

## DON'T CRY FOR NO CLICK-ONS! EXPLORING THE MERE EXPOSURE EFFECT AND AROUSAL THEORY<sup>1</sup>

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### ABSTRACT

This study aims to verify how keyword advertisers can capture consumer attention in SERPs and thus improve consumer attitudes toward those brands. Across two experimental studies, the results found that the consumers were exposed to brands in keyword ads during search tasks, and the brands that were shown multiple times received better brand attitudes than those which were only displayed once. This study is based on how arousal determines cognitive resource allocation and found that arousal moderates the relationship between the length of exposure to keyword ads and brand attitudes after consumers enter the SERPs. For consumers in a high-arousal state, the effect of repeated exposure to keyword ads will be weakened. However, for low-arousal scenarios, consumers have relatively more resources to allocate to peripheral information, which enhances the effect of repeated exposure to keyword ads.

Keywords: Keyword ad; The mere exposure effect; Arousal theory; Cognitive resources; Galvanic skin response

### 1. Introduction

*“Keyword ads allow my products to reach potential customers with specific interests and bring people to go over in more details through click. However, I recently found that the ads are not so effective, and no one clicks at all. Even if there is, I strongly suspect that competing businesses or advertising agencies may click on my PPC ads to waste money.... do keyword ads really work?” (From an interview with a keyword advertiser by this study)*

The comment above reveals advertisers' disappointment and doubts about the effectiveness of keyword ads. Can keyword ad effectiveness be measured only by clicks? This study addresses this issue and discusses the effectiveness of keyword ads from different perspectives.

Keyword ads are a form of search engine marketing, which helps advertisers select one or more specific search strings related to their products or services that are used online to query information (Jansen and Schuster, 2011). A search engine results page (SERP) includes both organic results and paid keyword ads (Naldi et al., 2010, Gauzente and Roy, 2012). Advertisers only pay advertising fees when consumers click on an ad (Blake et al., 2015). Keyword advertising was originally developed to mimic search engine results to break through cognitive ad avoidance. Because this type of advertising provides information based on consumers' keyword searches, it better matches consumers' expected message (Yanwu et al., 2018). However, research has verified that the preattentive processing of SERPs will recognize the keyword ad and trigger cognitive ad avoidance, subconsciously avoiding fixating on keyword ads. In this case, consumers perform physical ad avoidance (Lo et al., 2014), meaning that, even if they have the same

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information in the area of the keyword ad, they will choose to click the organic results rather than the sponsored search results (Lo et al., 2014). Are keyword ads not useful? This study is not so pessimistic. The motivation behind this study is to explore how elements in SERPs affect consumer browsing of keyword ads to capture consumer attitudes toward brands, providing advertisers and search engine providers with information regarding the effectiveness of advertising.

Prior research has proven that consumers take less action in keyword ad areas than in organic search result sections; however, through gaze behavior, their messages will be processed and impact consumers (Lo et al., 2014). Furthermore, the mere exposure effect asserts that, where various influencing factors remain consistent, as long as the recipient is repeatedly exposed to the stimulus, even if unconsciously, the receiver's attitude toward the stimulus will be more positive (Zajonc, 1968; Bornstein, 1989; Winkielman and Cacioppo, 2001). This study argues that, even if keyword ads are not directly related to consumers' search tasks and consumers do not click on keyword ads, as long as the keyword ads are repeated, consumer attitudes toward brands in that keyword ad will continue to improve as the number of exposures increases.

Also, consumers type string search information into search engines, implying they will target their browsing behavior to specific information search tasks. When SERPs appear, organic results are central information to the primary task, whereas sponsored results are peripheral information on the page; thus, the user's cognitive resources must be prioritized to the organic results, while the remaining cognitive resources will be given to sponsored results. When people have higher levels of arousal, more cognitive resources will be placed on central information (Easterbrook, 1959, Mandryk et al., 2006, Zajonc, 1965). Thus, we propose that when people are in a relatively low arousal state, there will be higher browsing behaviors for keyword advertising (peripheral information), and this unconscious gaze further leads to higher brand attitudes. In other words, if the background color of a manipulated SERP triggers a consumer with a relatively low level of arousal to enter a page, as compared with when they have a higher level of arousal, the brands in keyword ads receive a relatively large amount of cognitive resource allocation, enhancing the effect of keyword ads repeated exposure on the consumer's attitude toward the brand. However, when the consumer is triggered in a state of higher arousal, because consumer cognitive resources are more focused on the main tasks, there are less cognitive resources remaining that can be dedicated to peripheral information and the moderating effects of arousal on the relationship between repeated exposure to keyword ads and brand attitude are weak.

Previous studies have identified that when SERPs are presented to consumers, they are inclined to click the organic results rather than the sponsored results (Lo et al., 2014). This study extends this result and explores how keyword ads that consumers do not click on can improve advertising effectiveness through repeated exposure effects and how the impact of arousal state on cognitive resources can increase consumers' attitudes toward the keyword ad brand. Theoretically, this study provides insights into the psychological mechanisms underlying these effects. Practically, it provides insights for combining exposure frequency and arousal state to maximize keyword advertising effectiveness.

## **2. Theoretical Background**

### **2.1. Mere exposure effect**

Zajonc proposed the mere exposure effect in 1968 (Zajonc, 1968). According to the concept of repeated exposure, it was proven that attitudes toward the stimulus becomes positive after repeated exposures, even if a stimulus has no particular meaning for people. This effect exists not only in the case of stimuli with full semantic meaning, but letters, numbers, and nonverbal stimuli of any kind increases with exposure. A high positive correlation exists between the frequency of repeated exposures and the degree of preference (Zajonc, 2001).

Previous studies have also pointed out that the mere exposure effect is produced not by the subjective impression of the stimulus, but by objectively repeating the exposure (Zajonc, 2001; Fiore and Hyun-Jeong, 2003; Zajonc, 2000). Although the receiver will be more affected by repeated exposure to previously familiar stimuli than new unfamiliar stimuli (Zajonc, 2001), as long as new, unfamiliar stimuli are repeated, the receiver's attitude toward them will improve (Wright and Campbell, 2008). Thus, the main effect derives from the objective repetition process, rather than a subjective assessment of past research (Zajonc, 2001). Zajonc's series of studies highlights that the effect of repeated exposure exists regardless of whether the receiver is subliminally or consciously receiving and processing the message, but the effect of subliminal repetition outstrips conscious repeated exposure (Zajonc, 2001).

In principle, the mere exposure effect can be upheld by familiarity (Hansen and Wänke, 2009). Repeated exposure will familiarize people with the target stimulus (Zajonc, 1968; Harrison, 1969). The familiarity then further leads to a liking, attraction and then a positive attitude (Zajonc, 1968; Zajonc, 2001; Harrison, 1969; De Gregorio and Sung, 2010). This is, when A (person) is repeatedly exposed to B (brand), A becomes familiar with B and further develops

a positive evaluation of B. In such a relationship, it is not even necessary to be aware of the presence of the stimuli; the repetition, unconscious or subliminal, will produce this effect.

Bornstein (1989) proposed the effect of presentation variables on the mere exposure effect and divided the stimulus into the number of exposures, exposure sequence, and exposure duration. Bornstein (1989) observed that in previous studies on mere exposure, the number of exposures was typically between 10 and 50 times, and found that the receiver's degree of preference for the target stimulus paralleled the number of exposures. However, other studies show that many exposures reduce preference. For example, Stang and O'Connell (1974) showed that preference followed a downward trend with 10 or more exposures. Zajonc et al. (1972) also noted that preference peaked at 10 exposures; beyond that, the degree of preference did not change with additional exposure. Despite the lack of consensus about the peak number of exposures, according to Bornstein (1989), the effect of too many exposures will be weaker than that of a smaller number of exposures, for example, 30. The exposure sequence can be heterogeneous or homogeneous. The homogeneous exposure sequence is presented with the same or similar stimuli, while the heterogeneous exposure sequence separates the same or similar stimuli, making the overall exposure sequence appear more varied. Bornstein's (1989) meta-analysis holds that the mere exposure effect of a heterogeneous exposure sequence will be slightly better than that of a homogeneous exposure sequence. Harrison and Zajonc (1970) showed that the greater the number of exposures, the more positive the effect of repeated exposures was evaluated, regardless of whether the exposure duration was under 2 or 10 seconds. Marcus and Hakmiller (1975) researched exposure to photographs for 8 and 24 seconds and found no significant difference between the mere exposure effect and exposure time. However, Hamid (1973) found that the relationship between stimulus exposure time and the degree of preference of the target stimulus is an inverted U shape. Hamid used polygons as the exposure stimulus and the exposure time ranged from 1, 2, 5, 10, 15, and 25 seconds. The results showed that the subject's preference increased within 5 seconds and continued to grow after 5 seconds; however, between 10 to 15 seconds, the preference began declining. However, Bornstein's (1989) meta-analysis found that with a stimulus duration of less than 1 second, the effect of repeated exposure was strongest, and as the stimulus exposure time increased, the effect subsequently weakened.

## 2.2. Repeated exposure to keyword ads

Both ethical and government-related constraints on keyword ads should enable consumers to differentiate between ads and editorial content. Consequently, some search engine providers in the past displayed sponsored and organic results with slightly different background colors or differentiated the two with separate fonts or text colors. Currently, ad disclosure is even more regulated, for example, it is required that the sponsored results be marked with phrases such as sponsored searches, sponsored links, or search engine advertisements (Fain and Pedersen, 2006). Prior research has reached different results on whether consumers can distinguish between sponsored and organic results. For example, Lewandowski et al. (2017) found that many users could not distinguish between organic results and ads on Google SERPs. Schultheiß and Lewandowski (2020) extended Lewandowski et al. (2017). They found that if consumers do not know Google's business model, they will fixate and click more on sponsored results. Still, even consumers who are familiar with Google ads also exhibit browsing behavior, yet click less on ads. However, according to Lo et al. (2014), in view of Gestalt Theory, consumers do not view the two blocks of sponsored results and organic results as a whole, due to the visual cues. With the addition of ad disclosure text, searchers can quickly and easily distinguish between sponsored and organic results in different areas. In this case, due to the fact that working in the search environment is very goal-oriented when the target browsing task is interrupted or interfered with by advertising, consumers take this as a goal impediment (Cho and Cheon, 2004). This produces perceived ad intrusiveness (Ha, 1996), triggering annoyance while carrying out ad avoidance (Singaraju et al., 2022; Speck and Elliott, 1997). Lo et al. (2014) used an eye-tracking device as part of an experimental design. After verifying that the consumer had identified a keyword ad, to reduce exposure to the content of the ad, cognitive ad avoidance was conducted, causing the subject to subconsciously avoid fixating on the ad area, which happened automatically and did not require any conscious decision by the consumer. After that, the consumer performed physical ad avoidance and clicked on the organic results rather than the sponsored search results.

Despite the divergent viewpoints in previous research, this study leans toward the view that when consumers are susceptible to interruptions in goal-oriented tasks, they tend to avoid viewing and clicking on sponsored ads. However, according to Lo et al. (2014), it would seem that keyword ads are not useful; however, the present study is not so pessimistic. This study has delved further into the issue to deconstruct consumers' message processing sequence by understanding what consumers are confronted with on the search engine results pages as soon as they type a keyword. Consumers undergo a preattentive processing sequence in which they pre-consciously scan and analyze the entire field (Greenwald and Leavitt, 1984; Ryu et al., 2007). Although ad avoidance occurs due to scanning and identifying the keyword ad areas, the preattentive scan allows the searchers' gaze to be unconsciously directed toward a keyword ad. Even if previous studies found that these gaze behaviors in keyword ad areas are lower than in organic search result sections (Lo et al., 2014), as long as the action of staring takes place, even unconscious exposure to advertising, the

messages are subsequently processed, influencing consumers in the long run (Greenwald and Leavitt, 1984, Chatterjee, 2008). However, the effect of a one-time exposure of consumers to messages has no specific valence. It may be the result of the influencing factors in the actual advertising content, not exposure per se. As discussed in previous sections on the mere exposure effect, under the condition that the influencing factors are consistent, as long as the stimulus repeats itself, the respondent's attitude toward the stimulus will be more positive, even if it is repeated subliminally (Zajonc, 1968; Bornstein, 1989; Winkielman and Cacioppo, 2001). Therefore, despite knowing from Lo et al. (2014) that consumers are not inclined to click on sponsored results, according to the mere exposure effect, this study posits that after a consumer accumulates a certain number of past exposures to a particular brand, even though the consumer has not formed a subjective assessment or experience of the brand, the repeated objective exposure toward the brand will improve the consumer's attitude. Furthermore, the more repetition, the better the attitude toward the brand will be.

***H1:** Although consumers do not click on a brand's keyword ads, their attitudes toward the brand will nevertheless improve more with multiple exposures than with a single exposure.*

***H2:** Although consumers do not click on a brand's keyword ads, the longer the exposure time, the more positive consumer attitudes will be toward the brand.*

### 2.3. SERP background color triggering effect on exposure to keyword ads

Arousal is a psychophysiological state triggered by the autonomic nervous system (Ravaja, 2004) and can regulate the allocation of resources to the processing of information (Kaufman, 1999). Arousal affects people by configuring fixed and limited cognitive resources on tasks, determining the degree of attention paid to tasks (Lang, 2000), and affecting information processing and memory (Jeong and Biocca, 2012). The relationship between arousal and attention is extremely intimate.

According to prior research, arousal causes people to focus on the main task and ignore other tasks and information (Easterbrook, 1959, Mandryk et al., 2006, Zajonc, 1965). We can explain this phenomenon further using the Limited-Capacity Model of Attention (LCMA) (Kahneman, 1973). From the point of view of cognitive psychology, attention is the process of allocating cognitive resources to a subject or task (Kahneman, 1973; Lee and Faber, 2007). LCMA assumes that a person's overall attention capacity is limited at any point in time (Kahneman, 1973). Information in a media environment is often very rich and includes both central information related to the main task and peripheral information (Jeong and Biocca, 2012). For example, when watching a TV series, watching the plot is the main task for the audience, so the acting, dialog, and even costumes and accessories of the actors related to this main task are considered central information. But the street shops and passersby shown, or the scrolling banners that appear on TV, are peripheral information that is completely unrelated to the main task. Since attention capacity is limited, the selection and intensity of cognitive resources will be automatically directed toward central information. The remaining cognitive resources are then allocated to peripheral information (Lang, 2000; Lee and Faber, 2007). Resource capacity is divided into the capacity devoted to primary tasks and the spare capacity (Kahneman, 1973).

In addition to spare capacity being invested in secondary tasks or other surrounding environments and cues, the capacity used for the main task will not be used for secondary tasks. Therefore, the more the capacity is dedicated to the main task, the less capacity can be dedicated to handling secondary tasks (Lee and Faber, 2007). In the case of TV dramas, movies, video games, or shopping sites, consumers have a clear primary task when viewing or using these media, so it is natural to prioritize limited cognitive resources and focus on the main tasks.

Arousal regulates how people allocate fixed and limited cognitive resources to tasks, determining the degree of attention to tasks and affecting information processing and memory. In the case of a specific task, when the level of arousal is high, in addition to increased physiological sweat and heart rate, anxiety, tightness, and tension lead the individual to focus on the main task. That is to say, a high arousal state causes higher attentive behavior on the main task and neglect of the secondary information (Easterbrook, 1959, Mandryk et al., 2006, Zajonc, 1965). When consumers use search engines, they primarily search for information using goal-oriented browsing behavior. Thus, in the SERPs, the organic results will be the page's main content, which becomes consumers' primary task. In contrast, the sponsored results displayed are peripheral. According to the previous discussion, when people have a higher level of arousal, more cognitive resources will be directed toward the central information. If the level of arousal is relatively low, more cognitive resources are dedicated to the peripheral information than with a higher arousal level. We proposed that if the background color of the SERPs is manipulated to trigger the consumer's relatively low arousal level, the secondary task will receive greater cognitive attention than when consumers are in a highly aroused state. That is, the information in keyword ads receives more attention and greater unconscious fixation count and length in a state of low arousal.

Previous studies found that the amount of exposure to the target affects the viewer's response to the target. The number of exposures and exposure length are the two key elements of exposure (Wedel and Pieters, 2000). A person's feelings toward a stimulus are enhanced as the number of unconscious processes increases because unconscious analysis often creates a feeling of familiarity (Janiszewski et al., 2013, Janiszewski, 1998). Familiarity, in turn, can influence the effect of or preference for a stimulus. As the number of exposures to a stimulus and the length of the exposure increase (Gillebaart et al., 2012), the preference and attitude toward a stimulus increase (Wedel and Pieters, 2000, Janiszewski et al., 2013) during unconscious processing. Thus, compared to relatively high-level arousal, when the SERPs background color triggers the consumer's low-level arousal, more cognitive resources are dedicated to the keyword ad region, resulting in more attention and browsing behaviors. Because unconscious browsing behavior increases familiarity and liking, we proposed that although the brand keyword ad does not match consumers' search intentions and they do not click on the ad, their attitude toward a specific brand within a keyword ad under low-level arousal will be higher than under high-level arousal.

**H3:** *Although a consumer does not click on a brand's keyword ads, the SERP background color triggers the consumer in a low-level arousal, creating more positive consumer attitudes toward the brand than those triggered by a high-level arousal.*

We further proposed that the mere exposure effect will weaken when limited information exists. When there is a higher level of arousal, consumers dedicate fewer cognitive resources to peripheral information, and the number and length of time of unconscious fixations on the brand's keyword ads is small. Therefore, even if repeated keyword brand exposures increase, consumers' brand attitudes will not vary significantly. However, during lower levels of arousal, more cognitive resources and attention will be paid to keyword advertising. We suggested the positive effect and preference for the keyword brand resulting from the high reception of keyword ads enhance the effect of repeated exposure to the keyword ads. Thus, a brand with a repeatedly displayed keyword ad with identical appearances will generate more positive attitudes from consumers in a lower state of arousal than those in a higher level state of arousal.

**H4:** *Consumers' arousal levels triggered by the background color of SERPs moderates the effect of length of time of exposure to keyword ads on consumers' attitudes toward the brand.*

**H4a:** *When the SERP background color triggers a low-level of arousal in consumers, the greater the exposure frequency to the keyword ads for a particular brand, the more positive the consumer's attitude toward the brand, even when the consumer does not click on the brand's keyword ads.*

**H4b:** *When the SERP background color triggers a high-level of consumer arousal, regardless of the number of exposures to the brand's keyword ad, there is no significant difference in the attitude of consumers toward the brand, even when the consumer does not click on that brand's keyword ads.*

### 3. Experimental Design

#### 3.1. Procedure

This study set up the search engine and manipulated the background color of SERPs to induce the consumer arousal level. Voluntary participants were recruited openly through online announcements to the laboratory. All participants received a thorough explanation of the research procedures from the researchers, understood that the experiment involved measurements using a galvanic skin response device, and provided informed consent by signing the consent form. Participants were given the search task and were then required to enter the designated keywords in the search engine and search for task information in the SERPs, demonstrating real search motivation and behavior. Each participant was given 25 individual search tasks to find relevant information about specific products. Each task was an independent search behavior. The SERP appeared after typing the search task in the search engine. The background color of the SERPs seen by consumers is randomly assigned as red (triggers a high arousal) or blue (triggers low arousal) condition. This study manipulated four specific brand keyword ads with different numbers of exposures, i.e., once, 8, 16, and 24 times, in 25 search tasks.

After the participants completed all the tasks, a four-item scale adapted from a previous study (Crosno et al., 2009) on brand attitude was used with a Likert 8-point scale, from one meaning strongly disagree to eight meaning strongly agree. The Cronbach's alpha for the brand attitude toward the keyword ads is 0.867, which has acceptable reliability.

Since this study explores consumer behavior when searching for keywords, anyone with experience in online searches could participate in the experiment. This study publicly recruited 287 volunteers to participate in the research experiment. There were 143 participants in SERPs with the red background color (high arousal), including 73 males and 70 females with an average age of 21.47 years (s.d. = 1.537); and 144 participants in the blue background color (low arousal), including 78 males and 66 females with an average age of 21.55 years (s.d. = 1.612).

3.2. Experimental material and variables manipulation

*Search Engine and SERP Background Color.* The relationship between the variables is not affected by the search engine brand. Therefore, it is not necessary to use a virtual search engine. Also, using real search engines can reduce the experimental adverse effects in unnatural environments. We simulated Google search engines and SERPs as experimental materials. The layout, font, text color, and other elements in search engines and SERPs all imitate Google.

To avoid uneven exposure of keyword ad information if participants scroll up or down the SERPs, we control the amount of information to be fully presented on a single page. That is, the page does not have a scroll bar, there are eight links on each page, four of which are keyword advertisement links, and the other four are links to the organic search results. The keyword ads were placed at the top of the organic search results, and the “Ad” disclosure mark is indicated on the left of each keyword ad, which simulates the display mode of Google.

This study manipulates the background color of SERPs to trigger different levels of arousal. Prior research has verified the effect of environmental colors on arousal, with warm colors (such as red and yellow) increasing people’s arousal more than cool colors (such as blue and green) (Birren, 1950; Wilson, 1966; Küller, et al., 2009). Thus, we designed a red background for the SERPs to induce high arousal and a blue background for SERPs in low-arousal environments in the experiment. The pilot test was conducted, and we recruited participants and randomly assigned them to SERPs with red and blue backgrounds. We used a galvanic skin response device to detect participants’ arousal levels after being exposed to a stimulus. The electrode was placed on the volar surfaces of the distal phalanges to measure arousal. Higher SCLs indicated a higher level of arousal. Because each participant’s SCL is not in the same interval, this study subtracted the baseline SCL from SCL after the experimental stimulus (background color) to measure the participants’ arousal state. The greater the disparity between the two SCLs, the greater the arousal (Jeong et al., 2012).

Before entering the experimental SERPs, participants were asked to watch a video with soft music to relax physiologically and psychologically. After the film, the baseline SCL was measured, and then participants were randomly assigned to SERPs with a warm or cool background stimulation. We measured SCL during 10 seconds of browsing SERPs and subtracted the baseline from this value to obtain each participant’s arousal level. The average arousal value in the red background group is 0.035 (s.d. = 0.004), and in the blue background group is 0.021 (s.d. = 0.003). The pilot test results showed that the SERPs with a red background have a higher arousal level than the blue background (see Table 1).

Table 1: The Pilot Test Result

Dependent Variable	Background Color	n	M	s.d.	p
Arousal (SCL)	warm colour	30	0.035	0.004	0.001*
	cool colour	30	0.021	0.003	

Note. — \* *p*-value<0.05

Figure 1. Sample stimuli (the SERPs with warm and cool colors)



*The brand keyword ad and repeated exposure schedule.* This study created virtual brands for the keyword ads that appeared in SERPs to avoid that participants’ attitudes toward the real brand will affect the experimental results.

Among the self-created brands, only three were manipulated repeatedly (brands A, B, and C), while other brands that appeared in keyword ads and the set of control brands only appeared once (brand D). We performed a pilot test to avoid the differences in participants' attitudes toward different virtual brands. Thirty meaningless Chinese names were subjectively designed. Thirty participants were recruited and asked to measure their attitudes toward the 30 brands. This measure was adopted from the Crosno, Freling, and Skinner (2009) study. Then the attitude scores of the 30 brands were divided into three groups. The first group is the top 10 brand names with the highest average score, the second group is the 11th–20th names ranked by the average score, and the third group is the 21st–30th names ranked by the average score. We took the second-ranked group in the middle, and randomly selected four of the 10 names. We then performed ANOVA to confirm that the four brands have no difference in attitude scores and randomly assigned the four brands as A, B, C, and D.

To verify the effect of the number of repeated exposures of keyword ads on brand attitudes, we adopted the meta-analysis of Bornstein (Bornstein, 1989) that found an excessive number of repeated exposures will weaken the effect. For example, the effect of 100 and 200 repeated exposures will be lower than that 30 small exposures. Therefore, we set the number of repeated exposures to less than 30 and established the number of exposures to 8, 16, and 24, respectively, and once for the control group. We set the exposure times this way because there are four keyword ad links in the sponsored result. Considering that the position of the experimental brand will affect the result, the A, B, and C brands were shown evenly on the four link positions of the sponsored result. In the total 25 search tasks on SERPs, the number of exposure times that each brand appeared in the first row or other rows is the same. Therefore, brand A was designed to appear twice in each of the four link positions, and each link position was exposed once after every 11 searching tasks; thus, brand A has eight exposure times. Brand B appeared four times in each of the four link positions, and each exposure was exposed once after every five searches; thus brand B has a total of 16 exposure times. Brand C appeared six times in each of the four link positions, and each exposure was exposed once after every three searches; thus, brand C has 24 exposure times. To make each brand appear at a fixed interval in each link, there are 25 searching tasks and 25 SERPs. The control brand D will be arranged to appear only once at the 25th search.

In short, except for the three manipulated brands that appeared repeatedly in SERPs, the other brands in sponsored results only appeared once, and the three repeatedly exposed brands only appear in the sponsored results (see Table 2).

Table 2: The Schedule of Brands Exposure

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1 <sup>st</sup> row	C	B			C	A		B	C				C	B			C	A		B	C				D	
2 <sup>nd</sup> row		C	B			C	A		B	C				C	B			C	A		B	C				
3 <sup>rd</sup> row			C	B			C	A		B	C				C	B			C	A		B	C			
4 <sup>th</sup> row				C	B			C	A		B	C				C	B			C	A		B	C		

*The organic results.* This study aimed to understand if unconscious repeated browsing behavior produces a more positive attitude toward keyword advertising brands; thus, the task answer will only be placed in the organic search result area to avoid intentional browsing and clicking behavior in the sponsored results section. The organic search results have four links. To make the organic search results more authentic, two of the four links are brand websites, and the remaining two are blog links or personal web links. The brand names or blog names appearing in the organic search results are all virtual and are not repeated in the 25 search tasks. The positions of the four links are arranged randomly.

For it to be reasonable for four brands (A, B, C, and D) to repeatedly appear in the sponsored results section, this study controls the four brands to be under the same product category. Therefore, the search task is focused on pet-related problems because there are many subproduct categories under pet-related products, which are enough to support the 25 search task themes, such as dog food ingredients, feeding frequency of canned cat food, how to clean pet ears, antiflea issues, etc. Because there are 25 search tasks, there are 25 task answers. The title tag of the task answer in the organic search results is the same as the search task given to participants. For example, the search task is “how to cut nails for a cat,” and the title tag of the answer to the task that guides consumers to click is “how to cut the nails of a cat.”

**4. Results**

This study measures participants’ brand attitudes toward keyword ads with different numbers of exposure. We conducted ANOVA and the results showed significant differences on brand attitudes ( $F = 48.70, p = 0.001$ ) when faced with different exposure times of keyword ad brands. The attitude toward the brand that was exposed eight times was 4.028 (s.d. = 0.739); the brand attitude that was exposed 16 times was 4.205 (s.d. = 0.819); the brand attitude that was exposed 24 times was 4.483 (s.d. = 0.945); and the brand attitude that was exposed once is 3.790 (s.d. = 0.670). Multiple comparisons showed that whether the keyword ads were exposed eight, 16, or 24 times to consumers, the brand attitudes are significantly higher than after one exposure (see Table 4). Thus, hypothesis 1 was supported. Hypothesis 2 verified that the more keyword ads are repeatedly exposed to consumers, the better consumers’ attitudes toward the advertising brand will be. In Table 4, the results found that the brand attitude of a keyword ad exposed 16 times was significantly higher than the exposure of eight times, and the brand attitude of keyword ad exposed 24 times was significantly higher than the exposure of 16 times. Thus, hypothesis 2 was supported.

Table 3: ANOVA Table for Attitude Toward the Brand

	df	MS	F	p
Frequency	3	24.32	48.70	0.001*
Arousal	1	107.00	214.252	0.001*
Frequency *Arousal	3	18.79	37.63	0.001*
Error		0.499		

Note. — \*  $p$ -value<0.05

Table 4 The Comparison of Brand Attitudes on Different Exposure Times

Dependent variable	Mean difference	Standard error	p	
Attitude toward the brand	A(08) – B(16)	-0.176	0.066	0.001*
	B(16) – C(24)	-0.277	0.066	0.001*
	C(24) – D(01)	0.695	0.066	0.001*
	C(24) – A(08)	0.454	0.066	0.001*
	D(01) – A(08)	-0.237	0.066	0.001*
	D(01) – B(16)	-0.414	0.066	0.001*

Note. — \*  $p$ -value<0.05

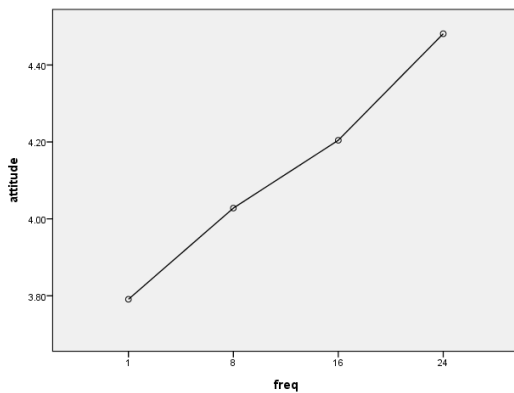


Figure 2: The effect of exposure times of keyword ads on brand attitudes

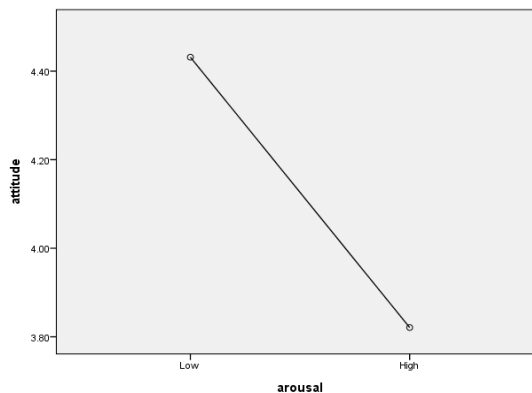


Figure 3: The effect of arousal triggered by SERPs background color on brand attitudes

Consumers with lower arousal triggered by cool background SERPs have an average brand score of 4.431 (s.d. = 0.953) for keyword ads, which is significantly higher than the average brand score of consumers with higher arousal on warm background SERPs of 3.820 (s.d. = 0.555) ( $F = 214.252, p = 0.001$ ) (see Table 3). Thus, H3 is supported.

H4 sought to verify if consumers’ arousal level triggered by the background color of SERPs moderate the effect of exposure times of keyword ads on consumers’ attitudes toward the brand. The interactive effects of the exposure times of keyword ads and arousal are shown in Table 3. Table 5 also shows that when consumers are in a low arousal



state, the keyword ads with different exposure times result in significantly different brand attitudes. However, when consumers are in a high arousal state, there is no significant difference between exposure times and brand attitudes. We further checked the 144 participants for whom low arousal was triggered with a cool background color in SERPs. After 25 search tasks and different exposure times of the four brands, the brand attitude of keyword ads that were repeatedly exposed eight times was 4.255 (s.d. = 0.852); the brand attitude of keyword ads that were repeatedly exposed 16 times is 4.564 (s.d. = 0.071); the brand attitude of keyword ad that was repeatedly exposed 24 times is 5.104 (s.d. = 0.865); and the brand attitude of keyword ad that was exposed once is 3.802 (s.d. = 0.733). In Table 5, whether the keyword ads are exposed eight, 16, or 24 times, the brand attitudes are significantly higher than one exposure. The 16 exposure times have a better brand attitude than the eight exposure times ( $p = 0.001$ ), and the 24 exposure times have a higher brand attitude than the 16 exposure times ( $p = 0.001$ ).

Table 5: The Effect of Exposure Times on Brand Attitude under Difference Level of Arousal

Arousal	Freq	Attitude toward the brand			<i>p</i>
		n	M	s.d.	
Low	A (08)	144	4.255	0.852	0.001*
	B (16)	144	4.564	0.071	
	C (24)	144	5.104	0.865	
	D (01)	144	3.802	0.733	
High	A (08)	143	3.801	0.514	0.598
	B (16)	143	3.844	0.589	
	C (24)	143	3.858	0.510	
	D (01)	143	3.779	0.603	

Note. — \*  $p$ -value < 0.05

Table 6: The Comparison of Brand Attitudes on Different Exposure Times under Difference of Arousal Level

Arousal	Freq	Mean difference	Standard error	<i>p</i>
Low	A(08) – B(16)	-0.309	0.097	0.001*
	B(16) – C(24)	-0.539	0.097	0.001*
	C(24) – D(01)	0.695	0.097	0.001*
	C(24) – A(08)	0.848	0.097	0.001*
	D(01) – A(08)	-0.020	0.097	0.001*
	D(01) – B(16)	-0.064	0.097	0.001*
High	A(08) – B(16)	-0.043	0.065	0.507
	B(16) – C(24)	-0.013	0.065	0.832
	C(24) – D(01)	0.078	0.065	0.232
	C(24) – A(08)	0.057	0.065	0.381
	D(01) – A(08)	-0.020	0.065	0.750
	D(01) – B(16)	-0.646	0.065	0.326

Note. — \*  $p$ -value < 0.05

A total of 143 participants were randomly assigned to high arousal situation with a red background in the SERPs. After 25 search tasks and different exposure times of the four brands, the results showed that the brand attitude of a keyword ad that was repeatedly exposed eight times is 3.800 (s.d. = 0.514); the brand attitude of a keyword ad that was repeatedly exposed 16 times is 3.844 (s.d. = 0.589); the brand attitude of keyword ad that was repeatedly exposed 24 times is 3.858 (s.d. = 0.510); and the brand attitude of keyword ad that was exposed once is 3.779 (s.d. = 0.603). There is no significant difference in brand attitudes under different exposure times when consumers are highly aroused ( $F = 0.626$ ,  $p = 0.598$ , see Table 5). According to multiple comparisons, we found that whether the keyword ads are exposed 8, 16, or 24 times, the brand attitudes are not significantly higher than that of one exposure (see Table 6). There is no significant difference in the brand attitudes between the 16 and 8 exposure times ( $p = 0.507$ ), and no significant difference in brand attitudes between the 24 and 16 exposure times ( $p = 0.832$ ); neither is there a significant difference in brand attitudes between the 24 and eight exposure times ( $p = 0.381$ ).

Thus, Hypothesis 4 is supported. We additionally analyzed the brand attitudes with different numbers of times of keyword advertising exposures at high and low arousal states. We found that whether they are exposed 8, 16, or 24

times, as long as the arousal level is relatively low, brand attitudes will be higher than when the arousal level is relatively high. However, when a brand that is only shown once, there is no significant difference in brand attitudes of consumers with high or low arousal states (see Table 7).

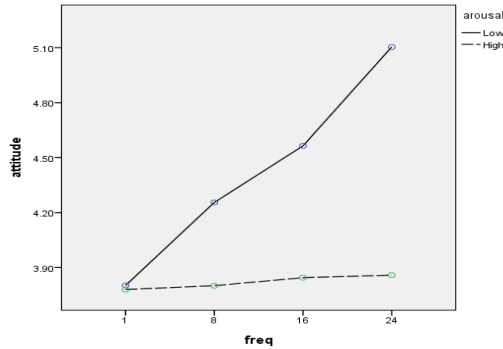


Figure 4: The Effect of Arousal Triggered by SERPs Background Color on Brand Attitudes

Table 7: The Effect of Exposure Times on Brand Attitude under High/Low Arousal Level

Freq	Arousal	Attitude toward the brand			p
		n	M	s.d.	
A (08)	Low	144	4.255	0.852	0.001*
	High	143	3.800	0.514	
B (16)	Low	144	4.564	0.859	0.001*
	High	143	3.844	0.589	
C (24)	Low	144	5.104	0.865	0.001*
	High	143	3.854	0.510	
D (01)	Low	144	3.802	0.733	0.778
	High	143	3.779	0.603	

Note. — \* *p*-value<0.05

### 5. General Discussion and Conclusion

People rely heavily on the Internet to access a wide variety of information. People use search engines to search for a specific target to quickly filter the massive amount of online information. Keyword ads, designed to respond to the strings that consumers search for, get more clicks from consumers. For this reason, they have become one of the most favored forms of advertising by advertising companies and advertisers in recent years.

This study suggests that in SERPs, consumers will avoid focusing on the keyword advertising area. However, when SERPs appear, consumers must perform an information processing procedure in the preattention stage that involves subconsciously scanning and analyzing the overall field. Although the scan and identification of the keyword advertising area may result in searchers avoiding the ads, their eyes still unconsciously glanced at the keyword ads. Regardless of whether the amount of time spent in the keyword advertising area is higher or lower than that of the organic search results area, as long as they are seen, even if it is unconscious advertising exposure, this information is processed and impacts consumers (Greenwald and Leavitt, 1984, Chatterjee, 2008)). Consumer attitudes toward stimuli will even become more positive due to repeated exposure (Zajonc, 1968, Bornstein, 1989, Winkielman and Cacioppo, 2001). This study gathered 287 voluntary participants and gave them 25 search tasks. Brands were shown in the keyword advertising area in the 25 SERPs in four different exposure times—once, eight times, 16 times, and 24 times. It was found that when consumers were exposed to brands in the keyword ads during the search tasks, those shown multiple times prompted more favorable brand attitudes than those displayed only once. Those shown 24 times had better consumer attitudes than those displayed 16 and eight times, while those shown 16 times also received significantly better attitudes than those shown eight times. That is, the more a brand is shown, the more positive its brand attitude.

This study also considers how arousal determines cognitive resource allocation and argues that searching search engines using search engines and entering SERPs is goal-oriented browsing behavior. In the overall use of the medium,

the organic results are the central information of SERPs; this is the consumer's primary task. In contrast, sponsored results are peripheral information on the page, and are secondary tasks. People focus their limited cognitive resources on the primary task and then allocate the remaining resources to the secondary task. If a person's arousal is in a high state, he or she will be more focused on performing the primary task; that is, more cognitive resources are invested in the primary task while peripheral information is secondary. Thus, this study argues that if the background color of SERPs can be manipulated to change the arousal level of consumers, the keyword ads will receive different levels of attention, resulting in different attitudes toward brands. All 287 voluntary participants were randomly assigned to SERPs with cool and warm background colors separately. Overall, participants in the low arousal scenario had significantly better brand attitudes toward the keyword ads than those in high arousal scenarios.

Arousal determines the allocation of cognitive resources and moderates the relationship between the exposure times of the keyword ads and brand attitudes after consumers enter the SERPs. In a high arousal state, consumers are more focused on the central information, and little attention is assigned to peripheral information; thus, the repeated exposure effect of keyword ads is weaker. However, consumers allocate more resources to peripheral information for low arousal scenarios, enhancing the effect of repeated exposure to keyword ads. In this study, 143 participants were randomly assigned to SERPs with a red background to trigger higher levels of arousal, while 144 participants were assigned to SERPs with a blue background, which triggered a relatively low arousal level. The results show that when SERPs are blue, consumers will have a better brand attitude toward the keyword ad because of the increasing number of repeated exposures to the keyword ads. In contrast, if SERPs are red, regardless of how many times a keyword ad is repeated, consumer attitudes toward the brand will not change. It is also shown that when the brand is only shown once in the keyword ad, participants' attitudes toward the brand will be low regardless of the arousal level triggered by the SERPs background color. These results can be explained by the argument of resource allocation for primary and secondary tasks that were discussed previously. We argued that few cognitive resources are allocated to keyword ads during high arousal levels. The amount of attention invested in peripheral information is so low that the preference and positive emotion toward the stimulus cannot be improved through establishing familiarity toward the stimulus, even unconsciously, by fixation count and fixation length. This same concept is also seen in how single exposure to keyword ads affects brand attitudes. Even in a low arousal state where consumers receive more stimuli than in high arousal scenarios, there is still much information in the SERPs, whether as organic or sponsored results. In our experiment, we arranged four links in each of the two areas, a total of only eight links in the test pages. But in actual SERPs, there are often 10 or more pieces of information. If the brand is only shown once, few cognitive resources are allocated to individual links. Even if a lower arousal level may give sponsored results a chance to be allocated a more unconscious fixation count and fixation length, with limited information, it is not easy to develop more preferences and positive emotions. Thus, such results reinforce the finding of this study, that even if the link is not clicked by the consumer, a brand's keyword advertising in the sponsored results area receives better brand attitudes from consumers as long as the advertisement is shown more than once. The greater the number of exposures, the better the effect. If the low arousal level when browsing the SERPs is manipulated, brand attitudes will be even better than those of the higher arousal level.

#### 5.1. Theoretical implications

This study is based on the theory of mere exposure effect, expanding on previous research (Lo et al., 2014), and argues that the effect of keyword advertising need not be restricted to direct clicks from consumers. Even if consumers do not click on keyword ads, advertisers can make use of the search engine's keyword strings in their buying strategy so that their keyword ads frequently appear in the sponsored results area, thereby improving consumers' attitudes toward their brands. This study also proposes influencing consumers' cognitive resource allocation toward the sponsored results area by manipulating consumers' arousal levels during SERP browsing, enhancing the mere exposure effect of keyword ads.

#### 5.2. Managerial implications

According to the results of this study, advertisers should replace the click-through rate with a positive brand attitude as the goal of keyword ads; that is, advertisers should investigate the keyword strings of queries that consumers use before purchasing. If search engines do not change the billing methods for keyword ads, advertisers can bid high prices and select as many key queries as possible to improve exposure to their advertisements. As consumers tend not to click on keyword ads, and keyword ads are billed by clicks, the cost for advertisers will not increase significantly, yet the ads will be greatly repeated in the keyword ad area, improving brand attitudes. Additionally, keyword advertising copy is typically used to induce clicks to bring consumers to a specific page, hoping to provide or persuade consumers through more information there. However, according to the results of this study, we suggest the strategy should be changed to manipulate the exposure time to the keyword ads, as it is not easy to get clicks. Therefore, keyword ad copy must be concise; in particular, brand name, product name, and product characteristics should be clearly presented, so that the stimulus to improve attitudes is clearly received by consumers. This study proposes using

SERP background color to manipulate the arousal level of consumers when browsing pages to enhance the effect of repeated exposure. Although it is not possible for advertisers to change the background colors of SERPs without the cooperation of the search engine companies, advertisers can adopt principles from cognitive resource allocation theory to consider how the design of keyword ad copy influences arousal, enhancing the effect of repeated exposure ads.

Search engine providers should understand that consumers are not inclined to click on keyword ads. The current mode of PPC billing may feel fair for advertisers, but advertisers can continue to get brand exposure without clicking or improving their brand attitudes due to the repeated exposure of their ads. This may not be fair to search engine providers. Thus, search engine providers can consider the effect of repeated exposure to design a billing mechanism. In addition, this study suggests using SERP background color to manipulate the arousal level of consumers to enhance the effect of repeated exposure. It also proposes that search engine providers should provide optional background colors or other ambient elements that will affect arousal levels, or keyword ads with different forms of presentation, e.g., text color, font type, animation/flash, shapes, or any features that can manipulate arousal levels. An additional billing mechanism can be designed to represent another income source for search engine providers.

### 5.3. Direction for future research

Previous research has found that too much repetition will worsen attitudes, so only a moderate number of exposures were shown during this study. However, this study is not able to make any recommendations regarding the maximum number of exposure times a keyword ad can be shown before it has a negative impact. Future research can be conducted to explore this issue.

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