

The Effect of Presentation in Online Advertising

on Perceived Intrusiveness and Annoyance in Different Emotional States

Kaveh Bakhtiyari, Jürgen Ziegler, Hafizah Husain

University of Duisburg-Essen
The National University of Malaysia (UKM)

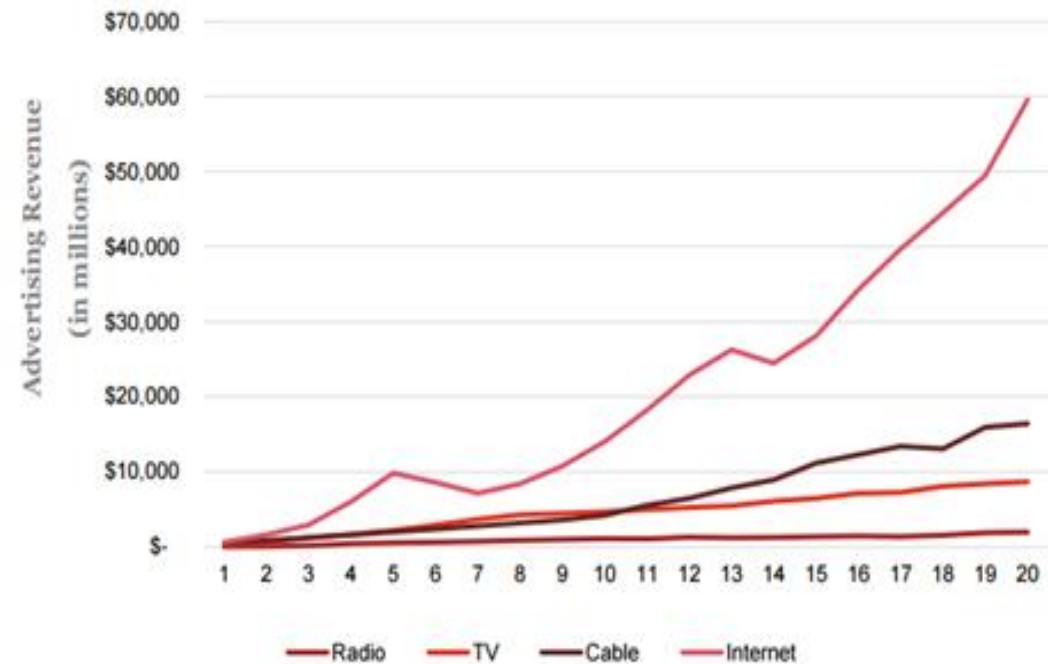


Outline

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Computational Advertising

- In 2015, there were revenues of \$59.6 billion from the online advertisements in the United States, which shows a 20.4% growth over the previous year.
- In order to increase the revenues, companies tend to deliver more relevant advertisements to the users to attract more attentions and conversions.
- The largest Ad brokers such as Google Inc., Yahoo!, Microsoft, etc. have invested a lot in this research area.
- In 2008, Broder coined the research area of Computational Advertising in order to deliver more relevant Ads to the users, and gain higher number conversions on online advertisements.



\$ have been adjusted for inflation

Sources: Douglas Galbi (purple notes) and IAB Internet Advertising Revenue Report, FY 2015

Ad Effectiveness

Advertisement effectiveness depends on many factors:

logo design, content, color and images affect the brand awareness and branding memory.

Effectiveness Evaluation:

- **Performance:** Click-through rates (CTR) and the conversion rate. CTR counts the number of clicks on an Ad campaign, and conversion is the user's activity for using, purchasing, or subscribing on the target website after clicking on the Ad. Performance model was applied on 65% of internet Ads in 2015, which was only 46% in 2005.
- **Cost-Per-Impression (CPM):** CPM is the pricing model based on every thousand impressions (views) of an Ad.
- **Hybrid:** it is a combination of both performance and CPM models.
- The user satisfaction and user's experience over the online advertisements are the main evaluation metrics. In this case, intrusiveness, annoy, incentives, salience, and other visual features of the advertisements come into the play.

Advertisement Delivering

There are two aspects on delivering an effective Ad:

- **Content**
 - It is about what item should be recommended.
- **Presentation**
 - **It is about how the selected item should be presented:**
 - **1. Frame size**
 - **2. Position**
 - **3. Animation**

Problem Statement

- According to the literature on online advertisements more visually salient (intrusive) banners are more disturbing and annoying.
- A website with annoying banners can easily jeopardize the reputation of the service provider and the promoted brand.

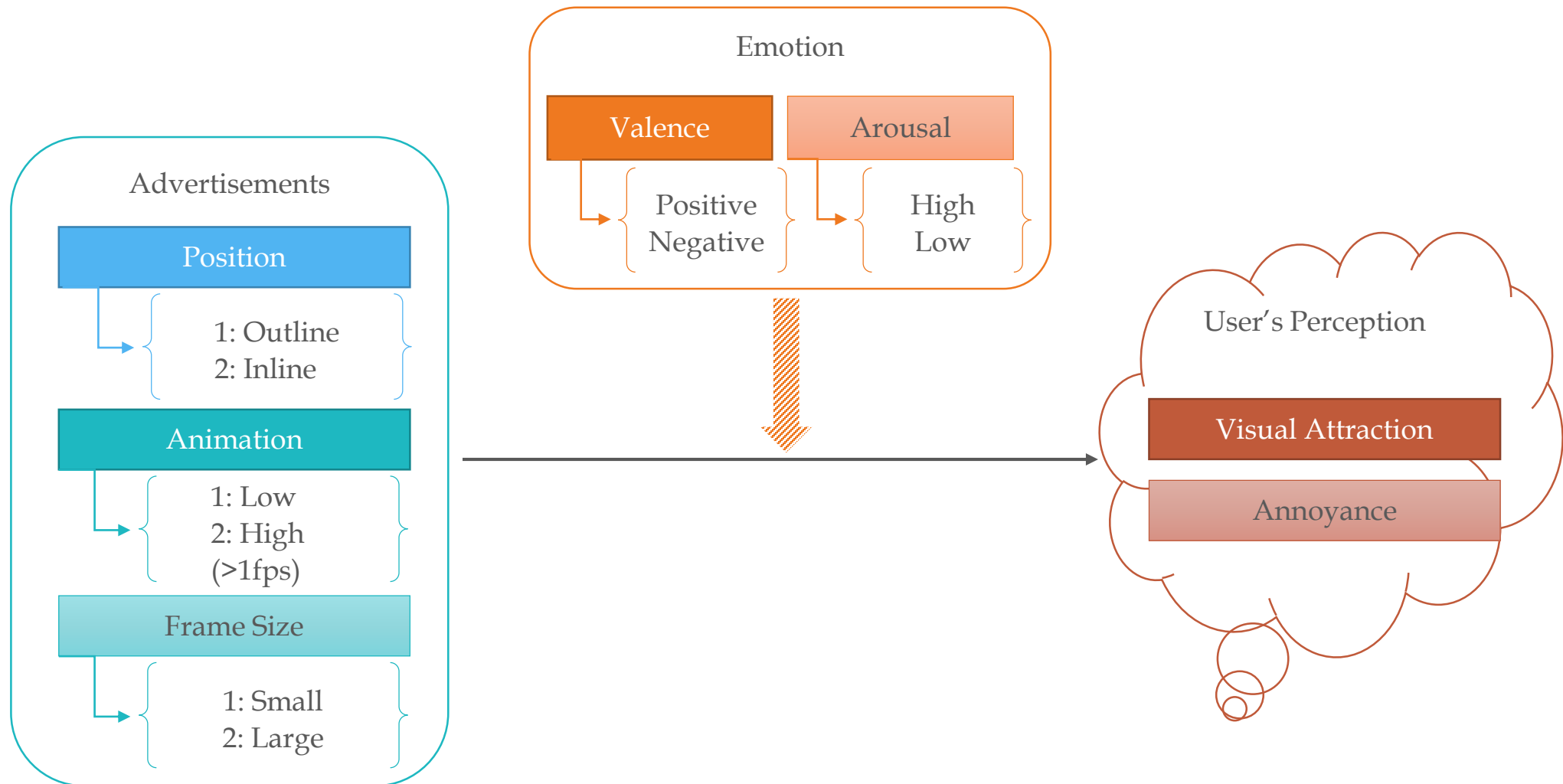
Objective:

- To deliver the contents with a balance of visual saliency and annoyance in order to gain more profit without losing the reputation and the users.

Research Questions

- RQ1: How do the different types of Ad's presentation attract the visual attention?
- RQ2: What is the extent of perceived annoyance for different types of Ad's presentations?
- RQ3: Is there any significant difference between male and female users' perceived attention and annoyance against the Ads?
- RQ4: Do the emotions effect the user's attention and perception on online advertisements?

Study Framework



Methodology

- To address the research question, a survey is designed based on the study framework.
- This survey questions the user's idea about intrusiveness/saliency and annoyance of 12 different forms of advertisement presentations.
- These 12 cases were selected based on three features of ad presentation.
- Cases were presented in a random order.
- This survey also asks the user's emotion explicitly (self-reported emotion) based on the PAM model.

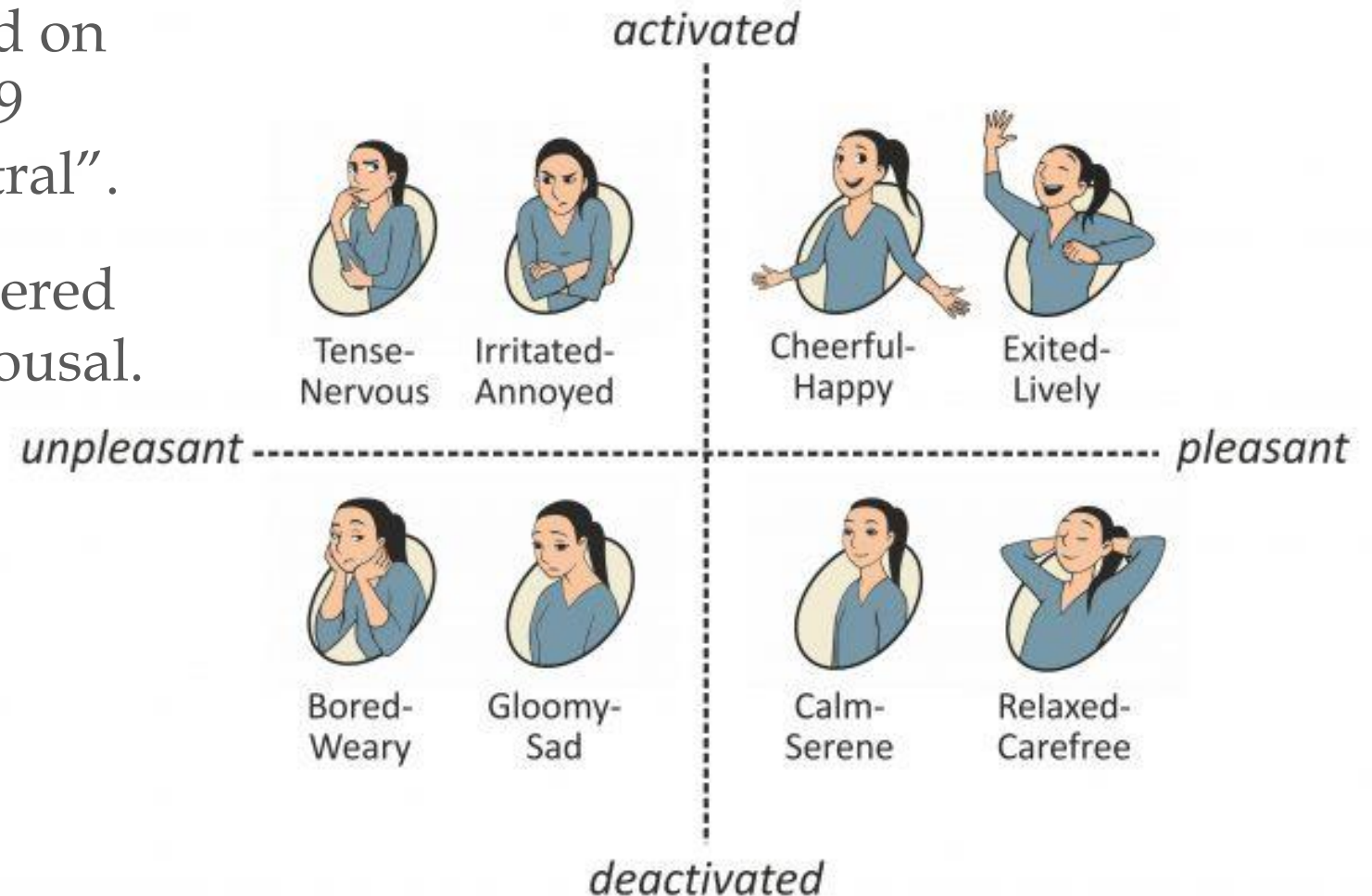
Survey: Cases

Ad Type	In/Out-line	Position	Animation	Frame Size	Case #
Horizontal					
	Outline	Top - Bottom	Low		1
	Outline	Top	Low	Big Size	5
	Outline	Bottom (fixed)	Low		6
Vertical					
	Outline	Right - Left (fixed)	Low	Skyscraper	3
	Outline	Right - Left (Fly-in)	Low/Medium	Skyscraper	8
	Outline	Right - Left (Fly-in)	High	Skyscraper	9
Square					
	Outline	Right - Left (fixed)	Low	Skyscraper	2
	Inline	Middle of text	Low		4
	Inline	Middle of text	High (Video) - Muted		10
	Inline	Middle of text	High (Video) - Sound		12
Full / Half Screen					
	Outline	Middle/Center	Low	Half Screen	7
	Outline	Page Transition	Low/Medium	Full Screen	11

Emotion Selection based on PAM model

Selecting an emotion based on PAM model from a list of 9 Emotions including “Neutral”.

These 9 emotions are clustered in terms of valence and arousal.



Survey Questions

- **Q1 and Q3: Visual Intrusiveness**
- **Q2 and Q4: Annoyance**

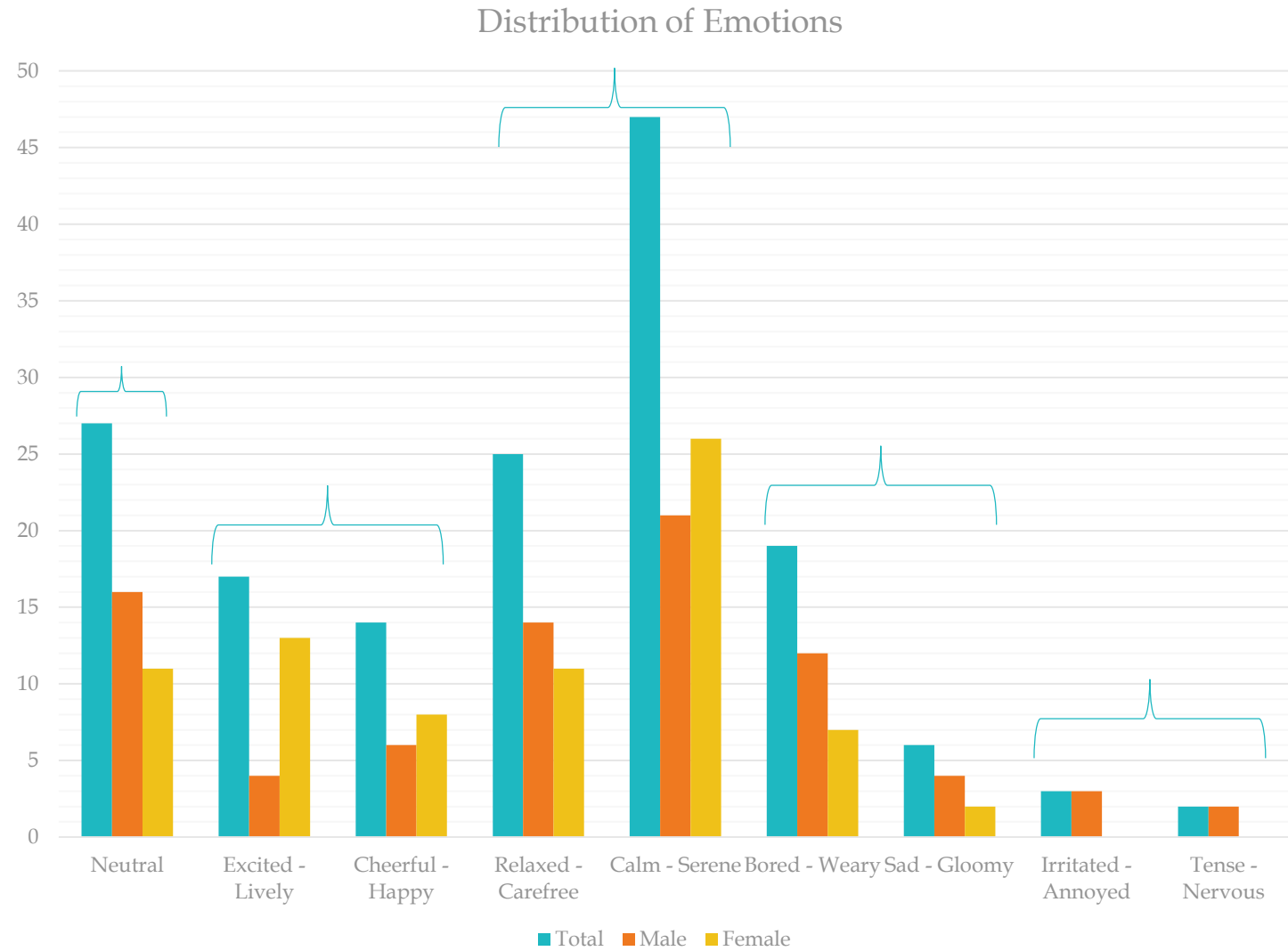
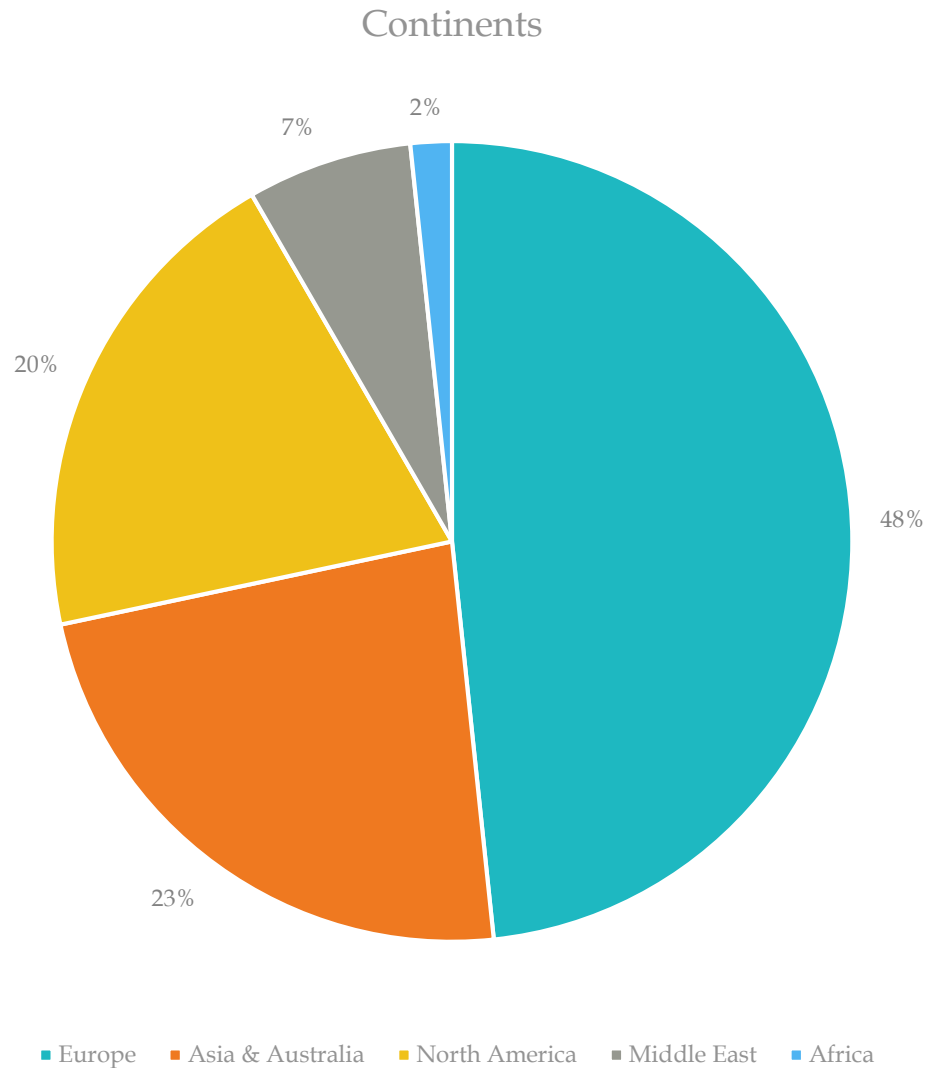
Answers in scale of 1 to 5

1: Very low; 3: Medium; and 5: Very high.

Survey Questions

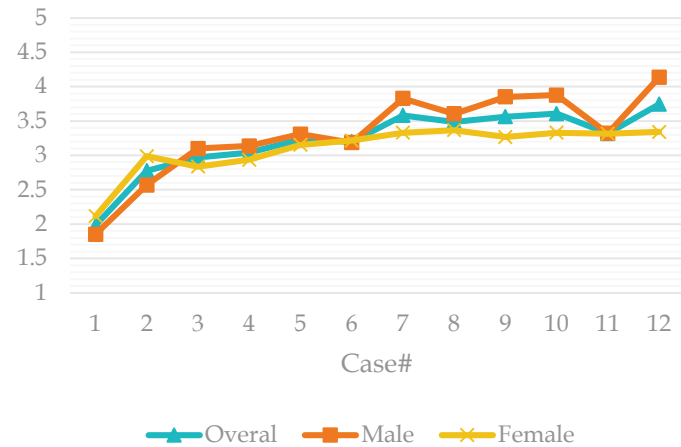
- Q1) How much does the presented advertisement attract your attention?
- Q2) How much does the presented type of advertisement annoy you?
- Q3) How much does the presented type of advertisement distract your concentration (focus) on the main content?
- Q4) If this type of advertisement is being shown frequently, how much does it make a negative perception/attitude towards the product/service/brand?

Results: Demographic and Emotions Distribution

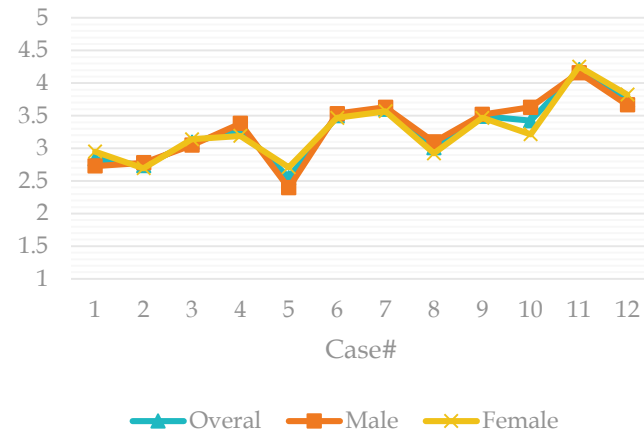


Results: Raw Data and Answers Correlation

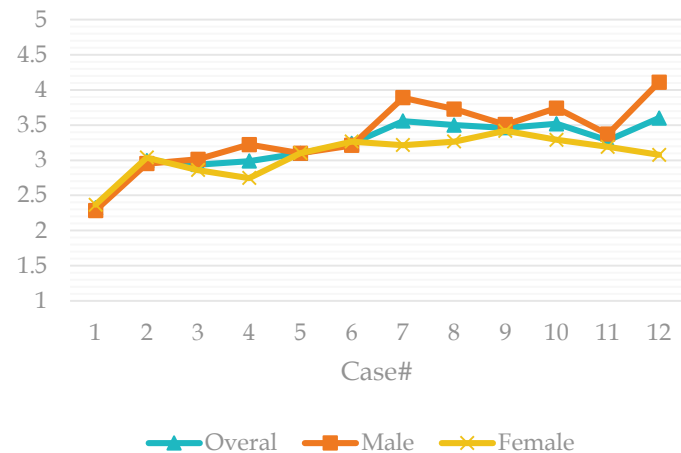
Attraction (Q1)



Annoyance (Q2)



Distraction (Q3)



Negative Perception (Q4)



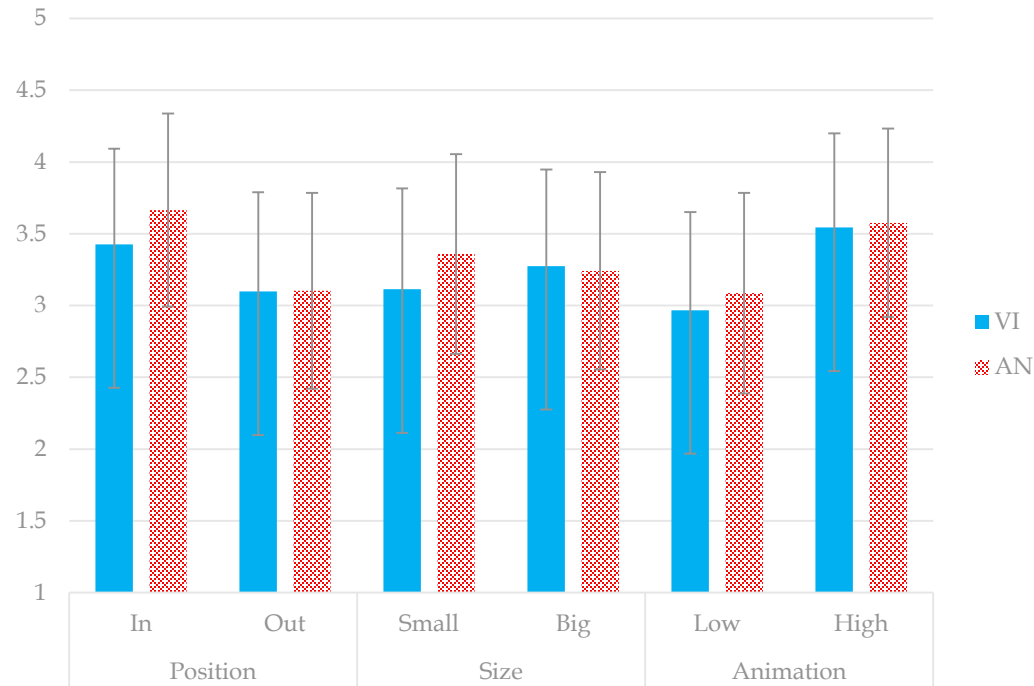
RQ3:

Even though male participants showed being more attracted to the advertisements, **no significant difference between male and female participants was observed.**

Correlations of answers to the survey questions

	Q1	Q2	Q3	Q4
Q1	1			
Q2	0.533025	1		
Q3	0.979866	0.53969	1	
Q4	0.652699	0.91148	0.650396	1

Results: Effect of Presentation Features



The means and error bars of the ad's features

ANOVA with Eta-squared analysis on the effects of features on VI and AN
 * df (Between groups): 1; df (Within groups): 1918; F -crit: 3.8463

	VI			AN		
	F	p	Eta-Squared	F	p	Eta-Squared
Position	24.6102	< 0.00	0.0126	73.1269	< 0.00	0.0368
Frame Size	6.4398	0.011	0.0033	60.2119	0.0483	0.0057
Animation	85.5155	< 0.00	0.0428	3.9068	< 0.00	0.0302

Results: Emotional-Aware Intrusiveness and Annoyance

ANOVA with Eta-squared values on the emotions for VI and AN

* *df (Between groups): 4; df (Within groups): 1915; F-crit: 2.376574*

	VI			AN		
	F	p	Eta-Squared	F	p	Eta-Squared
Emotion	10.30881	< 0.00	0.021	11.91755	< 0.00	0.0242

Intrusiveness recommendation based on the emotional dimensions

Dimensions	Intrusive Ads Recommended	Non-Intrusive Ads Recommended
Valence	Positive (+)	Negative (-)
Arousal	Low ↓	High ↑

Conclusion

- RQ1: Animation and Position features of an online ad have the most affect in visual intrusiveness/saliency.
- RQ2: Position of an ad has more annoying effect and generally more intrusive/salient ads are more annoying.
- RQ3: No significant difference between the males and females was observed.
- RQ4: Emotions effect the user's attention and perception on online advertisements, and intrusive ads are recommended to the people with positive valence and lower arousal level.

Future Works

- In the next study, we would like to check and detect the user's attention and annoyance implicitly.
- Measuring the interaction features such as the keyboard keystroke dynamics, mouse movements and eye movements (eye tracking machine), while users are interacting with some designed tasks.
- User's respiration and heart rate variabilities will be monitored during the experiment for affective measurements.
- The results will be modeled with a game theory game into the computational advertising systems to recommend the online ads in more effective forms of presentation.

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Q&A

