

## **DETECTING THE EFFECT OF VOICE-OVER IN TV ADS VIA OPTIC BRAIN IMAGING (fNIRS) AND IN-DEPTH INTERVIEW METHODS**

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### **Abstract**

Voice-overs are used extensively to increase the effectiveness of the TV ads especially in the last decade. The main purpose is to provide the brand message via a clear feature that will inevitably grab the attention of the viewers. The current study contains the neuro tests of 12 TV ads in banking and finance sectors on 168 participants in 8 groups. Optic brain imaging (fNIRS) and in-depth interviews were the methodologies utilized during the test of these TV ads. The obtained results indicate that the use of voice-over during the TV ads possibly causes the decrease in attention and emotional engagement levels of the participants.

**Keywords:** Optic Brain Imaging (fNIRS); TV Ad; Voice-over; Consumer Neuroscience.

## **REKLAM FİMLERİNDE DIŞ SES ETKİSİNİN OPTİK BEYİN GÖRÜNTÜLEME VE DERİNLEMESİNE MÜLAKAT YÖNTEMLERİYLE SAPTANMASI**

### **Öz**

Reklam filmlerinin etkisini arttırmak amacıyla son dönemde dış sesler daha sık bir şekilde kullanılmaya başlanmıştır. Bu kullanımdaki temel amaç izleyicilerin dikkatini çekecek bir unsur yaratarak, amaçlanan bilgilendirmenin sağlanmasıdır. Bu çalışmada, Türkiye’de faaliyet gösteren finans kuruluşlarına ait dışses içeren 12 reklam filmi toplam 168 katılımcıyla 8 farklı grupta tüketici nörobilimi yöntemleriyle test edilmiştir. Bu nöro test metodolojisinde optik beyin görüntüleme ve derinlemesine mülakat yöntemleri kullanılmıştır. Yapılan çalışmanın sonuçları katılımcılarda dış ses nedeniyle dikkat ve duygusal ilgi seviyelerinde azalma görülebileceğine işaret etmektedir.

**Anahtar Kelimeler:** Optik Beyin Görüntüleme (fNIRS); Reklam Filmi; Dış Ses; Tüketici Nörobilimi.

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## Introduction

One of the prior targets of marketing research is to understand human decisions and behavior via the use of various research methods and to propose insights that will be basis for better marketing strategies. There have been novel techniques that become popular in the scientific research as well as sector-specific projects especially since the beginning of 21<sup>st</sup> Century. In this respect, the use of new marketing research methods has provided a relatively wide range of applications from TV ad assessments to flavor tests and from concept to UX tests.<sup>1</sup>

TV ad assessments have been of higher interest due to the higher level of sector-specific demand and its relatively large market size. The most common application is to analyze a TV ad with respect to the change in the level of attention and emotional engagement of the audience. The scenes that indicated sharp decreases in attention or emotional engagement can be taken out of the ad. Therefore, it becomes possible for a company to optimize a TV ad before its release to the market.<sup>2</sup> There are also other potential applications like product and concept tests that have been subject to neuro-research. One of these possible applications could be related to assess the use of voice-overs that have impact on the TV ads.

The voice-overs in commercials are widely used for transmitting the relevant message directly to the target audience. Thus, the voice-overs are considered to have an impact on the cognitive processes of the audience. The previous studies have already shown that the use of voice-overs might not have a positive impact as considered initially. For instance, selection of an unsuitable presenter for an advertisement that is directly linked to the intended users<sup>3</sup>. One opposing view is that such use can cause a negative effect on the emotional processing of the audience, since this emotional attachment is interrupted by an external effect that occasionally irritate the ongoing emotional processing of the audience. Hereby, the main research question of this study has been whether the voice-overs in the TV ads have positive or negative impacts on the audience.

The main purpose of this empirical study is to investigate whether the effects of voice-overs in the TV ads could be assessed with an objective method, optic brain imaging (fNIRS). Moreover, this quantitative method was followed by the in-depth interviews to provide a richer and more reliable framework for analyzing the obtained neuro data. In the scope of this study, 12 TV ads were selected which had the explicit use of voice-overs.

## Theoretical Framework

TV ads have been one of the most common marketing communication tools for improving brand image and sales especially for the multinational companies and corporations. However, the effectiveness of these TV ads has been one of the critical issues that had

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<sup>1</sup> D. Ariely & G.S Berns. (2010). Neuromarketing: the hope and hype of neuromarketing in business. *Nature Review Neuroscience*, 11(4): 286.

<sup>2</sup> G. Vecchiato, L. Astolfi, F. De Vico Fallani, J. Toppi, F. Aloise & F. Bez. (2011). On the use of EEG or MEG Brain Tools in Neuromarketing Research. *Computational Intelligence and Neuroscience*: 579.

<sup>3</sup> J. Lynch & D. Schuler. (1994). The Matchup Effect of Spokesperson and Product Congruency: A Schema Theory Interpretation. *Psychology and Marketing*, 11(5): 424.

been investigated by the marketing professionals and academic researchers.<sup>4</sup> The main purpose has been to increase the quality and effectiveness of the TV ads by using different quantitative and qualitative marketing research techniques including questionnaires, focus groups, and in-depth interviews. Meanwhile, the search for applying new methods for the assessment processes continues. The use of new methods was initially argued to be revolutionary in the sense of replacing traditional methods like surveys, in-depth interviews and focus groups.<sup>5</sup>

The main argument was initially about the exclusion of traditional methods like surveys or in-depth interviews that could potentially misguide the researcher, since the data obtained by the subjective methods such as surveys are claimed to be potentially noisy when compared to the data obtained by the objective methods. However, the findings in the last decade have indicated that the neuroscientific methods will not necessarily replace the traditional ones but instead the best solution is to have these methods used as complementary tools.<sup>6</sup> In addition to this, some scholars claimed that these new methods would reduce the required time and budget, since these will provide faster and inexpensive means of research.<sup>7</sup> However, the current situation demonstrates that it could be possible to perform the projects faster but the research budgets do not occasionally reduce due to several different factors.

Another crucial claim has been related to accessing the “hidden information” of the customers with the use of neuroscientific techniques.<sup>8</sup> This claim has also risen ethical concerns in the sense that the customers’ unconscious processing might be vulnerable and could be affected against their will. Besides these ethical concerns, it should be remarked that there is yet too little evidence that the hidden information could be accessed via objective methods<sup>9</sup>. The most common and popular example in the relevant literature is *Pepsi Challenge* performed with fMRI method.<sup>10</sup> The findings from this neuroimaging study indicate that the participants’ self-reports might contradict their behavior but the findings from the neuroimaging study could provide a better account for explaining their behavior.<sup>11</sup>

Another neuroimaging study has been performed which indicates that the neural indicators might predict market success better than the findings obtained via the use of traditional

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<sup>4</sup> A. Z. Özgür. (2001). TV Reklam Filmlerinin Yaratıcı ve Yapım Süreçleri Açısından Değerlendirilme Standartları. *Selçuk Üniversitesi İletişim Fakültesi Dergisi*, 1(4):17.

<sup>5</sup> T. Çakar, K.Ge. (2017). Neuroscience Applications on the Assessments of TV Ads in Ed: Dos Santos, M. A., *Applying Neuroscience to Business Practice*. IGI Global Publishing, 231-256.

<sup>6</sup> D. Ariely & G. Berns, 2010: 285.

<sup>7</sup> A.e., 285.

<sup>8</sup> A.e., 284.

<sup>9</sup> G.Vecchiato, L.Astolfi, F.De Vico Fallani, J. Toppi, F.Aloise & F.Bez. (2011). On the use of EEG or MEG Brain Tools in Neuromarketing Research. *Computational Intelligence and Neuroscience*.

<sup>10</sup> S. M. McClure, J. Li, D.Toulin, K.Cypert, L. M. Montague & P. R. Montague. (2004). Neural correlates of behavioral preference for culturally familiar drinks. *Neuron*, 44(14): 384.

<sup>11</sup> A.e., 386.

methods as performed in a preference task after watching movie fragments from IMDB.<sup>12</sup> However, further empirical evidence is quite necessary to show that the neuroimaging results do provide a better account for explaining behavior of the target group of interest. On the other hand, it seems that these traditional and neuromarketing methods will be used as complementary methods in the next decade.

### **The Use of Voice-overs in TV Ads.**

Voice-over is a production technique that enables the designers to place a voice (that could be human voice or any other voice) that is not the part of narration. This production method could be used for an advertisement, theatre or any other production. The most frequent method is that a pre-recorded voice is placed over a film to provide information about the film such as in documentaries or to guide the players as in video-games. One such use has become common in TV ads to provide the commercially valuable message for the audience. For instance, an announcer might provide information about the new credit opportunities in a bank commercial.

The use of voice-overs in TV ads has been highly popular especially in the last decades. The main aim of this use has been issued to present and circulate the relevant brand message in a convenient and clear way to the audience. It is also important to mention that the selection of the presenter or announcer is highly critical for the effectiveness of the voice-over used in the commercial.<sup>13</sup> Even gender of the presenter or announcer might be influential on the effectiveness of the presented commercial and it is considerably difficult to provide an effectiveness assessment, since it is highly dependent on the perception of the target population.<sup>14</sup>

It has been believed that the use of voice-overs in commercials serves for the increase in engagement level as the message is presented to the audience directly.<sup>15</sup> Thus, the audience will be attended towards the informational content is presented.<sup>16</sup> However, the field studies indicate that the use of voice-overs might not necessarily provide an increase in the level of engagement on the audience. The speech characteristics of the narrator in voice-overs have also been an issue to be investigated. There are three main characteristics including syllable speed, interphase pause, and pitch that are considered to have effect on consumer perception and responses.<sup>17</sup> The results of an empirical study

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<sup>12</sup> M.A.S. Boksem & A.Smidts. (2015). Brain responses to movie-trailers predict individual preferences for movies and their population-wide commercial success. *Journal of Marketing Research* 52(4): 482-492.

<sup>13</sup> T. W. Whipple, & M. K. McManamon. (2002). Implications of using male and female voices in commercials: An exploratory study. *Journal of Advertising*, 31: 87.

<sup>14</sup> T. W. Leigh, A. J. Rethans & T. R. Whitney. (1987). Role portrayals of women in advertising: Cognitive responses and advertising effectiveness. *Journal of Advertising Research*, 27(5): 59.

<sup>15</sup> S. N. Singh & C. Cole. (1993). The Effects of Length, Content, and Repetition on Television Commercial Effectiveness. *Journal of Marketing Research* 30(1):91-104.

<sup>16</sup> A.e., 101.

<sup>17</sup> A. Chattopadhyay, D. W. Dahl, R.J.B. Ritchie, K.N. Shahin. (2003). Hearing Voices: The Impact of Announcer Speech Characteristics on Consumer Response to Broadcast Advertising. *Journal of*

demonstrate that a voice with faster-than-normal syllable speed is found to cause more favorable ad attitude.<sup>18</sup> Moreover, presenting a voice with lower pitch is found to have a similar impact on the audience.

On the other hand, there are empirical studies in the academic literature related to political marketing campaigns indicating that the gender of the narrator is selected strategically and this selection has an impact on the credibility on the audience.<sup>19</sup> The results from a relatively recent neuroimaging study (fMRI) on processing of voice-overs performed indicate that the use of human sounds (versus non-human sounds) leads to a higher-level neural activation around the primary auditory cortex.<sup>20</sup> For this study, we did not have control over these characteristics but instead we have presented the original versions of the TV ads.

### **Hypotheses.**

The initial hypothesis of this study has been about the onset of voice-overs cause a change in the level of attention and emotional engagement based on the empirical evidence. Since the TV ads are dynamical processes composed of several visual, auditory and perceptual factors, it was important to provide a considerably large set of TV ads to provide a reliable framework. There have been 12 TV ads were demonstrated randomly in different groups.

### **Methods**

The main method for the current study has been selected to be optic brain imaging because of its ease of use, mobility, and capability of monitoring neural activity among the human frontal cortex. Meanwhile, the in-depth interview method has been chosen as a complementary method to observe the consistencies and inconsistencies with the neuroimaging findings. As mentioned previously, the combined use of these traditional and neuroimaging methods is common because of the opportunity to complement each other.

### **Optic Brain Imaging.**

Optic Brain Imaging has been developed as a system for calculating the oxygenation level and volume in the blood. The changes in these levels have been accepted to be indicators of neural activity within the brain.<sup>21</sup> The academic research on this optic brain imaging system has started by 1980s and the number of publications has tremendously been increased that implicated fNIRS as a reliable indicator of oxygenation in the last

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*Consumer Psychology*, 13(3): 198-204.

<sup>18</sup> A. e., 202.

<sup>19</sup> P. Strach, K. Zuber, E. F. Fowler, T.N.Ridout, K. Searles. (2015). In a Different Voice? Explaining the Use of Men and Women as Voice-Over Announcers in Political Advertising. *Political Communication*, 32, 183–205.

<sup>20</sup> M. M. Mostafa. (2012). Brain processing of vocal sounds in advertising: A functional magnetic resonance imaging (fMRI) study. *Expert Systems with Applications*, 39: 12114-12122.

<sup>21</sup> H. Obrig, R. Wenzel, M. Kohl, S. Horst, P. Wobst, J. Steinbrink & A. Villringer. (2000). Near-infrared spectroscopy: does it function in functional activation studies of the adult brain? *International Journal of Psychophysiology*, 35(2): 126.

decade.<sup>22</sup> This device is technically capable of sending infrared lights from the source pads by which the sensors can perform measurement of oxygenation in the blood.<sup>23</sup>

This neuroimaging device mainly relies on the relative changes of the chromophores that are located at the tissues of oxyhemoglobin, deoxyhemoglobin on the capillaries.<sup>24</sup> It is known that this kind of tissues are highly sensitive to infrared lights and moreover, oxy- and deoxy-hemoglobin molecules are high emitters within 700-900 nm.<sup>25</sup> This relatively high level of changes within the blood concentration enables the online monitoring of activity as in the brain activity.<sup>26</sup>

On the other hand, this method has advantages related to its non-invasive, reliability and mobility when compared to the other neuroimaging methods. With the effect of these advantages/pros, this method has found a significant place in the growing field of applied neuroscience that ranges from medical applications to neuroergonomics, neuropolitics and neuromarketing and consumer neuroscience especially in the last 5 years. Within the neuromarketing research, this device has already been used in several different research domains like predicting purchasing decisions, brain-computer interface and monitoring the activity of prefrontal cortex during outdoor activities.<sup>27</sup>

## Experimental Design

### Participants.

168 participants have participated to this study that is performed in 8 different groups. There was no significant difference in the demographic composition of 8 groups. The age range has been from 18 to 45. The education level was from high school to post-graduate. The gender balance has been provided among the participants. The experimental procedure has been explained to each participant in detail. The participants were initially informed about their right to decline the experiment whenever they feel uncomfortable.

### Stimuli.

The participants from each section were demonstrated 7 different TV ads via 19-inch LCD monitor. The videos were displayed randomly and there were 20 seconds-long periods of fixation duration for rest between the commercials to provide a baseline period. One or two of these 7 demonstrated TV ads were including intensive use of voice-overs. These TV ads from the finance sector are the commercials that have been demonstrated for more than 6 months in the media. They all contain a narration with varying themes (like new

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<sup>22</sup> S. C. Bunce, M. Izzetoglu, K. Izzetoglu, B. Onaral & K. Pourrezaei. (2006). Functional near-infrared spectroscopy. *Engineering in Medicine and Biology Magazine, IEEE*, 25(4): 57.

<sup>23</sup> A.e., 55.

<sup>24</sup> F. F. Jobsis. (1977). Noninvasive, infrared monitoring of cerebral and myocardial oxygen sufficiency and circulatory parameters. *Science*, 198(4323): 1264.

<sup>25</sup> A.e., 1265.

<sup>26</sup> A.e., 1265.

<sup>27</sup> H. Ayaz, P. A. Shewokis, S. Bunce, K. Izzetoglu, B. Willems & B. Onaral. (2012). Optical brain monitoring for operator training and mental workload assessment. *Neuroimage*, 59(1): 36.

year, credit opportunities, or entrepreneurship) and a message carried out by the end of the commercial.

In the following sections, the obtained quantitative and qualitative findings will be presented and discussed accordingly. First, the results from the optic brain imaging will be presented then the findings from in-depth interviews will be presented.

### **Optic Brain Imaging Results.**

The obtained data from optic brain imaging method has been composed of relative oxygenation level that is converted to 2 data points for each second. These data points have first been filtrated to eliminate the external and internal noises related to physiology. These values obtained during watching TV ads has been recalculated with respect to the baseline that has been set to be the previous 6 seconds before the onset of each TV ad. The oxygenated hemoglobin levels from each optode have been calculated separately. The onset of voice-overs within a TV ad has been the critical moment for analyses. Previous 6 seconds has been accepted as the reference period and the whole duration with the voice-over has been the target period. The mean value differences of these periods have been calculated for each TV ad that included the use of voice-overs. For 2 of the 16 optodes (optode-8 and optode-16), target periods have been found to be significantly lower than the previous reference periods (O-8:  $MD=-.02343$ ,  $p<.024$ ; O-16:  $MD=-.01947$ ,  $p<.05$ ). These optodes, optode-8 and optode-16 are located on the medial and right lateral regions of the forehead and roughly correspond the related areas of the prefrontal cortex respectively. More specifically, the optode-8 has been accepted as a potential indicator of engagement level, as it is shown to be activated during the purchasing decision processes, since this region is accepted to be a part of the human brain reward system<sup>28</sup>.

### **Findings from In-depth Interviews.**

After the display of the TV ads, one-fourth of the participants were invited to an in-depth interview by which they could explicitly tell about their opinions about the psychological impacts of the onset of the voice-overs. An expert, who has also been informed about the results of the experiments, moderated the in-depth interviews. One of the main questions of this interview section has been about the deliberation of the voice-overs in relation to possible connections to level of emotional engagement and attention.

The main finding has been that the onset of voice-overs generally was presented as the end of narrated story in the TV ad and thus, they were perceived as a state change from the story to the brand message. However, the way that the voice-overs are presented has been explained to be irritating, disengaging and causing discomfort by most of the participants.

One of the most common instances is about the presentation of “informational message”, which is accompanied with the onset of a voice-over explaining this information. The common reaction has explicitly been expressed this presentation as distracting, since they

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<sup>28</sup> E. Metereau & J. C. Dreher. (2015). The medial orbitofrontal cortex encodes a general unsigned value signal during anticipation of both appetitive and aversive events. *Cortex*, 63: 49.

were confused while they were trying to understand the voice-over. One of the participants expressed that while she was watching the main character, the given information was highly irrelevant. One of the other participants mentioned that the presented offer was not attractive, since it is not relevant to the main story of the TV ad. Other participant indicated that he was distracted and disengaged by the onset of the voice-overs especially because of the background music stopped suddenly.

Another crucial issue related to the use of voice-over is the perception that a stranger enters to the narration unexpectedly (as a surprising factor). One of the mentioned scenes is about a conversation between Santa Clause and a woman then the scene is suddenly interrupted by a voice-over that is said to cause disengagement and distraction. Another participant indicated that the onset of the voice-over in one of the bank commercials caused high level of confusion because of the information presented meanwhile he was engaged with the narration depicted.

### **Conclusion, Limitations and Future Studies**

In conclusion, this empirical work is one of the preliminary studies about the use of voice-overs within TV ads by using qualitative and quantitative methods. As mentioned above, the use of objective methods in marketing research has been increasing especially in the very last decade. One of the most frequent applications of these objective methods has been focused on the commercials besides the other applications that is mainly because of the sector-specific demand. The most widespread applications related to TV ads has been about the detection of scenes that cause for significant increase or decrease in the level of attention and emotional engagement of the target population. This study has been focused on understanding the impacts of the use of voice-overs in TV ads, since the use of voice-overs in commercials has been a relatively niche area that needs to be explored.

The performed experiments include 168 participants and 12 TV ads that contain the explicit use of voice-overs. The obtained findings from both neuro quantitative and qualitative methods indicate that the use of voice-overs might cause negative impact on the audience. The negative impacts detected has been explained as the decrease in attention and interest levels as qualitatively obtained from the participants although the reasons behind might be related to different causes. The results from optic brain imaging method (fNIRS) also demonstrate that there is a significant decreasing trend in 2 of the 16 optodes, which might be accepted as potential indicators of the attention and engagement levels based on the current academic literature.<sup>29</sup>

The significant level of decrease observed in the optode 8 can possibly be associated with the onset of the presented parts of the TV ads. This decrease might be explained with the general trend related to their lower level of engagement that have been supported with the findings from the in-depth interviews.<sup>30</sup> The empirical findings in the literature have

<sup>29</sup> I.M. Kopton, P. Kenning. (2014). Near-infrared spectroscopy (NIRS) as a new tool for neuroeconomic research. *Frontiers in Human Neuroscience*, 8 (549): 7.

<sup>30</sup> I. Levy, S. C. Lazzaro, R. B. Rutledge & P. W. Glimcher. (2011). Choice from non-choice: predicting consumer preferences from blood oxygenation level-dependent signals obtained during



indicated that the activation increase in this region as a neural correlate of ventromedial PFC has been associated with increasing engagement during purchasing processes.<sup>31</sup> The other optode, O-16, is located at the right lateral part of the prefrontal cortex that is known to be associated with the visual attention. The studies indicate that the deactivation of O-15 and O-16 can be accepted as a potential indicator for the level of attention during watching videos. Thus, the decrease in level of activation for the optode 16 might be associated with the onset of voice-overs that probably distracts the participants.

The results of this study do not claim that the use of voice-overs necessarily have an overall negative impact on the audience but the way they are presented might be reorganized or optimized to have a more efficient version. From a more general point of view, it might be the case that the use of voice-overs in TV ads are interrupting the emotional bond between the commercial and the audience to provide a path for conveying the relevant message regarding the ad. As this emotional attachment is interrupted by the onset of a voice-over announcer presenting the main message of the commercial, there might occur an inevitable process involving negative affect related to decrease in the emotional attachment. Thus, it might be the case that the audience might be distracted from the narrated story that has implications related to attention and emotional engagement.

This is a preliminary study in this field and the number of empirical studies should be increased to drive stronger conclusions and the number of participants as well as the number of TV ads should be increased for more reliable assessments.<sup>32</sup> There might also be a potential of application in the field of political marketing in which voice-over announcers are used frequently<sup>33</sup>. On the other hand, as a limitation, it is difficult to analyze TV ads as they are composed of several different factors. At this point, one of the potential solutions might be testing two versions of the same TV ad, one with voice-over and the other without. Moreover, the influence of gender might be the subject of further studies that might be accompanied with similar quantitative and qualitative methods.

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passive viewing. *The Journal of Neuroscience*, 31(1): 121.

<sup>31</sup> M. P. Çakır, T. Çakar & Y.Girişken. (2015). Neural Correlates of Purchasing Behavior in the Prefrontal Cortex: An Optical Brain Imaging Study. *Proceedings of CogSci 2015 Annual Meeting of the Cognitive Science Society*, Pasadena, CA, USA.

<sup>32</sup> T. Çakar & K. Gez, a.g.m., 253.

<sup>33</sup> P. Starch et al., 183.

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