertisement increases, the discomfort of the advertising rises.

H4 Interesting video advertisements decrease the video advertising discomfort.

H5 Informative video advertisements decrease the video advertising discomfort.

Factors to increase the advertising efficiency lead consumers to perceive advertising negatively. For example, when an advertisement occupies the entire screen, interferes with consumers' behavior, is long, or is played repeatedly.[5,6,19] Conversely, another study asserts that consumers do not only like short videos but also indicates that the content of the video also matters.[23] Therefore, if there is something to be gained from the content of the adverting, the consumer can evaluate it positively, but the excess functions will lead to negative perception of advertising.

H6 The discomfort from the location of video advertising decreases the effect of the interesting video advertisement.

H7 The discomfort from the location of video advertising decreases the effect of the informative video advertisement.

H8 As the video advertisement length increases, the discomfort of the interesting video advertisement increases.

H9 As the video advertisement length increases, the discomfort of the informative video advertisement increases.

H10 As the video advertisement frequency increases, the discomfort of the interesting video advertisement increases.

H11 As the video advertisement frequency increases, the discomfort of the informative video advertisement increases.

The research model in Fig. 1 is designed from the 11 hypotheses above.

Methodology

Survey and Data

Before conducting the main survey, a pilot test was conducted on a total of 20 people, evenly distributed by age. The questionnaire was revised based on the test results. The main survey was conducted online and has included 300 people residing in South Korea during the 2019.5.8–2019.5.14 period. The respondents watched online video advertising within the past week at least once in the last week.

Respondents' characteristics like demographic and video content consumption patterns are explained in Table 2.

There liability and feasibility analysis of the observation variables for six latent variables are shown in Table 3. After excluding items lacking

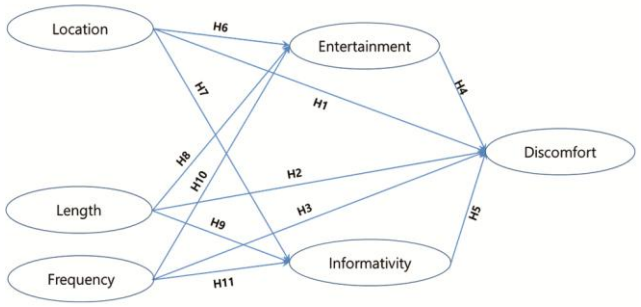

Fig 1 — Research model

Table 2 — Respondents' characteristics (n=300)

		Respondents (#)	Percent (%)
All		300	100
Gender	Male	150	50.0
	Female	150	50.0
Age (years)	20–29	73	24.3
	30–39	75	25.0
	40–49	76	25.3
	Over 50	76	25.3
Average monthly telecommunication fee (KRW)	Under 10,000	3	3.0
	10,000–30,000	102	34.0
	40,000–60,000	136	45.3
	70,000–90,000	46	15.3
	Over 100,000	13	4.3
Unlimited data services	Subscription	125	41.7
	None	175	58.3

* USD 1 equaled KRW (Korean won) 1,209.00 as of June 6, 2020.

Table 3 — Latent variables' convergent validity

Latent variables	Items	Standardized estimates	C.R.	AVE	Construct reliability	Cronbach's α
Perceived entertainment of advertisements	Entertainment 1	0.729	–	0.694	0.932	0.920
	Entertainment 2	0.800	17.418			
	Entertainment 3	0.825	14.179			
	Entertainment 4	0.848	14.602			
	Entertainment 5	0.820	14.101			
	Entertainment 6	0.815	14.004			
Perceived informativity of advertisements	Informativity 1	0.734	–	0.698	0.920	0.909
	Informativity 2	0.815	14.134			
	Informativity 3	0.862	14.995			
	Informativity 4	0.848	14.736			
	Informativity 5	0.818	14.184			
Perceived location of advertisements	Location 1	0.806	–	0.628	0.910	0.899
	Location 2	0.74	13.778			
	Location 3	0.787	14.887			
	Location 4	0.823	13.893			
	Location 5	0.803	15.275			
	Location 6	0.711	13.120			
Perceived length of advertisements	Length 1	0.762	–	0.615	0.712	0.900
	Length 2	0.75	13.347			
	Length 3	0.785	14.081			
	Length 4	0.749	13.340			
	Length 5	0.745	13.257			
	Length 6	0.746	13.280			
Perceived frequency of video advertisements	Frequency 1	0.752	–	0.734	0.933	0.918
	Frequency 2	0.824	18.036			
	Frequency 3	0.881	15.913			
	Frequency 4	0.868	15.65			
	Frequency 5	0.818	14.633			
Perceived discomfort of advertisements	Discomfort 1	0.803	–	0.733	0.956	0.942
	Discomfort 2	0.790	16.904			
	Discomfort 3	0.775	15.781			
	Discomfort 4	0.811	16.206			
	Discomfort 5	0.833	16.680			
	Discomfort 6	0.853	17.661			
	Discomfort 7	0.838	16.075			
	Discomfort 8	0.842	16.598			

validity, the final 36 items were used, and each latent variable appears to exceed each reference value of standardized estimates, construct reliability (C.R.), Cronbach's α, average variance extracted (AVE). The independent variables are the advertising's location, length, and frequency, the dependent variable is the advertising discomfort, and the mediator variables used are entertainment and informativity of advertising. The correlation coefficients were determined to be less than 0.9 through Pearson correlation analysis, so there was no multi-collinearity problem.

As shown in Table 4, the model's fitness index result was good.

Estimation Results

After verifying the model fit, the path coefficients were estimated and hypotheses were verified as shown in Table 5. The entertainment factor of advertising was judged to have a significantly negative effect, and the factors like advertising's location, length, and frequency affect the discomfort of advertising.

Table 4 — Fit indices of the research model

Fit index (Acceptable range)	Results
CMIN/DF (≤2)	1.942
RMR(≤0.05)	0.038
NFI(≥0.90)	0.880
CFI(≥0.90)	0.937

Significance Analysis of Indirect Effect

The phantom variables are used in this multiple mediator model to utilize mediators to identify the path through each variable, and bootstrapping is applied. As a result, the two routes: "Length → Entertainment → Discomfort" and "Frequency → Entertainment → Discomfort" have significant effect as shown in Table 6. If "Length" is an independent variable and "Entertainment" is considered as a mediator variable, the indirect effect estimate is lower than the direct effect estimate. In addition, if "Frequency" is an independent variable and "Entertainment" is considered as a mediator variable, the indirect effect estimate value is lower than the direct effect estimate.

Clustering Method

The advertising's discomfort is expected to vary depending on the consumer cluster. The variables used in the cluster are listed in Table 7. Firstly, we considered that device differences would be present in the consumption of video content.[24] The convenience of using a smartphone anytime, anywhere is apparent, but the multitasking is impossible, and a limited screen can be inconvenient to use. In addition, the average monthly subscription fee can be used to distinguish consumers' smart phone usage. We considered that the number of exposures to a video

Table 5 — Hypotheses evaluation

	Hypothesized relationships	Estimate	S.E	Results
H1	Location → Discomfort	0.103*	0.053	Adopt
H2	Length → Discomfort	0.421****	0.098	Adopt
H3	Frequency → Discomfort	0.178*	0.097	Adopt
H4	Entertainment → Discomfort	−0.276**	0.109	Adopt
H5	Informativity → Discomfort	−0.01	0.109	Reject
H6	Location → Entertainment	−0.095	0.071	Reject
H7	Location → Informativity	−0.162**	0.072	Adopt
H8	Length → Entertainment	−0.236*	0.124	Adopt
H9	Length → Informativity	−0.018	0.122	Reject
H10	Frequency → Entertainment	−0.21*	0.127	Adopt
H11	Frequency → Informativity	−0.391**	0.129	Adopt

Note: *p<0.1; **p<0.05; ***p<0.01, ****p<0.001

Table 6 — Indirect effect verification

Indirect effect	Estimate	S.E.	90% CI	
			Lower bound	Upper bound
Location → Entertainment→ Discomfort	0.026	0.028	−0.004	0.093
Length → Entertainment→ Discomfort	0.065	0.049	0.010	0.184
Frequency → Entertainment→ Discomfort	0.058	0.048	0.002	0.169
Location →Informativity→ Discomfort	0.002	0.023	−0.033	0.044
Length →Informativity→ Discomfort	0.000	0.017	−0.024	0.030
Frequency →Informativity→ Discomfort	0.004	0.051	−0.074	0.089

*Bootstrap sampling 2,000 times, estimates are non-standardized.

Table 7 — Variables used for K-meansclustering

		Respondents (#)	Percent(%)
All		300	100
Online video content Viewing device (Rank 1)	PC/laptop	74	24.7
	smartphone	218	72.7
	tablet	8	2.7
Average monthly telecommunication fee (KRW)	0–30,000	105	34.5
	40,000–60,000	136	45.6
	70,000–90,000	46	15.4
	Over 100,000	13	4.3
Subscription to unlimited data service	Subscription(1)	125	41.7
	No subscription(2)	175	58.3
Preferred platform for Internet access (Rank 1, 2, 3)	portal	31	10.5
	SNS	5	1.69
	OTT	2	0.6
	Portal + SNS	66	22.3
	Portal + OTT	70	23.6
	SNS + OTT	21	7.1
	Portal+ SNS + OTT	101	34.12
Preferred platform for online video content (Rank 1, 2, 3)	Portal	90	30.0
	SNS	2	0.7
	OTT	3	1
	Portal + SNS	77	25.7
	Portal + OTT	97	32.3
	SNS + OTT	3	1
	Portal+ SNS + OTT	28	9.3
Average video contents Viewing per day (average #: 6)	Under 2	69	23.0
	3–5	159	53.0
	6–10	67	22.3
	Over 11	5	1.7
Average video content Viewing time per day (average 37.5 mins)	Under 20 mins	46	11.4
	21–40 mins	83	20.5
	41–60 mins	104	25.7
	41–99 mins	109	27.0
	Over 100 mins	62	15.3
Whether to watch online video ads to the end	Yes (1)	54	18.0
	No (2)	246	82.0
Purchase through online video ads	Purchase	251	83.7
	Middle	43	14.3
	No purchase	6	2.0
Average time spent per an Internet shopping	0–10 mins	22	9.0
	11–20 mins	68	28.0
	21–30 mins	85	35.0
	31–90 mins	68	28.0
Average number of Internet shopping per month	0–5	215	71.7
	6–10	65	21.7
	11–15	20	6.7
Average Internet shopping cost per month (KRW)	Under 100,000	174	58.0
	110,000–200,000	62	20.7
	210,000–700,000	64	21.3

advertising was related to the average daily views and hours of online video content. The platforms that offer online video content can be divided into online portal, social network service (SNS), and OTT. An online portal is a door, gateway through which users can navigate websites.

Consumers were classified into different clusters through the K-means clustering method.[25] The number of clusters (K) must be determined prior to running the n the K-means clustering method, and the "NbClust" package of the R program was used to determine the initial optimal K-value.[26]

In this study, as shown in Fig. 2, two clusters were recommended.

The characteristics of clusters are illustrated in Table 8. When comparing the average of trait factors, there was a clear difference about the time spent on video content and the online shopping cost. Cluster 2 has high frequency and time to watch video content. In addition, the average Internet shopping time, frequency and cost were found to be higher than that of cluster 1. However, cluster 1 is more cautious about online content and online shopping, and is more sensitive to advertising discomfort.

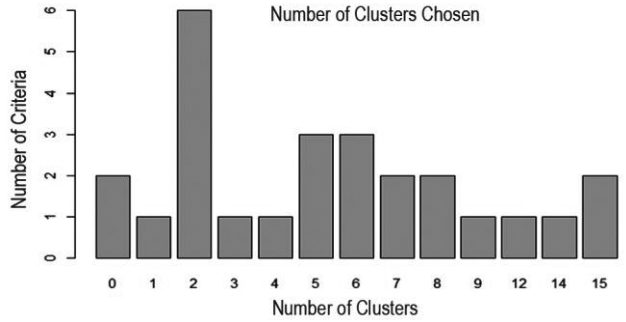

Fig. 2 — Clustering results

Table 8 — Cluster characteristics

Factors	Cluster 1 (n = 124)	Cluster 2 (n = 176)
Device	1.71	1.91
Monthly fee	4.18	5.67
Number of video content	3.68	6.41
Watching time of video content	47.69	82.24
Subscription of unlimited data	1.67	1.42
Internet site	4.89	5.36
Video site	4.91	4.94
Whether to watch the ads to the end	1.79	1.88
Buy through ads	1.72	1.65
Avg. time spent per online shopping session	21.56	37.15
Avg. number of online shopping	3.23	8.02
Avg. online shopping cost	8.97	25.74

The examination results whether differences exist in advertising discomfort factors for clusters 1 and 2 are listed in Table 9 and Table 10 shows the research model fit indices. Cluster 1 consumes video content relatively low, resulting in fewer online video advertising exposures. When it comes to frequent repetition of similar advertising, cluster 1 experiences discomfort. However, if advertising that appears frequently is fun, then the complete mediating effect occurs and the discomfort will be reduced. Furthermore, the discomfort with long advertising has a direct effect. Concerning cluster 2, higher video content consumption increases the number of online video exposures. This demonstrates that all advertising factors increase the degree of discomfort. The level of discomfort is found large in the order of the length of advertising, the location of one, and the frequency of one. Additionally, if the advertising is interesting even if it is long, indirect effect and partial mediation effect occurs. Therefore, advertisers should carefully consider about advertising length, because most consumers are sensitive to advertisement length. However, only if advertising is fun, the discomfort of the advertising length is seen to get reduced. Most consumers are experiencing the greatest discomfort concerning the length of advertising; the other advertising techniques are considered objects that add to consumers' discomfort.

Table 10 — Fit indices of the research model by cluster analysis

Fit index (acceptable range)	Results of research model	
	Cluster 1	Cluster 2
CMIN/DF(≤2)	1.56	1.91
RMR(≤0.05, 0.05~0.08 acceptability)	0.067	0.072
CFI(≥FI(2)	0.91	0.90

Table 9 — Hypotheses evaluation by cluster

Hypotheses	Relationships	Cluster 1 (n = 124)		Cluster 2 (n = 176)	
		Estimate	S.E.	Estimate	S.E.
H1	Location→Discomfort	−0.093	0.085	0.224****	0.067
H2	Length →Discomfort	0.543****	0.149	0.299**	0.125
H3	Frequency →Discomfort	0.220	0.164	0.216*	0.12
H4	Entertainment →Discomfort	−0.385*	0.217	−0.28*	0.137
H5	Informativity→Discomfort	0.189	0.223	−0.084	0.134
H6	Location→Entertainment	−0.155	0.133	−0.064	0.081
H7	Location→Informativity	−0.192	0.129	−0.144*	0.083
H8	Length →Entertainment	−0.097	0.213	−0.333**	0.148
H9	Length→Informativity	0.013	0.207	−0.077	0.145
H10	Frequency →Entertainment	−0.509**	0.243	−0.041	0.776
H11	Frequency →Informativity	−0.667***	0.241	−0.240	0.103

Note: * p<0.1; ** p<0.05; *** p<0.01, **** p<0.001

Table 11 — Indirect effect verification of Cluster 2

Effect	Estimate	S.E.	90 % CI	
			Lower bound	Upper bound
Location → Informativity →Discomfort	0.012	0.027	-0.012	0.078
Length → Informativity → Discomfort	0.006	0.033	-0.019	0.092
Frequency→ Informativity → Discomfort	0.020	0.050	-0.021	0.141
Location → Entertainment → Discomfort	0.018	0.029	-0.011	0.089
Length → Entertainment → Discomfort	0.093	0.079	0.010	0.263
Frequency → Entertainment → Discomfort	0.011	0.048	-0.043	0.123

*Bootstrap sampling 2,000 times, estimates are non-standardized.

In Table 11, the indirect effect was demonstrated using the phantom variables. If along advertising is determined to be interesting, the discomfort within cluster 2 is reduced. So, advertisers should focus on short, fun advertising.

Discussion

This study began by analyzing the double anomaly in which the number of consumers blocking advertising or subscribing to paid services is increasing while online video content consumption and video advertising generate more revenue. In addition, video advertising was selected as a research subject among online advertising because it is considered a great discomfort to consumers who are only able to consume the video content after watching the video advertisement.

According to the study results, the commonality between cluster 1, cluster 2, and overall results is that advertising should first be enjoyable. This is because advertising is perceived as time-consuming, and consumers have low expectations for advertising, such as sourcing valuable information. The consumers avoid advertising when negative experiences accumulate.[27] Instead, enjoyable advertising are easily consumed; consumers can enhance their satisfaction with pleasurable video advertising, creating positive attitudes toward the advertising.

Conversely, according to the existing research, consumers want to relatively comfortable, intuitive understanding, and enjoyment through content, and they want to consume content as easily as "snack".[28] Consumers prefer video content because it can be easily consumed on smartphone screens. In most video advertising, consumers do not expect to receive valuable information. In Speck and Elliot's study of media advertising avoidance, the highest avoidance was observed on TV[29] and consumer discomfort was clearly higher in video content. Cho and Cheon found that internet advertising avoidance was higher due to the increased congestion.[27,30]

Consumers tend to be aware of advertising content when advertising only provide basic functionality, but when the advertising repeats multiple times or plays in various locations, the consumers rapidly loses interest and does not focus on them. Therefore, existing studies have shown that excessive advertising that causes discomfort can have adverse effects, such as giving consumers a rather negative image of their product.[29]

Conclusions

According to the previous researches, people who block advertising are more interested in advertising and more sensitive to advertising, and advertisers try to focus their advertising to consumers who are less sensitive to advertising and who do not avoid them. However, as growth occurs in the number of adblocking programs and ad-free paid content services and platforms, it would be worthwhile to look at the causes of changes and consumer patterns.

This study found that consumers could reduce the discomfort about a pleasant advertising, and the discomfort of advertising has increased due to functions to increase the effectiveness of the advertising. In addition, although it is a long one, if it is interesting, the discomfort of advertising decreased, but the discomfort in the frequency and location of the advertising did not have a mediating effect. Also, the discomfort of a long advertising was decreased if it was interesting. In particular, in cluster 2, consuming ample video content and having abundant online activities were well characterized. Conversely, cluster 1's discomfort only increased with long and frequently repeated advertisements. However, it should be considered that these results may have limitations due to the limited number of samples.

We expect platform providers are expected to consider consumer more effectively when providing advertising. A flood of advertising can lead to situations where advertising is not properly valued, and appropriated advertising can have a good impact

on both providers and consumers. Consumers can use the content for free by watching the advertising, but this can lead to blocking and avoiding the advertising, which leads to a decrease in providers' revenue and in turn, fears that the internet ecosystem will decrease.

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