

Measuring Ad Effectiveness using Big-Five Personality Traits, Ad Recall and Visual Attention

Master's Thesis

By

Semira Maria Evangelou



July 2021

Human-Computer Interaction (HCI)

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Supervisor:

Michalis Xenos, Professor

Members:

Nikolaos Avouris, Professor

Ioannis Garofalakis, Professor

Abstract

This master's thesis investigated the effectiveness of advertising, considering advertisement recall, visual attention, and the role of consumer personality in advertising. In the context of this study, an online store was developed with six product categories and eight clickable banner advertisements. The advertisements were created using an online advertisement creation tool and the colors used were selected after a careful review of the literature on color effectiveness. During this study, an experiment was performed that took place in the usability evaluation and Human-Computer Interaction Laboratory at the Computer Engineering Department of the University of Patras. The results presented hereinafter were collected during the 2020-2021 academic year. Overall, forty-three participants (17 were women) participated in the study. They were all informed that the store was not a real one, and they were hypothetically given the amount of 1,000 euros to buy what they want from the online store. Eye-tracking data, questionnaires, and interviews were used and analyzed to provide a better understanding of the factors that are related to advertising effectiveness. Firstly, the research focused on examining correlations between the Big-Five characteristics scores and the percentage of the advertisements that were noticed or the percentage of the advertisements that were recalled. In addition, correlations between participants' Big-Five characteristics regarding their attitude toward advertising were examined. Finally, the banner blindness phenomena were tested regarding Big-Five personality trait correlations. Findings of this study revealed that participants with the lowest scores in the Openness to Experience dimension were more likely to have scores ranked higher in the response to advertising annoyance. Also, there was a positive correlation between the Extraversion scores of the participants and their attitude towards the advertising, which was statistically significant. Findings confirmed banner blindness since participants in most cases failed to recall advertisements even in cases that they did gaze at these. Insights related to the attention to the advertisement based on eye-tracking recordings were revealed that the longer users pay attention to a banner advertisement, the better their recognition performance.

Περίληψη

Η παρούσα διπλωματική εργασία εξετάζει την αποτελεσματικότητα της διαφήμισης, λαμβάνοντας υπόψη την ανάκληση μιας διαφήμισης, την οπτική προσοχή και τον ρόλο που διαδραματίζει η προσωπικότητα ενός καταναλωτή. Στο πλαίσιο αυτής της μελέτης, αναπτύχθηκε ένα ηλεκτρονικό κατάστημα με έξι κατηγορίες προϊόντων και οκτώ διαφημίσεις banner με δυνατότητα κλικ. Οι διαφημίσεις δημιουργήθηκαν χρησιμοποιώντας ένα διαδικτυακό εργαλείο δημιουργίας διαφημίσεων και τα χρώματα που χρησιμοποιήθηκαν επιλέχθηκαν μετά από προσεκτική ανασκόπηση της βιβλιογραφίας. Κατά τη διάρκεια αυτής της μελέτης, πραγματοποιήθηκε ένα πείραμα στο εργαστήριο αλληλεπίδρασης ανθρώπου-υπολογιστή στο Τμήμα Μηχανικών Ηλεκτρονικών Υπολογιστών και Πληροφορικής του Πανεπιστημίου Πατρών. Τα αποτελέσματα που παρουσιάζονται στη συνέχεια συλλέχθηκαν κατά τη διάρκεια του ακαδημαϊκού έτους 2020-2021. Συνολικά, σαράντα τρεις συμμετέχοντες (17 ήταν γυναίκες) συμμετείχαν στη μελέτη. Όλοι ενημερώθηκαν ότι το κατάστημα δεν ήταν πραγματικό, και τους δόθηκε υποθετικά το ποσό των 1.000 ευρώ για να αγοράσουν ό,τι θέλουν από το ηλεκτρονικό κατάστημα. Χρησιμοποιήθηκαν και αναλύθηκαν δεδομένα οφθαλμικής ιχνηλάτησης, ερωτηματολόγια και συνεντεύξεις για την καλύτερη κατανόηση των παραγόντων που σχετίζονται με την αποτελεσματικότητα της διαφήμισης. Πρώτον, η έρευνα επικεντρώθηκε στην εξέταση συσχετίσεων μεταξύ των χαρακτηριστικών προσωπικότητας του μοντέλου Big-Five και του ποσοστού των διαφημίσεων που παρατηρήθηκαν ή του ποσοστού των διαφημίσεων που ανακλήθηκαν. Επιπλέον, εξετάστηκαν συσχετίσεις μεταξύ των χαρακτηριστικών Big-Five των συμμετεχόντων σχετικά με τη στάση τους απέναντι στη διαφήμιση. Τέλος, εξετάστηκε το φαινόμενο banner blindness σχετικά με τους συσχετισμούς χαρακτηριστικών της προσωπικότητας Big-Five. Τα ευρήματα αυτής της μελέτης αποκάλυψαν ότι οι συμμετέχοντες με τις χαμηλότερες βαθμολογίες στη διάσταση Διαθεσιμότητα σε εμπειρίες ήταν πιο πιθανό να έχουν βαθμολογίες υψηλότερες στην απάντηση τους σχετικά με το πόσο ενοχλούνται από την διαφήμιση. Επίσης, υπήρχε μια θετική συσχέτιση μεταξύ των αποτελεσμάτων στη διάσταση της Εξωστρέφειας των συμμετεχόντων και της στάσης τους απέναντι στη διαφήμιση, η οποία ήταν στατιστικά σημαντική. Τα ευρήματα επιβεβαίωσαν το φαινόμενο banner blindness,

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

δεδομένου ότι οι συμμετέχοντες στις περισσότερες περιπτώσεις δεν κατάφεραν να ανακαλέσουν διαφημίσεις ακόμη και σε περιπτώσεις που έχουν εκτεθεί σε αυτές. Σχετικά με την οπτική προσοχή, βάσει των καταγραφών οφθαλμικής ιχνηλάτησης αποκαλύφθηκε ότι όσο περισσότερο οι χρήστες δίνουν προσοχή σε μια διαφήμιση banner, τόσο καλύτερη είναι η απόδοση ανάκλησης της.

Publications associated with this research

During the work on this master's thesis the following papers were published:

- Semira Maria Evangelou, Michalis Xenos, “*Banner Advertisement Effectiveness using Big-Five Personality Traits, Advertisement Recall, and Visual Attention*”, 24th Pan-Hellenic Conference on Informatics, PCI-2020, ACM Digital Library, pp. 256-259, Athens, Greece, 7-12 October 2020. Doi: [10.1145/3437120.3437319](https://doi.org/10.1145/3437120.3437319)

This work was published on the early stages of this research, using data collected before the Covid-19 lockdown and presented the results from the first eighteen Participants. The paper that was presented on PCI main track (acceptance rate 46%) included early findings and discussed that future work was to include more participants after the end of the Covid-19 lockdown.

- Semira Maria Evangelou, Georgia Stamoulakatou, Michalis Xenos, “*A Serious Game for Mobile Phones used in a Software Engineering Course: Usability Evaluation and Educational Effectiveness*”, 2021 IEEE Global Engineering Education Conference (EDUCON), pp. 219-225, Vienna, Austria, 21-23 April 2021. Doi: [10.1109/EDUCON46332.2021.9453987](https://doi.org/10.1109/EDUCON46332.2021.9453987)

This work run in parallel with the work of the masters' thesis during the Covid-19 lockdown, since it was research that didn't required the use of the lab. The paper that was presented in IEEE EDUCON 2021 (263 papers accepted out of 609 submission that results into a 43% acceptance rate) **received the best paper award** in the Area 4: Serious Games, Game-Based Learning and Gamification for Engineering Education.

Acknowledgements

Throughout the writing of this master's thesis, I have received a great deal of support and assistance. I would first like to thank my supervisor, Professor Michalis Xenos, whose expertise was invaluable in formulating the research questions and methodology. His insightful feedback pushed me to sharpen my thinking and brought my work to a higher level. I'm deeply indebted to the participants who took part in this study. In the difficult times of covid-19 lockdown, they participated in the experiment abiding by all the necessary protection measures to prevent the spread of the virus. Some special words of gratitude go to my friends who have always been a major source of support. Finally, my deep and sincere gratitude to my family for their continuous and unparalleled love, help and support.

Table of contents

Abstract.....	ii
Περίληψη	iii
Publications associated with this research	v
Acknowledgements	vi
Table of contents.....	vii
List of figures	xii
List of tables	xiv
Chapter 1: Introduction	1
1.1 Background and aims	1
1.2 Thesis structure	3
Chapter 2: The Advent of Advertising, Online Advertising & Color as Element of Advertising Communication.....	4
2.1 The Evolution of Advertising	4
2.1.1 Pre-modern advent of advertising.....	4
2.1.2 Origins of brand and advertising etymology.....	4
2.1.3 Advertising in prehistoric ages.....	5
2.1.4 Ancient Egypt and the first ad.....	5
2.1.5 Ancient Babylon and propaganda.....	5
2.1.6 Ancient China	6
2.1.7 Ancient Greece.....	6
2.1.8 Ancient Rome	7
2.1.9 Symbols in ancient civilizations and relation to advertising.....	7
2.1.10 The first newspaper advertisements	7

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table of contents

2.1.11	The advent of advertising agencies	8
2.1.12	The first radio advertisement	9
2.1.13	TV advertisements	10
2.2	Traditional and modern advertising platforms	11
2.2.1	The newspaper industry in modern ages.....	11
2.3	The advent of online advertising.....	12
2.3.1	Banner advertisement	13
2.3.2	Brand advertising	14
2.3.3	Brand advertising awareness	15
2.3.4	Definition of banner blindness.....	15
2.4	Colors as Elements of Advertising Communication	16
2.4.1	The human reaction level with colors.....	16
2.4.2	Color in Advertising.....	18
2.5	Related Work.....	19
2.5.1	Factors that contribute to advertising effectiveness.....	19
2.5.2	Physiological, behavioral and facial expressions measurements in advertising.....	20
2.5.3	Relationship between personality and advertising	21
Chapter 3: Research Questions, Methodology, The Big-Five Model & Measurements of Advertising Effectiveness		22
3.1	Research Questions	22
3.2	Methodology	24
		27
3.2.1	Participants and Procedures	28
3.2.2	Experiment Protocol, Metrics, and Instruments.....	29

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table of contents

3.3	The Big-Five model of personality.....	34
3.3.1	Extraversion	34
3.3.2	Agreeableness	34
3.3.3	Consciousness	34
3.3.4	Neuroticism	34
3.3.5	Openness to Experience.....	34
3.4	Visual attention & Recall	37
3.5	Eye-tracking technology	38
3.5.1	How does eye-tracking work?.....	39
3.5.2	Eye-tracking measurements	41
3.5.3	Eye Tracking Terms to Know	41
3.5.4	Data visualizations.....	42
3.6	Eye-tracking Visualization.....	43
Chapter 4: Data		45
4.1	Demographic information about participants	45
4.1.1	Gender - Age	45
4.1.2	Level of studies.....	45
4.1.3	Interests in buying products from the following product categories.....	46
4.1.4	Online spending time	47
4.1.5	Frequency of buying products online	48
4.1.6	Advertising is important for the consumers	49
4.1.7	The important content of an advertisement	50
4.1.8	The important information of an advertisement	51
4.1.9	The ads help me get a better idea of the prices and products on the market	52

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table of contents

4.1.10	Online ads are annoying.....	53
4.2	Data on how participants interact with Advertisements.....	54
4.2.1	Analysis of the Xiaomi Mi Smart Band advertisement	55
4.2.2	Analysis of the Apple iPhone 11 Pro max advertisement.....	57
4.2.3	Analysis of the Fitness treadmill advertisement.....	59
4.2.4	Analysis of the PS4 Pro advertisement	61
4.2.5	Analysis of the Emotional intelligence book advertisement	63
4.2.6	Analysis of the Eexercise bike advertisement.....	64
4.2.7	Analysis of the Samsung QLED 55” advertisement.....	66
4.2.8	An advertisement that shows an offer available in the store	67
Chapter 5: Results.....		69
5.1	Personality dimensions of the 43 participants.....	69
5.2	RQ1	69
5.3	RQ2	72
5.4	RQ3	73
5.5	RQ4	74
5.6	RQ5	77
5.7	RQ6	79
5.8	RQ7	80
5.9	RQ8	81
5.10	RQ9.....	82
5.11	RQ10	83
5.12	Interview Findings.....	84
Chapter 6: Conclusion, Limitations & Future Work		86
6.1	Conclusion	86

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table of contents

6.2	Limitations & Future Work	90
References		91
Appendices		99
6.3	The consent form	99
6.4	The second questionnaire	100
6.5	The third questionnaire	103

List of figures

List of figures

Figure 1. Barratt used art to draw attention to Pears Soap ads	9
Figure 2. The replacement of Newspapers with mobile phones.....	12
Figure 3. Here’s what the first banner ad looked like (HotWired / AT&T)	14
Figure 4. The Color Experience Pyramid (Font: Mahnke 1996)	17
Figure 5. The logo of the online store	24
Figure 6. The home page of the online shop	25
Figure 7. Advertisemnts used in this study	26
Figure 8. Advertisemnts used in this study	27
Figure 9. Advertisemnts used in this study	28
Figure 10. An example during the the eye-tracking calibration	32
Figure 11. Visual representation of the Experimental protocol	33
Figure 12. Eye-tracking.....	40
Figure 13. Percision and accuracy in calibration.....	41
Figure 14. Gaze plot – The participant looked at the advertisement.....	43
Figure 15. Gaze plot – The participant ignore the advertisement.....	44
Figure 16. Level of studies of the participants.....	46
Figure 17. Bar chart - Interests in buying products from the following product categories.....	47
Figure 18. Pie chart – Online spending Time	48
Figure 19. Pie chart - Frequency of buying products online	49
Figure 20. Bar chart - Advertising is important for the consumers.	50
Figure 21. Bar chart - The important content of an advertisement	51
Figure 22. Bar chart - The important information of an advertisement.....	52
Figure 23. Bar chart - The ads help me get a better idea of the prices and products on the market.....	53
Figure 24. Bar chart – Online Ads are annoying	54
Figure 25. Ad1 - The advertisemnet was on the home page.....	55
Figure 26. Ad2 - Apple iPhone advertisement that was on the books product category page.....	57

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

List of figures

Figure 27. Ad3 - Fitness treadmill advertisement that was on the TVs product category page.....	59
Figure 28. Ad4 - PS4 Pro advertisement that was on the sports product category page	61
Figure 29. Ad5 - The Emotional intelligence book Pro advertisement that was on the Gaming product category page.....	63
Figure 30. Ad6 - The Exercise bike advertisement that was on the Smartphones product category page.....	64
Figure 31. Ad7 - The Samsung QLED 55” advertisement that was on the Wearables & drones product category pag	66
Figure 32. Ad8 - The advertisement that was both on the Smartphones product category page and on Gaming product category page.....	67

List of tables

Table 1. Questions that were included in the second questionnaire	30
Table 2. Experimental protocol Summary	33
Table 3. Interpretations of the “Big-Five”	34
Table 4. 50-item IPIP Five-Factor Model.....	36
Table 5. Eye tracking basics.....	39
Table 6. Descriptive statistics – Gender	45
Table 7. Descriptive statistics – Age.....	45
Table 8. Descriptive statistics – Level of studies.....	45
Table 9. Descriptive statistics - Interests in buying products from the following product categories.....	46
Table 10. Descriptive statistics - Online spending Time	47
Table 11. Descriptive statistics - Frequency of buying products online	48
Table 12. Descriptive statistics - Advertising is important for the consumers.	49
Table 13. Descriptive statistics - The important content of an advertisement	50
Table 14. Descriptive statistics - The important information of an advertisement	51
Table 15. The ads help me get a better idea of the prices and products on the market.	52
Table 16. Online ads are annoying.....	53
Table 17. Options related to advertising recall.....	54
Table 18. Information about how participants interacted with the advertisement	56
Table 19. Information about how participants interacted with the advertisement	58
Table 20. Information about how participants interacted with the advertisement	60
Table 21. Information about how participants interacted with the advertisement	61
Table 22. Information about how participants interacted with the advertisement	63
Table 23. Information about how participants interacted with the advertisement	65
Table 24. Information about how participants interacted with the advertisement	66
Table 25. Information about how participants interacted with the advertisement	68
Table 26. Descriptive Statistics - Personality dimensions of the 43 participants	69
Table 27. Overall data about how participants interact with the advertisements	71

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

List of tables

Table 28. Ad8 - Table with the overall data of how participants interact with the advertisement	72
Table 29. Correlations between Big-Five scores and the observation of the advertisement on the homepage	73
Table 30. Correlations between participants' Big-Five scores and the recall of the advertisement on the homepage	73
Table 31. Relationship between Extraversion and the Percentage of the advertisements that were noticed.....	74
Table 32. Relationship between Agreeableness and the Percentage of the ads that were seen	75
Table 33. Relationship between Consciousness and the Percentage of the ads that were seen.....	75
Table 34. Relationship between Neuroticism and the Percentage of the ads that were seen	76
Table 35. Relationship between Openness to Experience and Percentage of the ads that were seen	76
Table 36. Relationship between Extraversion and Percentage of recall	77
Table 37. Relationship between Agreeableness and Percentage of recall.....	78
Table 38. Relationship between Consciousness and Percentage of recall.....	78
Table 39. Relationship between Neuroticism and Percentage of recall.....	79
Table 40. Relationship between Openness to Experience and Percentage of recall	79
Table 41. Correlations between participants' Big-Five personality traits and the percentage of the ads that were not seen but declared that they remember it	80
Table 42. Correlations between participants'Big-Five characteristics scores of the participants related to whether they are goal-oriented.....	81
Table 43. Correlations between participants' Big-Five personality trait scores and the "banner blindness" phenomena	82
Table 44. Correlations between participants' Big-Five characteristics scores related to their attitude towards the advertising.....	82

Chapter 1: Introduction

1.1 Background and aims

Online advertising is one of the most popular ways to promote products or services, being part of many activities of our daily life and can be defined as any kind of marketing message that is mediated with the help of the Internet [1]. Moreover, online consumers have been described as more goal-oriented and judge online advertising harshly in comparison with those of other media [2]. This master's thesis focuses on a specific form of online advertising which is the static banner advertising.

Banner advertising, also called display advertising, was first introduced in 1994 [3]. In essence, a banner is presented by images (static banner) or multimedia objects (animated banner). Their primary objective is to grab the user's attention to build awareness of a brand and is often used to encourage "click-through" to a Website [4].

Today, online consumers are exposed daily to a variety of banner advertisements. The brands are constantly competing for customers' visual attention, therefore being able to assess or even measure visual attention is becoming increasingly important. Also, due to the increase in advertising saturation, the term "banner blindness" has arisen [5]. This phenomenon occurs when internet users actively ignore banner advertisements while being exposed to them. Therefore, advertisers need to measure more accurately the effectiveness of online advertisements.

This work aims to relate the user's personality to advertising effectiveness. In general, personality psychology is a field that studies human personality and how it differs among individuals. The model used in this master's thesis, the Big-Five model, also known as the five-factor model (FFM), is one of the most widely accepted personality theories supported by psychologists today [6]. This model conceptualizes personality traits in five basic dimensions of personality namely: extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience.

Only for this work, an online store with six product categories was created. During a controlled experiment inside a software usability laboratory, forty-three

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

participants were invited to browse the online store which also included various clickable banner advertisements. The participant reactions were recorded using eye-tracking technology. They were all informed that the store was not a real one, and they were hypothetically given the amount of 1,000 euros to buy what they want from the online store. Eye-tracking data, questionnaires, and interviews were used and analyzed to provide a better understanding of the factors that are related to advertising effectiveness. In total, three questionnaires were used. The first was aimed at identifying the personality traits of the participants. The second included many demographic and marketing questions, and its primary objective was to determine the initial purchase intention of the participants regarding the product categories available in the online store. The third and last questionnaire was given to the participants after their browsing in the online store and included questions related to the ability to recall the advertisements.

The interactions of the participants with each advertisement were carefully tested with the aid of their eye-tracking data. In particular, the eye-tracking recordings revealed insights for each advertisement in the online store. For each advertisement was calculated the percentage of the participants who looked at the advertisement and recalled it as well, the percentage of the participants who looked at the advertisement but did not remember the advertisement, the percentage of the participants who did not look at the advertisement and they declared that they did not remember it, and finally, the percentage of the participants who did not look at an advertisement but they declared that they remember it.

The analysis focused on ten research questions. This study investigates correlations between the Big-Five characteristics scores and the percentage of the advertisements that were noticed or the percentage of the advertisements that were recalled. In addition, correlations between participants' Big-Five characteristics regarding their attitude toward advertising were examined. Finally, the banner blindness phenomenon was confirmed, and then it was examined regarding Big-Five personality trait correlations.

1.2 Thesis structure

This master's thesis is structured as follows: Chapter 2: presents a brief review of the history of advertising and a literature review. Chapter 2: provides, also, an overview of how colors are used as elements of advertising communication. Chapter 3: presents the research questions as well as the methodology of this experiment. Moreover, Chapter 3: provides a description of the Big Five Model of personality and the basics of eye-movement technology. Chapter 4: represents the data collected during this study as well as the demographics of the participants. Chapter 5: provides the analysis related to the research questions. And finally, Chapter 6: outlines conclusions and discusses limitations.

Chapter 2: The Advent of Advertising, Online Advertising & Color as Element of Advertising Communication

2.1 The Evolution of Advertising

The art and science of advertising have been undergoing a fundamental transformation. The introduction of the most important milestones of advertising will be helpful to understand how it has evolved over the years, how advertisers have benefited from the advent of various media such as radio, magazines, newspapers, the Internet, and television. In addition, looking back over the years, it would be easier to answer questions such as how advertising has been adapted to fit the digital age. Several researchers have dealt with the issue of advertising as it is considered a social responsibility [7]. Though, it is worth taking a look back to the history of advertising to see how advertising first appeared and how it evolved till the new modern era.

“How old is advertising?” The answer to this question depends upon the definition of advertising and whether the author wants to make advertising an ancient one. The history of advertising can be traced to ancient civilizations and has been linked to the history of commerce [8]. According to several authors and historians, although the terms “branding”, “advertising” and “promotion” were not known in ancient civilizations, several examples of how ancient trade took place are evidence of their preliminary existence. Several historians support that advertising is hiding at the beginning of humankind when the man has been a forager to provide for his family [9].

2.1.1 Pre-modern advent of advertising

Many researchers focused on trying to delimit the first appearance and use of advertising in human history. Advertising is generally considered to be as old as human society, although the word advertising was not used, it existed as an activity in the ancient civilizations of Africa, Asia, and Europe [10]. In ancient times, especially in areas with developed industries, advertising appeared in an early form.

2.1.2 Origins of brand and advertising etymology

The word “brand” has its roots in the Middle Age Nordic word “brand”, which means something that burns down, a stamp from a hot iron upon an object or an animal to declare ownership [11]. The word was brought to England by Vikings but it was

introduced in dictionaries many decades later in 1552 [12]. As far as the word “advertising” is concerned, it comes from the Latin word “adventure” which means to turn something to attract someone’s attention [13]. However, The word “advertising” began to be used during the mid-seventeenth century in a sense to influence the thinking of people [14].

2.1.3 Advertising in prehistoric ages

The prehistoric age is the age of the first appearance of humankind on earth until the creation of the first organized society with written documents (2.600.000 BCE-3.000 BCE). Information about the lifestyle of this period is limited. There are some drawings of symbols in ancient caves in France and Spain, but they have not been encrypted by the scientist. During the Stone Age hunting tools were marked with special symbols for efficient hunting [15]. The most ancient form of religion Totemism is considered as a form of branding by many scientists. It is believed that any community of the Neolithic era has its patron saint that was represented by a symbol like a totem. It’s the first attempt in human history in which an image, an object is a brand of an idea, a religion, a feeling [16].

2.1.4 Ancient Egypt and the first ad

One of the most ancient civilizations in the world is that of Ancient Egypt in Africa (3.300 BCE) with a great culture. There were many forms of advertising in this region. Egyptians used to mark their animals so they could find them in case they were lost or stolen, in this way they would advertise their ownership [17]. Depicting another way, pyramids as a funeral symbol gave the sense that the ruler of people continues to live with them as a defender of disorder. Many of those pyramids had the mark of the ruler that owned the pyramid. Also, Egyptians invented papyrus that enabled the first-time mass communication because notes could be transferred far away hand to hand. For the first time in human history, an ad was made. It was in a papyrus about a slave that had escaped and there was an award for his search [18].

2.1.5 Ancient Babylon and propaganda

Ancient Babylon was in the area of Mesopotamia. The reign of King Hammurabi marked the glory of southern Mesopotamia. There is a form of loyal propaganda in a

stone slab which is rumored to be the Code of Hammurabi. On this, the king is shown receiving the laws from god Shamash, the god of Justice. It was a document that aimed to enhance Hammurabi's power long after his death for political reasons [19]. Furthermore, was found in Babylon the first evidence of outdoor advertising: prints on clay plates of ornaments and footwear of sellers as a means of communication in the Middle East [20].

2.1.6 Ancient China

One of the civilizations that date back to the Paleolithic era is that of Ancient China. The first documents date back to the Shang Dynasty (1600-1046 BCE) in which a system of writing was developed. Many records were found on bones, leaves of bamboo, pottery, etc [21]. Also, artists that paint something use pseudonyms to mark their work while famous collectors mark with their personal stamps their artwork to add in this way extra value [22]. During the Zhou Dynasty (1046-256 BCE) China made great progress. Many goods displayed in central markets on streets and pending were used as sound advertising to attract customers like making sounds with phonate instruments. Laborers who belonged to different groups displayed their goods on the market for exchange trying to compete with the other groups [23].

2.1.7 Ancient Greece

The Minoan civilization of Crete was so advanced that everything from luxury palaces to small disc-shaped seals had a simple sign that stated property [24]. In Ancient Greece, after the age of the great industrial revolution in Athens persons that made vases and painted them used to sign upon them to advertise their work. One of the most famous artists who made a vase with a sign was Sophilos [25]. To promote their goods trades used to have pictorial signs in their stores. After 750 BCE many city-states began to compete for dominance by making buildings and developing trading overseas. Many years later, Alexander the Great used large events for personal propaganda to be well-known to his enemies. Also, he used his image on coins, pottery, and artwork to increase his reputation across his empire [26].

2.1.8 Ancient Rome

One of the oldest forms of advertising emerged as campaign displays painted on the walls were located in places with heavy traffic. Such examples of advertising on shop billboards signs for establishments for drinking, eating, and accommodations have been found in the ruins of Pompeii. The Roman colony of Pompeii was founded in the eighth century BCE, unfortunately, the volcano Vesuvius destroyed it by the seventh century BCE. There, many depictions of several events were found, which promoted sponsors and sponsored events. The main purpose of those "advertisements" was to inform [27].

2.1.9 Symbols in ancient civilizations and relation to advertising

Symbols have appeared since antiquity and can be observed in today's daily lives [28]. Thanks to the use of symbols, people can quickly distinguish a business, an idea, an object, etc. A symbol is a distinct and easily recognizable representation that contains a deeper meaning. Symbols were used for a variety of roles:

- Designation of ownership
- Differentiation of objects
- Emphasizing the identity and reputation of traders, craftsmen, and artists
- Emphasizing the origin, quality, and value of the goods
- Reinforcing the image of rulers
- Ritual
- Establishing harmony and order according to several religions
- Means of political propaganda
- Create language
- Create a signature

2.1.10 The first newspaper advertisements

The modern newspaper is a European invention. However, it owes little or nothing to the Roman acta, daily handwritten sheets that were posted up in the Forum, or to the early experiments in news dissemination developments in China.

The first weekly newspapers appeared in Venice as early as 1566 and were far away as London. From there, the idea of a weekly issue spread to many European

countries, such as Italy, Germany, and the Netherlands. Venice, like most of the cities that played a major role in the early history of the newspaper, was a center for trade and therefore for information. These Venetian news sheets, known as *avisi* or *gazette*, were filled with information on wars and politics in Italy and Europe.

It was 1622 the year when the first examples of a new type of publication appeared. First, the newsbook that had a quite literally revolutionary impact on English journalism and English society. A few months later, Nathaniel Butter began producing a weekly compilation of foreign news in collaboration with a syndicate of printers and booksellers (prominent amongst whom were Thomas Archer and one Nicholas Bourne). The innovation that made the newsbook popular was that it was formatted in a convenient quarto book size and consisted of from eight to twenty-four pages. This size was more familiar to contemporary English print culture. Hence, in 1665 this was the standard format for English newspapers.

Looking for ways to increase profits, in 1624 the syndicate hit on an idea that was to have an incalculably great impact on every facet of the media ever after: advertising. Thus, on the last page of the 16th of September issue probably appeared the first English newspaper advertisement. As newspapers became more reliable and more frequent, they began to play a major role in commerce, through their advertisements. More and more newspapers began to place advertisements to cover the cost of printing and distribution. Advances in printing have allowed manufacturers and retailers to print handbills and trade cards to promote their products and services.

2.1.11 The advent of advertising agencies

Nowadays advertising agencies are a crucial part of organizations as far as advertising and marketing on a global scale is concerned [29]. They appear for the first time in the United States in the mid of the nineteenth century due to the need for newspaper publishers to develop and make more profits. During the first years, agencies offered the purchasing and sale of space. Their main services were to help publishers and marketers to promote their advertising, help advertisers to find cheaper marketing as well as communicate all the above to the public [30].

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

2.1.11.1 United States

In 1840 in the United States, Volney B. Palmer founded the first advertising agency in Philadelphia, two years later in 1842 he bought large quantities of newspaper space at a reduced price and then resold the space at higher prices to advertisers. In the late 19th century the advertising agency of N.W. Ayer & Son was founded in New York. It planned, created, and executed complete advertising campaigns for its customers. The advertising agency of N.W. Ayer & Son created a number of memorable slogans for firms such as De Beers and AT&T [30].

2.1.11.2 Great Britain

Thomas J. Barratt known as the father of modern “advertising” created an effective advertising campaign for the Pears Soap Company that included targeted slogans, images and phrases [31]. Barratt’s strategy was to associate Pears soap with high culture, art, and quality. He purchased the rights of a statue by Giovanni Focardi (1842-1903) and used it in his first advertisement. After that, Thomas J. Barratt started collecting art and using it in his print advertisements making them beautiful and interesting (Figure 1). Barratt introduced many of the crucial ideas that lie behind successful advertising and these were widely circulated in his day.

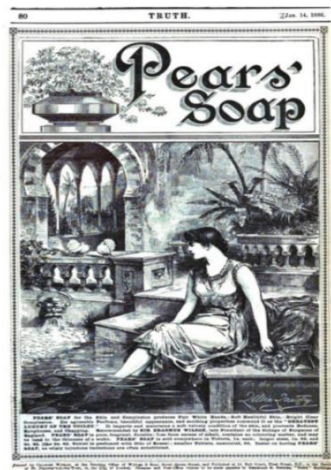


Figure 1. Barratt used art to draw attention to Pears Soap ads

2.1.12 The first radio advertisement

Modern broadcasting histories often begin with Italian Guglielmo Marconi (1874-1937) and his experiments that eventually resulted in wireless transmission of Morse code

[32]. Wireless communication was a means of communication for the Armed Forces, rather than a means of transmitting entertainment and information programs. Gradually, however, the public and industry began to realize the significant potential of the new medium.

The first music and speech broadcast were made on Christmas Eve 1906 by American radio pioneer Reginald Aubrey Fessenden, a Canadian-born American natural and electrical engineer [33].

From January to May of 1922, the number of licenses granted to broadcasting stations by the United States Secretary of Commerce increased from 30 to 218. By the end of the year, the number of licenses exceeded to 500.

In August 1922, the first advertisement was on the radio station WEAJ and lasted 10 minutes. The advertisement promoted a new apartment opening for the Queensboro Corporation [34]. The real estate development firm had bought a 10-minute block of time to promote its apartment buildings. The program started like this: "Let me enjoin upon you as you value your health and your hopes and your home happiness, to get away from the solid masses of brick, where the meager opening admitting a slant of sunlight is mockingly called a light shaft, and where children grow up starved for a run over a patch of grass and the sight of a tree. Friends, you owe it to yourself and your family to leave the congested city and enjoy what nature intended you to enjoy. Visit our new apartment homes in Hawthorne Court, Jackson Heights, where you may enjoy life in a friendly environment."

Advertising expanded to electronic media toward the mid-20th century. Radio advertising was the first electronic platform that was used for advertisements.

2.1.13 TV advertisements

From economics to politics and from entertainment to boredom there is one creation of technology that captivates people of all the ages: television. However, it claims that reporting reality many times, television can create its own world. Its power is indisputable and for this reason it has been connected with the world advertising since its creation [35].

Throughout the years, the television (TV) industry, taking advantage of the capabilities of information technology and electronics, has astonished the consumer market with a number of innovations and designs that radically changed the 20th-century society.

The first official paid television advertisement came out in the United States on July 1, 1941, over New York station WNBT (subsequently WNBC) before a baseball game between the Brooklyn Dodgers and Philadelphia Phillies.

2.2 Traditional and modern advertising platforms

As the concept of advertising progressed, new platforms continued to emerge. Advertising platforms can be categorized as traditional and modern ones. The earliest forms like posts, signs, cards, radio, and lithography are categorized as traditional platforms. Televisions, magazines, billboards, newspapers, social media, and other online arenas are classified as modern. It is important to take into consideration that most of the advertising platforms went through a chronological evolution that was defined by civilization, modernity, and technological advancement. Therefore, some platforms can easily be categorized both traditional and modern. For instance, newspaper, radio, and television advertising are a perfect example of them. However, the way it was undertaken some centuries ago is not the same way it is undertaken today [36]. There are also emerging platforms like outfits (merchandise branding) and the use of marketing/sales agents.

2.2.1 The newspaper industry in modern ages

The newspaper industry has undergone significant decline over the last decade, with most newspapers experiencing eroding profitability or mounting losses [37]. The rise of the Internet has already affected the newspaper business. Several people even consider that newspapers will face extinction, at least in the developed world. Philip Meyer, in his book "The Vanishing Newspaper: Saving Journalism in the Information Age (University of Missouri Press, 2004)" calculates that if current trends continue, the last U.S. paper will shut down in early 2043.

Throughout the 20th century, advertising grew rapidly with new technologies such as direct mail, radio, television, the internet, and mobile devices. Today,

advertising has become a vast field that is ubiquitous in many activities of our daily life. Ads appear on TV, radio, in a newspaper or magazine, in a web browser, in a search engine, on social media, on mobile devices, and even in email [38].



Figure 2. The replacement of Newspapers with mobile phones

2.3 The advent of online advertising

Advertising was launched several years ago when entrepreneurs were trying to find a successful way to sell their products or services. Therefore, they used advertising as a means of communication and persuasion to reach potential customers. By and large, the three primary objectives of advertising are to inform, persuade, or remind. Nowadays, advertising has become a vast field that is ubiquitous in many activities of our daily life. Ads appear on TV, radio, in a newspaper or magazine, in a web browser, in a search engine, on social media, on mobile devices, and even in email. Furthermore, more and more companies are spending money to advertise their products or services.

Over the years, the marketing industry has evolved radically. Indeed, the development of technology is directly related to the advertising industry and is constantly influencing it. In particular, the Internet has been a milestone in the history of advertising. In modern society, many people spend hours connected to the Internet and exposed daily to a variety of online ads.

Online advertising can be defined as any kind of marketing message that is mediated with the help of the Internet. In the United States, online advertising was

one of the most popular ways to promote products and services in 2017. Online advertising, also known as digital advertising, web advertising, internet advertising, or online marketing, can be defined as any kind of marketing message that is mediated with the help of the Internet. In certain cases, though it can be defined as an intruder. Many consumers find online advertising disruptive and have increasingly turned to ad blocking for a variety of reasons.

2.3.1 Banner advertisement

The now-ubiquitous banner advertisement, one of the largest markets within digital advertising, was first introduced in 1994. Hotwired was the first web magazine that embedded advertisements on its webpage. Those advertisements were called "banner ads" and were sold based on the number of "impressions" (individuals who saw the ad), which was the most common model followed by several traditional media for brand advertising. Specifically, in 1994 Hotwired displayed the first banner ad titled, "Have you ever clicked your mouse right HERE? YOU WILL" (Figure 3) which was part of AT&T's biggest "You Will" campaign, starting a revolution in web content and advertising that still reverberates today [39].

Today, banners are presented by images (static banner) or multimedia objects (animated banner) and often are used to encourage "click-through" to a Website. Banners aim to grab the user's attention. In order to be more attractive, they use an image with movements or short videos and for this reason, banner advertisements are founded more often in high-traffic websites. Ad networks have the role of advertising agencies: they search for advertising space on the internet and match it with the demands of the advertiser. The technology for this whole process relates to one central ad server [40]. Surveys have shown that men have not patience to deal with pop-up banner advertisements and search for ways to avoid them while women are more patient and make better use of them. However, both sides find that banners have many times negative aspects [41].



Figure 3. *Here's what the first banner ad looked like (HotWired / AT&T)*

Branding and marketing practice go hand in hand. During the marketing practice a company creates its logo, name, symbol, design so every time someone watches any of these elements, they recall the company. Therefore, the company gains popularity. It is also a method for the identification of a product that makes it differ from all the rest. With this meaning, branding has been used since ancient times. Branding is as old as advertising because they move in the same field [42].

Four factors make branding so important. The one is that branding gets recognition is a way how a company to become known to its potential consumers. The logo of the company is the most significant element of branding because it is the face of the company. The second factor is that the brand can increase the value of the business. A brand that has been strongly and fairly established in society can increase a company's value because it gives it more leverage in the industry than competitors. This makes it somehow a firmly established place in the marketplace. The third one is that branding can generate new customers because a good brand has always loyal customers that love it. Strong branding is associated with a positive impression of the company amongst consumers. On the next scale, investors are likely to do business with a company of a strong brand because there is a sense of familiarity and a sign that they negotiate with a name that is worth being trusted. Once a brand has been well-established it needs a good advertising technique to expand through the word of mouth. Last but not least, branding improves employee satisfaction. An employee that works for a very strong brand company is more satisfied with his job and can feel joy and happiness as he believes that he is a part of the company's success and good reputation [43].

2.3.2 Brand advertising

Whoever has a strong brand needs a way to advertise it. There are two methods of brand advertising. Direct respond ads and brand ads. Direct response ads are known as

performance-based ads that are used to draw attention from users. They are used in digital advertising and are campaigns with links, competitions, app installs, or coupon codes for a discount. The data that researchers and marketing teams gather require deep analysis and A/B testing consequently this method gives valuable insights about brand recognition and type of customers [44].

On the other hand, brand ads are typical ads on TV, newspapers, radio, and magazines. They are harder to track because there is no immediate interaction between the user and the advertisement. Fall to the category display ads that do not require some click movements but depend more on the impression that gives to the final consumer. Many advertising campaigns are based on brand ads and brand awareness as they expose, influence, and engage customers by urging them to make actions like making a delivery or a purchase [45].

2.3.3 Brand advertising awareness

An element of effective advertising is advertising awareness. Awareness is based on the long-term memory of consumer that has noticed the advertising of a brand. Many marketists use pre-testing and post-testing methods to measure the effectiveness of a marketing message through advertisements. A huge majority of commercial monitors use post-testing methods. Although there is a debate in the research world. The one side claims that spontaneous advertising measures have to deal with the different mental processes of the human brain. The other side believes that when a person is asked to recall a brand for an advertisement he processes his semantic memory [46].

2.3.4 Definition of banner blindness

The increase in advertising saturation is high, thus the term “banner blindness” has arisen. The phenomenon of banner blindness occurs when internet users actively ignore banner ads while exposed to them. Therefore, advertisers need to find solutions to measure and improve the effectiveness of online advertising. Another definition describes this term as the situation in which web users tend to ignore online page elements that perceive them as ads. Banner blindness is based on selective attention, the tendency of people to direct their attention in elements of their environment that are related to their aims [47].

The behavior of an internet user is similar: he tends to pay attention to tasks and elements that can help him with his goal like the menu top bar, search tool, avoiding anything that can interrupt him like banner advertisements or pop-up ads. However, ignoring ads is a behavior formed through learning and practice. For this reason, web users look first at the top of a website for the central menu so as not to concentrate on the first results that a browser gives them as they know that it is an advertisement. Also, users tend to avoid the right and left space of a webpage as they know that is a space for advertisement. They want to concentrate on the central element where there is a text, an image, a video, etc. Many advertisements are a part of a text in the center of a screen and a webpage as well. Then, many users tend to ignore them because they are different from the overall material due to their size, shape, color, and the text that is inside is an image. All those characteristics of an ad are a warning for a user that he will ignore it. Furthermore, when a content is placed in the same part of the screen that the user perceives as an advertisement space is often considered to be an ad so it is also ignored. This user behavior is a simple confirmation of the Gestalt law of proximity and the mental model that persons can create when they attend items [48].

2.4 Colors as Elements of Advertising Communication

In today's competitive businesses world, the use of advertising is prominent to attract potential clients [49]. Billions are spent in order to build, reach and influence target consumers to buy products or services. Creating awareness is one of the most important advertising goals and companies are using a variety of constructive elements in advertising to communicate and influence buyer behavior.

2.4.1 The human reaction level with colors

The communication is part of human nature and can be both verbal (language) and non-verbal (image, color, etc.). Visual elements and colors, as non-verbal communication, are powerful tools that has a significant impact on behavioral patterns that affect human social life. Color or transition effects can contain messages or concepts can trigger psychic or mental reactions in humans.

There is a mutual relation between psychology and advertising. Due to the variety of colors and their wide range, the science of physics has always been to describe the relationships between light, the sense of sight, and color perception. Moreover, in the field of psychology, perceptual and psychological reactions of man in the face with color and behavior it takes into consideration. Colors and emotions are closely linked. For example, warm colors can evoke different emotions than cool colors and bright colors can create different feelings than muted colors. It all depends on how the psychological effects of color are being used.

Frank Mahnke, was a color revolutionary. A colour guru and expert. One of Frank's fundamental teachings was the understanding how human beings process colour. He created a pyramid (Figure 4) that describes how people process or experience color, from a primal base level up to our personal relationships with color [50].

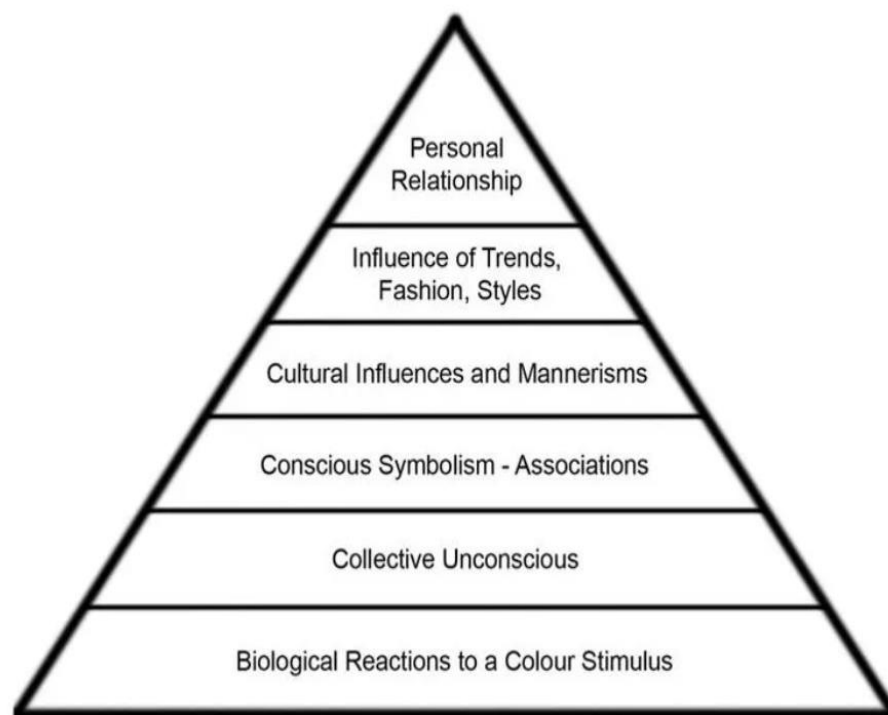


Figure 4. The Color Experience Pyramid (Font: Mahnke 1996)

The first and largest human reaction level compared to the biological effects of color is associated with environmental needs. These reactions are unlearned and out

of our control because they happen naturally. For example, leaves turn green in the spring because the biological process of photosynthesis. Most people react in a uplifted way because spring is here. This happens year after year and it is something inevitable. The second impact is caused by the reaction. These are reactions people are hard wired for and have no control over the behaviour. The red color is associated with blood, cross culturally and universally. The third level is a symbolic reaction to the conscious action and includes concepts that are informed and through training. These are people's learned responses to color. People have learned that the sky is blue by being told from the time they first understand language. The fourth level is related to the response under the dominate culture, climate and the beliefs of each area and representing characteristics of a community. One's culture gives them certain color associations. For instance, red is associated as a traditional colour for brides in many (not all) Asian counties, while white is the associated traditional colour for brides in North America. The fifth level is related to the social movement that is raised under the title of fashion or style, and in all the realm of artistic generalization. People are influenced by what is marketed to them through fashion, styles, and trends. Finally, the latest and smallest level of human interaction, individual interest and experience he returns. Almost everyone has a personal relationship to color. Some are blue lovers, some are green lovers, some are neither.

Having the knowledge of this color pyramid helps designers and professional color consultants to understand that color is complex on many levels. So, the choice of colors for products, clothing, or perhaps spaces, is not an easy procedure and goes hand in hand with fully understand the human experience around color.

2.4.2 Color in Advertising

One of the most powerful advertising tools is color. Color advertisements are essential for establishing the brand image and are more likely to grab users' attention than those without color. Over the past years, many well-known brands have been associated with colors. In essence, color in a brand is so important that it may become its own identity. Vodafone, Coca-Cola, Starbucks, and Facebook are such examples, as their brands are directly associated with a specific color. Vodafone as well as Coca-Cola were directly linked to red, Starbucks to green, and Facebook to blue. In general, color

affects the psychology and behaviors of consumers. Colors based on their wavelength have been categorized into cool and warm colors [51]. Blue and green (shorter wavelength colors) are cool colors, whereas red and yellow (longer wavelength colors) are warm colors. Each color contains meanings in terms of personality traits, salient qualities, and emotions. For example, red is generally a color that evokes emotions such as passion, excitement and danger, but in terms of business context, red is associated with love, power, energy, speed, and courage. Blue is associated with high quality, trustworthy and dependable, purple with progressive and inexpensive, yellow with happy and gray with dependable and high quality. However, colors may elicit negative meanings, such as red, sometimes is associated with fear, anger, intolerance, and exaggeration.

By and large, uplifting effects such as frequent eye blinking or increased blood pressure, are elicited in people by warm colors. These effects are mainly related to high intensity thus not pleasure. Regarding emotional response, cool color interiors are usually more appealing to customers and make them feel more pleasure than when exposed to warm color interiors. A pleasant emotional state is related to the intention of shopping. A study showed that users favored cool colors (specifically blue versions) in the websites. In this study, efficient colors were used as proposed in the literature.

2.5 Related Work

2.5.1 Factors that contribute to advertising effectiveness

Media professional and researchers remain greatly interested in examining the influence of media context on advertising effectiveness [52]. Media context is an important factor for determining advertising effectiveness and it is considered that some media contexts are more suitable for different types of advertising than others. Today one of the most important and fastest-growing media options is through the Internet, making Internet advertising predominant. The following factors appear mostly in research regarding the advertising effectiveness:

- Attitudes toward the medium
- Uses of the medium
- Involvement while using the medium

- Mood states affecting media usage
- Interactivity of the medium
- Recall
- Attitude toward the advertisements

In a previous study, advertising data and viewers' responses were used to predict advertisement recall score for TV advertisements of various mobile carriers. Overall, twenty participants took part in that study in which they were watching several advertisements as they were recorded. Photoplethysmography and eye-tracking data were used during the recording. The participants were also asked to complete questionnaires. Predictions made reflect how advertisements would be remembered by the target audience. The results suggested that advertisement recall is highly connected to the media placement.

A large literature has focused on the effectiveness of online advertising [53]. There are several measurements of advertising effectiveness that can be used such as product recall, click on an advertisement, purchase intent, and others [54]. Some responses, such as clickthroughs, are immediate and easily measured. In previous study conducted a research to answer some questions like:

"How significant are the measures of advertising effectiveness in terms of attitude towards the advertisements, advertisement recall, and click-through rates in explaining online purchase decision."

2.5.2 Physiological, behavioral and facial expressions measurements in advertising

Investigating factors that contribute to advertising effectiveness provides insights that play a major role for specialists who create marketing strategies [55]. Tools for physiological, behavioral and facial expressions measurements draw attention of marketing and advertisements research professionals and is also known as neurophysiological methods.

Physiological and behavioral responses to the content provide hints to predict consumer behavior [55]. A large part of advertisement content is supposed to evoke a certain emotional response to a message. Recent studies revealed that emotionally

engaging advertisements are greatly related to the higher purchase intent [56]. Advertisement effectiveness is conceptualized as a concept encompassing emotional appeal, informativeness, and creativity.

Several studies examined the use of psychophysiological measures and explored the usefulness of facial electromyography (EMG) and skin conductance (SC) methods in tracking emotional responses to advertisements [57]. The use of psychophysiological techniques was very important as capture moment-to-moment emotional responses. The literature suggests that consumers may be unaware that they have gone through a series of subliminally triggered emotional reactions that drive judgement and further behaviours [57]. Therefore, self-report measures are possible to exclude basic information because an individual is unable to report their unconscious emotional responses.

2.5.3 Relationship between personality and advertising

In spite of the sufficient literature on the relationship between personality and internet use in general few studies investigate the relationship between personality and attitudes toward online advertising [58]. A previous examined how consumer attitudes toward advertising in general affect their attitudes toward online advertising. It also investigates the moderating role of the personality traits of introversion and extroversion in explaining this relationship [59].

In a similar study, the Big-Five model was used as a tool to predict consumer behavior traits and to study the impact of personality traits in advertising [60]. Overall, their results showed that consumer personality traits are key elements in predicting their preferred advertisements. In this master's thesis, correlations between participants' Big-Five characteristics regarding their attitude toward advertising were examined.

Moreover, a recent study [61] explored the factors impacting the relationship between personality traits (using the Big-Five Model) and advertisement persuasiveness and revealed that matching consumer personality with congruent advertising messages can lead to more effective consumer persuasion for most personality types.

Chapter 3: Research Questions, Methodology, The Big-Five Model & Measurements of Advertising Effectiveness

3.1 Research Questions

The goals of the evaluation include the following research questions:

- **RQ1:** Is the Banner blindness phenomenon confirmed in this study?

The phenomenon of banner blindness occurs when Internet users actively ignore the ads, even though they have been exposed to them. Based on the findings of the semi-structured interview, participants in this experiment were categorized as participants who actively ignored the ads (the banner blind occurred) and as participants who noticed the existence of ads. This was confirmed by the eye-tracking recordings, as the participants who stated in the interview that they did not notice the existence of ads in the online store were those who did not look at the ads at all or had fewer gaze points in the ads.

- **RQ2:** *“Are there any differences in the participants’ Big-Five characteristics scores related to whether they noticed the advertisement on the home page?”*
- **RQ3:** *“Are there any differences in participants’ Big-Five characteristics scores related to whether they recall the advertisement on the home page?”*

Correlations was examined only for the advertisement hosted in the home page because it was the advertisement that all participants were exposed to. The remaining banners were seen from zero times to a few times, based on the navigation path each user selected, and, therefore, results were collected on uneven data.

- **RQ4:** *“Are there correlations between the participants’ Big-Five characteristics scores and the percentage of the advertisements that were noticed?”*

With the aid of the recorded recordings, the number of advertisements viewed by the participants was counted. It is assumed that a participant had noticed the advertisement if they have gazed at the advertisement for at least two consecutive fixations and total fixation duration (how long participants spend looking at a particular advertisement) greater or equal to 500 ms.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

- **RQ5:** *“Are there correlations between the participants’ Big-Five characteristics scores and the percentage of the advertisements that were recalled?”*

It is important to clarify that in this analysis the advertisement recall is considered to occur when the recipients of the advertisement declare in the third questionnaire that they remember the advertisement.

- **RQ6:** *“Are there correlations between the participants’ Big-Five characteristics scores and the percentage of the advertisements that were not seen but declared that they remember it?”*
- **RQ7:** *“Are there any differences in the participants’ Big-Five characteristics scores related to whether they are goal-oriented?”*

In the second questionnaire participants were asked if they are interested in buying any products from the available product categories in the online store. If their answers matched their purchases, participants were considered goal-oriented online users. Eye-tracking data used for the categorization of the participants as goal-oriented and not.

- **RQ8:** *“Are there any correlations between the Big-Five personality trait scores and the banner blindness phenomena?”*

The interview process was very informative regarding the users’ attitudes and interactions towards advertisements. At this point, it is important to define when the phenomena of banner blindness occurred. In general, the phenomenon of banner blindness occurs when users completely ignored advertisements although their exposure to them. During the interview process, several participants commented: “I didn’t notice any advertisement.” Those kinds of users are considered as a user who during their browsing the banner blindness phenomena occurred. They visited the online shop and were exposed to ads, but they actively ignored the existence of advertisements. This was confirmed by the eye-tracking recordings, as the participants who stated in the interview that they did not notice the existence of ads in the online store were those who did not look at the ads at all or had fewer gaze points in the ads.

- **RQ9:** “Are there any correlations in participants’ Big-Five characteristics scores related to their attitude towards the advertising?”
- **RQ10:** “Were the participants goal-oriented users?”

3.2 Methodology

Solely for the purpose of this master’s thesis, a fully functional WordPress online shop (except for the actual payment of the products feature) was developed. WordPress is one of the most famous open source content management systems available [62]. The online shop was named “Saturn” and a logo (Figure 5) was created for the purpose of this study. The store included seven pages, the Homepage shown in Figure 6 and the six product categories are:

1. TV,
2. Smartphones & Tablets,
3. Books,
4. Gaming,
5. Wearables, Drones & Hi-tech,
6. Sports & Fitness



Figure 5. *The logo of the online store*

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

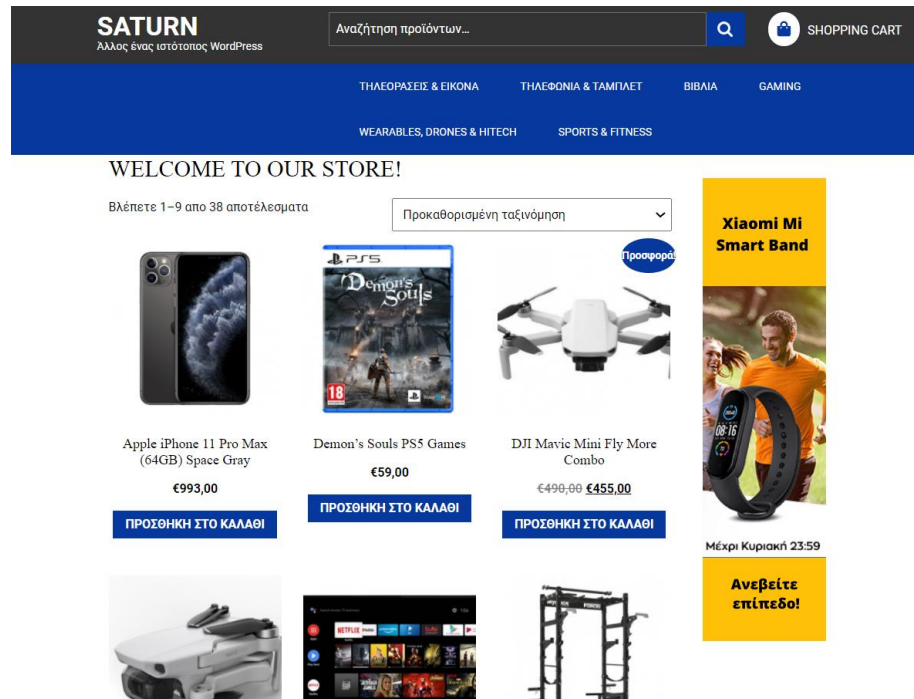


Figure 6. The home page of the online shop

These categories hosted 38 individual products available to be purchased. All these products were real market products at realistic prices. All pages contained static banner advertisements that were directly related to products inside the store. Overall, eight banner advertisements were included in the store (one on the first page and one in each product category, except for the “Smartphones” category that had two banners). All the banners used in the online store were created in an online ads creation tool and they are shown in Figure 7, Figure 8 and Figure 9.

Participants were exposed to those clickable banners during browsing. The colors used in the online store, the products, and the advertising banners were selected based on studies that indicated how colors affect a consumer’s psychology and behavior [63].

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

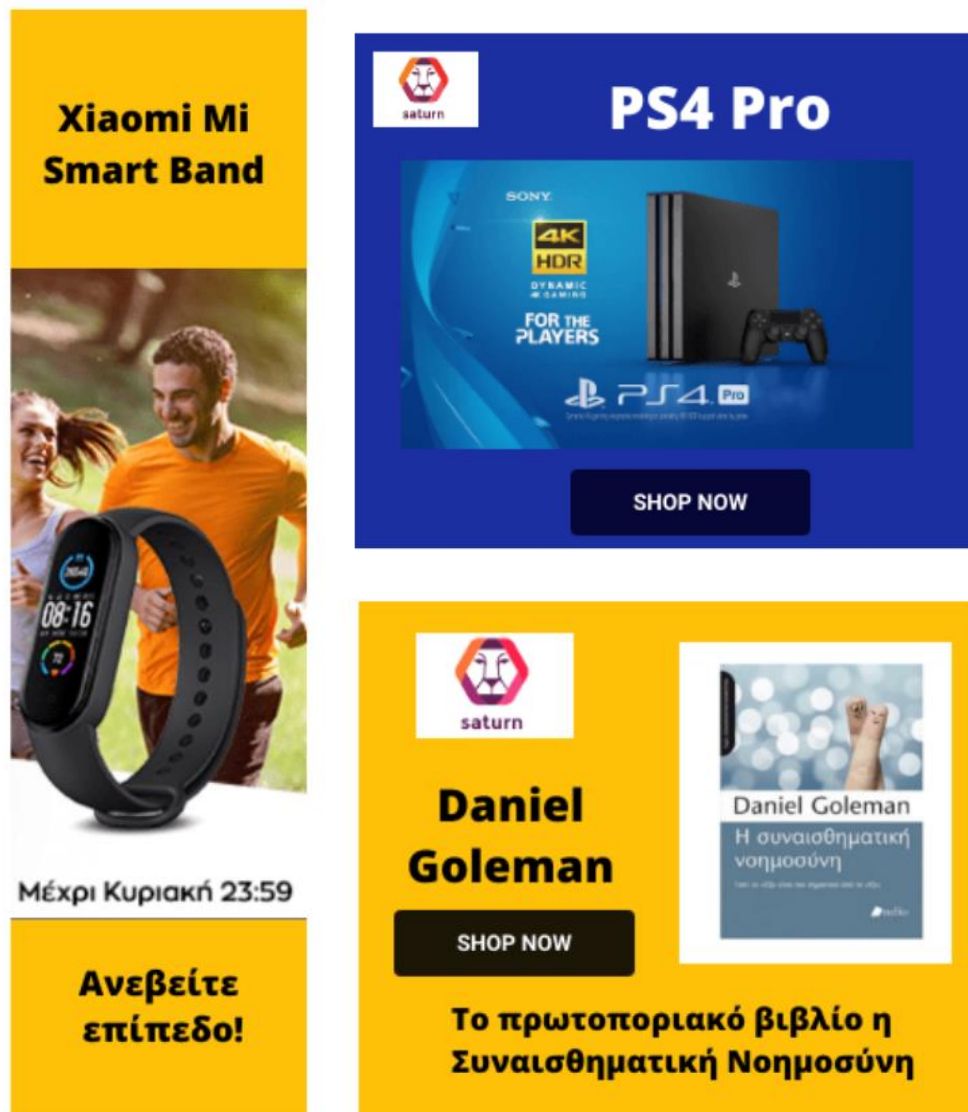


Figure 7. Advertisemnts used in this study

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention



Figure 8. Advertisements used in this study

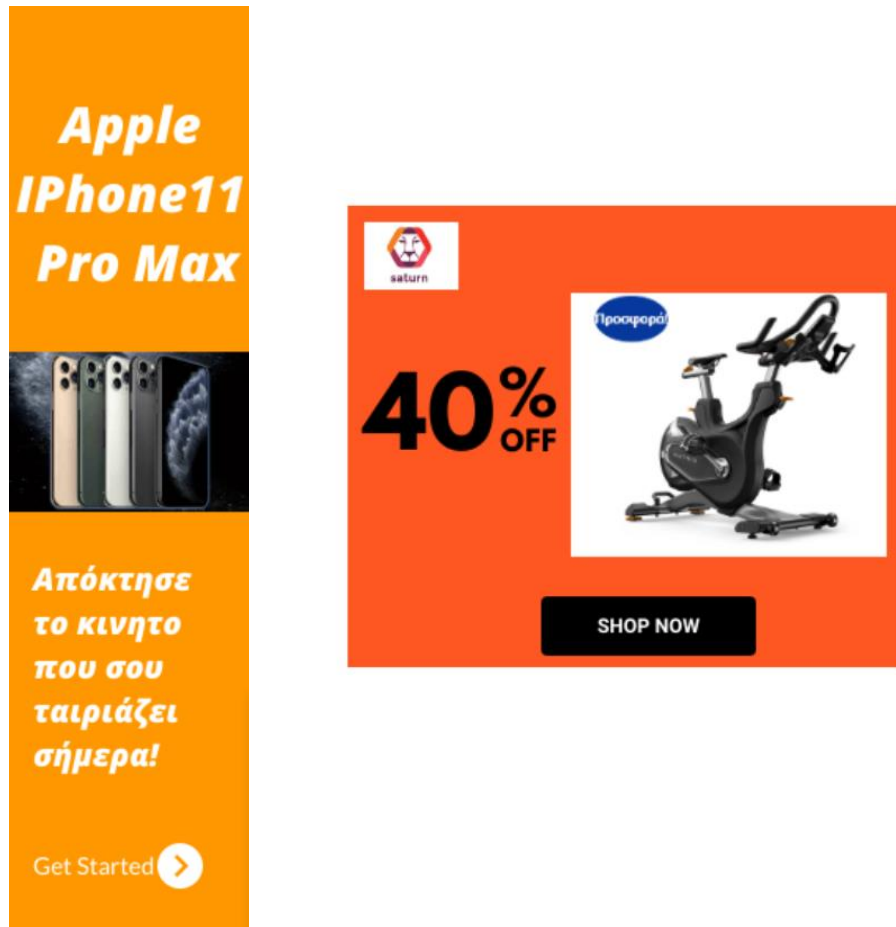


Figure 9. Advertisemnts used in this study

3.2.1 Participants and Procedures

The experiment took place in the usability evaluation and Human-Computer Interaction laboratory at the Computer Engineering Department of the University of Patras and lasted approximately 20 minutes per participant. The results presented hereinafter were collected during the 2020-2021 academic year.

During that time and more specifically for three months, it was impossible to conduct the experiment in the laboratory due to the worldwide spread of the COVID-19 virus. So, there was a small-time gap. However, in June 2021, and having taken the necessary measures against the virus, the experiment was carried out again. Overall, forty-three users (17 females) were finally exposed to the online store that we have created. They were all informed that the store was not a real one, and they were hypothetically given the amount of 1,000 euros to buy what they want from the online store. In particular, the scenario was: *“You are given the amount of 1,000 euros to buy anything you want from the online store. You can spend the whole amount, but you*

also have the option not to buy anything. You have all the time needed to complete your purchases”.

3.2.2 Experiment Protocol, Metrics, and Instruments

Before arriving in the laboratory, the participants were delivered an email that was highly informative and helpful as to provide a clear view of what the experiment is about and the possible dates that they can participate in. Also, the 50-item IPIP FFM questionnaire¹ and some instructions about its completion was included in that email. The 50-item Big-Five questionnaire had to be completed before they arrived in the laboratory. Moreover, the participants were told that during the experiment they would be going to undergo overall three questionnaires including the Big-Five one.

An additional and important reason for sending this email was also to inform the participants about the ID that they had to complete in all questionnaires. There was clearly explained that the IDs would not be associated with their names. The reason for the existence of the unique IDs was the correlation of the three questionnaires and the interview with the recorded eye-tracking data. The first field in every questionnaire asked the participants to enter their ID. For this study, a form was created which included the 50 questions shown in Table 4.

When participants arrived at the laboratory, they signed a consent form to declare their agreement to take part in the study. The consent form was in Greek and is shown in Appendices. After that, they were given the second questionnaire² which included few demographic and marketing questions and the questions are shown in Table 1. This second questionnaire was in Greek and there is available in Appendices. The most important goal of it was to determine the purchase goals of each participant. They were asked whether they are interested in buying any product from the available product categories in the online shop.

¹ The questionnaire can currently be viewed at the following link:
<https://forms.gle/mVPdhkERKU8ayVN48>

² The questionnaire can currently be viewed at the following link:
<https://forms.gle/qzZdynDJpsfzd32SA>

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table 1. Questions that were included in the second questionnaire

ID:
Gender:
Age:
Level of studies:
I am interested in buying products from the following product categories:
How much time do spend online?
How often do you buy products or services through the internet?
Advertising is important for the consumers.
The content of an advertisement is preferable to be:
What is the most important information about a product?
The ads help me get a better idea of the prices and products on the market.
Online ads are annoying.

At this stage, participants were advised to take a comfortable position and were requested to keep their heads as stable as possible during their browsing in the online shop.

Then participants were left free to interact with the store and “spend” their 1,000 euros. Eye-tracking data were collected during their navigation to examine how the participants viewed the banners and the products. A photograph from a real participant that took part in the experiment during the eye-tracking calibration is shown in Figure 10. The eye-tracking data facilitate also the interview that followed (the evaluator had access to these data, helping her to ask the right questions during the interviews).

When the participants had completed their purchases, a third questionnaire³ was given to them in order to examine whether, how many and at which extend was possible for the participants to recall the advertisements they were exposed to. And

³ The questionnaire can currently be viewed at the following link:
<https://forms.gle/HX2UWF7xpngN17wh8>

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

finally, a semi-structured interview with the participants followed and was the last stage of the experiment. This third questionnaire was in Greek and can be found in Appendices. The interview took place mostly to identify the reasons why the participants noticed some advertisements and ignored others. An objective of this interview was also to identify discrepancies between participants' behavior towards advertising and understand their general attitude towards advertising. Each participant was interviewed for approximately 10 minutes. The entire interview process was recorded with the consent of each participant. The questions were about the general experience of the participants in the online store focusing on the advertisements. Indicatively some of the questions were *"Did you notice the advertisements that were in the online store?"*, *"Why did you look at this particular advertisement?"* or *"Why did you ignore this particular advertisement?"*. The questions were tailored to each participant, according to the data collected from the eye-tracker.

Figure 11 depicts a brief visual representation of the experimental protocol. Overall, three questionnaires and an online store were created for the purposes of this experiment. All the text in the questionnaires and in the online store was in Greek, except for the Big-Five questionnaire which was in English. In addition, all interviews were conducted in Greek so that participants could express themselves in their mother tongue.

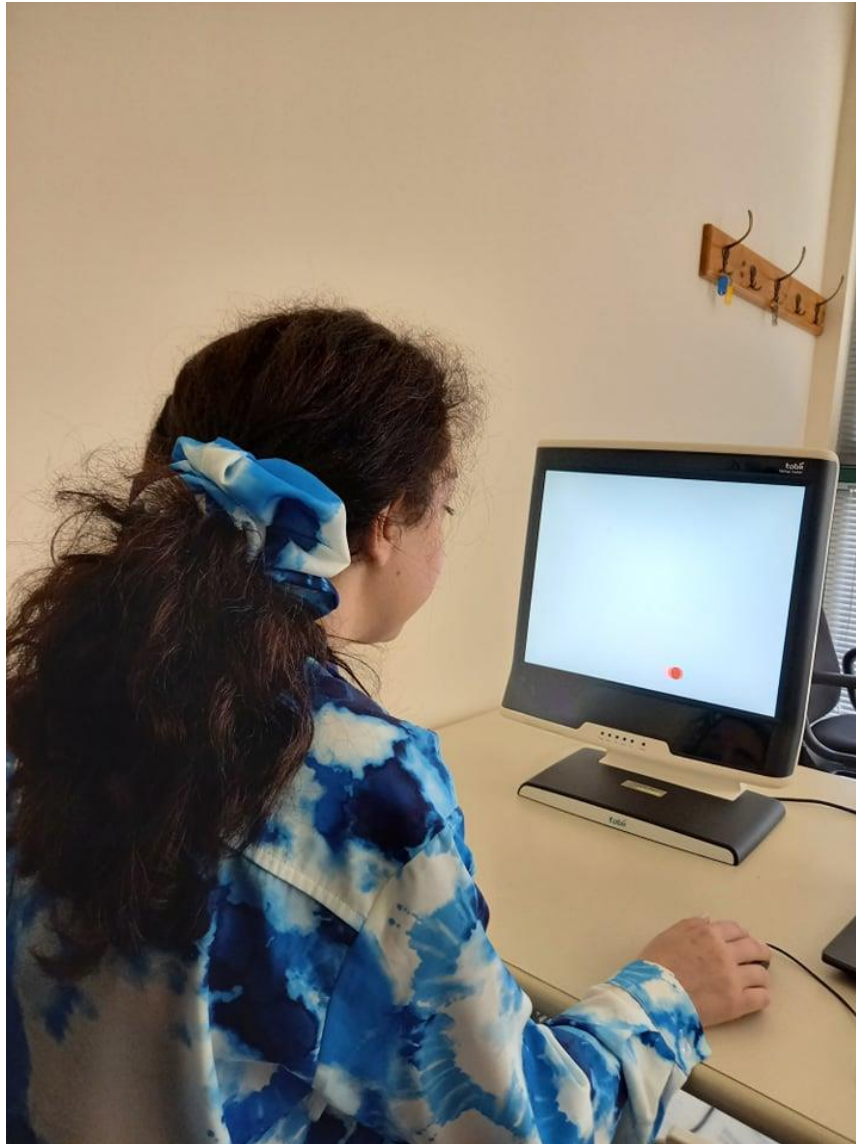


Figure 10. An example during the the eye-tracking calibration

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

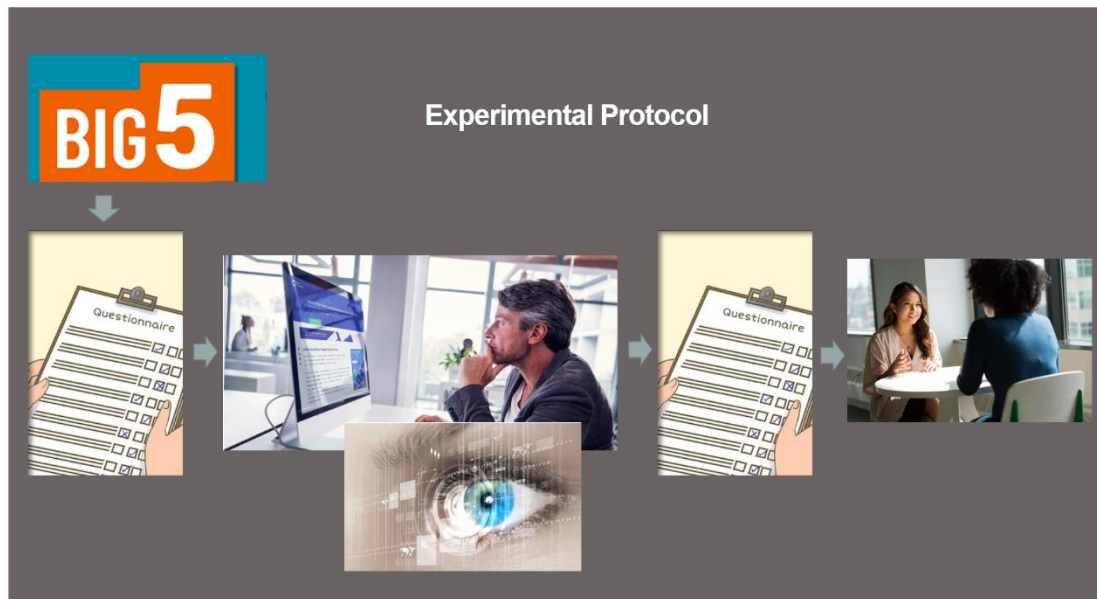


Figure 11. Visual representation of the Experimental protocol

Table 2 provides a summary regarding the experimental protocol.

Table 2. Experimental protocol Summary

	Materials	Description
Step 1.	Questionnaire 1	Big Five Personality trait questionnaire
Step 2.	Questionnaire 2	Demographic and marketing questions
Step 3.	Eye-tracking recordings during browsing	The participants visited the online store and hypothetically had up to 1,000 euros to make their purchases.
Step 4.	Questionnaire 3	Examine the advertisement recall
Step 5.	Semi-structured interview	The interview occurred at the end of the experiment in order to examine more insights into the user experience related to advertising exposure

3.3 The Big-Five model of personality

The Big Five Model of personality, also called the five-factor model (FFM) is the dominant model in trait psychology which describes individual differences in human personality [64]. This model conceptualizes personality traits in five basic dimensions of personality (extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience) [65].

3.3.1 Extraversion

The characteristic of extroversion is sometimes related primarily to sociability and evaluates the amount and intensity of interpersonal interactions and ambition. People who show a high degree of extroversion are sociable, talkative, gregarious, impetuous, ambitious, assertive, expressive, exhibitionist and energetic.

3.3.2 Agreeableness

The characteristic of agreeableness refers to the quality of the individual's interpersonal relationships. It is considered that people who score high in this dimension have strong empathy; they are cooperative, kind, forgiving, compassionate, willing, kind, trustworthy and tolerant.

3.3.3 Conscientiousness

Conscientiousness reflects dependability. People with a high degree of conscientiousness are usually hardworking, organized, disciplined, responsible, meticulous, ambitious and reliable.

3.3.4 Neuroticism

Neuroticism is also called emotional Stability and people with high are usually anxious, embarrassed, insecure, angry and worried.

3.3.5 Openness to Experience

The last dimension has been called Openness to Experience (also known as Intellect). People with a high rating of this feature are usually original, imaginative, cultured, artistically sensitive, curious, intelligent, and broad-minded. Table 3 lists the dominant characteristics of people with high score in each dimensions of personality.

Table 3. Interpretations of the "Big-Five"

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Dimension	People with high score are:
Extraversion	sociable, talkative, gregarious, impetuous, ambitious, assertive, expressive, exhibitionist, energetic
Agreeableness	compassionate, kind, cooperative, kind, willing, kind, forgiving, trustworthy, tolerant
Conscientiousness	organized, disciplined, responsible, meticulous, ambitious, hardworking, reliable
Neuroticism	anxious, embarrassed, insecure, angry, worried
Openness to Experience	original, imaginative, cultured, artistically sensitive, curious, intelligent, broad-minded

Many researchers have used the Big-Five model as a tool to predict consumers' behavioral traits and have studied the impact of personality traits in advertising [66]. Also, previous academics tried to cast some light on whether there is a better match between personality traits and advertisements. Overall, the results showed that people's personality traits are key elements in predicting their preferred ads.

Not only marketing researchers but also in a variety of cases in academic research, the assessment of an individual's personality is required [67]. Thus, it was suggested an international collaboration [68] to create an easily available personality inventory, such as a bank of questionnaires designed to measure facets of personality. Several items were developed and are widely known as the International Pool Personality Item Pool (IPIP). In the IPIP Big-Five inventory, there are several versions of questionnaires consisting of 300, 100, or 50 items [69]. The shortened version of the 50-item is frequently used in research which consists of 50 items, 10 per personality domain, rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) [70]. All items are reported in Table 4.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table 4. 50-item IPIP Five-Factor Model

1. Am the life of the party.
2. Feel little concern for others.
3. Am always prepared.
4. Get stressed out easily.
5. Have a rich vocabulary.
6. Don't talk a lot.
7. Am interested in people.
8. Leave my belongings around.
9. Am relaxed most of the time.
10. Have difficulty understanding abstract ideas.
11. Feel comfortable around people.
12. Insult people.
13. Pay attention to details.
14. Worry about things.
15. Have a vivid imagination.
16. Keep in the background
17. Sympathize with others' feelings.
18. Make a mess of things.
19. Seldom feel blue.
20. Am not interested in abstract ideas.
21. Start conversations.
22. Am not interested in other people's problems.
23. Get chores done right away.
24. Start conversations.
25. Am not interested in other people's problems.
26. Have little to say.
27. Have a soft heart.
28. Often forget to put things back in their proper place.
29. Get upset easily.
30. Do not have a good imagination.
31. Talk to a lot of different people at parties.
32. Am not really interested in others.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

33. Like order.
34. Change my mood a lot.
35. Am quick to understand things.
36. Don't like to draw attention to myself.
37. Take time out for others.
38. Shirk my duties.
39. Have frequent mood swings.
40. Use difficult words.
41. Don't mind being the center of attention.
42. Feel others' emotions.
43. Follow a schedule.
44. Get irritated easily.
45. Spend time reflecting on things.
46. Am quiet around strangers.
47. Make people feel at ease.
48. Am exacting in my work.
49. Often feel blue.
50. Am full of ideas.

3.4 Visual attention & Recall

It is imperative to understand when and how internet users devote attention to commercial stimuli and what determines their attentional strategies and patterns [71]. A large amount of research has been conducted to investigate consumers' visual processing behavior, particularly visual attention, toward advertisements or packages with pictures [72]. There are two basic measurements to examine the advertising effectiveness, visual attention and recall [73], as both have an impact on brand and product awareness. Therefore, by using the eye-tracking technique, researchers can investigate how and when the content elements of online banner advertisements influence customers' attention [74].

Visual attention plays an imperative role in marketing and determines the effectiveness of advertising [75]. Visual attention is not only a gate, but also and more important, is a key coordinating mechanism that serves to maintain information

processing and other goals over time [76]. Visual attention to advertising has been shown to have systematic downstream effects on brand memory, indicating its predictive validity [77].

However, sometimes is not only the attention that plays the major role. People do not always remember everything they notice. In several situation, an advertising message is cognitively processed and remains in the consumer's memory, but at other times it does not [78].

One of the predominant approaches to measuring the amount of attention related to advertising is to use self-reported memory measures by asking questions such as *"Did you remember this advertisement?"* or *"How well do you remember the advertisement"*. However, memory measures are a poor metric for measuring consumers' attention to advertising [79]. To examine the way cognitive processes work in many different conditions [80], several eye-tracking studies have been conducted in the fields of information systems [81] and marketing [82]. In particular, a previous study [78] revealed that when banner advertisements were noticed but not recalled, they still can influence users in an unconscious way.

Advertisement recall occurs when the recipients of an advertisement due to a stimulus remember and recall from their memory the advertising message they were exposed to, and thus bring to mind both the advertised product and details about it such as the brand, price, etc.

3.5 Eye-tracking technology

Eye-movement tracking is a technique that is being used to study usability issues in Human-Computer Interaction (HCI) contexts [83]. It is important for the reader before reading the analysis using eye-tracking data to be introduced to the basics of eye-movement technology, and also be informed about several key aspects of practical guidance. Eye tracking is a method of recording a person's eye movements so that the researcher knows how the user behaves during browsing related to what they saw. Researchers by using eye-tracking techniques can answer questions like where the user looked, for how long and can know the sequence in which their eyes change from one location to another. Apart from the typical use of eye-tracking technology in

research user gazes at a computer screen are recorded, it can also be used to control a computer with your eyes instead of using a traditional way (keyboard, mouse).

Eye-tracking provides such measures. Eye movements are tightly coupled with visual attention, making them eminent indicators of the visual attention process, which is now easy to assess with modern eye-tracking equipment. Eye movements are behavioral measures of the unobservable visual attention process of prime interest. “The eyes don’t lie. If you want to know what people are paying attention to, follow what they are looking at”

3.5.1 How does eye-tracking work?

Eye trackers deliver information about where on the screen the user is looking. The eye tracker sends out near infrared light. The light is reflected in your eyes. Those reflections are picked up by the eye tracker’s cameras. Through filtering and calculations, the eye tracker knows where you are looking (Figure 12). The steps are shown in Table 5.

Table 5. Eye tracking basics⁴

1. The eye tracker sends out near infrared light.
2. The light is reflected in your eyes.
3. Those reflections are picked up by the eye tracker’s cameras.
4. Through filtering and calculations, the eye tracker knows where you are looking.

⁴ <https://us.tobiidynavox.com/pages/what-is-eye-tracking>

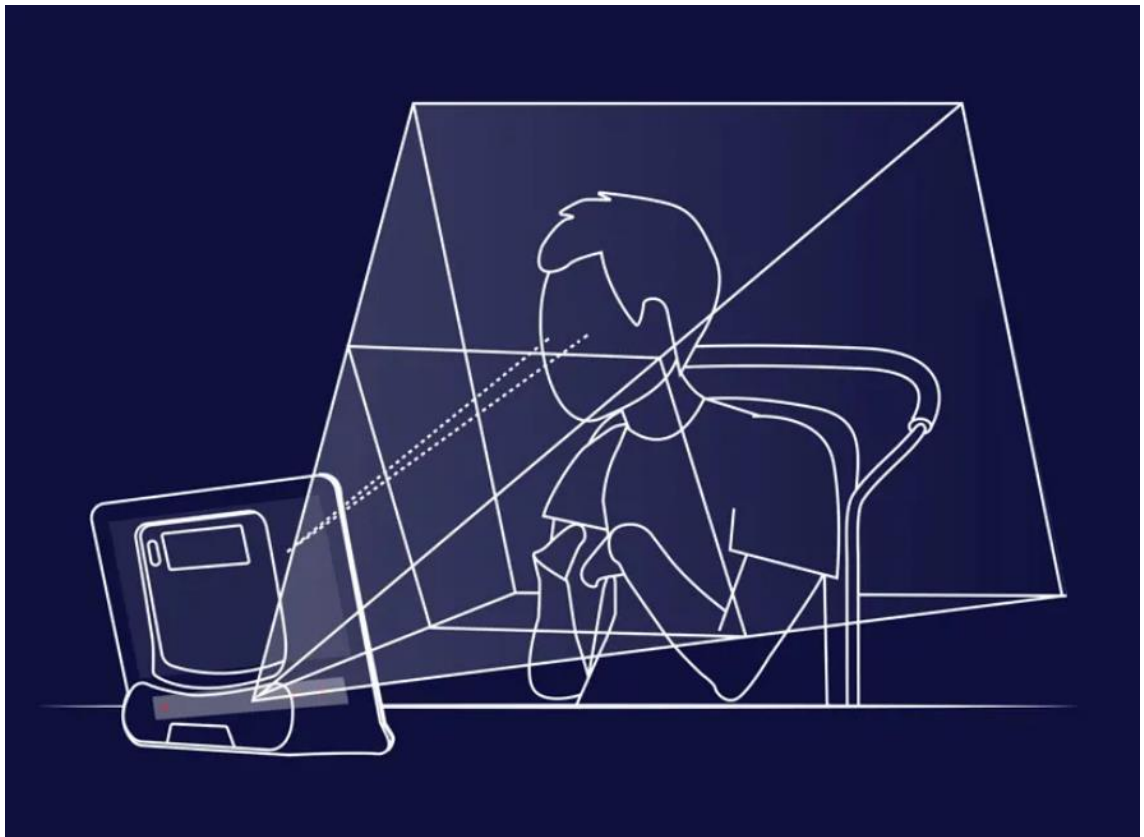
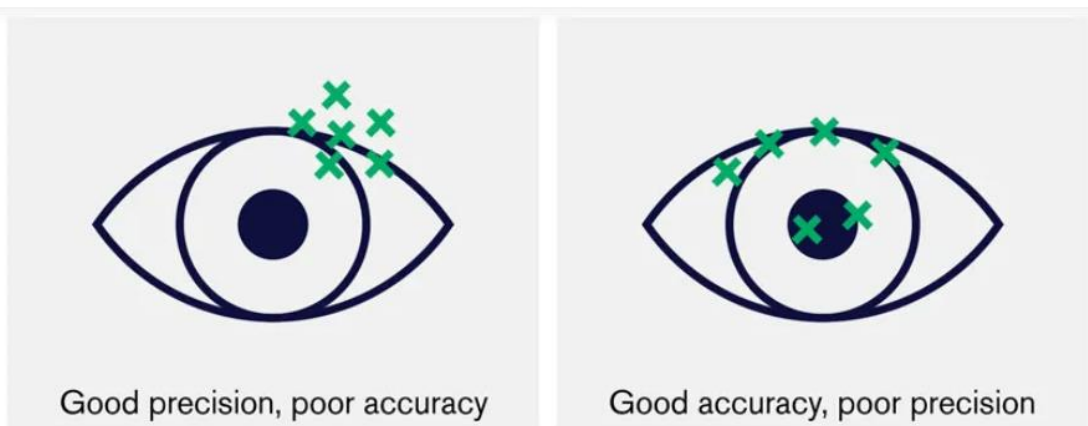


Figure 12. Eye-tracking

In order to achieve as accurate results as possible, the eye tracker must know more about your eyes. Thus, the calibration is an essential procedure that the users must undergo before the eye tracker measures how user eyes reflect light. So, obtaining a good calibration is required when using eye tracking.



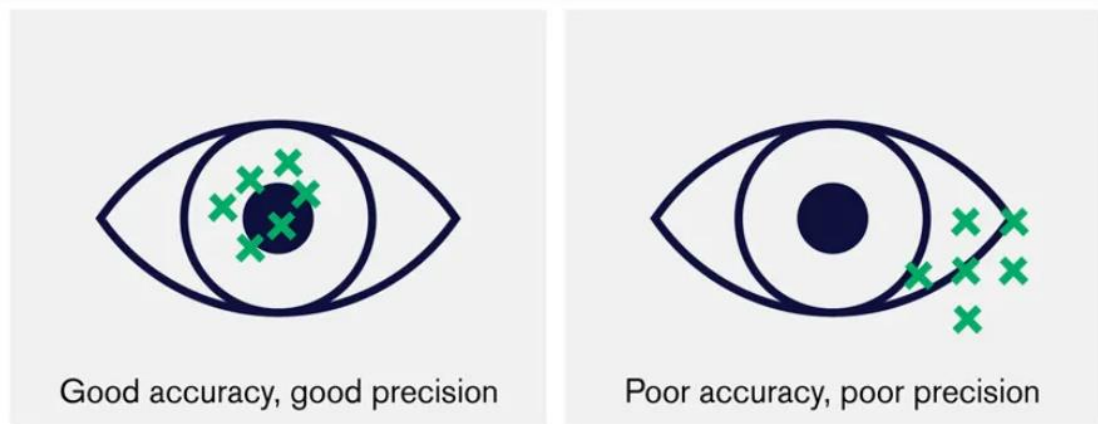


Figure 13. Percision and accuracy in calibration⁵

3.5.2 Eye-tracking measurements

An eye-tracking device can measure:

- Fixation frequency (i.e., number of eye fixations on target stimuli)
- Fixation duration (i.e., total duration of eye fixation on target stimuli)
- Scan path (fixation sequence)
- Location of the first fixation
- Time of the first fixation

3.5.3 Eye Tracking Terms to Know

3.5.3.1 Gaze point

One of the most important metrics that can be gathered by eye-tracking technology is a gaze point. Gaze points are the instantaneous spatial locations of the visual axis landing on the stimulus⁶. A gaze point records a user's gaze with x-y coordinates and a timestamp corresponding to its measurement, so information like where the participant was looking and when in a specific moment in time is provided. If the device is operating at 60 Hz, a gaze point will be reported every 16.7 milliseconds.

3.5.3.2 Fixation

A fixation, in the world of visual tracking, is a gaze point maintained in one place for a certain amount of time. It adds another metric to the gaze point, not only the x-y coordinates, but also the duration in time corresponding to those coordinates. A fixation occurs when the

⁵ <https://us.tobiidynavox.com/pages/what-is-eye-tracking>

⁶ <https://www.tobiipro.com/learn-and-support/learn/eye-tracking-essentials/types-of-eye-movements/>

participant stops scanning an image or page and holds their gaze in place.

Fixations have two characteristics distinguishing them from gaze points. The first is that since they are made up of multiple gaze points, fixations have duration in addition to a spatial (x, y) location and start and end timestamps. The second is that fixations are not real in the sense of being directly measurable. Fixations are constructions, outputs of a mathematical algorithm that translates the sequence of raw gaze points into an associated sequence of fixations.

3.5.3.3 Fixation Sequence

Another term is “fixation sequence.” This is the order and direction in which fixations occur, including data on where the user was looking as well as when they were looking at a specific point. A fixation sequence provides a better understanding of what aspects of a stimulus the user prioritizes.

3.5.4 Data visualizations

3.5.4.1 Gaze plot

Gaze plots⁷ show the location, order, and time spent looking at locations on the stimulus, whether web page, print advertisement, or video. So, the primary objective of a gaze plot is to show the time sequence of looking or where exactly the users look. Time spent looking, most commonly expressed as fixation duration, is shown by the diameter of the fixation circles. The longer the look, the larger the circle.

3.5.4.2 Heat Maps

Heat maps⁸ show how *looking is distributed* over the stimulus. In contrast to the gaze plot, there is no information about the order of looking in a static heat map. Neither is the focus on individual fixations. Rather, heat maps are a visualization that can effectively reveal the focus of visual attention for dozens or even hundreds of participants at a time.

⁷ <https://www.tobiipro.com/learn-and-support/learn/steps-in-an-eye-tracking-study/interpret/working-with-heat-maps-and-gaze-plots/>

⁸ <https://www.tobiipro.com/learn-and-support/learn/steps-in-an-eye-tracking-study/interpret/working-with-heat-maps-and-gaze-plots/>

3.6 Eye-tracking Visualization

Insights related to the attention to the advertisement based on eye-tracking recordings were revealed that the longer users pay attention to a banner advertisement, the better their recognition performance.

In Figure 14 a gaze plot is provided in which the participant clearly looked at the advertisement. Moreover, the same participant recalled it. However, Figure 15 depicts an example of a participant who ignored completely the advertisement on the visited page.

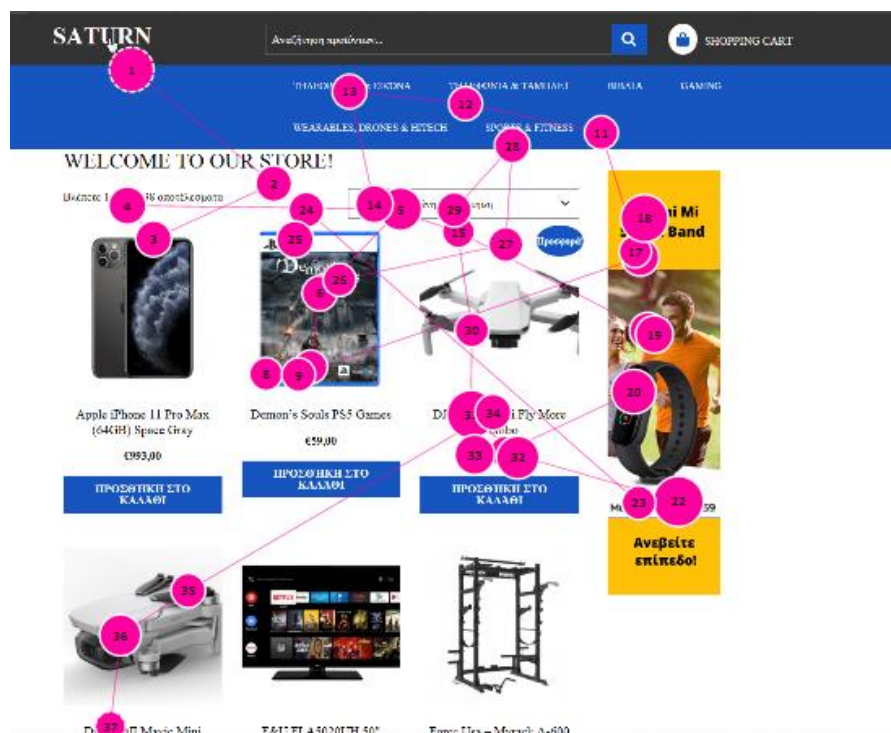


Figure 14. Gaze plot – The participant looked at the advertisement

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention



Figure 15. Gaze plot – The participant ignore the advertisement

Chapter 4: Data

4.1 Demographic information about participants

After analyzing the second questionnaire used in the experiment, some findings emerged and are presented in this chapter.

4.1.1 Gender - Age

Overall, forty-three participants (17 women) participated in the experiment (Table 6). Their ages ranges from the [18-24] age group to [40-60] (Table 7).

Table 6. Descriptive statistics – Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	17	39.5	39.5	39.5
	Male	26	60.5	60.5	100.0
	Total	43	100.0	100.0	

Table 7. Descriptive statistics – Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	27	62.8	62.8	62.8
	25-30	12	27.9	27.9	90.7
	31-45	3	7.0	7.0	97.7
	46-60	1	2.3	2.3	100.0
	Total	43	100.0	100.0	

4.1.2 Level of studies

Most participants were undergraduate students (55.8%) and also in the experiment participated twelve postgraduate students (27.9%) (Figure 16).

Table 8. Descriptive statistics – Level of studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's degree	1	2.3	2.3	2.3
	Doctorate	2	4.7	4.7	7.0
	Postgraduate student	12	27.9	27.9	34.9
	PhD candidate	4	9.3	9.3	44.2

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Undergraduate student	24	55.8	55.8	100.0
Total	43	100.0	100.0	

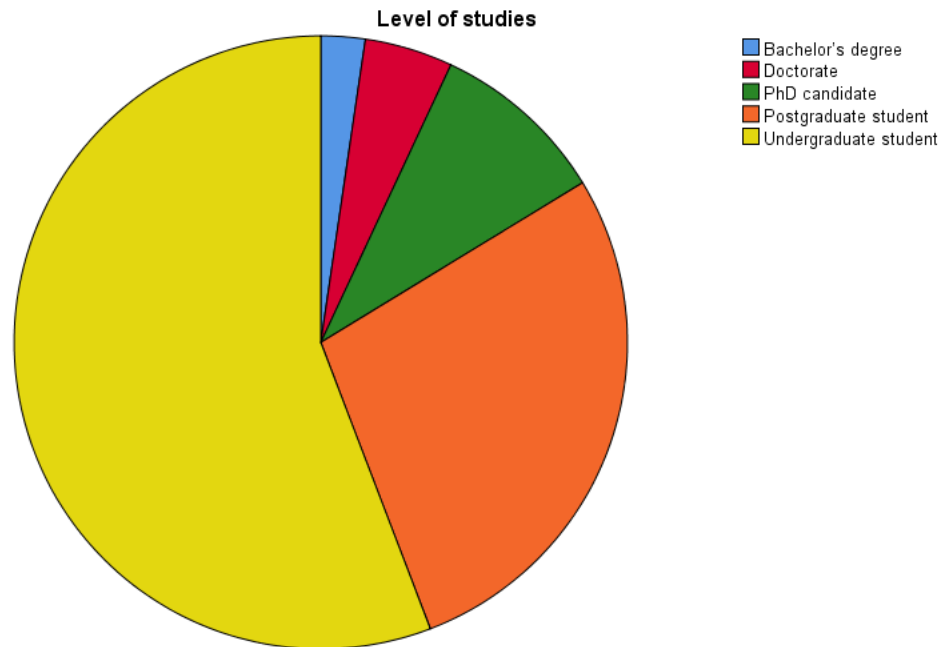


Figure 16. Level of studies of the participants

4.1.3 Interests in buying products from the following product categories

An important goal of the second questionnaire was to determine the purchase goals of each participant. So, they were asked whether they are interested in buying any product from the available product categories in the online shop. Each participant could select more than one option. Overall, twenty-two participants were interested in buying books (24.7%), twenty were interested in smartphones & tablets (22.5%), seventeen in Sports & Fitness products (19.1%), eleven in gaming products (12.4%), ten in TVs (11.2%) and finally, only nine were interested in buying products from the Wearables, drones & High-tech product category (10.1%). Table 9 shows the Descriptive statistic for this question and in Figure 17 a bar chart is shown.

Table 9. Descriptive statistics - Interests in buying products from the following product categories

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Books	22	24.7	24.7	24.7

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Gaming	11	12.4	12.4	37.1
Smartphones & Tablets	20	22.5	22.5	59.6
Sports & Fitness	17	19.1	19.1	78.7
TV	10	11.2	11.2	89.9
Wearables, Drones & High-tech	9	10.1	10.1	100.0
Total	89	100.0	100.0	

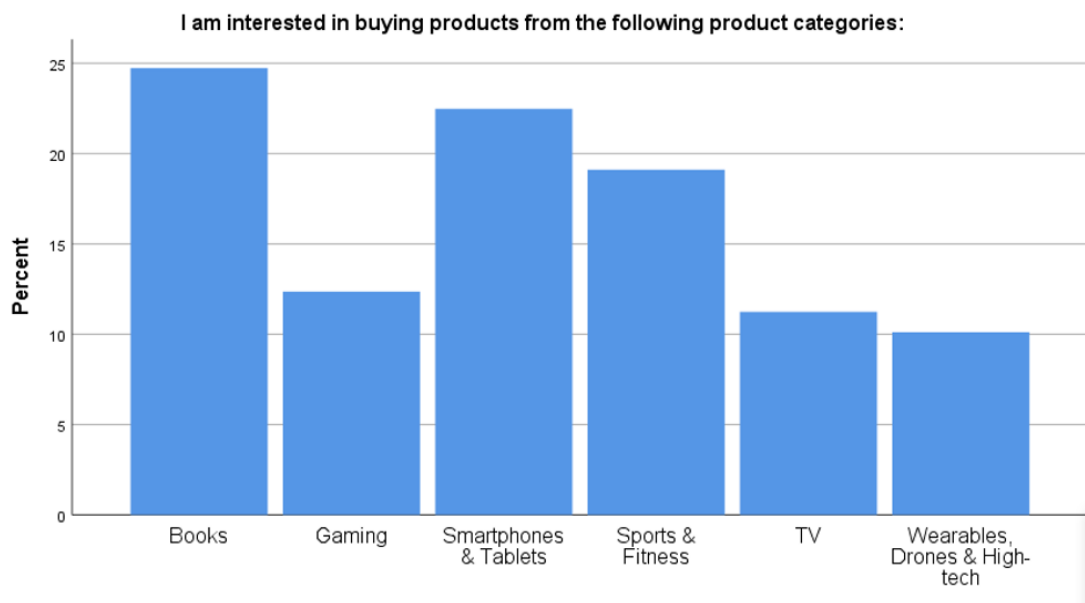


Figure 17. Bar chart - Interests in buying products from the following product categories

4.1.4 Online spending time

Regarding the time that users spent online daily, the Descriptive statistics are shown in Table 10 as well as a Pie-chart in Figure 18. Overall, eighteen participants answered that they spent 3-5 hours online per day (41.9%) as well as eighteen participants spent 6-10 hours online (41.9%). Some participants who answered that they are always connected (7.0%).

Table 10. Descriptive statistics - Oline spending Time

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1-2 hours	2	4.7	4.7	4.7

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

11-15 hours	2	4.7	4.7	9.3
3-5 hours	18	41.9	41.9	51.2
6-10 hours	18	41.9	41.9	93.0
Always connected	3	7.0	7.0	100.0
Total	43	100.0	100.0	

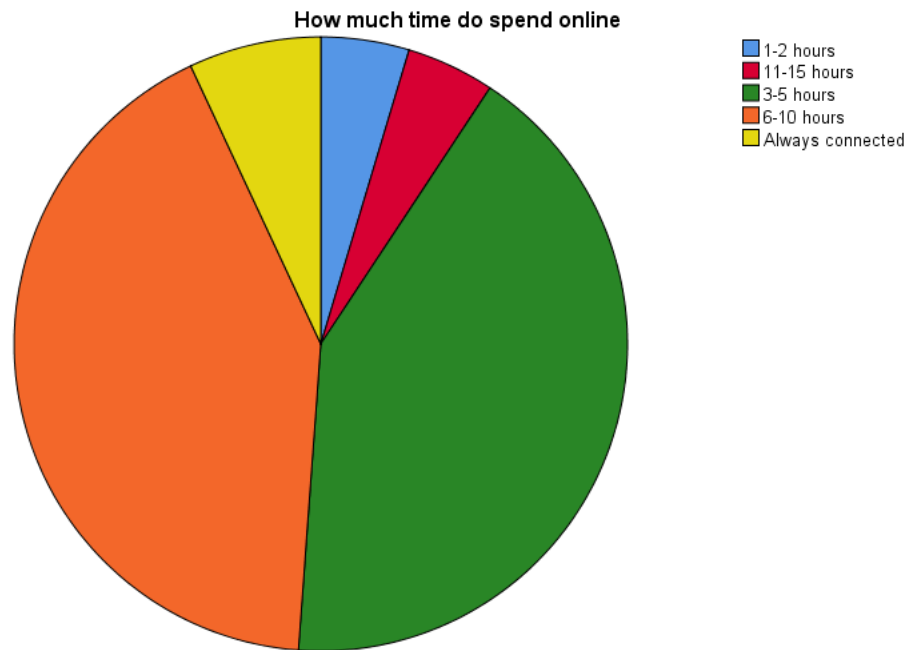


Figure 18. Pie chart – Online spending Time

4.1.5 Frequency of buying products online

Regarding the frequency of buying products online, the Descriptive statistics are shown in Table 11 as well as a Pie-chart in Figure 19. Overall, twenty participants answered that they buy products online one time per month (46.5%). Ten participants buy products online one time per six months (23.3%). Six participants buy products online one time per week (14.0%) and four participants two times per week (9.3%). While three participants select the option “Other” without defining exactly (7.0%).

Table 11. Descriptive statistics - Frequency of buying products online

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 time per month	20	46.5	46.5	46.5
	1 time per six months	10	23.3	23.3	69.8
	1 time per week	6	14.0	14.0	83.7

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

2 times per week	4	9.3	9.3	93.0
Other	3	7.0	7.0	100.0
Total	43	100.0	100.0	

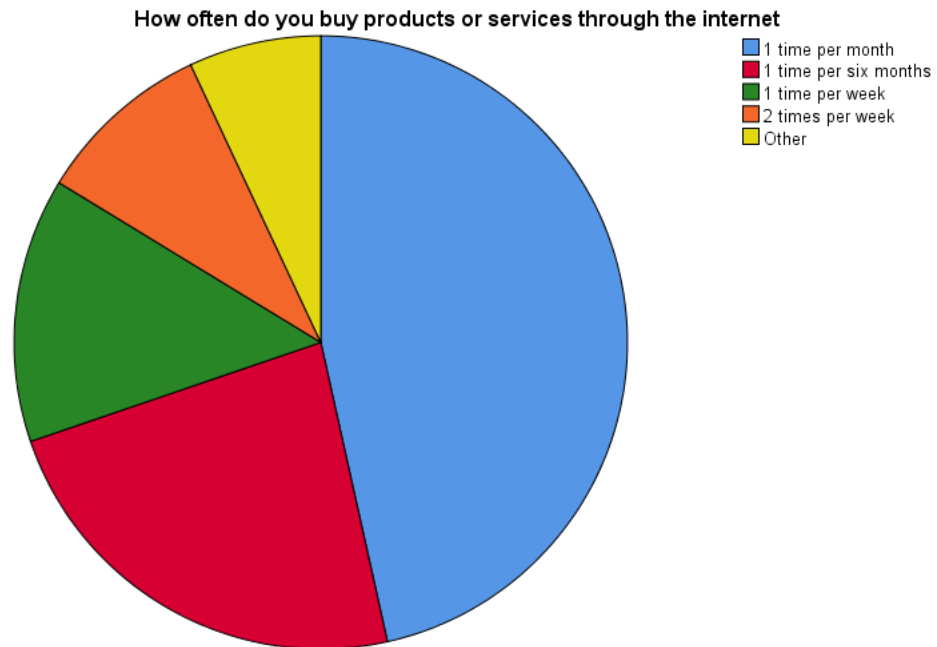


Figure 19. Pie chart - Frequency of buying products online

4.1.6 Advertising is important for the consumers

Participants were asked to rate how much they agree to the following statement: “Advertising is important for the consumers”, the possible answers were a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Table 12 provides the Descriptive statistics of how participants rated this statement. Also, the Bar-chart in Figure 20 provides visual feedback on participants’ answers.

Table 12. Descriptive statistics - Advertising is important for the consumers.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	7	16.3	16.3	16.3
	3	13	30.2	30.2	46.5
	4	12	27.9	27.9	74.4
	5	11	25.6	25.6	100.0
	Total	43	100.0	100.0	

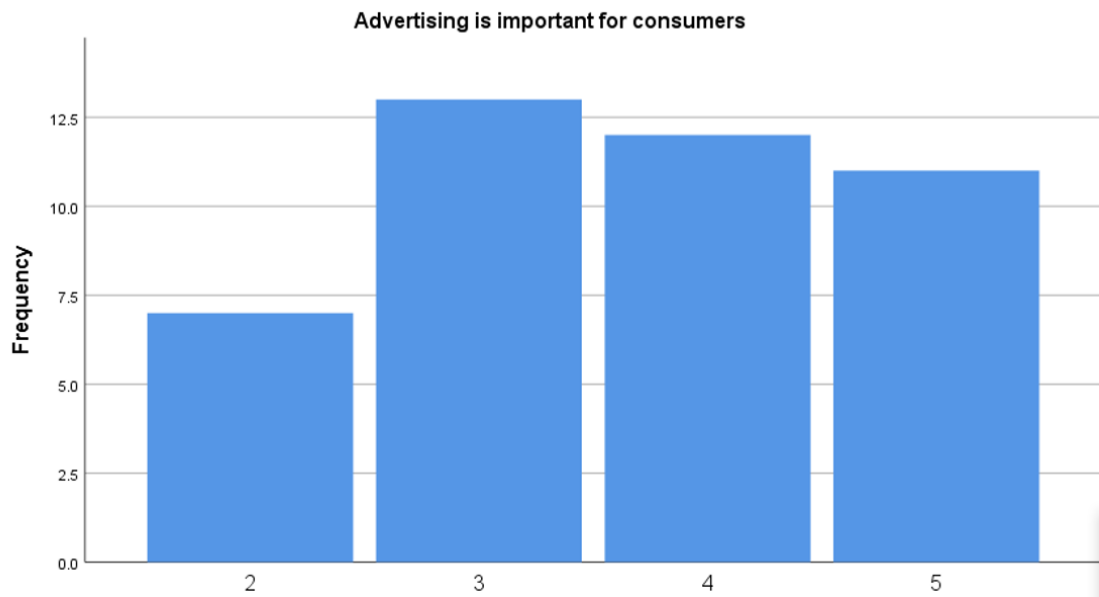


Figure 20. Bar chart - Advertising is important for the consumers.

4.1.7 The important content of an advertisement

Participants were asked to express their opinion regarding the important content of an advertisement. In this question, they could choose more than one option. Twenty-five participants said that the content of the advertisement is preferable to be “*Smart*” (26.9%). Nineteen participants declare that they prefer the advertisement to be “*Creative*” (20.4%) as well as nineteen participants chose the option “*Informative*” (20.4%). Moreover, fourteen participants answered that the advertisement is preferable to be “*Funny*” (15.1%). Table 13 provides the Descriptive statistics of this question. Also, the Bar-chart in Figure 21 provides visual feedback on participants’ answers.

Table 13. Descriptive statistics - The important content of an advertisement

		Frequency	Percent
Valid	Creative	19	20.4
	Emotional	8	8.6
	Funny	14	15.1
	I do not care about the content of an ad	3	3.2
	Informative	19	20.4
	Simple	5	5.4
	Smart	25	26.9

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Total	93	100.0
-------	----	-------

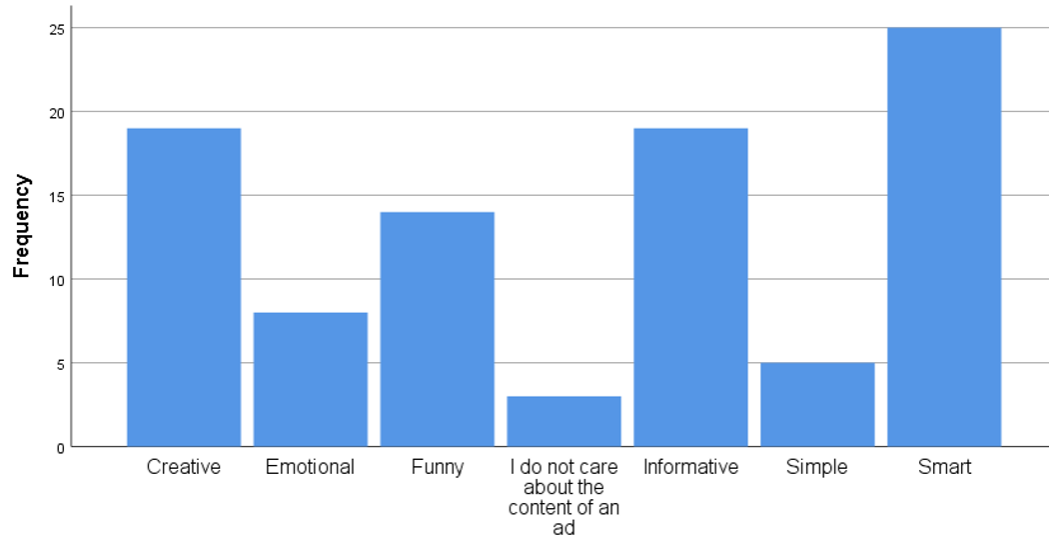


Figure 21. Bar chart - The important content of an advertisement

4.1.8 The important information of an advertisement

Regarding the important information of an advertisement, the Descriptive statistics are shown in Table 14 as well as a Bar-chart in Figure 22. Overall, forty-three participants answered that product features are important information on an advertisement (44.0%). Twenty-eight participants said that the price is important (37.3%). Thirteen participants care about the possible use of a product (13%).

Table 14. Descriptive statistics - The important information of an advertisement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I do not care	1	1.3	1.3	1.3
	Price	28	37.3	37.3	38.7
	Product features	33	44.0	44.0	82.7
	The use of the product	13	17.3	17.3	100.0
	Total	75	100.0	100.0	

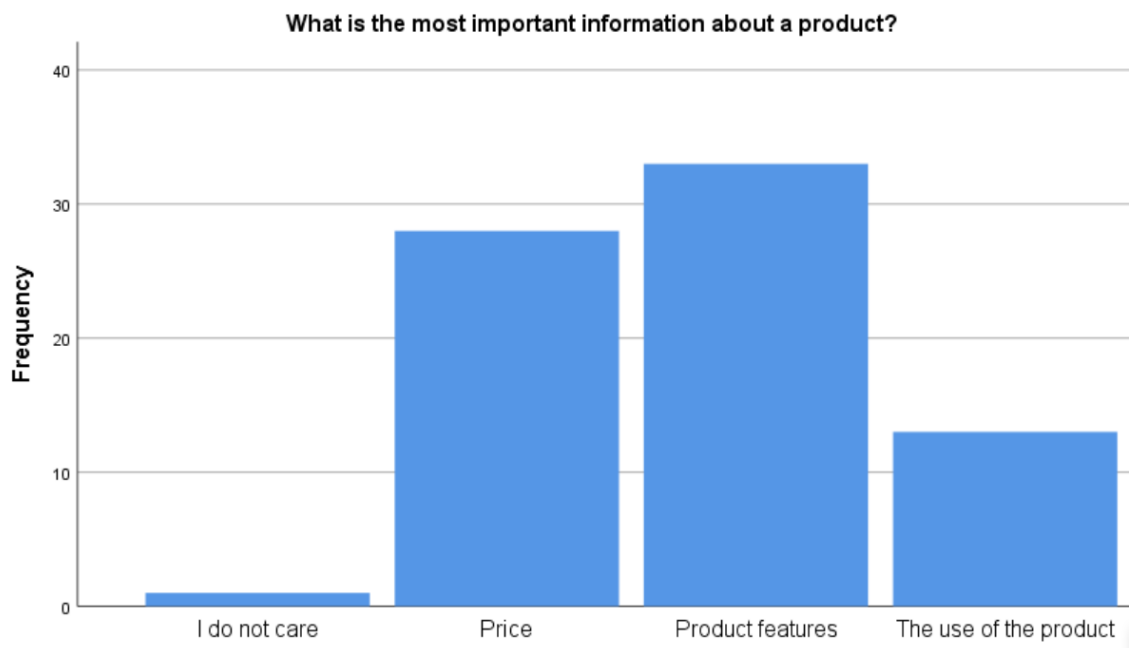


Figure 22. Bar chart - The important information of an advertisement

4.1.9 The ads help me get a better idea of the prices and products on the market

Participants were asked to rate how much they agree to the following statement: “The ads help me get a better idea of the prices and products on the market”, the possible answers were a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Table 15 provides the Descriptive statistics of how participants rated this statement. Also, the Bar-chart in Figure 23 provides visual feedback on participants’ answers.

Table 15. The ads help me get a better idea of the prices and products on the market.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.0	2.3	2.3
	2	9	18.0	20.9	23.3
	3	13	26.0	30.2	53.5
	4	15	30.0	34.9	88.4
	5	5	10.0	11.6	100.0
	Total	43	86.0	100.0	
Missing	System	7	14.0		
Total		50	100.0		

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention



Figure 23. Bar chart - The ads help me get a better idea of the prices and products on the market.

4.1.10 Online ads are annoying

Participants were asked to rate how much they agree to the following statement: “Online ads are annoying”, possible answers were a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Table 16 provides the Descriptive statistics of how participants rated this statement. Also, the Bar-chart in Figure 24 provides visual feedback on participants’ answers.

Table 16. Online ads are annoying

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	7	14.0	16.3	16.3
	3	12	24.0	27.9	44.2
	4	9	18.0	20.9	65.1
	5	15	30.0	34.9	100.0
	Total	43	86.0	100.0	
Missing	System	7	14.0		
Total		50	100.0		

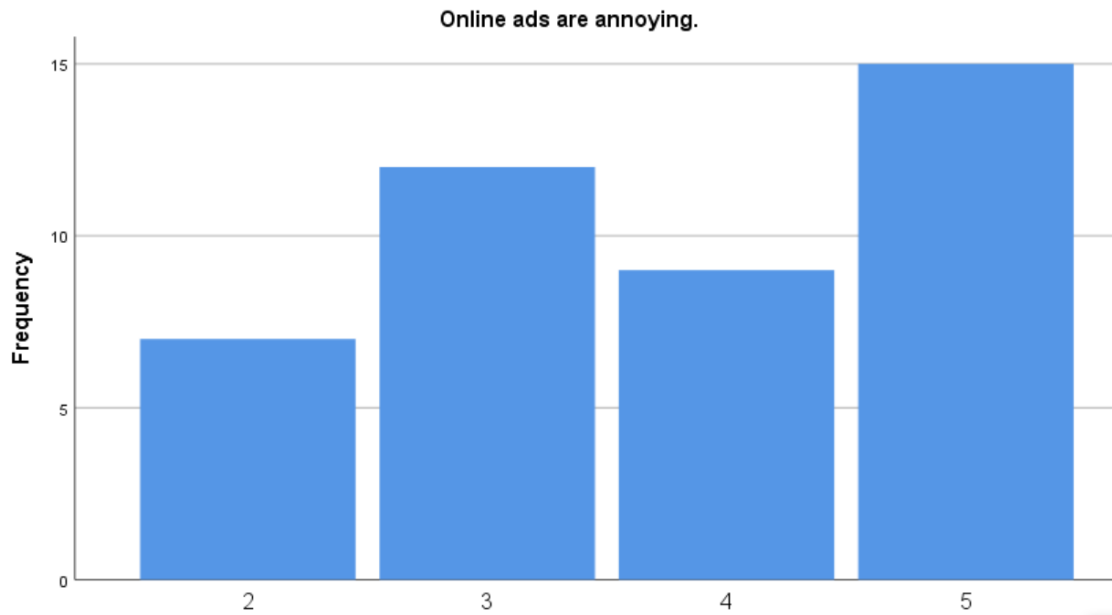


Figure 24. Bar chart – Online Ads are annoying

4.2 Data on how participants interact with Advertisements

It is assumed that a participant had noticed the advertisement if they have gazed at the advertisement for at least two consecutive fixations and total fixation duration (how long participants spend looking at a particular advertisement) greater or equal to 500 ms. Moreover, it is considered that advertisement recall occurs when the recipients of an advertisement remember and recall from their memory the advertising message. That means that the participants who recall the advertisement bring to mind the advertised product and details about it. We separate the situation in which participants remembered only the advertisements without details or when participants can recall only the depicted product. After browsing all participants were asked the following question “*How well do you remember this advertisement?*”. Table 17 provides the available options to this question.

Table 17. Options related to advertising recall

I remember the ad.
I remember seeing the advertisement, but I did not remember the product shown.
I only remember the product shown in the advertisement but could not remember details of what it was like.
I don't remember anything from the ad.

Other with option to explain.

4.2.1 Analysis of the Xiaomi Mi Smart Band advertisement



Figure 25. Ad1 - The advertisement was on the home page

Forty-three participants visited the home page of the online store as it was by default the first page which was shown to the user after the loading of the online shop. Based on the eye-tracking data **Twenty-two** participants gazed at the advertisement based on their advertisement recordings. **Twelve** of them recall the advertisement. **Six** of them did not recall the ad. Finally, **fourteen** of the twenty-two participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

advertisement but could not remember details of what it was like. Moreover, **six** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 25) is provided in Table 18.

Table 18. Information about how participants interacted with the advertisement

Visits to the page where the advertisement was:	43
The number of participants who noticed the advertisement:	22
The number of participants who recalled the advertisement:	12
The number of participants who completely ignored the advertisement:	6
The number of participants who noticed the advertisement but did not recall it:	6
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	3
The number of participants who gazed at the advertisement and stated that remember some information on it:	14
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	1
Clicks on the advertisement:	0

4.2.2 Analysis of the Apple iPhone 11 Pro max advertisement



Figure 26. Ad2 - Apple iPhone advertisement that was on the books product category page

Twenty-seven participants visited the *Books* product category page of the online store. Based on the eye-tracking data, **Fourteen** participants gazed at the advertisement based on their advertisement recordings. **Seven** of them recall the advertisement. **Five** of them did not recall the ad. Finally, **two** of the fourteen participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **seven** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 26) is provided in Table 19.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table 19. Information about how participants interacted with the advertisement

Visits to the page where the advertisement was:	27
The number of participants who noticed the advertisement:	14
The number of participants who recalled the advertisement:	7
The number of participants who completely ignored the advertisement:	7
The number of participants who noticed the advertisement but did not recall it:	5
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	5
The number of participants who gazed at the advertisement and stated that remember some information on it:	2
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	1
Clicks on the advertisement:	1

4.2.3 Analysis of the Fitness treadmill advertisement



Figure 27. Ad3 - Fitness treadmill advertisement that was on the TVs product category page

Thirty-one participants visited the TVs product category page of the online store. **Eleven** participants gazed at the advertisement based on their advertisement recordings. **Four** of them recall the advertisement and **four** did not. Finally, **three** of the eleven participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **thirteen** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

about how the participants interacted with the advertisement (Figure 27Figure 31) is provided in Table 20.

Table 20. Information about how participants interacted with the advertisement

Visits to the page where the advertisement was:	31
The number of participants who noticed the advertisement:	11
The number of participants who recalled the advertisement:	4
The number of participants who completely ignored the advertisement:	13
The number of participants who noticed the advertisement but did not recall it:	4
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	7
The number of participants who gazed at the advertisement and stated that remember some information on it:	3
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	0
Clicks on the advertisement:	0

4.2.4 Analysis of the PS4 Pro advertisement

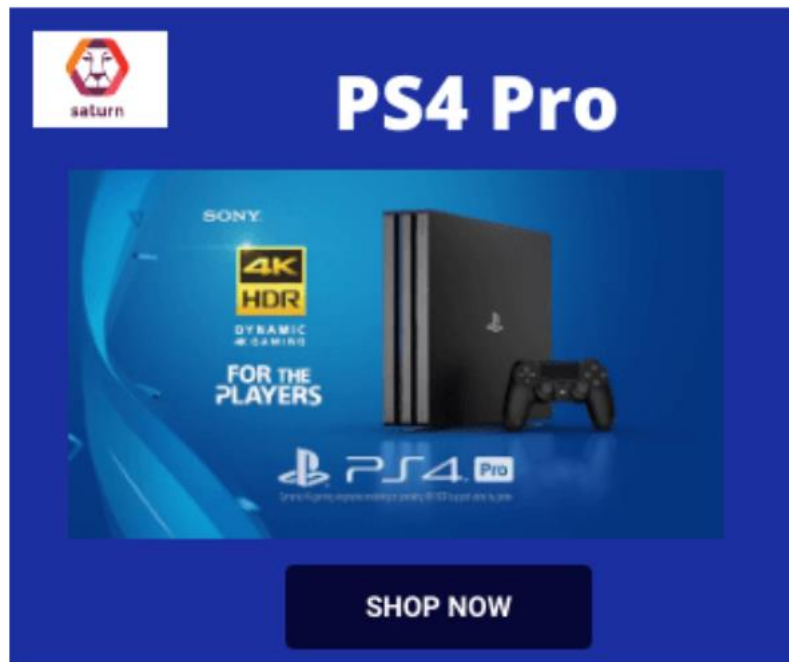


Figure 28. Ad4 - PS4 Pro advertisement that was on the sports product category page

Twenty-nine participants visited the *Sports & Fitness product category page* of the online store. **Eleven** participants gazed at the advertisement based on their advertisement recordings. **Eight** of them recall the advertisement and **two** did not. Finally, **one** of the eleven participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **nine** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 28) is provided in Table 21.

Table 21. Information about how participants interacted with the advertisement

Visits to the page where the advertisement was:	29
The number of participants who noticed the advertisement:	11
The number of participants who recalled the advertisement:	8

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

The number of participants who completely ignored the advertisement:	9
The number of participants who noticed the advertisement but did not recall it:	2
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	7
The number of participants who gazed at the advertisement and stated that remember some information on it:	1
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	2
Clicks on the advertisement:	1

4.2.5 Analysis of the Emotional intelligence book advertisement



Figure 29. *Ad5 - The Emotional intelligence book Pro advertisement that was on the Gaming product category page*

Twenty-five participants visited the *Gaming* product category page of the online store. **Twelve** participants gazed at the advertisement based on their advertisement recordings. **Two** of them recall the advertisement but **six** did not. Finally, **four** of the twelve participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **seven** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 29) is provided in Table 22.

Table 22. *Information about how participants interacted with the advertisement*

Visits to the page where the advertisement was:	25
The number of participants who noticed the advertisement:	12
The number of participants who recalled the advertisement:	2

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

The number of participants who completely ignored the advertisement:	7
The number of participants who noticed the advertisement but did not recall it:	6
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	3
The number of participants who gazed at the advertisement and stated that remember some information on it:	4
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	3
Clicks on the advertisement:	0

4.2.6 Analysis of the Exercise bike advertisement

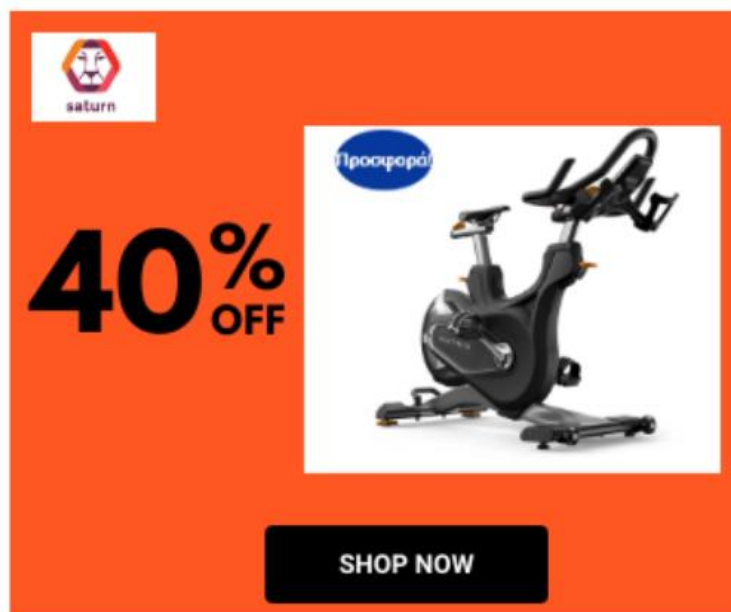


Figure 30. Ad6 - The Exercise bike advertisement that was on the Smartphones product category page

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Thirty-two participants visited the *Smartphones & Tablets product category page* of the online store. **Nine** participants gazed at the advertisement based on their advertisement recordings. **Three** of them recall the advertisement but **three** did not. Finally, **three** of the nine participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **twelve** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 30Figure 31) is provided in Table 23.

Table 23. Information about how participants interacted with the advertisement

Visits to the page where the advertisement was:	32
The number of participants who noticed the advertisement:	9
The number of participants who recalled the advertisement:	3
The number of participants who completely ignored the advertisement:	12
The number of participants who noticed the advertisement but did not recall it:	3
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	6
The number of participants who gazed at the advertisement and stated that remember some information on it:	3
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	5
Clicks on the advertisement:	0

4.2.7 Analysis of the Samsung QLED 55" advertisement



Figure 31. Ad7 - The Samsung QLED 55" advertisement that was on the Wearables & drones product category pag

Twenty-eight participants visited the *Wearables, drones & high-tech category page* of the online store. **Thirteen** participants gazed at the advertisement based on their advertisement recordings. **Two** of them recall the advertisement and **eight** did not. Finally, **three** of the thirteen participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **eleven** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 31) is provided in Table 24.

Table 24. Information about how participants interacted with the advertisement

Visits to the page where the advertisement was:	28
The number of participants who noticed the advertisement:	13
The number of participants who recalled the advertisement:	2
The number of participants who completely	11

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

ignored the advertisement:	
The number of participants who noticed the advertisement but did not recall it:	8
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	2
The number of participants who gazed at the advertisement and stated that remember some information on it:	11
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	2
Clicks on the advertisement:	0

4.2.8 An advertisement that shows an offer available in the store



Figure 32. Ad8 - The advertisement that was both on the Smartphones product category page and on Gaming product category page.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

The advertisement in Figure 32 was hosted on two product category pages, *Smartphones & Tablets as well as Gaming*. **Twelve** participants gazed at the advertisement based on their advertisement recordings. **Three** of them recall the advertisement and **six** did not. Finally, **three** of the twelve participants who noticed the advertisement could remember seeing it but they did not remember the product shown or stated that they only remember the product shown in the advertisement but could not remember details of what it was like. Moreover, **ten** participants did not gaze at the advertisement and stated that they did not remember it (completely ignored the advertisement). All information about how the participants interacted with the advertisement (Figure 32) is provided in Table 25.

Table 25. Information about how participants interacted with the advertisement

The number of participants who noticed the advertisement:	12
The number of participants who recalled the advertisement:	3
The number of participants who completely ignored the advertisement:	10
The number of participants who noticed the advertisement but did not recall it:	6
The number of participants who did not gaze at the advertisement but stated that they remember some information from the advertisement:	2
The number of participants who gazed at the advertisement and stated that remember some information on it:	3
The number of participants who did not gaze at the advertisement and stated that remember the advertisement:	3
Clicks on the advertisement:	0

Chapter 5: Results

5.1 Personality dimensions of the 43 participants

The five dimensions of the Big-Five personality trait model are Extraversion (**E**), Agreeableness (**A**), Conscientiousness (**C**), Neuroticism (**N**), and Openness to Experience (**O**). After participants' answers to the Big-Five questionnaire, a score for each dimension was calculated which varied from 0 to 100. The Descriptive Statistics of the Big-Five dimensions of personality for the forty-three participants of the experiment are shown in Table 26.

Table 26. Descriptive Statistics - Personality dimensions of the 43 participants

	N	Minimum	Maximum	Mean	Std. Deviation
E	43	25.0	85.0	60.930	15.0101
A	43	35.0	100.0	74.302	14.4371
C	43	22.5	97.5	64.767	17.1288
N	43	7.5	70.0	36.919	16.4646
O	43	30.0	70.0	50.988	9.9274
Valid N (listwise)	43				

5.2 RQ1

"Is the Banner blindness phenomenon confirmed in this study?"

To investigate the occurrence or not of the banner blindness phenomenon each advertisement was analyzed regarding the participants' interactions. Overall, forty-three participants took part in this study. During the experiment, they were exposed to a variety of clickable banner advertisements that were hosted on different pages of the online store. Based on the eye-tracking recordings we counted how many participants view each advertisement. The exposure to each advertisement depended on each participant as they were left free to interact in the online shop and make their own decisions without any restrictions or guidance. So, there were participants who did not visit all the product category pages and participants who visited some product category pages more than one time. In this analysis, it was considered that browsing on a page is continuous despite repeated visits by participants. So, in Table 27 in the

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

field “*number of participants who visited the Page where the ad was*”, the participants' visits counted once, regardless of whether there is more than one visit to the page.

For this analysis presented in Table 27, it is considered, also, that a participant had noticed the advertisement if they have gazed at the advertisement for at least two consecutive fixations and total fixation duration (how long participants spend looking at a particular advertisement) greater or equal to 500 ms. Moreover, it is assumed that advertisement recall occurs when the recipients of an advertisement remember and recall from their memory the advertising message. That means that the participants declared in the third questionnaire that they remember the advertisement. After carefully reviewing the eye-tracking recordings, it was examined whether a participant had seen an advertisement or not. In the third questionnaire, they were asked to decide the extent to which the advertisement can be recalled.

The following categories emerged to correlate advertisement observation and recall:

- True Positive (TP): Participants looked at the advertisement and recalled it as well.
- True Negative (TN): Participants looked at the advertisement but did not recall it.
- False Positive (FP): Participants did not look at the advertisement, but they declared in the third questionnaire that they remember the advertisement.
- False Negative (FN): Participants did not look at the advertisement and did not recall the advertisement.

When a participant was unable to fully recall an advertisement stating that “*I remember seeing the advertisement, but I did not remember the product shown*” or stated “*I only remember the product shown in the advertisement but could not remember details of what it was like*”, it is considered not to belong to the TP or TN category. TP means that the participants saw the advertisement and in the third questionnaire they said that they remember it and TN means that they have seen the advertisement but do not remember any information about it. Insights related to the

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

factors that contribute to the seen of an advertisement were examined through the interview process.

Table 27. Overall data about how participants interact with the advertisements

	The number of participants who visited the Page where the ad was	Number of participants who looked at the Ad	TP	TN	FP	FN
Ad1	43	22	12	6	1	6
Ad2	27	14	7	5	1	7
Ad3	31	11	4	4	0	13
Ad4	29	11	8	2	2	9
Ad5	25	12	2	6	3	7
Ad6	32	9	3	3	5	12
Ad7	28	13	2	8	2	11
Total	215	92	38	34	14	65

The FN showing the number of participants who completely ignored an advertisement is high enough for Ad3, Ad4, Ad, and Ad7. The TN also indicates an occurrence in which participants could not recall the advertisement. This means that the participants have looked at the advertisement based on their eye-tracking recordings but they did not recall it. Moreover, low rates on TP provide an insight that few participants noticed and recalled the advertisements.

In total, there were 215 advertising exposures. In a high rate of these exposures, advertisements were not noticed and were not recalled. Moreover, in order to confirm the banner blindness phenomena findings from the semi-structured interview and the eye-tracking recordings were taken into account. The interview was conducted with each participant and its primary objective was to better understand the participants' experience related to advertisements in the online store. **The interview revealed that**

twenty-one participants completely ignored the advertisements. These twenty-one participants during the interview asked questions like “Was the experiment’s purpose to notice the advertisements?”, “Did I do something wrong because I did not notice any advertisement?”, etc. This was confirmed by the eye-tracking recordings, as the participants who stated in the interview that they did not notice the existence of ads in the online store were those who did not look at the ads at all or had fewer gaze points in the ads.

So, taking into consideration the high rate of FN, the rate of TN, and the findings from the semi-structured interview the banner blindness phenomenon was confirmed since participants in most cases failed to recall advertisements even in cases that they did gaze at these.

Advertisement 8 was included in two product categories, *Smartphones & Tablets as well as Gaming*. For this reason, it is excluded from the overall analysis and the results are reported in Table 28 separately.

Table 28. Ad8 - Table with the overall data of how participants interact with the advertisement

	Gaming	Smartphones & Tablets	Overall data for this advertisement				
	Number of participants who visited the Page that hosted the Ad		Number of participants who looked at the Ad	TP	TN	FP	FN
Ad8	25	32	12	3	6	3	10

5.3 RQ2

“Are there any differences in participants’ Big-Five characteristics scores related to whether they noticed the advertisement on the home page?”

To investigate the RQ2 about correlations between participants’ Big-Five personality traits and the observation of the advertisement on the homepage, an independent t-test was conducted since in terms of the Shapiro-Wilk test, we can

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

assume that the data are approximately normally distributed for each group. This study did not show that the groups means were statistically significant (Table 29).

Table 29. Correlations between Big-Five scores and the observation of the advertisement on the homepage

				95% Confidence Interval of the Difference	
		t	Sig. (2-tailed)	Lower	Upper
E	Equal variances assumed	1.524	.135	-2.5374	18.1477
	Equal variances not assumed	1.581	.134	-2.6743	18.2846
A	Equal variances assumed	.138	.891	-9.4453	10.8326
	Equal variances not assumed	.157	.877	-8.5514	9.9387
C	Equal variances assumed	1.367	.179	-3.9763	20.6315
	Equal variances not assumed	1.243	.236	-6.1417	22.7968
N	Equal variances assumed	-.456	.651	-14.4513	9.1252
	Equal variances not assumed	-.546	.591	-12.8172	7.4912
O	Equal variances assumed	-.269	.789	-8.1030	6.1982
	Equal variances not assumed	-.230	.822	-9.9657	8.0609

5.4 RQ3

“Are there any differences in participants’ Big-Five characteristics scores of the participants related to whether they recall the advertisement on the home page?”

To investigate the RQ3 about correlations between participants’ Big-Five personality traits and the recall of the advertisement on the homepage, an independent t-test was conducted since in terms of the Shapiro-Wilk test, we can assume that the data are approximately normally distributed for each group. This study did not show that the groups means were statistically significant (Table 30).

Table 30. Correlations between participants’ Big-Five scores and the recall of the advertisement on the homepage

		t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
				Lower	Upper
E	Equal variances assumed	.087	.931	-9.3597	10.1976
	Equal variances not assumed	.084	.934	-9.9032	10.7411

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

A	Equal variances assumed	-.020	.984	-9.4201	9.2370
	Equal variances not assumed	-.020	.984	-9.4284	9.2453
C	Equal variances assumed	.473	.639	-8.8371	14.2458
	Equal variances not assumed	.543	.591	-7.4476	12.8563
N	Equal variances assumed	-.322	.749	-12.5896	9.1250
	Equal variances not assumed	-.295	.771	-14.0217	10.5571
O	Equal variances assumed	-.265	.792	-7.4408	5.7147
	Equal variances not assumed	-.293	.772	-6.8897	5.1636

5.5 RQ4

“Are there correlations between participants’ Big-Five characteristics scores and the percentage of the advertisements that were noticed?”

A Kendall’s tau-b correlation was used to test whether there is an association between two variables. Kendall’s tau-b correlation is considered a nonparametric alternative to the Pearson’s product-moment correlation when the data has failed one or more of the assumptions of this test.

So, the test was run to determine the relationship between participants’ **Extraversion** (E) scores and the percentage of the ads that were seen. The correlation between the two variables, with 43 participants, is $r_s = -0.178$ (Table 31). From our ‘two-tailed’ prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.110$). This suggests that people with similar Extraversion scores do not necessarily share a similar percentage of ads that were seen.

Table 31. Relationship between Extraversion and the Percentage of the advertisements that were noticed

		Percentage of ads seen	E
Kendall's tau_b	Percentage of ads seen	Correlation Coefficient	1.000
		Sig. (2-tailed)	.110
		N	43
E		Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	43

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

N	43
---	----

A Kendall's tau-b correlation was run to determine the relationship between participants' **Agreeableness** (A) scores and the percentage of the ads that were seen. The correlation between the two variables, with 43 participants, is $r_s = -0.062$ (Table 32). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.576$). This suggests that people with similar Agreeableness scores do not necessarily share a similar percentage of ads that were seen.

Table 32. Relationship between Agreeableness and the Percentage of the ads that were seen

			Percentage of ads seen	A
Kendall's tau_b	Percentage of ads seen	Correlation Coefficient	1.000	-.062
		Sig. (2-tailed)	.	.576
		N	43	43
	A	Correlation Coefficient		1.000
		Sig. (2-tailed)		.
		N		43

A Kendall's tau-b correlation was run to determine the relationship between participants' **Consciousness** (C) scores and the percentage of the ads that were seen. The correlation between the two variables, with 43 participants, is $r_s = -0.078$ (Table 33). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.480$). This suggests that people with similar Consciousness scores do not necessarily share a similar percentage of ads that were seen.

Table 33. Relationship between Consciousness and the Percentage of the ads that were seen

			Percentage of ads seen	C
Kendall's tau_b	Percentage of ads seen	Correlation Coefficient	1.000	-.078
		Sig. (2-tailed)	.	.480
		N	43	43

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

C	Correlation Coefficient		1.000
	Sig. (2-tailed)		.
	N		43

A Kendall's tau-b correlation was run to determine the relationship between participants' **Neuroticism** (N) scores and the percentage of the ads that were seen. The correlation between the two variables, with 43 participants, is $r_s=0.11$ (Table 34). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.924$). This suggests that people with similar Neuroticism scores do not necessarily share a similar percentage of ads that were seen.

Table 34. Relationship between Neuroticism and the Percentage of the ads that were seen

		Percentage of ads seen	N
Kendall's tau_b	Percentage of ads seen	Correlation Coefficient	1.000
		Sig. (2-tailed)	.011
		N	.924
N		43	43
		Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	43

A Kendall's tau-b correlation was run to determine the relationship between participants' **Openness to Experience** (O) scores and the percentage of the ads that were seen. The correlation between the two variables, with 43 participants, is $r_s=0.12$ (Table 35). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.41$). This suggests that people with similar Openness to Experience scores do not necessarily share a similar percentage of ads that were seen.

Table 35. Relationship between Openness to Experience and Percentage of the ads that were seen

Percentage of ads seen	O
------------------------	---

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Kendall's tau_b	Percentage of ads seen	Correlation Coefficient	1.000	.093
		Sig. (2-tailed)	.	.409
		N	43	43
	O	Correlation Coefficient		1.000
		Sig. (2-tailed)		.
		N		43

5.6 RQ5

“Are there correlations between participants’ Big-Five personality traits and the percentage of the advertisements that were recalled?”

A Kendall’s tau-b correlation was run to determine the relationship between participants’ Extraversion (E) scores and the percentage of the ads that were seen. The correlation between the two variables, with 43 participants, is $r_s = -0.091$ (Table 36). From our ‘two-tailed’ prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.436$). This suggests that people with similar Extraversion scores do not necessarily share a similar percentage of ads seen.

Table 36. Relationship between Extraversion and Percentage of recall

		E	Percentage of recall
Kendall's tau_b		Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	43
	Percentage of recall	Correlation Coefficient	
		Sig. (2-tailed)	.
		N	43

A Kendall’s tau-b correlation was run to determine the relationship between **Agreeableness** (A) and the percentage of recall scores. The correlation between the two variables, with 43 participants, is $r_s = -0.156$ (Table 37). From our ‘two-tailed’ prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.178$). This suggests that people with similar **Agreeableness** scores do not necessarily share a similar percentage of recall.

Table 37. Relationship between Agreeableness and Percentage of recall

			Percentage of recall	A
Kendall's tau_b	Percentage of recall	Correlation Coefficient	1.000	-.156
		Sig. (2-tailed)	.	.178
		N	43	43
	A	Correlation Coefficient		1.000
		Sig. (2-tailed)		.
		N		43

A Kendall's tau-b correlation was run to determine the relationship between participants' **Conscientiousness** (C) and the percentage of recall scores. The correlation between the two variables, with 43 participants, is $r_s = -0.011$ (Table 38). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.922$). This suggests that people with similar Conscientiousness scores do not necessarily share a similar percentage of recall.

Table 38. Relationship between Conscientiousness and Percentage of recall

			Percentage of recall	C
Kendall's tau_b	Percentage of recall	Correlation Coefficient	1.000	-.011
		Sig. (2-tailed)	.	.922
		N	43	43
	C	Correlation Coefficient		1.000
		Sig. (2-tailed)		.
		N		43

A Kendall's tau-b correlation was run to determine the relationship between participants' **Neuroticism** (N) and the percentage of recall scores. The correlation between the two variables, with 43 participants, is $r_s = 0.071$ (Table 39). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.540$). This suggests that people with similar Neuroticism scores do not necessarily share a similar percentage of recall.

Table 39. Relationship between Neuroticism and Percentage of recall

			Percentage of recall	N
Kendall's tau_b	Percentage of recall	Correlation Coefficient	1.000	.071
		Sig. (2-tailed)	.	.540
		N	43	43
	N	Correlation Coefficient		1.000
		Sig. (2-tailed)		.
		N		43

A Kendall's tau-b correlation was run to determine the relationship between participants' **Openness to Experience** (O) and the percentage of recall scores. The correlation between the two variables, with 43 participants, is $r_s=0.090$ (Table 40). From our 'two-tailed' prediction of the relationship, it would be necessary to accept the null hypothesis that no association exists ($p = 0.442$). This suggests that people with similar Openness to Experience scores do not necessarily share a similar percentage of recall.

Table 40. Relationship between Openness to Experience and Percentage of recall

			Percentage of recall	O
Kendall's tau_b	Percentage of recall	Correlation Coefficient	1.000	.090
		Sig. (2-tailed)	.	.442
		N	43	43
	O	Correlation Coefficient		1.000
		Sig. (2-tailed)		.
		N		43

5.7 RQ6

"Are there correlations between participants' Big-Five personality traits and the percentage of the advertisements that were not seen but declared that they remember it?"

A Kendall's tau-b correlation was run to determine the relationship between Big-Five personality traits and the percentage of the ads that were not seen but declared

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

that they remember it. The test suggests that people with the same scores in Big-Five personality traits (in each dimension separately) do not necessarily share a similar percentage of the ads that were not seen but declared that they remember it (Table 41).

Table 41. Correlations between participants' Big-Five personality traits and the percentage of the ads that were not seen but declared that they remember it

		How many ads did they not see but said they remember them	
Kendall's tau_b	E	Correlation Coefficient	.078
		Sig. (2-tailed)	.516
		N	43
	A	Correlation Coefficient	-.015
		Sig. (2-tailed)	.902
		N	43
	C	Correlation Coefficient	.142
		Sig. (2-tailed)	.231
		N	43
	N	Correlation Coefficient	.063
		Sig. (2-tailed)	.599
		N	43
	O	Correlation Coefficient	-.065
		Sig. (2-tailed)	.590
		N	43

5.8 RQ7

“Are there any differences in participants' Big-Five characteristics scores of the participants related to whether they are goal-oriented?”

Overall, thirty-two participants were goal-oriented. Only, eleven participants were bought products that were no match to their initial plan. However, most of them stated in the interview that they wanted to spend the entire amount of the money that was hypothetically given.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

To investigate the RQ7 about correlations between the participants' Big-Five characteristics scores of the participants related to whether they are goal-oriented, an independent t-test was conducted since in terms of the Shapiro-Wilk test, we can assume that the data are approximately normally distributed for each group. This study did not show that the groups means were statistically significant (Table 42).

Table 42. Correlations between participants' Big-Five characteristics scores of the participants related to whether they are goal-oriented

		t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
				Lower	Upper
E	Equal variances assumed	-.697	.490	-13.7639	6.7031
	Equal variances not assumed	-.718	.482	-13.8494	6.7886
A	Equal variances assumed	-.381	.705	-11.6497	7.9542
	Equal variances not assumed	-.324	.751	-14.1112	10.4157
C	Equal variances assumed	-.043	.966	-12.4416	11.9211
	Equal variances not assumed	-.042	.967	-13.5166	12.9961
N	Equal variances assumed	-1.464	.151	-19.2395	3.0708
	Equal variances not assumed	-1.342	.199	-20.9130	4.7443
O	Equal variances assumed	.519	.607	-5.1320	8.6820
	Equal variances not assumed	.527	.604	-5.3008	8.8508

5.9 RQ8

“Are there any correlations between participants' Big-Five personality trait scores and the banner blindness phenomena?”

In terms of the Shapiro-Wilk test, we can assume that the data are approximately normally distributed.

The null hypothesis (H_0) states that there is no significant difference between the two groups (The first group consists of the participants in which the phenomena Banner Blindness was observed). There was not significant effect of banner blindness phenomena (Table 43).

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Table 43. Correlations between participants' Big-Five personality trait scores and the "banner blindness" phenomena

		t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
				Lower	Upper
E	Equal variances assumed	-2.276	.028	-18.0475	-1.0782
	Equal variances not assumed	-2.282	.028	-18.0290	-1.0967
A	Equal variances assumed	-.789	.434	-11.8572	5.1929
	Equal variances not assumed	-.794	.432	-11.8076	5.1432
C	Equal variances assumed	-.539	.593	-13.4526	7.7844
	Equal variances not assumed	-.549	.586	-13.2693	7.6010
N	Equal variances assumed	1.068	.292	-4.6503	15.0964
	Equal variances not assumed	1.073	.290	-4.6121	15.0582
O	Equal variances assumed	.852	.399	-3.4738	8.5438
	Equal variances not assumed	.856	.397	-3.4432	8.5132

5.10 RQ9

"Are there any correlations in participants' Big-Five characteristics scores related to their attitude towards the advertising?"

After participants' answers to the Big-Five questionnaire, a score for each dimension Extraversion (E), Agreeableness (A), Conscientiousness (C), Neuroticism (N), and Openness to Experience (O) was calculated which varied from 0 to 100. The participants also were asked to rate from 1 to 5 in a Likert scale whether they find that advertising is annoying.

A Kendall's tau-b correlation was run to determine any correlation between participants' Big-Five characteristics scores related to their attitude towards the advertising.

Table 44. Correlations between participants' Big-Five characteristics scores related to their attitude towards the advertising.

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

		Online ads are annoying.	
Kendall's tau_b	E	Correlation Coefficient	.237*
		Sig. (2-tailed)	.048
		N	43
	A	Correlation Coefficient	.086
		Sig. (2-tailed)	.470
		N	43
	C	Correlation Coefficient	.049
		Sig. (2-tailed)	.678
		N	43
	N	Correlation Coefficient	-.024
		Sig. (2-tailed)	.844
		N	43
	O	Correlation Coefficient	-.270*
		Sig. (2-tailed)	.025
		N	43
	Online ads are annoying.	Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	43

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the results of the study (Table 44), participants who had the lowest scores in the **Openness to Experience** dimension were more likely to have scores ranked higher in the response to advertising annoyance ($\tau_b = -0.27$, $p < 0.05$).

There was a positive correlation between participants' **Extraversion** scores of the participants and their attitude towards the advertising, which was statistically significant ($\tau_b = -0.23$, $p < 0.05$).

5.11 RQ10

"Were the participants goal-oriented users?"

Overall, forty-three participants took part in this study. Thirty-two were goal-oriented users in their browsing as they bought products from the product categories matched in their initial declaration in the second questionnaire. Particularly, the participants were asked if they are interested in buying any product from the available

product categories in the online store. Eleven participants were not considered as goal-oriented online users as they bought products that were not matched to their declaration in the second questionnaire. However, nine of them mentioned in the interview that they wanted to spend the full amount of money given hypothetically and for this reason, they bought products that were not in their initial plan.

Thus, the high rate of the goal-oriented participants confirms the statement that internet users are high goal-oriented.

5.12 Interview Findings

At the end of the experiment, each participant was asked a few questions about their experience in the online store and some more general questions about advertising. The interview helped to discover deeper insights into the banner blindness phenomenon and the participants' attitude toward advertising. Twenty-one participants completely ignored the advertisements. During the interview, these twenty-one participants asked questions like "Was the experiment's purpose to notice the advertisements?", "Did I do something wrong because I did not notice any advertisement?".

Moreover, most participants commented that to buy products for advertisements, the product has to be something very close to their interests and their needs. The participants who noticed the existence of the advertisements were asked about the reason looked at them. The answers varied. Some mention that the depicted products matched their interests. Others said that the brand was known and catch their attention. Most of the participants commented that the colors played a major role in looking at the advertisement. And finally, the offers depicted in the advertisements were an important factor.

The majority of participants declared that they are completely annoyed by the advertisements during browsing in general. Some said that if they had the opportunity to never see another ad in any medium, they would choose it.

Regarding the participants who did not fully remember the advertisements. The semi-structured interview provided insights into what exactly the participants

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

remembered from the advertisement and the reasons why they remembered that information. Colors were an important factor that was contributed to the seen of an advertisement, as well as the offers were depicted caught participants' attention. In particular, several participants commented that "I remember seeing colors on the right of the screen" or they stated, "I always look at the offers".

Finally, participants were asked if they bought something that was not in their initial purchase plan. Eye-tracking data used for the categorization of the participants as goal-oriented and not. Overall, eleven participants were not considered as goal-oriented online users as they bought products that were not matched to their declaration in the second questionnaire. However, nine of them mentioned that they wanted to spend the full amount of money given hypothetically and for this reason, they bought products that were not in their original plan.

Chapter 6: Conclusion, Limitations & Future Work

6.1 Conclusion

In the context of this master's thesis, a fully functional, but not real, WordPress online shop was developed which included six product categories and a variety of clickable banner advertisements. The advertisements were created using an online banner advertisement creator and the colors used were selected after carefully reviewing the literature about efficient colors in advertising.

In total, forty-three participants (17 were women) took part in this study. The scenario was that the participants had hypothetically the amount of 1,000 euros to buy what they want from the online store. The participants were left free to interact with the store and their navigation through it depended on them. So, there were participants who did not visit all the product category pages and participants who visited some product category pages more than one time.

To provide a better understanding of the factors that are related to the effectiveness of advertising, eye-tracking data, questionnaires and a semi-structured interview were used and analyzed. Regarding the questionnaires, this study included three questionnaires. The first was sent to the participants before their arrival in the laboratory and included fifty questions related to their personality. Its primary objective was the calculation of a score that varied from 0 to 100 for each of the five dimensions of the Big-Five personality trait model. The five dimensions are **Extraversion (E)**, **Agreeableness (A)**, **Conscientiousness (C)**, **Neuroticism (N)**, and **Openness to Experience (O)**.

Upon the participants' arrival in the laboratory, they were given the second questionnaire that included several demographic and marketing questions. It, also, aimed to examine whether the participants were interested in buying any product for the available product categories in the online store. At this point, the initial purchase plan for each participant was determined in order to be compared with the products that they had finally bought. This comparison was made to examine whether the online users that participated in the study were goal-oriented users. Eye-tracking data used for the categorization of the participants as goal-oriented users and not. Overall,

thirty-two participants were considered as goal-oriented online users as they bought products that were matched to their declaration in the second questionnaire.

After the completion of the second questionnaire, participants started browsing the online shop, and they were free to interact with it and buy whatever they wanted with the hypothetically available amount of 1,000 euros. When participants completed their purchases, they were given a third and final questionnaire. This questionnaire included questions about the extent to which advertisements could be recalled. Finally, the last step of this experiment was the semi-structured interview that was conducted after the completion of the third questionnaire. The interviews' primary objective was a better understanding of the participants' experience with advertisements in the online store.

After carefully reviewing the eye-tracking recordings, it was examined whether a participant had seen an advertisement or not. The eye-tracking data revealed how many participants noticed each advertisement. It was considered that: 1. A participant had noticed the advertisement if they have gazed at it for at least two consecutive fixations and total fixation duration greater or equal to 500 ms, 2. the browsing on a page is continuous despite repeated visits by participants, and 3. advertisement recall occurs when the recipients of an advertisement remember and recall from their memory the advertising message. That means that the participants declared in the third questionnaire that they remembered the advertisement.

However, there have been cases in which advertisements have been noticed based on the eye-tracking data, but participants have stated that they remember some information about them. When a participant was unable to fully recall an advertisement (stating in the third questionnaire that "I remember seeing the advertisement, but I did not remember the product shown" or stated "I only remember the product shown in the advertisement but could not remember details of what it was like"), it was considered that they did not recall the advertisement but also that they did not ignore it.

The following categories emerged to correlate advertisement observation and recall: True Positive (**TP**): Participants looked at the advertisement and recalled it as

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

well. True Negative (**TN**): Participants looked at the advertisement but did not recall it. False Positive (**FP**): Participants did not look at the advertisement, but they declared in the third questionnaire that they remember the advertisement. False Negative (**FN**): Participants did not look at the advertisement and did not recall it. When a participant could not fully recall an advertisement remembering only some information from the advertisement was not included in any of these categories.

The semi-structured interview provided insights on what exactly the participants remembered from the advertisement and why they remembered this information. **Colors** were an important factor that was contributed to the seen of an advertisement, as well as the “**offers**” caught participants’ attention. In particular, several participants commented that “*I remember seeing colors on the right of the screen*”. Also, they stated “*I always look at the offers*”. Regarding the overall analysis of the interview, most of the participants declared that it is more possible to remember the advertisements when the depicted **product matched their interests**. In that situation, it is also possible for the product to be bought. Also, the majority of participants are completely annoyed by the advertisements during browsing. Some participants said that if they had the opportunity to never see another ad in any medium, they would choose it.

During the interview process, participants were asked if they finally bought any product that was not in their initial purchase plan. In all, eleven participants did so. However, nine of them stated that they wanted to spend the full amount of money hypothetically given and for this reason, they bought products that were not in their original plan.

Insights from the interview revealed that **twenty-one participants completely ignored the advertisements**. These twenty-one participants asked questions like “*Was experiment’s purpose to notice the advertisements?*”, “*Did I do something wrong because I did not notice any advertisement?*”. The number of participants who ignored the advertisements, without having any idea of their existence in the online store they just visited and bought products for it, confirms the phenomenon of banner blindness.

The banner blindness was confirmed also based on the eye-tracking data as a high rate of participants focused entirely on the content of the page ignoring completely the advertisements.

The research focused also on finding correlations between the Big-Five characteristics scores and several other variables that arose from analysis and are related to the participants' interactions with the advertisements in the online store. In particular, the study aimed to find correlation between the participants' Big-Five characteristics scores and the percentage of the advertisements that were noticed or the percentage of the advertisements that were recalled.

Furthermore, the advertisement hosted on the homepage was analyzed separately, as it was the only advertisement that each participant was exposed to. The homepage was the first page that the participants interact with because it was the default loading page shown. Two research question that were examined are whether there are differences in participants' Big-Five characteristics scores related to whether they noticed the advertisement on the home page and whether there are differences in participants' Big-Five characteristics scores related to whether they recall the advertisement on the home page.

This master thesis aimed to shed light on the question of whether there are differences in the participants' Big-Five characteristics scores related to whether they are goal-oriented users. Finally, correlations between participants' Big-Five characteristics regarding their attitude toward advertising were examined.

The findings of this study **confirmed the banner blindness effect** and the statement that **online users are goal-oriented users**. It, also, revealed that participants with the **lowest scores in the Openness to Experience** dimension were more likely to **have scores ranked higher in the response to advertising annoyance**. Also, there was a **positive correlation** between the **Extraversion** scores of the participants and their **attitude towards the advertising**, which was statistically significant.

6.2 Limitations & Future Work

An obvious limitation of this work is the number of participants. This study investigated whether there were correlations between participants' personality traits and several measurements that emerged during the study. Due to the small sample, there were a few participants per dimension of the Big-Five and it is possible that it did not show correlations in many RQs with the Big-5. A future goal is to increase the sample size by involving more participants and further investigating the correlations with the Big-Five dimensions. This study was conducted during the covid-19 lockdown, so it was not an easy task to search for participants as no courses were held at the University of Patras at that time.

References

- [1] *Brajnik, G., & Gabrielli, S. (2010). A review of online advertising effects on the user experience. International Journal of Human-Computer Interaction, 26(10), 971-997.*
- [2] *Deshwal, P. (2016). Online advertising and its impact on consumer behavior. International Journal of Applied Research, 2(2), 200-204.*
- [3] *Lohtia, R., Donthu, N., & Hershberger, E. K. (2003). The impact of content and design elements on banner advertising click-through rates. Journal of advertising Research, 43(4), 410-418.*
- [4] *McMillan Sally, J. (2004). Internet Advertising: One Face or Many?.*
- [5] *Hervet, G., Guérard, K., Tremblay, S., & Chtourou, M. S. (2011). Is banner blindness genuine? Eye tracking internet text advertising. Applied cognitive psychology, 25(5), 708-716.*
- [6] *Maziriri, E. T. (2020). The big five personality traits influencing habitual Facebook usage, life satisfaction and psychological well-being of Generation Y students. TD: The Journal for Transdisciplinary Research in Southern Africa, 16(1), 1-13.*
- [7] *Deuze, M. (2016). Living in Media and the Future of Advertising. Journal of Advertising, 45(3), 326-333, vol. 45, no. 3.*
- [8] *Mendelová, D. (2018). The birth of American advertising. Communication today, 9(2), 4-19.*
- [9] *Presbrey, F. (1929). From symbols in Babylon to painted walls in Rome. History and Development of Advertising, 1-13.*
- [10] *Starcevic, S. (2015). The origin and historical development of branding and*

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

advertising in the old civilizations of Africa, Asia and Europe. Marketing, 46(3), 179-196, vol. 46, no. 3.

- [11] *Starcevic, S. (2015). The origin and historical development of branding and advertising in the old civilizations of Africa, Asia and Europe. Marketing, 46(3), 179-196, vol. 12.*
- [12] *Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. Journal of marketing, 57(1), 1-22, vol. 57, no. 1.*
- [13] *Jenks, C. (Ed.). (2002). Visual culture. Routledge.*
- [14] *Jowett, G. S., & O'donnell, V. (2018). Propaganda & persuasion. Sage publications.*
- [15] *Starcevic, S. (2015). The origin and historical development of branding and advertising in the old civilizations of Africa, Asia and Europe. Marketing, 46(3), 179-196, vol. 12.*
- [16] *Goldenweiser, A. A. (1910). Totemism, an analytical study. The Journal of American Folklore, 23(88), 179-293, vol. 23.*
- [17] *Rozin, R. S. (2002). The branding iron: From cowboys to corporations. Journal of Brand Management, 10(1), 4-4, vol. 10.*
- [18] *Sandage, C. H., & Fryburger, V. (1989). Advertising Theory and Practice.*
- [19] *Davis, W. S. (2004). Readings in Ancient History: Rome and the West. The Minerva Group, Inc..*
- [20] *Ezejideaku, E., & Ugwu, E. (2010). The linguistics of newspaper advertising in Nigeria. Language in India, 10(3), 1-17, vol. 10.*
- [21] *Feng, S. (2009). Talking about Ancient Chinese Commercial Advertising Styles. Asian Social Science, 5, 12.*

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

- [22] Li, W. (2010). *Chinese writing and calligraphy*. University of Hawaii Press.
- [23] Cheng, H., & Chan, K. K. (Eds.). (2009). *Advertising and Chinese society: Impacts and issues*. Copenhagen Business School Press DK.
- [24] Hemingway, S. A., Picón, C. A., & De Puma, R. D. (2007). *Art of the Classical World in the Metropolitan Museum of Art: Greece, Cyprus, Etruria, Rome*. Metropolitan Museum of Art.
- [25] Kilmer, M. F., & Develin, R. (2001). *Sophilos' vase inscriptions and cultural literacy in archaic Athens*. *The Phoenix*, 9-43, vol. 55.
- [26] Taylor, P. M. (2013). *Munitions of the mind: A history of propaganda from the ancient world to the present era*. Manchester University Press.
- [27] in Elsner, J. (1996). *Inventing imperium: texts and the propaganda of monuments*. *Art and text in Roman culture*, 32.
- [28] Moore, K., & Reid, S. (2008). *The birth of brand: 4000 years of branding*. *Business History*, 50(4), 419-432.
- [29] Baldasty, G. J. (1992). *The commercialization of news in the nineteenth century*. Univ of Wisconsin Press.
- [30] Smelser, N. J., & Baltes, P. B. (Eds.). (2001). *International encyclopedia of the social & behavioral sciences (Vol. 11)*. Amsterdam: Elsevier, ভলি. 1.
- [31] Morris, E. (1992). *Advertising and the acquisition of contemporary art*. *Journal of the History of Collections*, 4(2), 195-200.
- [32] Campbell, T. C. (2006). *Wireless Writing in the Age of Marconi (Vol. 16)*. U of Minnesota Press.
- [33] Belrose, J. S. *FESSENDEN'S 1906 CHRISTMAS EVE BROADCAST*.
- [34] Warner, C. (2009). *Media selling: television, print, internet, radio*. John Wiley &

Sons.

- [35] Bourdieu, P. (2001). *Television. European review*, 9(3), 245-256, vol. 9, no. 3.
- [36] "Kuyucu, M. M. The Change of Global Advertising Market From Traditional to Digital World."
- [37] Sridhar, S., & Sriram, S. (2015). *Is online newspaper advertising cannibalizing print advertising?. Quantitative Marketing and Economics*, 13(4), 283-318.
- [38] Jhally, S. (2000). *Advertising as religion: The dialectic of technology and magic. Advertising & Society Review*, 1(1).
- [39] Lobschat, L., Osinga, E. C., & Reinartz, W. J. (2017). *What happens online stays online? Segment-specific online and offline effects of banner advertisements. Journal of Marketing Research*, 54(6), 901-913.
- [40] North, M., & Ficorilli, M. (2017). *Click me: an examination of the impact size, color, and design has on banner advertisements generating clicks. Journal of Financial Services Marketing*, 22(3), 99-108.
- [41] Krushali, S., Jojo, N., & Manivannan, A. S. (2018). *Cognitive marketing and purchase decision with reference to pop up and banner advertisements. The Journal of Social Sciences Research*, 4(12), 718-735., vol. 4, no. 12.
- [42] Müller, M. (2017). *'Brand-centred control': A study of internal branding and normative control. Organization Studies*, 38(7), 895-915, vol. 38, no. 7.
- [43] Smithson, E. (2015). *What Is Branding And Why Is It Important For Your Business. Retrieved from.*
- [44] Bala, M., & Verma, D. (2018). *A critical review of digital marketing. M. Bala, D. Verma (2018). A Critical Review of Digital Marketing. International Journal of Management, IT & Engineering*, 8(10), 321-339..
- [45] Lee, E. B., Lee, S. G., & Yang, C. G. (2017). *The influences of advertisement*

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

attitude and brand attitude on purchase intention of smartphone advertising. Industrial Management & Data Systems.

- [46] *Romaniuk, J., Sharp, B., Paech, S., & Driesener, C. (2004). Brand and advertising awareness: a replication and extension of a known empirical generalisation. Australasian marketing journal, 12(3), 70-80, vol. 12, no. 3.*
- [47] *Karlsson, N., Loewenstein, G., & Seppi, D. (2009). The ostrich effect: Selective attention to information. Journal of Risk and uncertainty, 38(2), 95-115.*
- [48] *Pernice, K. (2018). Banner blindness revisited: users dodge ads on mobile and desktop. Nielsen Norman Group.*
- [49] *Manickam, S. A. (2014). Do advertising tools create awareness, provide information, and enhance knowledge? An exploratory study. Journal of Promotion Management, 20(3), 291-310..*
- [50] *Mahnke, F. H. (1996). Color, environment, and human response: an interdisciplinary understanding of color and its use as a beneficial element in the design of the architectural environment. John Wiley & Sons..*
- [51] *Crowley, A. E. (1993). The two-dimensional impact of color on shopping. Marketing letters, 4(1), 59-69.*
- [52] *Kwon, E. S., King, K. W., Nyilasy, G., & Reid, L. N. (2019). Impact of media context on advertising memory: A meta-analysis of advertising effectiveness. Journal of Advertising Research, 59(1), 99-128..*
- [53] *G. Broussard, " How advertising frequency can work to build online advertising effectiveness. International Journal of Market Research, 42(4), 1-13.," 2000.*
- [54] *E. Martin and T. Farid, "The effectiveness of advertising: A meta-meta-analysis of advertising inputs and outcomes".Journal of Advertising, 45(4):519–531, 2016..*
- [55] *Martin, N., & Morich, K. (2011). Unconscious mental processes in consumer choice: Toward a new model of consumer behavior. Journal of Brand*

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Management, 18(7), 483-505.

- [56] Lee, J., & Hong, I. B. (2016). Predicting positive user responses to social media advertising: The roles of emotional appeal, informativeness, and creativity. *International Journal of Information Management, 36(3), 360-373.*
- [57] Li, S., Walters, G., Packer, J., & Scott, N. (2018). Using skin conductance and facial electromyography to measure emotional responses to tourism advertising. *Current Issues in Tourism, 21(15), 1761-1783.*
- [58] Souiden, N., Chtourou, S., & Korai, B. (2017). Consumer attitudes toward online advertising: The moderating role of personality. *Journal of promotion management, 23(2), 207-227.*
- [59] Barnett, L. A. (2013). What people want from their leisure. *Journal of Leisure Research, 42(2), 150–191.*
- [60] Hirsh, J. B., Kang, S. K., & Bodenhausen, G. V. (2012). Personalized persuasion: Tailoring persuasive appeals to recipients' personality traits. *Psychological science, 23(6), 578-581.*
- [61] Shumanov, M., Cooper, H., & Ewing, M. (2021). Using AI predicted personality to enhance advertising effectiveness. *European Journal of Marketing.*
- [62] Williams, B., Damstra, D., & Stern, H. (2015). *Professional WordPress: design and development. John Wiley & Sons.*
- [63] N. G. Vlug, "Do color and product congruence positively influence banner ads' efficacy? An eye-tracking study," 2020. [Online].
- [64] Novikova, I. A. (2013). *Big Five (the five-factor model and the five-factor theory). The Encyclopedia of Cross-Cultural Psychology/Ed. Kenneth D. Keith.—Hoboken, New Jersey: Wiley-Blackwell, 136-138.*
- [65] Barrick, M. R., & Mount, M. K. (1991). *The big five personality dimensions and job*

performance: a meta-analysis. Personnel psychology, 44(1), 1-26.

- [66] H. J. B., K. S. K. and G. V. Bodenhausen, "Personalized Persuasion: Tailoring Persuasive Appeals to Recipients' Personality Traits," *Psychol. Sci.*, vol. 23, no. 6, pp. 578–581, Jun. 2012, doi: 10.1177/0956797611436349..
- [67] Gow, A. J., Whiteman, M. C., Pattie, A., & Deary, I. J. (2005). Goldberg's 'IPIP' Big-Five factor markers: Internal consistency and concurrent validation in Scotland. *Personality and Individual Differences, 39(2), 317-329.*
- [68] Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. G. (2006). The international personality item pool and the future of public-domain personality measures. *Journal of Research in personality, 40(1), 84-96.*
- [69] Ehrhart, K. H., Roesch, S. C., Ehrhart, M. G., & Kilian, B. (2008). A test of the factor structure equivalence of the 50-item IPIP Five-factor model measure across gender and ethnic groups. *Journal of Personality Assessment, 90(5), 507-516.*
- [70] Hughes, D. J., De Olazabal, D. P., Kratsiotis, I. K., Twumasi, R., & Booth, T. (2020). An Examination of the Spanish Translation of the 50-item International Personality Item Pool Big-five Inventory in a Spanish Speaking Peruvian Sample., *The Spanish Journal of Psychology, 23.*
- [71] Rosbergen, E., Pieters, R., & Wedel, M. (1997). Visual attention to advertising: A segment-level analysis. *Journal of consumer research, 24(3), 305-314.*
- [72] Li, Q., Huang, Z. J., & Christianson, K. (2016). Visual attention toward tourism photographs with text: An eye-tracking study. *Tourism Management, 54, 243-258.*
- [73] Kong, S., Huang, Z., Scott, N., Zhang, Z. A., & Shen, Z. (2019). Web advertisement effectiveness evaluation: Attention and memory. *Journal of Vacation Marketing, 25(1), 130-146.*

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

- [74] Peker, S., Menekse Dalveren, G. G., & İnal, Y. (2021). *The Effects of the Content Elements of Online Banner Ads on Visual Attention: Evidence from An-Eye-Tracking Study. Future Internet*, 13(1), 18.
- [75] Wedel, M., & Pieters, R. (2017). *A review of eye-tracking research in marketing. Review of marketing research*, 123-147.
- [76] LaBerge, D. (2013). *Attentional processing. Harvard University Press*.
- [77] Davenport, T. H., & Beck, J. C. (2001). *The attention economy. Ubiquity*, 2001(May), 1-es.
- [78] Lee, J., & Ahn, J. H. (2012). *Attention to banner ads and their effectiveness: An eye-tracking approach. International Journal of Electronic Commerce*, 17(1), 119-137.
- [79] Rosbergen, E., Pieters, R., & Wedel, M. (1997). *Visual attention to advertising: A segment-level analysis. Journal of consumer research*, 24(3), 305-314.
- [80] Rayner, K., Miller, B., & Rotello, C. M. (2008). *Eye movements when looking at print advertisements: The goal of the viewer matters. Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, 22(5), , 697-707.
- [81] Burke, M., Hornof, A., Nilsen, E., & Gorman, N. (2005). *High-cost banner blindness: Ads increase perceived workload, hinder visual search, and are forgotten. ACM Transactions on Computer-Human Interaction (TOCHI)*, 12(4), 423-445.
- [82] Pieters, R., & Wedel, M. (2004). *Attention capture and transfer in advertising: Brand, pictorial, and text-size effects. Journal of marketing*, 68(2), 36-50.
- [83] Poole, A., & Ball, L. J. (2006). *Eye tracking in HCI and usability research. Encyclopedia of human computer interaction*, 211-219. doi: 10.4018. ch034.

Appendices

6.3 The consent form



ΠΑΡΟΧΗ ΣΥΝΑΙΝΕΣΗΣ ΓΙΑ ΣΥΜΜΕΤΟΧΗ ΣΕ ΠΕΙΡΑΜΑ

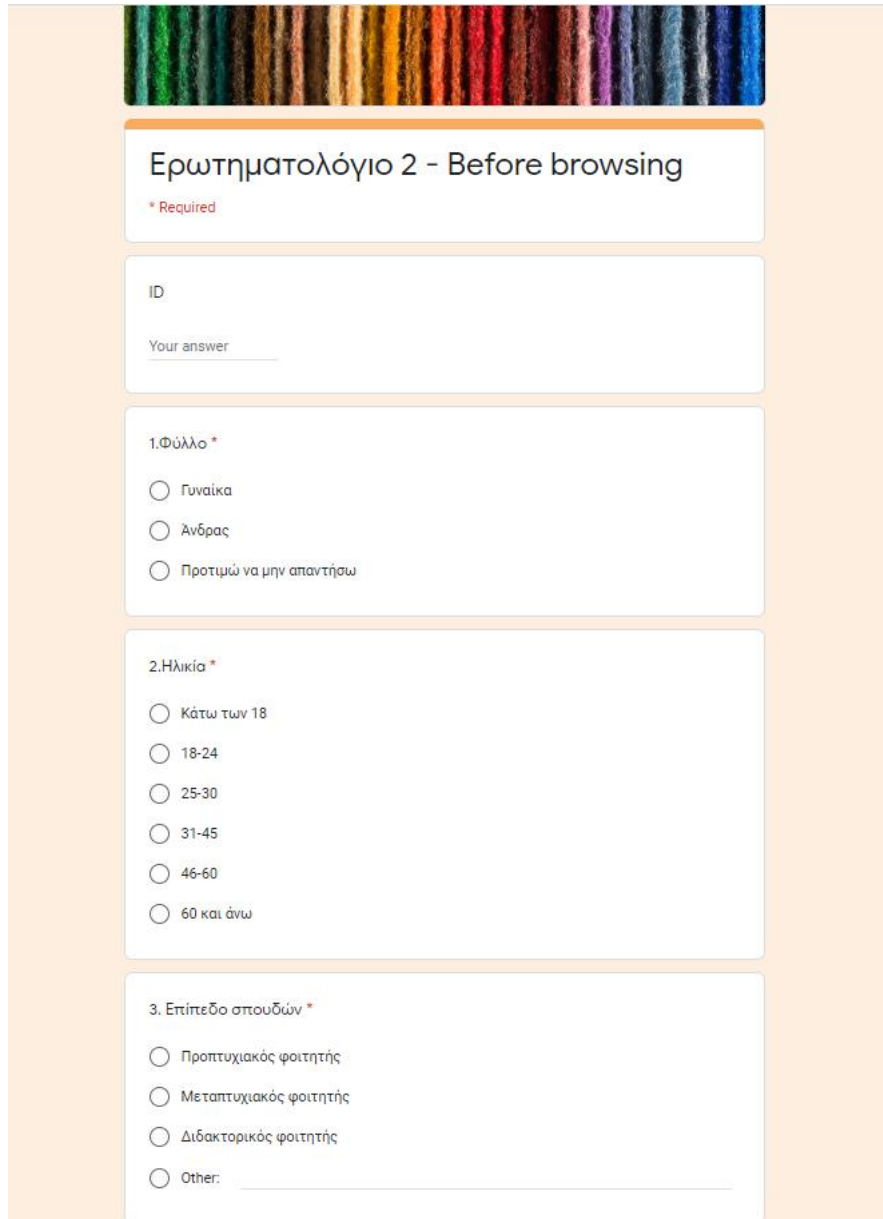
Με την παρούσα ο/η _____
δηλώνω πως επιτρέπω στο Πανεπιστήμιο Πατρών προσωπικά μου δεδομένα (μόνο το όνομα, ιδιότητα, και ημερομηνία συμμετοχής) να μπορούν να συσχετιστούν με το υλικό της έρευνας και για τις ανάγκες υλοποίησής της. Ενημερώνομαι ότι δεν θα υπάρξει καμία συσχέτιση των δεδομένων με το όνομα μου και ότι όλα τα δεδομένα θα γίνουν ανώνυμα αμέσως μετά την επεξεργασία τους.

Η συναίνεση παρέχεται σύμφωνα με το άρθρο 57 του Αστικού Κώδικα και του Γενικού Κανονισμού 2016/679 του Ευρωπαϊκού Κοινοβουλίου και Συμβουλίου για αόριστο χρόνο. Γίνεται μνεία ότι διατηρώ δικαίωμα ανάκλησης ή μερικής τροποποίησης του δικαιώματός και των προσωπικών δεδομένων που παρέχω.

___/___/___

Υπογραφή

6.4 The second questionnaire



Ερωτηματολόγιο 2 - Before browsing

* Required

ID

Your answer

1. Φύλλο *

☐ Γυναίκα

☐ Άνδρας

☐ Προτιμώ να μην απαντήσω

2. Ηλικία *

☐ Κάτω των 18

☐ 18-24

☐ 25-30

☐ 31-45

☐ 46-60

☐ 60 και άνω

3. Επίπεδο σπουδών *

☐ Προπτυχιακός φοιτητής

☐ Μεταπτυχιακός φοιτητής

☐ Διδακτορικός φοιτητής

☐ Other: _____

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

4. Με ενδιαφέρει να αγοράσω κάποιο προϊόν από την/τις ακόλουθες κατηγορίες προϊόντων:

ΤΗΛΕΟΡΑΣΕΙΣ & ΕΙΚΟΝΑ	ΤΗΛΕΦΩΝΙΑ & ΤΑΜΠΛΕΤ	ΒΙΒΛΙΑ	GAMING
WEARABLES, DRONES & HITECH	SPORTS & FITNESS		

- ☐ Τηλεοράσεις & εικόνα
- ☐ Τηλεφωνία & Τάμπλετ
- ☐ Βιβλία
- ☐ Gaming
- ☐ Wearables, drones & hitech
- ☐ sports & fitness

5.Πόσο χρόνο κατά προσέγγιση αφιερώνετε καθημερινά στο διαδίκτυο; *

- ☐ Πάντα συνδεδεμένος
- ☐ 11-15 ώρες
- ☐ 6-10 ώρες
- ☐ 3-5 ώρες
- ☐ 1-2 ώρες
- ☐ <1 ώρα

6.Πόσο συχνά αγοράζετε προϊόντα από το διαδίκτυο; *

- ☐ Καθημερινά
- ☐ 1 φορά την εβδομάδα
- ☐ 2 φορές την εβδομάδα
- ☐ 1 φορά το μήνα
- ☐ 1 φορά το 6μηνο
- ☐ 1 φορά το χρόνο
- ☐ Άλλο

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

7. Η διαφήμιση είναι σημαντική στον μέσο καταναλωτή; *

1 2 3 4 5

Διαφωνώ απολύτως ☐ ☐ ☐ ☐ ☐ Συμφωνώ απολύτως

8. Το περιεχόμενο της διαφήμισης στην οποία εκτίθεμαι θα ήθελα να είναι: *

☐ Αστεία

☐ Δημιουργική

☐ Πληροφοριακή

☐ Μοναδική

☐ Απλή

☐ Έξυπνη

☐ Συναισθηματική

☐ Μου είναι αδιάφορο το περιεχόμενο των διαφημίσεων

☐ Other: _____

9. Ποιες είναι οι πιο σημαντικές πληροφορίες σε μια διαφήμιση; *

☐ Τιμή προϊόντος

☐ Χαρακτηριστικά-Ιδιότητες προϊόντος

☐ Η χρήση-χρήσεις του προϊόντος

☐ Αδιάφορο

10. Οι διαφημίσεις με βοηθούν να έχω μια καλύτερη εικόνα για τις τιμές και τα προϊόντα που υπάρχουν στην αγορά. *

1 2 3 4 5

Διαφωνώ απολύτως ☐ ☐ ☐ ☐ ☐ Συμφωνώ απολύτως

11. Οι διαφημίσεις στο διαδίκτυο είναι ενοχλητικές. *

1 2 3 4 5

Διαφωνώ απολύτως ☐ ☐ ☐ ☐ ☐ Συμφωνώ απολύτως

Submit

6.5 The third questionnaire



Ερωτηματολόγιο 3 - Recall

Second

* Required

ID

Your answer

1. Οι διαφημίσεις στο κατάστημα που μόλις περιηγήθηκα με βοήθησαν στην επιλογή προϊόντος/προϊόντων. *

1 2 3 4 5

Διαφωνώ απολύτως ☐ ☐ ☐ ☐ ☐ Συμφωνώ απολύτως

2. Οι διαφημίσεις στο κατάστημα που μόλις περιηγήθηκα ήταν ενοχλητικές.

1 2 3 4 5

Διαφωνώ απολύτως ☐ ☐ ☐ ☐ ☐ Συμφωνώ απολύτως

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

3. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από τη διαφήμιση
- ☐ Άλλο

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

4. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

5. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο.



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

6. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

7. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

8. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

9. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Θυμάμαι μόνο το προϊόν που απεικονίζεται στη διαφήμιση αλλά όχι λεπτομέρειες για το πως ήταν η συγκεκριμένη διαφήμιση
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

Banner Advertisement Effectiveness using Big-5 Personality Traits, Advertisement Recall, and Visual Attention

Appendices

10. Κοιτάξτε την εικόνα που ακολουθεί και επιλέξτε την απάντηση που σας αντιπροσωπεύει περισσότερο. *



- ☐ Θυμάμαι την διαφήμιση
- ☐ Θυμάμαι ότι είδα την διαφήμιση αλλά δεν θυμόμουν το προϊόν που απεικονίζεται
- ☐ Δεν θυμάμαι τίποτα από την διαφήμιση
- ☐ Άλλο

11. Είμαι ικανοποιημένος/η από την αγοραστική εμπειρία στο ηλεκτρονικό κατάστημα.

- | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Διαφωνώ απολύτως | ☐ | ☐ | ☐ | ☐ | ☐ | Συμφωνώ απολύτως |

Submit