The impact of banner advertisement placement for Arabic readers and advertising outcomes

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A main advantage of web advertising over other advertising mediums is its efficiency in driving purchase intentions, enabling consumers to jump from advertisement to purchase in a single click. This paper aims to explore the optimal advertisement placement for Arabic web pages by considering how advertising placement and page context affects advertising outcomes. This study is one of the first to examine the physiological and cognitive processes involved in the understanding of the effectiveness of ad placement in Arabic languages. The theoretical model suggests that advertising outcomes can be affected significantly by hemispheric context (how the two hemispheres of the brain process information on an image or text-oriented page) as well as hemispheric ad placement, pertaining to optimal left-right placement of image/text ads. Demographic and advertisement data was collected from participants during the study upon ensuring ethical approval for this. The data sample involved online testing of 320 Arabic readers who were shown one of eight different web page layouts, with each layout shown to 40 respondents. Results indicate that Arabic readers perform differently to English readers, since the former process text using both brain hemispheres, in comparison to other languages. The implications of this research are that placement and optimal banner advertisement design are highly dependent on the objectives of advertising.

Keywords: *Website Design and Usability, Website Effectiveness, Arabic, Web Banners, Web Advertising, Attention, Advertising Outcomes.*

1. INTRODUCTION

With online notice spending evaluated at billions of dollars, the internet has now become the largest communication medium for companies to advertise their products. It has been predicted that there will be a growth in digital advertisement (ad) spending in the Middle East and North Africa region. The Middle East and North Africa region include several markets such as the Gulf Cooperation Council countries, Egypt, and several other key markets (Statista,2020). The Arabic language is a common factor in the Middle East and North Africa market. There are estimated to be 183 million internet users in Arabic language countries in 2020, 70.2% of the population (Internet World Stats,2020). There has been a shift toward digital advertising with the internet having 44.2% of the total ad expenditure, and TV ad spend decreasing to 30%. Digital advertising in the Middle East and North Africa region rose significantly between 2010 to 2015, increasing by almost 600%, (Statista,2020) with digital ad spending reaching over $1 billion in 2017. Egypt comprises more than half of the advertising companies and employees in the region, due to its population, low salaries, and its historical role as a local content creation hub. The United Arab Emirates represents 30% of advertising companies and employees, which benefit from its economic-free zones (Klaus Schoenbach, Robb Wood, Marium Saeed, 2018). Collectively, Middle East and North Africa countries trail other regions in innovation and adoption of new technologies. As a result, many of the opportunities of digital advertising have yet to be realised, despite the high levels of digital consumption in the region. With Arabic among the most spoken language across the world, and

one of the oldest, it is perhaps surprising to see that this language has received little attention as to how it may affect online advertising. This paper will consider the relevant literature on hemispheric processing for advertising placement and reading through the lens of Conceptual Model (Kendall Goodrich, 2007). Following this, an empirical methodological framework is described. The results from testing this framework are presented and discussed. Finally, theoretical, and managerial implications are drawn.

2. LITERATURE REVIEW

The relationship between *hemispheric context* and *hemispheric ad placement* is key to this work. Hemispheric context relates to how the two hemispheres of the brain process information on an image or text-oriented page (Janiszewski, 1988). Hemispheric ad placement pertains to the left or right placement of images and text in advertisements. This relationship may influence advertising outcomes, measured by attention, attitude, recognition, and purchase intention (Goodrich, 2007). These differences in the brand preference are best understood through the *matching activation hypothesis*: a prediction that when activating the right or left hemisphere, the other (less activated hemisphere) is encouraged to process additional present, but non-attended (not observed) material (Friedman & Polson, 1981).

It has been found that brand names are more favoured when placed to the left of a text passage. This is known as *hemispheric priming*, when one brain hemisphere will process non-attended material (images or text) while the opposite hemisphere processes attended (read, or viewed) material (Janiszewski, 1990).

2.1 The Hemispheric Processing Research on Advertising Placement

Janiszewski's research on hemispheric processing on advertising placement in 1988 and 1990 integrated the theories that advertising stimuli directed to an optimal brain hemisphere generates significantly more favourable attitudes to advertisements. It can therefore be posited that varying ad positioning strategies will have different impacts on ad performance. Specifically, Janiszewski (1988) suggests that there is a notable difference between types of stimuli, such as when an image or text ad is placed on the left or right side of newspaper text. Non-attended text ads were more effective when placed on the right side of text, in contrast to the left; the opposite was found to be true for non-attended image ads. Janiszewski (1990) conducted another study and found that

various choices of ad placements in relation to text or image material influenced individuals' preferences for a brand name. He also revealed that brands become more favourable when placed on the right side (and so sent to the left-brain hemisphere) of an image representation, than when placed on the left side (sent to right brain hemisphere) of a text representation.

2.2 Hemispheric Processing for Arabic Readers

Generally hemispheric processing on the right side of the brain is congruent with visual spatial information, and is better suited to image stimuli, while the left hemisphere is better suited to process text and integrative stimuli (Janiszewski, 1988). Eviatar (2010) considered how Arabic readers process Arabic characters in relation to both brain hemispheres. He suggested that Arabic speaking individuals were likely to utilise the left hemisphere to distinguish between Arabic letters due to its advantage in processing detail; however, the right hemisphere would also help to process the placement of dots in text, which are necessary to distinguish between different letters of Arabic text. The right hemisphere uses a template matching procedure and can recognise words as whole units (Gough & Tunmer, 1986), whereas the left hemisphere tends to be sequential such that it absorbs individual units of information and combines them into meaningful sentences or information (Erevellesa, 1998).

The differences between Arabic and English Language are:

- Arabic is read from right to left.
- In the Arabic, Latin, and Cyrillic writing systems, the letters of a word are connected, making it one single complex line. Most of the letters in the Arabic alphabet are linked to their neighbours. As a result, an Arabic letter can appear at the beginning, the middle, or the end of a word or word segment. The appearance of a letter changes when its position within a word or word segment changes.
- Words are formed from cursive text (i.e., the letters in Arabic naturally join, even in printed formats, much like hand-written text in English).
- The Arabic script has no capital letters.
- For readers of English, both hemispheres of the brain are independently involved in the task of reading, i.e., neither side is dependent on the other. For readers in Arabic, the right hemisphere is not able to function independently when reading without using the resources of the left hemisphere due to the language's written structure, as the letters of Arabic

text may look similar in shape but are distinguished from by the position of tiny dots - *nuqta*. Thus, when reading Arabic text (as opposed to English), the right hemisphere processes text in collaboration with the left hemisphere.

2.3 Advertising outcomes

Cho & Cheon (2004) explored internet banner advertising and found four potential factors which affect advertising outcomes. These factors are *Brand Attitude*, *Attention*, *Recognition* and *Purchase Intention.*

2.3.1   Brand Attitude

Janiszewski (1993), and Cham, Kim & Muk (2016) revealed the impact of page context on consumers' attitudes towards a brand. In a situation where matching activation and ad placement compete, then this gives rise to the matching activation hypothesis due to the demonstrated importance of ad context.

2.3.2   Attention

It has been indicated that images rank higher than text in capturing attention, irrespective of image size (Pieters & Wedel, 2004). However, Janiszewski (1998) concluded that images with more visual competition were less effective at capturing the attention of a reader. As such there is a superiority of ad context, regarding the matching activation, over ad placement in attracting attention. Thus, the importance of ad context images, (e.g., potential dominance of matching activation over optimal left-right hemispheric placement) must be considered while predicting advertising attention.

2.3.3   Recognition

Studies reveal that attention adds to the total amount of information available to memory, and so consequently improves recognition and recall for a brand (Pieters, Warlop & Wedel, 2002). As a result, it can be reasonably predicted that effectiveness of recognition will display similar results to that of attention.

2.3.4   Purchase Intention

Explicit attitude may not override implicit attitude if attention and recall are low (Wilson et al., 2000) and the effects of mere exposure will impact attitude formation in this study. It is natural to expect that exposure effects on attitude are positive because judgments are made instantly (Herr and Page, 2004). However, explicit attitudes may also have positive effects on purchase intention where there are conditions which support higher recognition – such as images. As such, if a consumer has positive considerations towards an advertised brand, then the purchase intention of a consumer would be

higher when they can recall the brand with ease (Dahlen and Lange, 2005).

This study will consider how hemispheric context, and hemispheric ad placement affects advertising outcomes for Arabic readers.

3.RESEARCH METHODOLOGY

The methodology aims to provide a deeper understanding into the impacts of reading direction, script type and dialect development. An applied theoretical model (Goodrich, 2007) will consider eight ad placement/page type combinations that may determine advertising outcomes. This will demonstrate how hemispheric ad placement (left-right placement of image or text ads) and hemispheric context (matching activation, dependent on an image or text-oriented page) can influence advertising outcomes.

A 2 x 2 x 2 subject factorial design has been implemented which considers banner advertisements - either text or image-based; left / right banner advertisement placement; and text or image-oriented page types. These scenarios are manipulated in an online environment.

The conceptual model by Goodrich (2007) places an emphasis on independent variables – eight ad placement/page type combinations, and the dependent variables - four advertising outcomes (attitude, attention, etc.).

Figure 1 The Conceptual Model, Goodrich (2007)
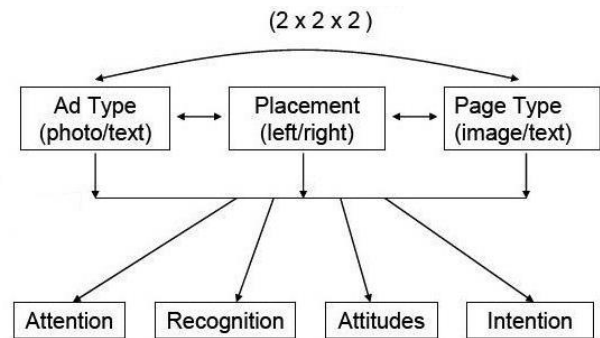
Each will be observed in this study.   Goodrich examined and summarised the hypotheses advertising outcomes shown in Table 1, which details the effect of advertisements for each stimuli condition: image page vs a text page, right or left placement and text ad or image ad. The strength of the effect is ranked from 1 to 4 – with the strongest effect being ranked 1 and weakest ranked 4.

Table 1 *Placement and Page type, (Kendall Goodrich, 2007) and Banner Advertising Effects by Ad type*

	Text Page			
	Left Ad		Right Ad	
	I-L	T-L	I-R	T-R
Attention	1	3	2	4
Recognition	1	3	2	4
Attitude	1	2	4	3
Intention	1	2	3	4
	Image Page			
	Left Ad		Right Ad	
	I-L	T-L	I-R	T-R
Attention	2	4	1	3
Recognition	2	4	1	3
Attitude	3	4	2	1
Intention	3	4	1	2

I-L = Left-placed Image ad, T-L = Left-placed Text ad

I-R = Right-placed Image ad, T-R = Right-placed Text ad

This study considered data sampled from a voluntary panel of Arabic internet users from a wide range of backgrounds - with a 50/50 male/female gender balance, a broad range of ages, family composition, incomes, and education. Eight sets of respondents were recruited, with each set having 40 respondents. The respondents were first asked to provide demographic information, including age, gender, and level of education. The participants where then asked to conduct a visual test using Lucky Orange (Luckyorange.com, 2015): a web-based attention tracking method for measuring the visual performance of advertisements. A mouse 'click test' recorded in real-time the regions of a webpage that respondents were engaging with.

Each set of respondents were delivered one specific web page out of the eight different web page layouts. Each web page contained one of the eight conditions for ad placement as detailed in Table 1. Participants were instructed to complete a questionnaire which would measure the effectiveness of an advertisement. Advertisements were based on products that are relevant to Middle East and North Africa populations and were also changed into Arabic language. Questionnaires collected information as detailed in Table 2

Internal and external validation of attention-tracking, through the recording computer mouse clicks, was compiled by the study team; observing how a series of website images caught the participants' attention.

Table 2 *Demographic and Advertisement data collected from participants during the study*

Questionnaire data collected
Gender
Age
Education level
Household size
Unaided Brand and Product Recall
Aided Brand Recall
Aided Product Recall
Recognition
Purchase intent
Brand Items
Feeling about the brand

Recognition of Samsung Mobile advertisements was measured using a dichotomous variable (Unnava and Burnkrandt, 1991), wherein respondents were asked to mark recalled brands from a list of companies. Five attitude items (attractive/ unattractive, good / bad, likeable / unlikeable, appealing / unappealing, pleasant / unpleasant) as defined by Janiszewski (1990) were used in determining brand attitude. Scores were measured on a 7-point scale with 7 indicating the highest score, and 1 the lowest. Purchase intentions were measured through a single item (Morrison, 1979) where a respondent would identify with a 7-point scale whether they would be *very likely* to purchase or *very unlikely* to purchase.

4.RESULTS

4.1 Overall Descriptive Statistics Results

The main objective of the study was to identify the independent variables (main and interaction effects), which potentially affect the dependent variable set. The results of both ANOVA and MANOVA tests were observed to evaluate significant overall advertising effects. ANOVA detailed results for dependent variables. MANOVA was used to understand the effects of ad type (image/text), page type (image/text) and ad placement (left-right) on the targeted advertising effects of recognition, attitude, purchase intention and attention. In this research, ranking was detected by comparing *cell means*, wherein each factor level undergoes comparison with the mean of the subsequent factor levels to indicate the significance of the entire comparison. Through the help of simple contrasts, a factor level is compared with one reference level.

The results are summarised in Table 3. *Attention* is the mean attention score, and more detailed

statistics are provided for *Attitude, Recognition* and *Purchase Intention*.

Table 4 shows the advertising effects for each stimuli condition whether it is text or image page, whether it is placed right or left, and lastly if it is an image ad or text ad. The strength of stimuli is evaluated from 1 to 4, with 1 being the most effective.

The results show that the ranking of advertising in Arabic is different to that in the English, supporting the result of previous research (Almabruk, 2011), which concluded that Arabic readers recognise words differently compared to English language readers.

5. DISCUSSION AND CONCLUSION

5.1 Discussion on findings

The research findings support / corroborate the results of research by Ibrahim & Eviatar, (2009) which indicate the difference between Arabic and other languages like English and Hebrew. For languages like Hebrew and English the results show that both hemispheres of the brain function independently whereas for Arabic readers it is suggested that both hemispheres, i.e., both the right and left, are utilised. Almabruk (2011) showed how Arabic readers recognise words differently compared to readers of other languages. Further, it reveals that there are clear differences in how both halves of the brain recognise Arabic words. This online environment in this study seems to support only matching activation effects on advertising outcomes, as determined in the results.

5.2 Overall Results for Hemispheric Ad Placement

The results for hemispheric ad placement are as follows (also described in detail in Table 4):

- For web pages that are image-oriented the hemispheric ad placement has a greater effect on attributes i.e., attention, recognition, attitude, intention, and attitude even though the results were significant only for left image ads.
- For web pages that were text-oriented, the hemispheric ad placement has a greater effect on attributes i.e., attention, recognition and purchase intention despite the results being significant only for left image ads. Matching activation effects were further tested through a series of four theory-specific

planned contrasts (with more favourable stimuli listed first within each contrast):

(i) Leftward image ad on a text versus image-oriented page.

(ii) Leftward text ad on a text versus image-oriented page.

(iii) Rightward image ad on an image-oriented versus text page.

(iv) Rightward text ad on an image-oriented versus text page.

Based on the results provided in Table 3 and by using Wilk's test, a statistical test in MANOVA, discriminant analysis, and other multivariate results, we examined the p-values for the Wilk's test statistic to determine whether there is significant evidence for model effects. Wilks' output provides a significance value (***p***), a lambda value (***lambda***), and a statistic (***F***) which refers to the F-statistic associated with the degrees of freedom (Nath and Pavur,1985). ***M*** refers to the mean.

We summarized the results as below:

(i) **Leftward image ads on a text page versus an image-oriented page** were associated with less favourable effects for attention (M=0.39) and recognition (lambda= 2.9000, F= 73.09, p <.05) the opposite of what would be expected under this theory. However, there were significantly more favourable effects on attitude (lambda= 1.4750, F= 47.42, p <.05) and intention (lambda= 2.0750, F= 32.65, p <.05).

(ii) **For Leftward text ad on a text vs. image-oriented page**, there were significantly more favourable effects on attention (M= 0.61). However, there were less favourable effects for recognition (lambda= 3.0250, F= 80.11, p <.05), attitude (lambda= 1.4000, F= 22.07, p <.05) and intention (lambda= 1.7500, F= 17.94, p <.05).

(iii) **For Rightward image ad on an image-oriented vs. text page**, there were significantly more favourable effects on attention (M= 0.382), intention (lambda= 0.20370, F= 50.96, p <.05). However, there were less favourable effects for recognition (lambda= 0.12651, F= 52.34, p <.05) and attitude (lambda= 0.27165, F=69.66, p <.05).

(iv) **For Rightward text ad on an image-oriented vs. text page**, there were favourable effects on

attention (M= 0.29), recognition (lambda= 0.16506, F= 77.49, p <.05), attitude (lambda= 0.27019, F= 150.13, p <.05) and intention (lambda= 0.20544, F=183.01, p <.05).

The overall results provide only limited support for matching activation effects on attributes like attitude and intention for image ads, text ads placed on left for attention on text-oriented pages, and image ads placed right on image-oriented pages. The effect of each advertisement scenario can be seen in Table 4 below.

Table 3 Planned Contrasts for Matching Activation Ad Placement

	Left Image ad		Left Text ad		Right Image ad		Right Text ad	
	Text Page	Image Page	Text Page	Image Page	Image Page	Text Page	Image Page	Text Page
Attention (M)	0.39	0.411	0.61	0.108	0.382	0.26	.09	0.29
Recognition	2.9000* (0.3392) [8.55]	3.4000* (0.4109) [8.27]	3.0250* (0.3380) [8.95]	4.2750* (0.5259) [8.13]	0.12651* (0.01749) [7.23]	0.17143* (0.01874) [9.15]	0.08972* (0.01461) [6.14]	0.16506* (0.01875) [8.80]
Attitude	1.4750* (0.2142) [6.89]	1.3750* (0.2376) [5.79]	1.4000* (0.2980) [4.70]	2.0750* (0.3317) [6.25]	0.27165* (0.03255) [8.35]	1.5250* (0.2097) [7.27]	0.15962* (0.02552) [6.25]	0.27019* (0.02205) [12.25]
Intention	2.0750* (0.3632) [5.71]	1.9250* (0.2697) [7.14]	1.7500* (0.4132) [4.24]	2.7500* (0.4359) [6.31]	0.20370* (0.02853) [7.14]	0.18336* (0.02083) [8.80]	0.16058* (0.01531) [10.49]	0.20544* (0.01519) [13.53]

*$p<.05$ * (Significant coefficient at p-value ≤ 0.05)*
1st line results indicate regression coefficient (ratio of effect)
2nd line results - Standard deviations - are indicates in ( )
3rd line results - T- Statistics - are indicates in [ ]

The results summary is provided in **Table 4**:

Table 4 Ad Effects by Ad type, Placement and Page type

	Text Page			
	Left Ad		Right Ad	
	I-L	T-L	I-R	T-R
Attention	2	1	4	3
Recognition	2	1	3	4
Attitude	2	3	1	4
Intention	1	2	4	3

	Image Page			
	Left Ad		Right Ad	
	I-L	T-L	I-R	T-R
Attention	1	3	2	4
Recognition	2	1	3	4
Attitude	2	1	3	4
Intention	2	1	3	4

I-L = Left-placed Image ad, T-L = Left-placed Text ad
I-R = Right-placed Image ad, T-R = Right-placed Text ad

A summary of the four key findings derived from this online environment study based on the purpose of ads result in the followings conclusions:

-If the objective of banner ads is to receive greater attention for a specific product, then image ads to the left of image-based page will help achieve this. While text ad on the left of text-based page facilitates the process of attracting greater attention.

-If the objective of banner ads is to receive higher brand recognition, then text ads on the left of the text page produce more favourable effects whereas text ads on the left of the image page produce more favourable effects.

-If the objective of the banner ads is to receive more favourable attitudes, then text ads on the left of the image-based page generate more favourable attitudes, and image ads to the right of the text-based page produce more favourable attitudes.

-If the objective of banner ads is to sell certain products and receive higher purchase intention then image ads to the left of the text-based Web page will produce effective results and text ads on the left of the image-based page will lead to a higher purchase intention.

We have summarised these findings visually as below, ads are in blue borders:

(i) If the advertising campaign objective is getting high attention or click-through rates:

For text-oriented Page: Text ads on the left side of text page are associated with more favourable effects.
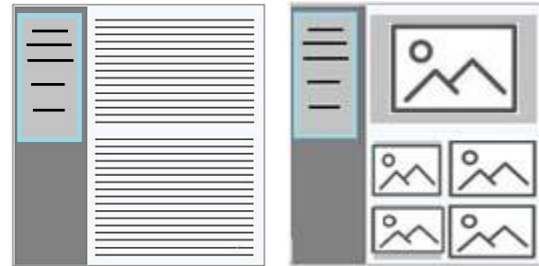
For image-oriented Page: Image ads on the left side of image page are associated with more favourable effects.

(ii) If the advertising campaign objective is getting high brand recognition:

For Text-oriented Page: text ads on the left side of Text page are associated with more favourable effects.
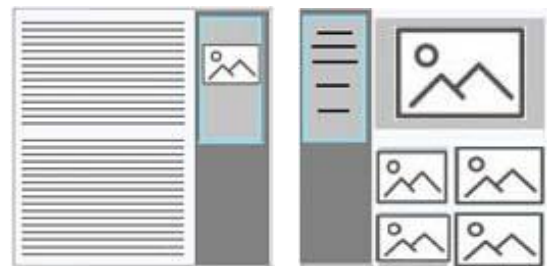
For Image-oriented Page: Text ads on the left side of Image page are associated with more favourable effects.

(iii) If the advertising campaign objective is targeting high Brand Attitude:

For text-oriented page: Image ads on the Right side of Text page are associated with more favourable effects.

For image-oriented page: Text ads on the left side of the Image page are associated with more favourable effects.

(iv) If the advertising campaign objective is high Purchase Intention:

For text-oriented page: Image ads on the left side of Text page are associated with more favourable effects.

For Image-oriented Page: Text ads on the left side of the Image page are associated with more
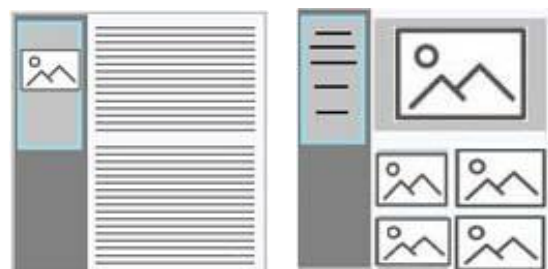
favourable effects.

5.3 Practical Implications

Arabic websites are designed for users who are interested in reading information in their native language. Thus, we need to present web sites for Arabic users in a way that suits users' needs and achieve advertising targets. As such, designers should consider web page context, layout and banner ad placement and apply the findings of this research.

Current web design practices require dealing with design issues to facilitate preferences in layout for different languages, based on the web page context type and advertising campaign targets. Advertisement is not the main concern of web designers generally, but if these are not accounted for then it could result in a disoriented layout, where ads would either alter the sequence of the website or be placed where the attention captured is very low.

Thus, website designers must focus on these findings in the design process to ensure that placements and ad content are suitable for them to generate the required impact. If designers are focusing on maximising ad revenue for clients with minimal interference in the appearance and usability of the website, then the findings of this research must be considered in the entire design process to design the most effective advertising strategies for Arabic web pages.

Specifically, based on the findings of this study, Arabic versions of advertising banner design and placement should not be identical to the English versions, as both hemispheres of the brain process the Arabic language differently to some other languages.

Webpages could also consider advertisement placement and banner design, based on the study findings. This research shows differences between Arabic and English language and evidence that Arabic readers process language differently, such that both the sides of the brain process Arabic text as opposed to one side for English and other languages. The effect of advertising and advertisement placement for Arabic readers has been shown to be different than that of English readers. Thus, website owners and website designers must focus on this parameter in the design process to ensure placements and content of ads are suitable and the ads generate the required impact.

3. REFERENCES

Almabruk AAA, Paterson KB, McGowan V, Jordan TR (2011) Evaluating Effects of Divided Hemispheric Processing on Word Recognition in Foveal and Extrafoveal Displays: The Evidence from Arabic. PLoS ONE 6(4): e18131. https://doi.org/10.1371/journal.pone.0018131

Dahlén, Micael and Fredrik Lange (2005), Advertising weak and strong brands: Whogains? Psychology & Marketing, 22, 473-485.

Erevellesa, Sunil (1998), The Role of Affect in Marketing, Journal of Business Research, 42, 199-215.

Goodrich, K. (2007). Optimal positioning of Webpage advertisements: An extension of hemispheric processing theory.

Goodrich, K. (2010). What's up? Exploring upperand lower visual field advertising effects. Journal of Advertising Research, 50, 91-106.

Gough, Philip B ; Tunmer, William E · Los Angeles, CA: SAGE,(1986), Publications · Remedial and special education, 1986-01, Vol.7 (1), p.6-10

Ibrahim, R., & Eviatar, Z. (2009). Language Status and Hemispheric Involvement in Reading: Evidence from Trilingual Arabic Speakers Tested in Arabic, Hebrew, and English. Neuropsychology, 23, 240.

Janiszewski, Chris (1988), Preconscious Processing Effects: The Independence of Attitude Formation and Conscious Thought, Journal of Consumer Research, 15,199-209.

Janiszewski, Chris (1990), The influence of print advertisement organization on affect toward a brand name, Journal of Consumer Research, 17, 53-65.

Janiszewski, Chris (1993), Pre attentive mere exposure effects, Journal of Consumer Research, 20,376-392.

Janiszewski, Chris (1998), The Influence of Display Characteristics on Visual Exploratory Search Behavior, Journal of Consumer Research 25, 290 -304.

Kunst-Wilson, W. R., & Zajonc, R. B. (1980), Affective discrimination of stimuli that cannot be recognized, Management Science, 207, 557-558.

Nath, R. and Pavur, R. (1985) A new statistic in the one-way multivariate analysis of variance, Computational Statistics and Data Analysis, 2, 297–315.

Pictorial, and Text-Size Effects, Journal of Marketing,68,36-50.

Pieters, Rik and Michel Wedel (2004), Attention Capture and Transfer in Advertising: Brand,

Schoenbach, Klaus, Marium Saeed, and Robb Wood. (March 2018), "Audience responses to online video in MENA: New favourite genres or

just more of the same as on television?"
International Communication Gazette 80, no. 8,
697–713.
http://dx.doi.org/10.1177/1748048518759196.

Scheier,   Christian   (2006),   Validating
AttentionTracking™, MediaAnalyzer Software &
Research GmbH, Retrieved 5 April 2014,
from www.mediaanalyzer.com

Unnava, H. R., & Burnkrant, R. E. (1991). An
imagery-processing view of the role of pic-tures in
print advertisements. Journal of Marketing
Research, 28, 226–231