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CONSUMERS' VISUAL ATTRACTIVENESS TO DMS IN TRAVEL ADVERTISEMENTS: AN EYETRACKING TEST

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Abstract

In recent years, with the booming development of sightseeing tourism, the dissemination of tourism information has become more rapid and extensive, and tourism advertising DM has become one of the important marketing tools to attract customers. Different designs of travel advertisement DMs will have an impact on

consumers' purchase intention. In this study, we used eye-tracking tests to investigate the visual attractiveness of DM travel advertisements and to analyze the eye-movement responses of secondary school teachers when they viewed such advertisements. The content of the advertisements consisted of four main elements, namely, the main headline of the tour, the promotional image, the price and the brand name of the tour company. 53 secondary school teachers were invited to participate in the eye-tracking test. The results of the study showed that teachers' eye-movement responses and visual attractiveness were mainly influenced by the main headline of the travel advertisement and the promotional image, whereas branding and price had less influence. Therefore, the design of the main headline and images in travel advertisements plays a key role in attracting consumers' attention and influencing their decision-making time.

Keywords:

Travel Advertisement DM, Oculomotor Response, Total Gaze Duration, Number of Gaze Episodes, Continuous Gaze Duration

1. Introduction

During the peak travel seasons every year, operators usually invest a large amount of money in advertising, hoping to attract consumers' attention through high-frequency advertisement exposure and ultimately achieve sales goals (Manfredo, Bright, & Haas, 1992; Central News Agency, 2009a). With the advent of the Internet era, travel-related advertisements and services have gradually shifted to online channels for promotion and distribution (Sussmann & Baker, 1996). Major travel agencies have set up their own websites to publicize their products and explain their itineraries. Compared with traditional media, websites are not limited by space and time, and are interactive and multimedia, which makes it possible to create attractive and creative advertisements. iMedia Connection, 2006).

In addition, travel is a highly involved consumer behavior, and at each stage of the decision-making process, consumers are constantly searching for information to shape their impressions of the destination (Kokolosalakis, Bagnall, Selby, & Burns, 2006) and to plan their travel accordingly (Prentice, 2006). Capella and Greco (1987) and Johnson and Messmer (1991) have shown that a wealth of travel information is critical to consumer decision making. Therefore, the information provided by travel agencies' websites is an important source of reference for consumers when planning their travel itineraries. In this study, we take the example of "spring travel itinerary" on a travel agency's website to examine the visual eye movement behavior of consumers when they browse the DM of travel advertisements, and further analyze the factors that affect consumers' attention and decision-making.

According to the latest statistics, there are more than 4,000 travel agencies in Taiwan (Ministry of Transportation and Communications, 2024), and the market is extremely competitive. The market is highly competitive, with tour operators often competing on price or adding new activities and attractions to their group itineraries to

attract customers. However, due to the fast pace of competitors, the market tends to become homogenized in terms of itinerary design (Wong & Kwong, 2004). The key to stand out from similar itineraries lies in the effective use of "pictures or photographs" in the itinerary description.

Images have always played an important role in tourism advertising. On the one hand, pictures can make the image of a destination more concrete and vivid, and help consumers feel the attractiveness of the destination intuitively (MacInnis & Price, 1987). On the other hand, as the core memory of an advertisement, pictures not only enhance the likelihood of the advertisement being remembered, but also stimulate consumers' desire to visit the destination, thus increasing their willingness to travel (Okoroafo, 1989). Therefore, this study focuses on the use of images in travel advertisements in an attempt to understand the mechanism of influence they play in consumer behavior.

2. Literature References

2.1 Tourist Advertising

Tourism advertising is a marketing tool used by travelers to promote their products and services by conveying tourism-related information through various media, and its main purpose is to promote product sales and bring economic benefits (Chou & Lien, 2010). In general, most researchers focus on how the elements and presentation of tourism advertisements affect consumers' responses. Smith and MacKay (2001), for example, examined whether there are differences in advertising memories among consumers of different ages when exposed to pictorial advertisements that do not indicate travel destinations, but the results failed to confirm the significant effect of age.

Continuing this research, MacKay and Smith (2006) further analyzed the effects of text-only and picture-only ad formats on consumers' memory and cognitive

responses to advertisements across age groups when consumers had prior knowledge of the advertised destination. They found that, controlling for educational background and destination familiarity, the young group outperformed the older group in remembering text-only advertisements, while there was no significant difference in the memory performance of pictorial advertisements. The study also shows that the format of the advertisement affects the cognitive response, with pictorial advertisements stimulating more thoughts and associations

2.2 Visual Appeal

When we are about to meet a stranger, we often hear the advice that it is important to make a good first impression. Similarly, e-commerce websites need to be designed to create a good first impression when dealing with new users. An attractive website can quickly win over users (Basso, Goldberg, Greenspan, & Weimer, 2001). In recent years, research on usage of websites and human-computer interaction (HCI) has increasingly focused on the impact of websites on users' visual appeal.

Geng, Liu, Jain, and Li (2011) conducted a study on the search results of image search engines and proposed three levels of attractiveness: perceptual quality, aesthetic sensitivity, and attractive tune. Perceptual quality refers to whether a picture has the basic conditions to attract users, i.e., whether users can easily interpret the main message conveyed by the picture; aesthetic sensitivity evaluates whether users can appreciate the aesthetics of the picture through their own aesthetic view; and attractive tune focuses on exploring how the picture triggers users' emotional feelings and psychological responses.

2.3 Eye Movement Behavior and Its Significance

There are two main types of human eye movements: fixation and saccades. Fixation is the process by which the eye receives and encodes information in a relatively static state. At this time, images are projected to the central fovea for more detailed

visual processing (Wedel & Pieters, 2007). The average duration of each gaze is about 0.2 to 0.5 seconds, and the range of viewing angles is usually between 1 and 5 degrees (Rayner, 1998, 2009; Renshaw et al., 2003). In contrast, scanning is a rapid eye movement that occurs between two gazes in order to move the eye to the next gaze point and project a new visual area onto the central fovea (Wedel & Pieters, 2007). Typically, the eye performs three to four sweeps in one second, each of which lasts about 0.02 to 0.04 seconds and can move up to 500 visual degrees per second (Rayner, 1998, 2009; Renshaw et al., 2003).

One of the central assumptions of eye movement behavior research is the "mind's eye" hypothesis (Just & Carpenter, 1980), which states that eye movement behavior reflects people's internal perceptions and thoughts. Therefore, fixation duration and fixation count were used as the main indicators of eye movement behavior in this study. Before measurement, the area of interest (AOI) is defined, which usually covers one or more words, and can be quantified in terms of AOI for data analysis to enhance the accuracy of measurement and interpretation of eye movement behavior. Table 1 summarizes the AOIs used in this study and their corresponding cognitive processing implications.

Table 1: *Eye Movement Indicators*

Eye Movement Indicator	Definition	Awareness Processing
Total gaze time	Sum of all gaze times available for a task or a page	Gaze time indicates the viewer's processing time. The longer the total gaze time, the more time is spent on interpreting the information or interconnecting internal and external representations.
AOI gaze time	Sum of all gaze times	The longer the gaze time of an AOI, the more

	in the AOI	difficult it is to extract or interpret the information, or the more in-depth the information needs to be explored.
Total number of stares	The sum of all gaze counts available for a task or a page.	The number of gazes indicates non-deep cognitive processing by the viewer. A higher total number of gazes indicates poor search efficiency, extensive filtering, or attractive information (taking into account the task execution time, e.g., if the task takes about as long as it should, there will usually be more gazes).
Number of AOIs	The sum of all gaze counts in the AOI.	The number of gaze counts can be interpreted differently in different tasks, e.g., in an encoding task (e.g., browsing a web page), a high number of gaze counts indicates a high level of interest in the AOI or that the AOI is so complex that it is difficult to decode/compile it, or in a search task, it indicates a high level of uncertainty about the area.

Source: Yang, Shufei (2013).

3. Research Design

3.1 Purpose of the Study

3.1.1

To understand the effect of the travel headline in the DM of the travel advertisement on teachers' visual appeal.

3.1.2

To understand the effect of promotional images in tourism advertisements DM on the visual appeal of secondary school teachers.

3.1.3

To understand the effect of price on the visual appeal of DMs in tourism advertisements for secondary school teachers.

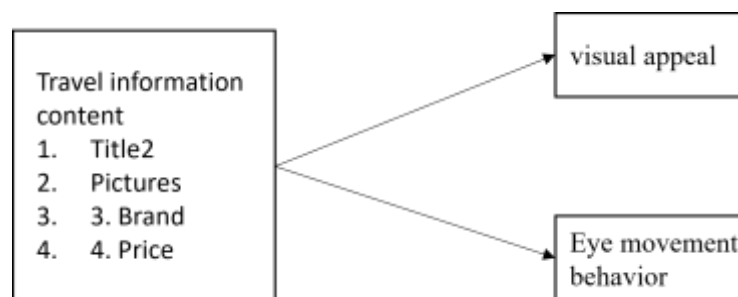
3.1.4

To understand the impact of the branding of travel companies on the visual appeal of secondary school teachers in the DM of travel advertisements.

3.2 Research Framework

The structure of this study is shown in Figure 1-1, where the independent variable is travel information content, and the dependent variables are "visual attractiveness" and "eye movement behavior". The total number of gaze times and the average gaze time were used as the indicators of eye behavior. The definitions and contents of each variable are described below.

Figure 1-1: Research Framework



3.3 Definition and Operationalization of Each Variable

3.3.1 Self-Variable

The independent variable of this study was "travel information content", which was presented in the form of advertisement DMs for spring travel to Japan by five well-known travel companies, as shown in Figures 1-2, 1-3, 1-4, 1-5, and 1-6.



Figure 1-2 *Tourism Advertising DM*



Figure 1-3 *Tourism Advertising DM*



Figure 1-4 *Tourism Advertising DM*



Figure 1-5 *Tourism Advertising DM*



Figure 1-6 *Tourism Advertising DM*

3.3.2 Variable Dependent

3.3.2.1 Visual Appeal

Visual appeal refers to the extent to which the content presented in a travel advertisement DM can arouse curiosity or amusement when the user views the advertisement DM, and this study utilizes the total gaze time as a measure of the user's preference for the content portion of the advertisement.

3.3.2.2 Eye Movement Behavior

In this study, the eye tracking device was used to record the users' eye responses while watching the DMs of travel advertisements, which were measured by

two main eye movement indices, namely:

(1) Fixation Count: It refers to the number of skipping eye movements, i.e., the total number of times users viewed a certain webpage element. Since this study only focuses on users' eye movements in travel advertisements DMs, the AOI (Area of Interest) was set on the advertisements DMs of five famous travel companies for the spring trip to Japan, and the fixation counts of all the AOIs were calculated as the measurement data for this indicator.

(2) Total Gaze Time: This refers to the total amount of time users spent viewing the spring travel advertisements of five well-known travel companies. Since this study only focuses on users' eye movement responses on the travel advertisement DMs, the AOI was set on each travel advertisement DM and the gaze time of all AOIs was calculated as the measurement data.

(3) Average Gaze Time: This refers to the average time spent by users on each viewing of the travel advertisement DMs, i.e., the result of dividing the total gaze time by the total number of times of viewing. In this study, the average gaze time will be calculated by dividing the gaze time of all AOIs (travel advertisement DMs) by the number of times of viewing.

3.4 Research Methodology

3.4.1 Experimental Tools

In most cognitive science studies, eye movements have been shown to reflect the internal cognitive processes of human beings. Using an eye tracking system, an objective scientific tool, eye movement data can be accurately collected when subjects watch DMs of travel advertisements. Compared with traditional studies without the aid of an eye-tracking device, this method can provide more in-depth information on the location of gaze, the duration of gaze in each area, and the visual path of gaze during the viewing process.

3.4.2 Subjects

The total number of subjects in this study was 53, selected from secondary school teachers.

3.4.3 Experimental Design and Experimental Contexts

In this study, the experimental situation was set as viewing travel advertisement DMs and asking the participants to assume that they were willing to purchase a travel itinerary. The experimental stimuli consisted of five different types of travel advertisement DMs, and in order to make the experimental situation more realistic, the travel advertisement DMs used in this experiment were based on the pages of the top five travel websites on the Internet. The content of each travel advertisement DM included the image, main title, brand, and price to facilitate the recording and analysis of eye movement data.

3.4.4 Experimental Procedures

The experimental procedure was divided into three stages: explanation of the experiment, calibration of the ocular dynamometer and the eyeball, and the formal experiment. After the subjects entered the laboratory, the experimenter first introduced the procedure and asked the subjects to sign a consent form. Next, the experimenter assisted in adjusting the chin rest and asked the subject to place the chin steadily on the rest. In order to ensure the accuracy of eye movements during the experiment and to avoid any deviation between the computer screen display and eye tracking, a nine-point calibration and validation test were performed before the experiment started. After calibration and validation, subjects were randomly assigned to five groups to watch different travel advertisements and start the experiment at the same time.

4. Findings

It was hypothesized that the main headline, price, picture and brand in five different travel advertisements DM would have an effect on respondents' eye movement behavior, and it was expected that the total number of gazes and the mean gaze time would be higher for the main headline and picture than for the price and brand in these advertisements.

In the past literature, it has been suggested that the more times a subject gaze at an area of interest (AOI, Area of Interest), the more appealing the area is or the more important it is (Jacob & Karn, 2003; Poole, Ball & Phillips, 2004). After comparing the results with those of the visual attractiveness effects of the product image context, it can be seen that the main headline and images in the travel advertisement DMs were indeed more visually appealing to users than the price and brand. However, the average gaze time of users varied among different contents (e.g. main title and image versus price and brand). Specific data on total gaze duration, number of gaze sessions and duration of gaze are shown in Tables 2, 3 and 4.

Table 2: *Total gaze time (tct)*

Picture order	roi1 (main title)	roi2 (picture)	roi3 (price)	roi4 (brand)	Outside the box condensation
1	562.25	392.25	23.25	0	92.125
2	531	285.25	94.75	0	165.375
3	491.25	254.75	272.875	0	37.75
4	172.125	358.625	63.125	0	27.875
5	316.375	339.125	53.375	2	105.625

Table 3: Number of gazes (nof)

Picture order	roi1 (main title)	roi2 (picture)	roi3 (price)	roi4 (brand)	Outside the box condensation
1	23.125	16.625	1.25	0	4
2	22.875	12.875	4.25	0	6.25
3	20	12	9.875	0	1.625
4	7.125	14.375	2.875	0	1
5	13	15.5	2.375	0.125	1.5

Table 4: Duration of gaze (ffd)

Picture order	roi1 (main title)	roi2 (picture)	roi3 (price)	roi4 (brand)	Outside the box condensation
1	17.5	23.625	8	0	10.75
2	18.625	15.875	9.25	0	18
3	15.25	22.5	17.125	0	7
4	28.125	27.25	5.875	0	8.375
5	22.625	20.625	4.125	2	11.125

5. Conclusion

This study aimed to investigate the effects of five different types of travel advertisement DMs on users' visual appeal and to analyze the effects of travel advertisement DMs on users' eye responses through eye tracking techniques. The study collected data from the subjects through eye-tracking experiments, analyzed and discussed the data, and came up with the following conclusions:

5.1 Images and Main Headlines in DMs of Tourism Advertisements are Important Factors Affecting Teachers' Visual Appeal

The results of the study show that when travel ad DMs are presented with content that includes the main headline and images, they are more likely to attract users' visual attention than when they only show the price or brand. This means that people are more likely to be attracted to the text displayed in the main headline when viewing

a travel advertisement DM, thus increasing their attention to the advertisement.

5.2 Images and Main Titles in Dms of Tourism Advertisements are Important Factors Affecting the Total Number of Times Teachers Gaze at Them

The study found that the subjects devoted more attention to the main headline and pictures in the advertisements when browsing the DMs of travel advertisements. This suggests that the main headlines and pictures in the DMs of travel advertisements are more attractive to people.

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