

# Research on Consumers' Brain Activations by Means of Electroencephalography Method

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## Abstract

Marketers are excited about two main reasons that are concerned with neuroelectrical brain imaging. The first reason is that they expect neuroimaging will offer a more efficient exchange between cost and benefit. This expectation is based on the assumption that consumers don't want to express their preferences explicitly or that it is not possible for them to do this when their preferences are asked; or that consumer's brain, which is related to real preferences, contains confidential information. Such information is used in theory to influence purchasing behavior. Thus, the cost of performing neuroimaging studies against improved product design and increased sales benefit is outweighed. As the second reason, marketers expect that they will be able to obtain an accurate marketing research method that can be applied even before an existing product. The purpose of this study is to determine the rational influence activation of consumers and to emphasize the deficiency of using traditional method of questionnaire based solely on declaration to understand consumers. Accordingly, volunteer subjects watched an advertisement film and their brain activities were tried to be measured while they were watching the advertisement. This measurement was performed with a 10 channel EEG device. During the research, the emotional responses of participants and their brain activities were measured and EEG patterns were obtained. The obtained data were interpreted by academicians and EEG experts.

**Keywords:** Electroencephalography (EEG), Neuromarketing, Consumer Behaviour

## **Introduction**

Understanding human behaviors in the sense of business management today is indispensable to perpetuate the existence of the businesses. It has long been thought that people have made these decisions within reason with a rational inference. The routine in this process arose as *think-perceive-buy/don't buy*. However, this process does not continue so simply. The simplest thing that shows this is not the case is shopping habits of the consumers. How can a consumer behavior be interpreted when he/she buys a pair of shoes more although they don't need them? And why does a consumer want to replace his new computer for a newer one on the market? Here, the mentality which advocates that the process goes on in a routine manner remains silent to these questions. To repeat, these attitude and behaviors indicate that people are not rational beings only, they act with their emotions and their irrational behaviours must be analyzed. Accordingly, in traditional methods, among the possibilities of significant differences between what the consumer say and do, only creating declaration-based marketing strategies will cause big costs (Girişken, 2015).

Because of these kinds of needs and when neurology and marketing science have come together with technological movements, the concept of neuromarketing has become the agenda. In this study, brains activations are presented with eeg method which is a one of the neuromarketing techniques and it is aimed to discover what parts of people's brains are active for how long while watching the ads and what kinds of images they are most impressed by. As a result of the measurement, the declarations of the potential consumers were included and the correlation between measurement results and declaration was also investigated. This study differs from the others because of the fact that it is analyzed by eeg measurement which is one of techniques used by neuromarketing discipline of a commercial film so as to investigate buying behavior.

### **I. Neuromarketing and Electroencephalography (EEG)**

#### **A. Neuromarketing**

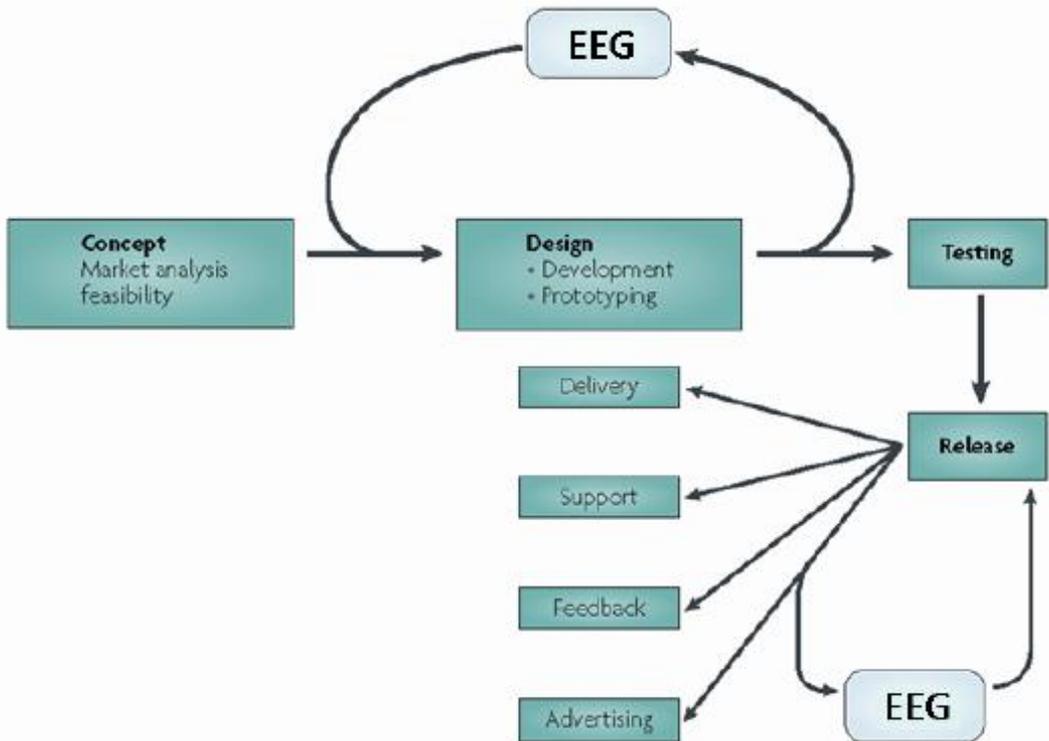
Neuromarketing, which has managed to attract attention especially in advertising in recent years in terms of both academic studies and business practices, is a new successful application to integrate neuroscience and consumer psychology. The said application has enriched marketing research portfolio in a short time and it supports marketers to a considerable extent by getting beyond verbal statements of the consumers. Neuromarketing which can measure emotional and unconscious responses of the consumers has actually broken fresh ground in marketing

researches. It can carry out this by determining the source of consumer behavior and it manages the process of being convinced while customers are making a decision to purchase or not by making use of neuroimaging techniques and other biological measurements. Trying to conceive the factors that the consumers are influenced in this process is included in the field of occupation of the application (Kong et al. 2013; Girişken, 2015).

Neuromarketing has recently aroused interest enabling academicians and business practices to focus on the issue that much and it has made progress considerably. Under the guidance of this interest, to create conceptual framework, many definitions have been made in the literature about what neuromarketing means. According to Lee et al., neuromarketing is a methodology based on a measurement which combines brains waves and clinical psychology so as to improve the understanding of heuristic responses of people to products, brands and advertisements (Lee et al. 2007). Bercea describes consumer behavior as an interdisciplinary area which aims to search and conceive by investigating the brain (Bercea, 2013). According to Babu et al., it is an application of cognitive neuroscience to marketing and marketing research (Babu and Vidyasagar, 2012). Lindstrom regards neuromarketing as a key to rise subconscious thoughts, feelings and desires which direct purchasing decisions made by consumers everyday (Lindstrom, 2014). Butler asserts that neuromarketing tries to understand the biology of human behaviors and thoughts and actions in this context (Butler, 2008). Hubert and Kenning approach the concept more simply and call neuromarketing a simple marketing research tool only. They define it as an integration process of neuroscience and pscophysiology outputs into marketing world and they generally prefer the concept of consumer neuroscience (Pop and Iorga, 2012). Georges and Badoc define neuromarketing as recognising knowledge process of human brain related to theory production mechanism to influence the decisions of the masses the marketers do business with (Pop and Iorga, 2012). Stephen Genco describes it as any marketing or marketing research activities which use the methods and techniques of neuroscience or which is enlightened by neuroscience findings or views (Genco et al. 2013). According to Pepe Martines, neuromarketing is cognitive psychology which investigates human brain and relationship between thoughts and behaviors and it is the integration of variety of disciplines such as the combination of art and science which are responsible for the development of new concepts for the products and services so as to satisfy the consumers and to increase the profits (Martinez, 2012).

## **B. Electroencephalography**

Neuromarketing applications of electroencephalography is included in product development cycle in two places potentially. First, it is used as a part of EEG design process. Here, neural responses are used to confine before the products come onto the markets. Second, it is used as a part of an advertising campaign to increase the sales and to measure the neural responses generally after the product is manufactured completely (Martinez, 2012).



**Figure 1.** Product Development Process

**Source:** Giovanni Vecchiato, Patrizia Cherubino, Arianna Trettel ve Fabio Babiloni, **Neuroelectrical Brain Imaging Tools for The Study of The Efficacy of TV Advertising Stimuli and Their Application to Neuromarketing**, [electronic version], UK: Springer, 2013, p. 5.

EEG is one of the most commonly used techniques in clinics and in the area of psychophysiology and cognitive neuroscience. It is aimed to comprehend the relation between brain functions and behavior in either case. In a study performed in 1960s to explain the relation between brain and behavior, Benjamin Libet performed an EEG measurement and asked the subjects to raise their fingers whenever they wanted.

Meanwhile, the subjects were looking at a high-resolution timer and when they felt an impulse to do the action, they would write down that moment. Libet discovered in his study that the impulse to move was formed before the movement was carried out. However, in actual output of the research, Libet who was observing brain waves indicated that the increase of activity in the brains of the participants was felt much earlier than the desire to move. Here, the statement "much earlier" should be emphasized because the indicated time exceeds one second. So it means, in consideration of the study, that before we get the news that we have made a decision to raise our finger, brain and its functions have already started to work (Vidal et al. 2015; Eagleman, 2013).

In that case, brain may resemble a circuit which makes a connection of senses and electrical events occur during the functions of the brain. As well as typical consisted electric potentials; the method of printing a bit more different electric potential changes, in excited state depending on receptor activities, is called EEG. First EEG measurements were performed by German psychologist Hans Berger in 1929. The measurements of electric activities are carried out by means of electrodes placed by EEG device in scalp or directly in the cortex. EEG waves are not periodical physically but they are rhythmic waves. The observed potential wave frequency varies between 0.5-70Hz and amplitudes vary between 5-400 mikrovolt ( $\mu\text{V}$ ). As activity level of the brain increases, EEG wave frequencies also increase and amplitudes decrease. Electrodes measure potential differences in the scalp at  $\mu\text{V}$  interval. For this reason, EEG can measure a great deal of neuron activities. The results of the measurements are quite sensitive because electromagnetic waves spread simultaneously in their environment. High number of electrodes are useful because they increase measurement precision and more proper measurements can be performed. While the discussion about the standardization of this number is still going on, Neurofocus company state that at least 16 electrodes are required (Girişken et al. 2014; Yücel and Çubuk, 2014).

EEG outputs change according to age, alertness of the brain, sensory stimuli, diseases –brain diseases particularly- and chemical changes in the body. Accordingly, the mood and psychological state of people cause small electrical currents in the brain. The data measured with high sensitivity are analyzed by means of an algorithm. Relevant EEG data are placed in three dimensional brain map and they reveal what part of brain is activated by each feeling of people during shopping or when watching visuals. In this way, the method removes the necessity of consumer's declaration and it enables to get more rational results. It can even get beyond the declaration and determine consumer's real thoughts in subconscious which can't be interpreted or accounted for



of parietal and occipital. 10-second schedule corresponds to one output of EEG paper. The names of electrode placements used generally are Oz, O1, O2, Pz, P3, P4, P7 (T5), P8 (T6), CP3, CPz, CP4, TP7, TP8, Cz, C3, C4, T7 (T3/C7), T8 (T4/C8), FC3, FCz, FC4, FT7, FT8, Fz, F3, F4, Fp1, Fp2. In EEG device, wave lengths with odd numbers show left part of the brain and wave lengths with even numbers show right part of the brain. Centre line electrodes are shown by lower case "z". Eyeball movements in Fp1 Fp2 electrodes may sometimes be seen in F3-F4 electrodes.

**"F" Frontal-Pole:** In forehead area. Whereas frontal lobe (left frontal lobe) is related to volitional acts, prefrontal cortex is related to memory, intelligence, concentration, anger and personality. Premotor cortex undertakes the orientation of eye and head movements while broca area has importance for talking. In essence, frontal area has influence to dominate memory, buying behaviors, socialising, resolution process and motor functions.

**"T" Temporal Area:** Audibility zone above each ear. This area is especially effective in memory. Right side keeps visual memory and left side keeps verbal memory.

**"O" Occipital Area:** Visual areas are above two protruding bones in the back. Visual cortex is located in the above-mentioned region. Because of the fact that these lobes have systematically cross-over work, right occipital lobe enables to see left side and left occipital lobe enables to see right sight.

**"C" Central Area:** As its name suggests, this is a central area and it starts from ten-finger above the ear.

**"P" Parietal Area:** Parietal area starts from the top point of the head and it goes on in the right and left regions. The signals coming from 5 senses in the body are processed in this area.

The number of the waves shown on the screen within one second is just as important as knowing the letters belonging to the electrodes in an EEG application. David Lewis describes the said wave numbers in his work called *The Brain Sell* (Lewis, 2013):

- **Delta Waves  $\delta$**  (0.5-4 Hz) : Especially related to sleep.
- **Theta Waves  $\theta$**  (4-6 Hz) : Related to a mental comfort and condition and imagination.
- **Alpha Waves** (8-12 Hz) : Related to comfort, wakefulness and carelessness.
- **Beta Waves  $\beta$**  (13-40Hz) : Irregular and the smallest amplitude waves which are the most common when someone is stimulated or doing something requiring mental effort.

▪ **Gamma Waves  $\gamma$  (40-100 Hz)** : Related to memory formation and combination.

While electrodes are being placed, first the distance between nasion (nasal bridge) andinion (occipital pretuberance) is measured. The mid-point of this distance is known as Cz (central vertex). Fz (midline frontal) is found by getting beyond 20% of the distance between nasion-inion from Cz. Pz (midline parietal) is determined by going back from Cz in 20% ratio. Moving back from Pz 20%, Oz is found. Then, the distance between two external auditory canals (targus) going through Cz is measured. Moving from Cz electrode 20% to right and left of the mentioned distance, C3 and C4 are determined respectively. T3 and T4 are found by moving away C3 and C4 in 20% ratio. The distance of frontopolar electrodes to nasal bridge must be nearly 10% of the distance between nasion-inion. EEG application makes it possible to determine in what hemisphere of the brain the activities are carried out. During EEG application, the fact that the eyes are closed or open affect wave lengths because swallowing and eyeball movements can be determined during the application. Even the psychological state of the subject at that moment like being stressed is involved in this. Approaching the subject nearer than 2 meters, electrode skidding, gestures distracting the subject may cause artefacts (misleading or confusing alteration that does not reflect the reality in data or observation) and they naturally affect the measurement results negatively (Event-Related Potentials ERP, Recordng and Analysis 15.05.2016).

### **III. Methodological Framework**

As research methodology, the relevant application was compiled under a few headings in this chapter. Firstly, a general definition of the company included in the study was made. Then, why the matter was investigated and what target was intended with the results obtained from the study was dealt with in the section of '*the aim of the research*'. The contribution of the study to the theory or application area and the different aspects of the study from similar ones were mentioned in the section of '*the importance of research*'. In the section of '*the method of the research*', answers were sought for the questions such as how the data were obtained, what the content and universe of the research was, what problems were solved by this information and how it was used, what method and techniques were made use of in this process. The results were analyzed and interpreted.

#### **A. The Importance and Target of the Study**

Neuromarketing tries to solve the puzzle of 'the fact that the individuals with a complex biological structure act with their emotions as well as with their minds make them move away rationality'. And the main objective of this study performed in

neuromarketing is to determine the effects of the advertisements and their messages, which has a function to prepare potential buyers to visit salesman, on consumers by eeg method. Neuromarketing is a new and different area which should be developed and the awareness of which should be expanded. And also it has a high cost application, so contributing to the development of neuromarketing, drawing a projection for the businesses which want to minimize the costs by determining the expecations of the customers well and by interpreting the obtained data scientifically; and creating an awareness for consumers whose needs and demands are met in desired level are among other objectives.

Real results are obtained in neuromarketing studies because what the consumers really want is measured, that is, consumers do not tell lies and they give replies without worries and prejudices. It is declared that the studies performed in this field are realist, scientific and more reliable. In addition, the fact that the researches direct other studies which eliminate ethical concerns make a contribution to existence of more conscious individuals and make them behave more rationally. The other studies on neuromarketing so far and in the future, including this one, will contribute to the national and international literature of neuromarketing and also it is important that they show the suitability of social sciences for experimental studies. Besides, this study has a particular importance in that it makes a better comparison, it emphasizes the deficiency of using traditional survey technique based on declaration to understand the consumers; and because the commercial film is analyzed by eeg measurement which is one of the techniques used by neuromarketing discipline.

## **B. Method of the Study**

The study deals with the effect of the advertisement on consumers by means of electroencephalography technique. A commercial film made for Father's Day for the product 'No:1 Wafer' of Konya Şeker Corporation Torku was investigated. Konya Şeker, a producer cooperative, created Torku brand in 2007 with a strategic and visionary point of view. In this part of the study, the subjects watched the mentioned commercial film of the company. While they were watching the film, their brain activations were measured. This measurement was performed by 10-channel EEG device. During the research, emotional responses of the participants whose brain activations were measured were recorded and EEG patterns were obtained. EEG outputs were analyzed and interpreted by academicians and EEG experts comparatively, taking into account the declaration of consumers.

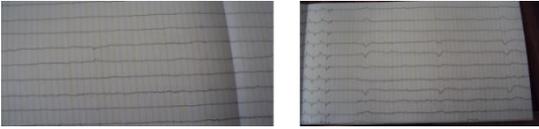
#### **IV. Data and Results**

84-second commercial film which was made especially for Father's Day for No:1 Wafer product of Torku was watched by the volunteer subjects who were analyzed by EEG and the reactions of the subjects for the stimuli were tried to be measured. In some cases, the opinions of the participants were also taken for the purpose of confirmation. Brain waves of 30 volunteer subjects, 15 males and 15 females, were measured by means of EEG device. EEG patterns obtained as a result of the measurements were interpreted by academicians and electroneurophysiology experts. Sample group was formed using random sampling technique and it consisted of university students aged 18-40 who consumed wafers. Brain waves of the subjects were measured by EEG technique and the emotional reactions were recorded. Furthermore, these reactions reveal significant results because they are in accordance with the demographic attributes of the participants. A different segmentation was made for this and the measurements were analyzed specifically because innate physiological and emotional differences of male and female brains cause sometimes simultaneous and sometimes tally unlike changes for similar stimuli. For this reason, it must be emphasized how the exchange values are important on male and female participants caused by the difference between the seconds and the themes in the commercial film. Women are emotionally more devoted and they give more importance to details than men do. The reason is that right hemisphere of woman brain is more developed than left hemisphere.

Data algorithms measured by EEG device indicate emotional reactions of the subjects. The electrodes named Fp1-F7, F7-T3, T3-T5, T5-O1, Fp1-F3, F3-C3, C3-P3, P3-O1, T3-A1 show red wave lengths and the activations in left hemisphere of the brain. The electrodes Fp2-F8, F8-T4, T4-T6, T6-O2 Fp2-F4, F4-C4, C4-P4, P4-O2, T4-A2 are blue wave lengths and they show the activations in right hemisphere. Fz-Cz, Cz-Pz are black electrodes and they show the activations in the middle (Yücel and Çubuk, 2014). EEG device used in the study is designed for international 10-20 system and the diversions, the placement of the electrones, are F7-F3, F3-Fz, Fz-F4, F4-F8, F8-F4, T4-T6, T4-C4, F7-T3, T3-T5, T3-C3.

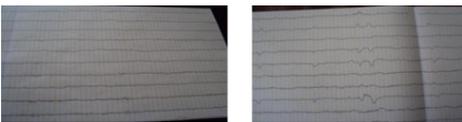
The first 10 seconds of Torku commercial film is a kind of introduction. Father Pascal introduces himself and he talks about Pascal's childhood. The walking stick with eagle head in father Pascal's hand resembles the company (the eye of the eagle is shining). And the Eiffel Tower is shown because Pascal Nouma is French. Neutral data show that not many reactions are observed in male and female subject, so it can be concluded that this introduction part of the film is not so effective.

Then, it can be said about this part that the effectiveness of the equal theme was similar for male and female subjects and their stress levels increased.



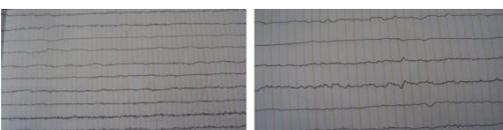
**Figure 4.** Male (left) and Female (right) EEG Patterns

After the 10th second, an upbeat music is started emphasizing that Pascal is 9 years old and Pascal kisses the hands of the guests saying “Nobir Auntie” in front of bewildered father Pascal. Then, Pascal says “good morning dady” with menemen (spicy Turkish omlette) in his hand and starts to tell his father about menemen. He eats menemen hungrily saying “come and dip a bit” and he sends the basket to the grocery store from his flat ordering “three croissants a packet of milk.” It is clear that Turkish customs are emphasized here. The suit and open-necked shirt of father Pascal, gold chain, large frame glasses, golden watch and handlebar moustache make these Turkish motifs richer. In this part of the film from 10th to 32nd second, it was seen that female subjects were impressed with the scenes of kissing hands and sending the basket more. The responses of male subjects measured during Menemen scene which goes on from 16th second to 26th second and during supporting this scene by slogans attract attention. After 16th second, beta rhythmic activities were observed in left hemisphere and especially more clear in right frontotemporal area.



**Figure 5.** Male (left) and female (right) EEG patterns

After 32nd second, the music changes and it is explained that Pascal is a very good footballer. Pascal completes this scene making gestures at the gol keeper and saying ‘Nobiiiiir’. During this period lasting until 36th second, it can be said that the *positive data* of the males were steady whereas female data were stable. Effects were seen in the right hemisphere of the males for about 5 seconds. Space and the goals made of stones and walls are effective in the responses in terms of nostalgia.



**Figure 6.** Male (left) and Female (right) EEG Patterns

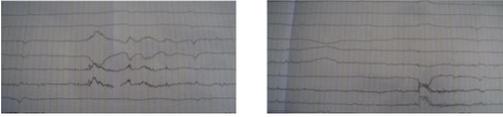
Together with the same music at 36th second; describing a car with a CD on the mirror, barbecue, camping cylinder and a football in the car trunk, a child figure on fuel lid and a sticker written 'NOBİİR' on the rear window; beads in Pascal's hand and his coat, watch and glasses, as a fashion of that moment, all caused to continue the responses. This time the responses of instant attention are high and it can be said that amplitudes decrease considering the responses obtained from football scene. These responses generally consist of short instant attention. However, after 40th second, the fact that Pascal toots a horn while the girls are passing by the car and he says "wonderful! Gearing up like a cat!" caused positive data and increased emotional involvement level in men especially. After 40th second, it became clear in right frontotemporal areas that waves varied and amplitudes increased more. Moreover, reactions were observed in opposite hemisphere areas in some male subjects and it was seen that activations increased gradually. Between 42nd and 44th second, activations were observed in some female subjects during 1 or 2 second while the girls were passing by. However, no remarkable reactions were observed in females in this period lasting 46th second.



**Figure 7.** Male (left) and Female (right) EEG Pattern

Between 46th and 53rd second, Pascal gives directions to a Frenchman using the statements like "yes, please dear?", "ohh mr. you ringed to false place" and "keep in the right hand, ok?." It is understood from this scene that giving a direction in Turkish style is approached wittily. In these scenes, short time equal increases were observed in right frontotemporal areas of males and females. From 54th second on, father Pascal talks about Pascal's transfer to Turkey with his eagle-head stick in his hand. At that time, close-up eagle figure represents Anadolu Birlik Holding (ABH) and Beşiktaş Football Club. During this period lasting until 62nd second, males and females were affected by the equal theme in the same level statically. This effectiveness occurred as short time ripples in general. However, after 62nd second, whereas noticeable activations were seen in males with Pascal's expression "happy father's day, dady", no movement was seen in the same level in the waves of female subjects. Then, from 67th second of the ad, Father Pascal says "what nobir about you?" in close-up and Pascal advertises the product in close-up also saying "nutty nobir from me". During these talks, emotional involvement levels of the subjects show similarities. Close-up view of Father Pascal was more effective than of Young Pascal. The real point to be

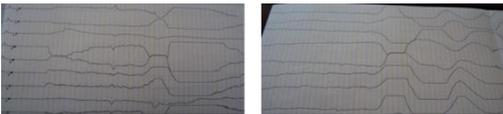
emphasized is that emotional involvement and positive data increased in male and female subjects who consume Torku products at 68th second and beta rhythmic activities were detected in left hemisphere from time to time and in right frontotemporal areas (F7, F3, F8, F4, T3, T5, T6) more clearly symmetrically.



**Figure 8.** Male (left) and Female (right) EEG Patterns

In the responses which continued decreasingly, positive waves were observed at 75th second when Father and Son Pascal were eating Torku No:1 Wafer with a subtitle "I will always be proud of my son." These responses were remarkable in the customers of Torku but a partial movement was seen in others. In accordance with EEG patterns particularly and with the obtained results, which were confirmed taking into account the subjects' opinions, it was discovered that the expression "Happy Father's Day, all dads!" at 78th second, Torku logo at 81st and 82nd second and the slogan "Naturally From Us" became prominent in long-term memory metrics and Konya Şeker took place in short-memory scala.

On the other hand, it was found out that the artefacts in EEG patterns resulted from eyeball movements, physical movements of hands and feet and swallowing. It was seen that the facts such as stress, straining, risk and uncertainty cause artefacts.



**Figure 9.** EEG Patterns Artefact Image

## V. Conclusion and Discussion

Electroencephalography measurements have shown that some behavioral outputs can be adapted to the outputs of emotional reactions based on subconscious responses created in the brain. The participants' waves which were in alpha rhythm before they watched the film started to change as from 10th second and it was seen that amplitudes increased especially after 40th second and the rhythms turned into Beta rhythm. That is to say, when child Nouma came in and kissed hands saying "Nobir auntie" after upbeat music at 10th second, participants' attention level increased and wave rhythms got move and changed after this activation. This movement became clear especially after Young Nouma made horn sound in his car

with “Nobiir” sticker in rear window and he made a pass to the girls and this was valid for nearly all participants. Using a foreign person like Pascal Nouma in a commercial film, fitting out him with Turkish motifs, the slogan “naturally from us” and the expressions such as “Nobiir” and “we say nobir to all daddies” affected this activity even if it was partial. The fact that Pascal Nouma is a friendly person and a successful, favorite footballer in Turkey made a contribution to this. To express in a technical statement, it was observed in EEG measurement that electrical currents in the brain were under the influence after 40th second especially. These mentioned areas are right frontal and temporal areas with diversion of FZ-F4, F4-F8, F8-T4, T4-T6, T4-C4. According to EEG outputs, it was observed that the factors in commercial films caused different reactions in men and women occasionally. A general inference in accordance with this commercial film is that positive reactions were received from the participants in the scenes which were natural and sincere; where family bonds were emphasized, tradition was expected to keep on, emotional and smiling people were together and proper music and color were used in the theme. As mentioned before, the film was made for Father’s Day and the responses of males were so clear in these scenes specifically. However, generally negative responses or no responses were obtained from females in those scenes. It was seen that using a star in the ad was not in the expected level in terms of the attention of the participants. Fortunately, the fact that Pascal Nouma was mostly a favorite person in Turkey and reflected Turkish culture in the film and his friendly behaviors reversed this situation even if a bit. In spite of this, it must be borne in mind that using a star in a commercial film is a risky factor. Level of interest of male participants were remarkable especially in those scenes. Supporting Pascal Nouma’s life in the film with a suitable jingle increased interest level. On the other hand, the fact that the film was long and it mainly appealed to males and the actor got beyond the brand increased the findings that it caused opposite changes in responses. Besides, describing Pascal’s life for quite some time, making a pass to girls and repeating the themes resulted in a negative effect especially in terms of women. It can also be criticized that the film was not so effective in arousing interest. Another criticism is that the ad was deprived of vivid colors. Although not very noticeable changes were observed in brand, logo and slogan scenes with regard to responses, it can be said that it was effective. However, it was seen in the findings that the sub-factors such as off-voice, jingle and background music in the scenes with these factors affected consumers’ perception in a positive way and increased the positiveness of interest. Accordingly, it is possible to criticize that first 10 seconds of the ad did not cause an electrical responses in the brain but including more remarkable factors in these parts would increase degree of influence of the film.

In the final analysis, the commercial films are more likely to be successful if people find some values from themselves, ordinary people are used, clear product environments are presented, mental costs of consumers are minimized; and when they are not exaggerated and do not contain information inflation. Final determination in accordance with EEG is that it is more rational to run an effective advertising plan for the balance between the messages of the advertisement of the company and the reactions expected from consumers.

In essence, in EEG measurement after 40th second especially, it was found out that electrical currents in the brain were under the influence till the end of the film. These areas are right frontal and temporal areas with FZ-F4, F4-F8, F8-T4, T4-T6, T4-C4 diversions. Accordingly, it is possible to criticize that first 10 seconds of the commercial film did not cause any electrical reactions in the brain and including more noticeable factors in this part would enhance effect level. In short, it was seen that the themes increase positive effects of the participants when people find some values from themselves, there are natural and sincere family bonds, more lively jingle and vivid colors are used, debonairness and emotions are together and nostalgia is mentioned. The fact that the film addressed males in general affected female participants negatively and using a foreign famous person in the film did not cause expected obvious changes in the reactions. Finally, the themes with unnatural, pale colors tiring for the brain caused negative effects or no effects in people.

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