

Eye-tracking: the influence of picture and text layout on the effect of commercial advertising

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Abstract: *Advertisements play a crucial role in promoting products and shaping the brand image. The primary purpose of advertising is to capture consumers' attention and convey brand-related information. In this study, we investigate two typesetting methods in advertisements. The positions of images and text, whether on the left or right side, are treated as independent variables, while the gazing behavior of subjects is considered the dependent variable. Twenty subjects were included and divided into two groups. Each group was exposed to corresponding advertising materials—one viewed advertising posters with text on the left-hand side and images on the right-hand side, while the other group observed posters with text on the right-hand side and images on the left-hand side. The subjects' gazing behaviors were recorded using an eye tracker, enabling us to identify and quantify their attention. Subsequently, statistical analyses were conducted. The results indicate that the subjects paid more attention to the text information and less attention to the images. Furthermore, the horizontal position of the text and pictures also influenced the subjects' attention. These findings provide valuable insights for advertising design, emphasizing the significance of strategically placing text and images to optimize the effectiveness of advertisements.*

Keywords: *Eye-tracking, commercial advertising, advertising typesetting, consumer, attention*

1. Introduction

From verbal peddling to newspaper printing, from video advertisements to film and television soft placement, the history of advertising is extensive^[1]. As time progresses and technology becomes more advanced, the forms, types, and modes of advertising communication are becoming increasingly diverse, and the role of advertising in the sale of commodities is also becoming more significant^[2]. The primary goal of advertisements is to capture people's attention and promote products. Context and visuals are two essential elements in advertising, and previous studies have extensively examined advertisement text and images^{[3][4][5][6]}. However, this study takes a comprehensive approach, considering both text and images, and explores the impact of the horizontal positions of pictures and text on consumers' attention in advertisements, offering an innovative perspective compared to previous research. Many previous studies on advertising effects have relied on subjective self-assessment questionnaires and recall recognition methods^[7]. In contrast, this study employs the eye-tracking method to record participants' gaze and attention. Eye tracking is an effective research technique that has been used in human studies for many years^[8] and finds applications in various fields^[9]. The number of studies incorporating eye-tracking methods has increased over the past decade^{[10][11]}. Using eye-tracking parameters, this study quantifies people's attention and generates more accurate results. The independent variable in this study is the horizontal positions of text information and pictures in commercial advertisements, while the dependent variable is the eye-tracking parameters of the participants. The results will shed light on how people's attention is distributed between text and images in advertisements. Additionally, the study will investigate how different horizontal positions influence people's attention to text and image information. The conclusions drawn from this research could offer valuable insights for advertisement design.

2. Materials and methods

2.1. Participants

The study recruited a total sample of 20 participants ($M_{age} = 30.05$, $SD = 12.98$), including 10 females and 10 males. All participants were recruited from a shopping mall in Shanghai. They were

informed that the study was a social science experiment and would receive snacks as gifts for participating. All participants provided their consent by signing a letter of commitment.

2.2. Stimulus

Three commercial posters introducing different products were selected as stimuli. These posters had similar text and image layouts, with half of the poster displaying text and the other half showing the image. The text and image were organized in a left-right structure. P1 and P4 were based on the same poster, with P1 having text on the right-hand side and the image on the left-hand side. In P4, the text and image positions were exchanged. P2 (text on the right; image on the left) and P5 (text on the left; image on the right) were also based on the same poster. Similarly, P3 (text on the right; image on the left) and P6 (text on the left; image on the right) were based on the same poster. P1 and P4 were referred to as Group1, P2 and P5 as Group2, and P3 and P6 as Group3. The text described the products' features and advantages, while the image provided a brief view of the product. Additionally, a commercial poster (P7) was introduced as a distractor element to conceal the experiment's goal.

2.3. Design and procedure.

The study utilized a between-subjects design with two experimental groups. Group C1 viewed posters with text on the right-hand side and images on the left-hand side (P1, P2, and P3), while Group C2 viewed posters with text on the left-hand side and images on the right-hand side (P4, P5, and P6).

To mask the experiment's purpose, an irrelevant poster (P7) was included in the sequence. For Group C1, the sequence was P1, P2, P7, and P3, while for Group C2, it was P4, P5, P7, and P6.

The experiments were conducted at a shopping mall in Shanghai. Participants voluntarily participated in the social experiment and provided signed consent forms. They were informed that they would view a series of posters during the experiment. Participants were asked to sit in front of a screen at a distance of approximately 0.5m. An eye-tracker (Tobii 4C) was mounted at the bottom of the screen, connected to a laptop with Tobii Pro Lab software. Before viewing the stimuli, a nine-point calibration was conducted to ensure accurate eye movement tracking. Participants were then instructed to watch the posters displayed on the screen without moving their heads or bodies. Each poster was presented for 15 seconds. The sequence for the first ten participants (5 females and 5 males) was P1, P2, P7, and P3. The sequence for the second group (5 females and 5 males) was P4, P5, P7, and P6.

Areas of Interest (AOIs) in each stimulus (excluding P7) were classified into two groups: the text and the image. Eye tracking parameters, including total fixation duration (TFD), first fixation duration (FFD), and fixation count (FC), were used to analyze participants' visual attention when viewing the pictures.

2.4. Data analysis

To compare people's gazing behaviors on texts and images in Groups C1 and C2, we conducted within-group t-tests for TFD and FFD (C1 text vs. C1 picture, C2 text vs. C2 picture). Additionally, between-group t-tests were performed to analyze people's gazing patterns for different text-image layouts in Groups C1 and C2, specifically for TFD and FC (C1 text vs. C2 text, C1 picture vs. C2 picture). Furthermore, we carried out within-group t-tests for FC for both pictures and text in Groups 1, 2, and 3.

3. Results

3.1. TFD analysis within C1 and C2

The t-test results indicated that the subjects in the C1 group paid significantly more attention to the text ($M_{\text{text}}=19.96$, $SD_{\text{text}}=7.12$) compared to the picture ($M_{\text{pic}}=5.88$, $SD_{\text{pic}}=3.85$). Similarly, participants in the C2 group also directed significantly more attention ($t=2.16$, $p<0.01$) to the text ($M_{\text{text}}=17.85$, $SD_{\text{text}}=6.84$) than the picture ($M_{\text{pic}}=7.14$, $SD_{\text{pic}}=3.20$), see Table 1.

3.2. FC analysis within C1 and C2

The results of the T-test for the C1 group indicate that the subjects' fixation counts on the text part

($M_{text}=82.9$, $SD_{text}=24.30$) are significantly greater ($t=2.16$, $p<0.01$) than those on the picture ($M_{pic}=20.3$, $SD_{pic}=11.61$). Similarly, the T-test results for the C2 group also demonstrate that the subjects' fixation counts on the text ($M_{text}=69.8$, $SD_{text}=15.43$) are higher ($t=2.10$, $p<0.01$) than those on the picture ($M_{pic}=31.7$, $SD_{pic}=13.54$), see Table 1.

3.3. TFD and FC analysis between C1 and C2

Through the between-group T-test for C1 and C2, it can be observed that the subjects' total fixation duration and fixation counts do not change significantly when the text changes positions between left and right ($t=1.73$, $p=0.51$) ($t=1.75$, $p=0.17$). Similarly, there is no significant difference between the left and right panels in terms of the subjects' fixation duration and fixation counts ($t=1.74$, $p=0.43$) ($t=1.73$, $p=0.058$), see Table 1.

3.4. FC analysis within Group1, Group 2 and Group 3

Within-group t-test analyses were conducted in Groups 1, 2, and 3. No significant difference was found in Groups 1 and 3. However, in Group 2, the fixation counts of the text on the left (Mean=34.6, SD=10.89) were significantly higher ($t=1.75$, $p<0.05$) than the text on the right (Mean=26.9, SD=6.12). Additionally, the fixation counts of the picture on the left (Mean=18.2, SD=9.07) were significantly higher ($t=2.12$, $p<0.05$) than those on the right (Mean=9.3, SD=6.53), see Table 2.

Table 1 TFD and FC analysis within C1 and C2

	TFD (s)		FC	
	TEXT	PICTURE	TEXT	PICTURE
C1	19.96	5.88	82.9	20.3
C2	17.85	7.14	69.8	31.7

Table 2 TFD and FC analysis within Group1, Group 2 and Group 3

		TFD(s)			FC		
		GROUP1	GROUP2	GROUP3	GROUP1	GROUP2	GROUP3
C1	TEXT	4.19	8.59	5.79	26.2	34.6	22.1
	PICTURE	1.60	2.97	1.30	7.00	9.30	4.00
C2	TEXT	4.47	7.41	4.92	22.5	29.6	20.4
	PIXTURE	1.24	4.19	1.71	5.8	18.2	7.70

4. Discussion

The goal of the present research is to investigate the influence of horizontal text-picture layouts on people's gazing attention when viewing advertisements. Three advertisements were selected as stimuli for the experiment, and the participants were randomly divided into two groups. One group viewed advertisements with texts on the right-hand side and images on the left-hand side, while the other group viewed advertisements with texts on the left-hand side and images on the right-hand side. The participants' gazing behaviors were recorded using an eye tracker, and statistical analyses of eye-tracking parameters were performed. The results suggest that people tend to focus more on the text information than on the images, and the horizontal layout of text and pictures does influence people's initial attention.

In the t-test analyses of TFD and FC within C1 and C2, it was observed that people paid more visual attention to the text rather than the pictures, regardless of the test-image horizontal layouts. This result aligns with the findings of previous research by Wang Keqin^[12]. However, Ding Jinhong^[13] reached a different conclusion, stating that people would pay more attention to the image part. The difference between these studies could be attributed to the cognitive process. According to the cognitive resource theory, an individual's cognitive resources are limited. When cognitive resources are occupied by one stimulus, new stimuli cannot be fully processed^[14]. Thus, the part that contains more information and has a more complex design will utilize more cognitive resources, leading to fewer resources being allocated to the other part with lower processing duration and times. In this study, the

pictures only displayed the appearance of the products, while the text part provided a detailed introduction, including properties and features of the products, making the text more informative and complex. Hence, participants directed higher TFD and FC towards the text.

Regarding the FC analyses within Group 1, Group 2, and Group 3, there was no significant difference between left-right layouts in Group 1 and Group 3. However, in Group 2, it was found that the fixation counts of the text on the left side were higher than those on the right side. Simultaneously, the fixation counts of the picture on the left were also significantly higher than those on the right side. This phenomenon may be influenced by the reading and writing habits of Chinese people, where characters are typically written and read from left to right, leading people to tend to read from left to right when browsing content. This phenomenon was not observed in the other two groups. Xu Feifei^[15] mentioned that the text of advertisements can be classified into two types: describing search attributes (i.e., objective features of the product, e.g., "100% cotton") and describing experience attributes (i.e., how consumers feel about the products, e.g., "very soft"). When describing search attributes, consumers prefer the text to be displayed on the right. On the other hand, when describing experience attributes, consumers prefer the text to be displayed on the left. In this study, the texts of Group 2 described the taste of the product, which belongs to the experience attribute, hence attracting more attention when placed on the left side. The texts of Group 1 and 3 described either search attributes or both search and experience attributes.

There are several areas of improvement for future studies. While this research focuses on horizontal text-image layouts, different typesetting methods of advertisements, such as upper and lower layouts, can be investigated to provide a more comprehensive result. Additionally, the product type may also influence people's attention and can be used as an independent variable in future studies. Finally, as this study is a primary investigation into image-text layout for advertisements, a relatively small group of participants was recruited. Future studies could include a larger sample size for more robust results.

5. Conclusion

The purpose of this research is to examine the impact of the horizontal positioning of texts and pictures on people's gaze attention towards advertisements. The eye-tracking results reveal that, when viewing commercial advertisements, individuals generally tend to focus more on the text rather than the picture. This pattern holds true for both scenarios, whether the text is placed on the right or left side of the advertisement. However, when comparing the left and right layouts of texts and images in different advertisements, varying results are observed. For instance, one advertisement poster indicates that placing the texts on the left side attracts more attention. A potential reason for this finding is discussed in the study. If designers aim to draw consumers' attention towards the image part of the advertisement, they can achieve this by strategically adding key words onto the image. As consumers typically pay more attention to texts, essential information could be included in the text section to ensure it receives due notice. The aforementioned results hold valuable insights for advertisement design, enabling designers to optimize the placement of texts and images to enhance overall advertising effectiveness.

References

- [1] Yao Xi, Jiang Yibin. (2006). *The historical staging and staging basis of the world advertising history. Advertising Research (theoretical edition) (02)*, 65-71.
- [2] Dai Xinyu & Lin Shengliang. (2023). — *Take Guangzhou Daily as an example. Media Forum (10)*, 4-7.
- [3] Chen Xiaoxu. (2022). *Analysis of the euphemism in the advertising text. Overseas English (21)*, 67-68 +71
- [4] Ding Taiyan & Yang Muke. (2019). *The influence of the advertising text literariness on the brand. Audio-visual (02)*, 193-194. doi:10.19395/j.cnki.1674-246x.2019.02. 106.
- [5] He Xueting. (2020). *Research on the influence of product display picture type on advertising click willingness (master's thesis, Zhongnan University of Economics and Law)*. <https://43.138.60.40/KCMS/detail/detail.aspx?dbname=CMFD202102&filename=1020748359.nh>
- [6] Li Baoku, Wang Qiaoli. (2019). *Metaphor and the cognitive effect of picture advertising: the regulating effect of thinking mode. Journal of Liaoning Engineering and Technical University (Social Science Edition) (03)*, 161-169.
- [7] Nan Yu-fan. (2002). *How to conduct advertisement effect evaluation scientifically. Industrial*

technology and Economy (04), 91-92

[8] Ewing, K. (2005). *Studying web pages using Eye Tracking*, Tobii Technology, USA.

[9] Goodwin, S., Prouzeau, A., Whitelock-Jones, R., Hurter, C., Lawrence, L., & Afzal, U., et al. (2022). *Veta:visual eye-tracking analytics for the exploration of gaze patterns and behaviours*. *Visual Informatics (English)*, 6 (2), 13.

[10] Granka, L. A., Joachims, T., & Gay, G. (2004). *Eye-tracking analysis of user behavior in WWW search*. In *Proceedings of the 27th*

[11] M. Oya Çınar. (2009). *Eye Tracking Method to Compare the Usability of University Web Sites: A Case Study*. *International Conference on Human Centered Design*. Springer, Berlin, Heidelberg.

[12] Wang Keqin. (2005). *Eye movement research in different ways of print advertising (master's dissertation, Shanghai Normal University)*.
<https://43.138.60.40/KCMS/detail/detail.aspx?dbname=CMFD0506&filename=2005063025.nh>

[13] Ding Jinhong, Wang Jun, Zhang Qin. (2004). *Eye movement study of differences between graphics and text processing in print advertising*. *New Psychology Exploration (04)*, 30-34.

[14] Ella Gill(2018). *General Psychology*. Tritech Digital Media.

[15] Huang Zan, Du Yingjue, Xu Feifei & Hu Chuming. (2022). *How Does the Horizontal Position of Pictures and Text Affect Product Evaluation? Based on Left and Right Position Effect*. *Frontiers in Psychology*.