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An implicit research methodology to evaluate advertising effectiveness in Esports streaming based on viewers' gaze, cognitive and emotional responses.

Metodología de investigación implícita para evaluar la eficacia de la publicidad en el streaming de Esports basada en la mirada, las respuestas cognitivas y emocionales de los espectadores.

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ABSTRACT

It is difficult to assess the real effectiveness of the sponsorship of esports for a brand. An initial approach would be to calculate the visibility of the brands' ads during a broadcast, which is usually characterized in terms of exposition time. Classically, this time was computed manually by visual inspection, but computer vision algorithms have recently automated this process, providing some sort of cost effectiveness parameter. This study goes a step further by proposing a new and complementary research methodology to assess the effectiveness of ads in esports, based on implicit research techniques such as electroencephalogram, galvanic skin response, eye-tracking, and analysis of the gaze behavior of the viewers, along with their emotional and cognitive states. Although there is no scarcity of studies on market investigation and advertising employing these research methodologies, these have not been applied to esports research yet. This study reports the implementation of this methodology in a case study with 48 participants during a given esports match. It is also demonstrated how these new metrics, which capture the non-conscious states of viewers, can be used to assess the performance of ads (in this case, brand logos). Additionally, it is shown how ad exposition time (widely accepted metric to assess ad effectiveness) presents an error of 60.18% with respect to real visualization, and how the methodology presented herein can be used to find the best placements for ad/brand exposure during esports broadcast.

KEYWORDS

Neuromarketing; Electronic sports; Brand effectiveness

RESUMEN

Es difícil evaluar la eficacia real del patrocinio de los esports para una marca. Una primera aproximación sería calcular la visibilidad de los anuncios de las marcas durante una retransmisión, que se suele caracterizar en términos de tiempo de exposición. Clásicamente, este tiempo se calculaba manualmente mediante inspección visual, pero recientemente los algoritmos de visión por ordenador han automatizado este proceso, proporcionando algún tipo de parámetro de rentabilidad. Este estudio da un paso más al proponer una metodología de investigación nueva y complementaria para evaluar la eficacia de los anuncios en los deportes electrónicos, basada en técnicas de investigación implícitas como el electroencefalograma, la respuesta galvánica de la piel, el seguimiento ocular y el análisis del comportamiento de la mirada de los espectadores, junto con sus estados emocionales y cognitivos. Aunque no escasean los estudios sobre investigación de mercado y publicidad que emplean estas metodologías de investigación, aún no se han aplicado a la investigación de los deportes electrónicos. Este estudio informa de la aplicación de esta metodología en un estudio de caso con 48 participantes durante un partido de esports. También se demuestra cómo estas nuevas métricas, que captan los estados no conscientes de los espectadores, pueden utilizarse para evaluar el rendimiento de los anuncios (en este caso, los logotipos de las marcas). Además, se muestra cómo el tiempo de exposición de los anuncios (métrica ampliamente aceptada para evaluar la eficacia de los anuncios) presenta un error del 60,18% con respecto a la visualización real, y cómo la metodología aquí presentada puede utilizarse para encontrar las mejores ubicaciones para la exposición de anuncios/marcas durante la emisión de deportes electrónicos.

PALABRAS CLAVE: Neuromarketing; Deportes electrónicos; Eficacia de la marca

1. INTRODUCTION

1.1. Advertising effectiveness in esports

The video game industry has experienced an exponential increase during the last decade. Some gaming events have even become major sporting events worldwide, compared in magnitude to sport mega events (Hamari & Sjoblom, 2017). This new discipline is called esports, which refers to a different concept: esports players sit in front of a computer instead of utilizing physical capacity or effort, which is characteristic of traditional sports (Grao, 2017). Although integration into an academic-scientific field of electronic sports is still in its infancy (Faust &Griffiths, 2013; Hamari &Sjoblom, 2017), there is consensus regarding the significant business being generated (Newzoo, 2019). The main channel of esports is the internet, as all esports events are transmitted via streaming on the internet (Mirón &Lago, 2017). Thus, a live esports broadcast is usually followed by millions of viewers (mainly young audiences). For instance, the peak of viewers of the League of Legends World Championship in 2018 was USD 205 million, surpassing traditional sports events such as the Super Bowl (USD 98.2 million) or Wimbledon (USD 56 million) (https://escharts.com). Although these figures are still far from FIFA's World Cup viewers (USD 3.572 billions), many large soccer teams are trying to enter the esports market right now due to the incredible growth experienced in recent years (Wolf, 2016).

The ability of esports to reach young audiences has made brands recognize esports as a new penetration channel. This explains why advertising revenue was USD 155.3 million in 2017 and has increased to USD 189.2 million in 2019 (Newzoo, 2019). However, to the best of the authors' knowledge, there are no research methodologies developed to understand the effectiveness of advertisements in the esports industry defining effectiveness as the ability to achieve the desired or expected effect over the brand experience (Moreno & Martín, 2016; Zajonc, 1968). Esports is still a very young market that is evolving very quickly, leading to the necessity of further investigation on the effectiveness of ads, which will be approached herein.

1.2. Evaluation of advertising with explicit/implicit methods

As consumers are increasingly being exposed to advertisements, ad effectiveness has been in the spotlight of research aimed at a better comprehension of brand awareness (Keller, 1993), holistic perspectives on the multidimensionality of brand awareness (Keller, 2003), and the impact of brand communication on brand equity (Coulter et al., 2012). The importance of brand memory in the professional and academic fields is evident (De Luca & Botelho, 2020). However, it is still not clear why consumers remember some brands and repeat the purchase of those brands. This dilemma encompasses the emotion, exposure, and cognitive characteristics of consumers (Johar et al., 2006; Sánchez-Fernández et al., 2021). Marketing and advertising research has been primarily based on the extraction of different metrics for the evaluation of advertising stimuli, classified as memory, affection, and persuasion (Johar et al., 2006; Belanche et. al., 2014). Psychophysiological responses have also been employed to measure emotional levels (Ariely & Berns, 2010; Loh et. al., 2021).

Human behaviour research methodologies are classified as implicit and explicit. Explicit methods capture conscious information obtained through widely used techniques such as questionnaires, interviews, and focus groups (Kareinen et al., 2019). Implicit methods access the non-conscious information of subjects and are usually based on psycho-physiological responses or implicit association tests (Greenwald et al., 1998). Focusing on implicit research methods and on physiological parameters, the sensing instruments usually utilized include the electroencephalogram (EEG), eye tracker (ET), galvanic skin response (GSR), etc. These have been extensively used for advertisement research, as in Koc & Boz, 2018; Cartocci et al., 2017; Casado-Aranda et al., 2019; Harris et al., 2018.

The key difficulty of these implicit methods is that measurements present inter-intra-subject variability, and therefore depend on each individual and the recording time. For this reason, this study considers different computational models (Valenza et al., 2014; Picard et al., 2001; Kim et al., 2004) that enable the learning of individual response patterns during a calibration phase with stimuli for each participant, and subsequently employ the models to decode the subject's emotion and cognitive processes during the evaluation phase with target stimuli. The advantage of these methods is that they create a subject- and time -specific mapping between physiological responses and conscious cognitive and emotional processes. This reduces the intra- and inter -personal variation inherent to the use of physiological responses.

1.3. Overview of this research

This study proposes a new implicit research methodology to better understand the non-conscious association between brand exposure and effectiveness in the esports industry. The main question answered herein is: (1) How can visual, emotional, and cognitive metrics be used to measure the effectiveness of ads during esports streaming? along with two secondary questions: (2) How does the exposition time of ads in streaming esports events broadcasts relate to visualization time by viewers? and (3) How can this methodology be employed to draw conclusions about the optimal placement of ads?

The previous questions are answered by utilizing the following implicit research techniques and metrics: (1) an eye-tracker (ET) device to obtain visual behavior (Bylinskii et al., 2015); (2) a galvanic skin response sensor (GSR) to obtain emotional impact (Boucsein, 2012); and (3) an electroencephalograph (EEG) to obtain the emotional impact (Golland et al., 2014; Boucsein, 2012), memorization (Long et al., 2014; Kilmesch & Doppelmayr, 1996), and attention (Gevins et al., 1998;

Klimesch, 1999; Stikic et al., 2014). Also, this study proposes new metrics adapted for ad evaluation in esports, based on gaze behavioral, emotional, and cognitive states.

2. METHODS

2.1. Participants

The sample was composed of 48 male subjects with ages between 18 and 35 years (M = 23.4 SD = 4.35), who dedicated an average of 8.98 (SD = 9.73) weekly hours to watch esports and an average of 8.7 hours (SD = 9.88) to play esports. The inclusion criteria for participants were: (a) between 18 and 40 years of age, and (b) consumption of esports (minimum 5h/week, playing or watching). The exclusion criteria were: (a) diagnosis of a neurological or psychological disorder, (b) visual problems, and (c) having watched the Spanish Final of League of Legends 2018.. All subjects participated voluntarily.

2.2. Instruments and materials

The equipment. The experimental setup comprised the following three devices and software:

– EEG “Diadem” (http://www.bitbrain.com): Wireless and mobile electroencephalogram system with eleven dry sensors, placed at standard positions in accordance with the international 10-20 system: FC3, FCZ, FC4, C3, C1, CZ, C2, C4, CP 3, CPZ, CP 4 (see Figure 1). Ground and reference electrodes were placed on the left earlobe. Signals were digitized at 256 Hz sampling rate.
– GSR “Ring” (http://www.bitbrain.com): Wearable and wireless device for real-time monitoring of electrodermal activity, which recorded skin conductance (electro- dermal activity - EDA / galvanic skin response - GSR), cardiovascular (blood volume pressure - BVP) activity and finger movements with a three-axis solidary accelerometer (ACC) (see Figure 1). Signals were digitized at 16 Hz sampling rate.
– ET “Tobii Pro X2-30” (http://www.tobiipro.com), which digitized gaze location on the screen at 30 Hz with a gaze sampling variability of 2 Hz and values of 0.40 and 0.26 degrees (accuracy and precision respectively).
– Software “SennsLab” (http://www.bitbrain.com): software platform for stimuli presentation and synchronized data collection of all previous devices.

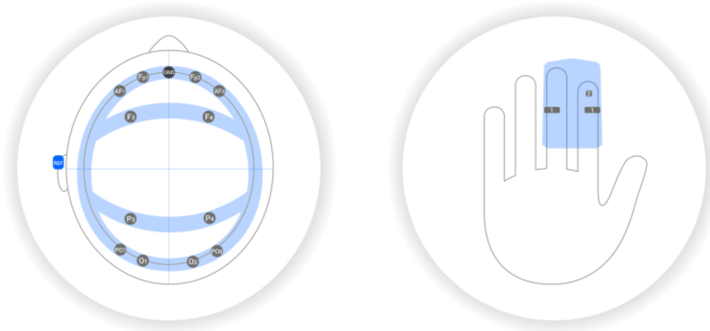

Figure 1. On the left the “Diadem” layout and on the right the “Ring” layout

2.2.1. The stimuli

A transmission via the “Twitch.tv” streaming web page was selected because it is the leading platform for the broadcasting of electronic sports games worldwide (Peyró et al., 2019; Johnson and Woodcock, 2019). In 2018, Twitch viewers live-streamed a total of 2.72+ billion hours (or 72.2% of all live hours watched) compared with 735.54 million hours of YouTube gaming (19.5%), 197.76 million hours of Facebook Gaming (5.3%) and 112.29 million hours (3%) of Mixer (Bashore, 2018). The format of esports broadcast is very homogeneous across games in the same streaming web page.

The stimulus was a 10.5 minutes’ video of the start-stand during the Spanish Final of League of Legends, which showed the moment of picks and bands (choice of character for the match, before the confrontation of teams). This moment was selected because: (1) it is the moment with the most advertisement stimuli; (2) after this phase, the attention of esports spectators is attenuated as they concentrate on the battle phase (Seo *et al*., 2018).

2.2.2. Advertisement and location segmentation

The study encompasses 14 ads (brand logos) belonging to all the advertising brands present at the event, and 14 locations, corresponding to all locations where there were advertising brands in the event ((1) Background screens, (2) Podium, (3) Cup, (4) Flag, (5) Projection, (6) Banner, (7) Shirts in the background, (8) Referee’s shirt, (9) Player’s shirts, (10) Mousepad, (11) Sticker, (12) Chair, (13) Headsets, and (14) Coach’s pants.), which could be on the players, coaches, or referees (clothes or accessories, such as headsets) as well as on different surfaces. The brands were Adidas, Drift, Giants, HyperX, League of Legends, LVP, MAD Lions, Only the Brave, Orange, Ozone, SuperLiga Orange, Takis, Versus, and Vodafone. The locations where segmented into “on the clothes” and “not on clothes”.

Selection of these 14 locations and segmentation considered the camera plans used in the transmission of esports events, and different criteria such as type of display, visual clutter, close-up, camera view (La Ferle and Edwards, 2006), format (Gómez & Puentes, 2010; Sobrino & Ruiz, 2014), and location of the advertising insertion (Costa & Pérez, 2011) used for brand placement in sporting events and television broadcasts.

2.3. Experimental procedure

The experimental procedure lasted approximately 45 minutes and comprised the following steps (see Figure 2):

2.3.1. Briefing and setup

The subject sits at approximately 0.5 meters from the screen. The researcher briefs the participant on the study, and the participant gives the informed consent. The EEG and GSR are placed on the subject by the researcher, and once the software reports adequate signal quality, the researcher proceeds to calibrate the ET following the instructions of the system. Once all the devices are correctly installed with satisfactory signal quality, the researcher proceeds to the next phase.

2.3.2. Data collection

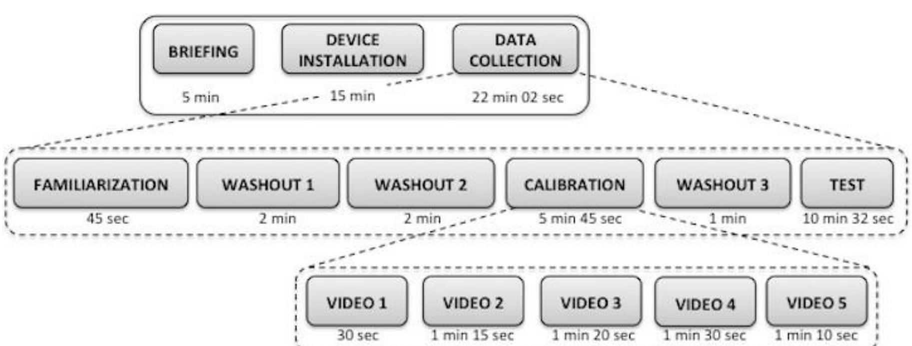

Figure 2. Complete experimental procedure.

This process has six phases, sequentially executed (see Figure 2): Familiarization, Washout 1, Washout 2, Calibration, Washout 3, Test. These phases are described next (Monge-Benito *et al*., 2019).

- In the familiarization step, the participant watches an audiovisual with all the devices installed. The objective is to emulate the real test, so that the participant is comfortable with wearing the technology and understands the dynamics of the study.
- During washout 1 and washout 3, a black screen is displayed with the message “close your eyes”, which indicates that the participant must close his eyes and relax two and one minute respectively. These phases drive the participant to a resting state, so that the physiological state produced in the previous block does not manifest in the following block.
- In the washout 2 phase, a back screen is displayed with a white cross in the center. The participant must try to fix his gaze on the cross for a period of two minutes. This phase forces the subject to keep eyes still, thus avoiding the introduction of artifacts in the EEG in subsequent steps due to the movements of eyes.
- In the calibration phase, the participant watches five videos predefined by the software to induce a maximum and minimum physiological response for all variables (emotional impact, attention, etc.), which will be used as a baseline for the computational models, based in the arousal-valence scale (Russell, 1979).
- Visualization of the target video - test. The participant watches the esports video while all physiological responses are collected.

2.4. EEG and biosignal pre-processing

EEG signals were bandpass-filtered between 0.5-30 Hz, using a fourth order Butterworth filter, and channels with low signal quality were reconstructed using spherical interpolation. An ASR (Artifact Subspace Reconstruction) (Mullen *et al*., 2015) filter was used to remove high amplitude artifacts, and ICA (Independent Component Analysis) (Hyvarinen, 1999) and MARA (Multiple Artifact Rejection Algorithm) (Winkler *et al*., 2011) were employed to remove independent components with artifacts. The IAF (Individualized Alpha Frequency) (Klimesch, 1999) was also computed to address inter subject alpha band differences.

The GSR signals were lowpass-filtered using a fourth order Butterworth filter with a cutoff frequency of 1 Hz, and the signal was then divided into two components tonic (SCL) and phasic (SCR) using a negative deconvolution technique (Benedek and Kaernbac, 2010).

The ET signals were obtained by means of image processing algorithms that identify the reflection patterns of the cornea and extract the exact point of the gaze (Williams *et al*., 1992). A moving average filter (5 samples) was used to lowpass-filter the signal.

2.5. Visual, cognitive, and emotional metrics

The computation of the metrics obtained from the EEG, GSR, and the ET are described next.

2.5. 1. Visual Metrics

- Exposition time T_i^e(%): percentage of time that brand *i* was shown on video with respect to the video's duration.
- Subject visualization N_i^s(%): percentage of viewers that visualized brand *i* with respect to the total number of viewers.
- Visualization time of a brand T_i^{brand}(%) and of a location T_j^{loc}(%): percentage of time that brand *i* or location *j* were effectively visualized by the participants, with respect to the duration of the video. More specifically, fixations are computed (discrete samples of the participant´s gaze on a visual display, obtained from continuous eye movements) (Bylinskii *et al*., 2015) along with the cumulative duration of all fixations of a participant on brand *i* or location *j*. The time that brand *i* or location *j* were effectively visualized by participants is the average time that all participants dedicated to brand *i* or location *j*.

2.5.2. Emotional and cognitive Metrics

- Emotional Impact (IMP_i): Measures the number and intensity of specific changes in the emotional state produced by the brand *i* (i.e., if it attracts attention, causes excitement or stress) (Boucsein, 2012; Golland *et al*., 2014). In particular, the emotional impact is measured when participants fixate on brand *i*, and the average is computed across participants. The latency of SCR responses has been corrected to 2.5 s., and the signal is max-min normalized (0-100) based on the values of SCR recorded in the calibration phase for each participant (Boucsein, 2012).
- Memorization (MEM_i): Measures the intensity of cognitive processes related to the formation of future memories during the presentation of stimulus. In particular, memorization is measured when the participants fixate on brand *i*, and the average is computed across participants. Participant memorization is computed using the Global Field Power in theta frequency band (Klimesch & Doppelmayr, 1996; Long *et al*., 2014), and the signal is max-min normalized (0-100), based on the values recorded in the calibration and test phases for each participant.

– Attention (ATT_i): Measures the focus of a subject when stimulus is presented. Attention is measured when participants fixate on brand *i*, and the average is computed across participants. Participant attention is computed using the ratio between the theta frequencies power in frontal areas and the alpha power in parietal zones (Gevins *et al*., 1998; Klimesch, 1999; Stikic *et al*., 2014). Then the signal is max-min normalized (0-100), based on the values of memorization recorded in the calibration and test phases for each participant.

2.5.3. Adapted metrics for the esports context

- Emotional Impact (IMP_i(%)): for a given brand *i*, this metric captures a combination of the emotional impact of this brand, the number of participants that visualized this brand, and the time during which this brand was visualized.

$$IMP_i(\%) = IMP_i * \frac{T_i^{brand}(\%)}{100} * \frac{N_i^s(\%)}{100} \quad (1)$$

- Memorization (MEM_i(%)): for a given brand *i*, this metric captures a combination of the degree of memorization of this brand, the number of participants that visualized this brand, and the time during which this brand was visualized.

$$MEM_i(\%) = MEM_i * \frac{T_i^{brand}(\%)}{100} * \frac{N_i^s(\%)}{100} \quad (2)$$

- Attention (ATT_i(%)): for a given brand *i*, this metric captures a combination of the degree of attention of this brand, the number of participants that visualized this brand, and the time during which this brand was visualized.

$$ATT_i(\%) = ATT_i * \frac{T_i^{brand}(\%)}{100} * \frac{N_i^s(\%)}{100} \quad (3)$$

- Visual error of a brand (*Err*(%)): This metric captures a combination of the differences between the time that a brand was exposed with respect to the time that it was visualized, and the number of the participants who viewed the brand with respect to the total number of participants.

$$Err(\%) = 100 - \frac{1}{M} \sum_i \frac{T_i^{brand}(\%) * N_i^s(\%)}{100} \quad (4)$$

3. RESULTS

This section describes how the research methodology was employed to evaluate ad effectiveness in esports streaming. Other secondary results are also presented, related to the exposition time metric and the optimal placement of brands for optimal effectiveness.

3.1. Result 1: Evaluating advertising effectiveness in esports streaming

3.1.1. Visualization Time and Number of Participants Metrics

A brand that is not visualized cannot produce any effect on the viewers. The opposite is also valid, as the first step towards ad effectiveness is to reach the maximum number of participants N_i^s(%) and if possible, during the maximum possible time T_i^{brand}(%) (Smith & Swinyard, 1983; Wright & Lynch, 1995). This effect can be measured in the N_i^s(%) × T_i^{brand}(%) space (see Figure 3). Brands on the upper-right part of the Figure are the most effective in terms of visualization, those in the lower-left are the least effective ones, and those located in other quadrants need to be carefully interpreted.

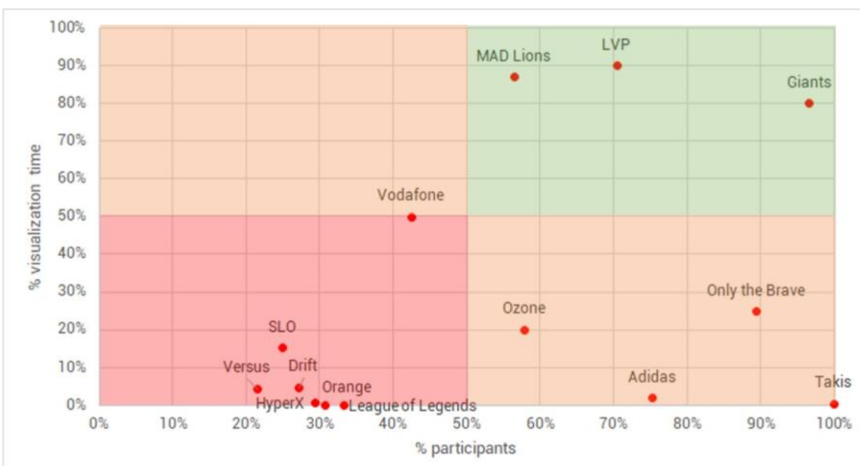

Figure 3. Number of participants that visualize the brand vs. visualization time of brands.

In this case, it is observed that Giants, LVP and MAD Lions are the most effective brands in terms of visualization and number of viewers. These brands were visualized during more than 80% of their total exposition time (MAD Lions 87%; LVP 94.18%; and Giants 79.97%). This means that on average, the brands were ignored by participants during less than 20% of their exposition time. Also, all these brands were seen for more than 50% of the participants (MAD Lions 56.54%; LVP 70.40%; and Giants 96.80%). Figure 3 also shows that Versus, HyperX, Drift, Orange, SuperLiga Orange (SLO) and League of Legends are the less effective brands in terms of visualization and number of viewers. Finally, Vodafone, Ozone, Adidas, Only the Brave and Takis require further analysis to determine which one is more effective.

3.1.2. Emotional and Cognitive metrics

Although the idea behind ad effectiveness is that the ad should be long as possible by the highest amount of people, this is probably not sufficient. It is also desirable that the emotional and cognitive reactions are appropriate when the ad is seen (herein it is proposed that ads should attract high levels of attention, memorization, and emotional impact). The metrics ATT_i(%); MEM_i(%); and IMP_i(%) capture a combination of all these variables: emotional or cognitive reaction during brand visualization, time of visualization, and number of participants who see the brand.

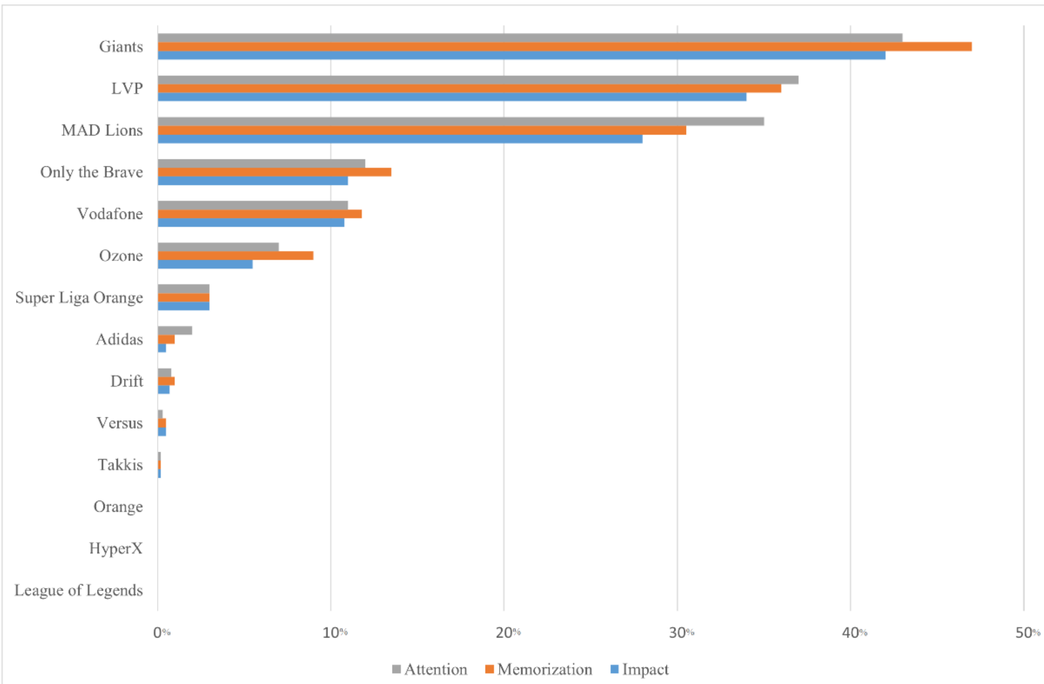

Figure 4. Non-conscious emotional and cognitive reactions to brands

Figure 4 depicts how Giants is the most effective brand during this broad- casting while HyperX, Orange, and League of Legends are not effective. This new metric helps distinguish between results that are not so clear in the N_i^s(%) × T_i^{brand}(%) space. For instance, Adidas has a higher percentage of participants seeing the brand than Ozone, while Ozone has more visualization time than Adidas. Thanks to the emotional and cognitive metrics, it can be concluded that Ozone is more effective than Adidas.

3.2. Result 2: Exposition time is not a valid metric

The error of the exposure time of the brand regarding the viewers who visualized the brand is 60.18%, and if the same ratio of Equation 4 is applied to the 14 brand placement locations, error is 60.09%. This indicates that the exposition time of a brand has a considerable error with respect to the real visualization of the participants when modeling effectiveness.

3.3. Result 3: Optimal brand placement for ad effectiveness

The same effectiveness analysis carried out for brands can be developed for ad placements. Utilization of the $N_j^s(\%) \times T_j^{loc}(\%)$ space identifies the most effective placements in terms of visualization time and number of participants (see Figure 5). In this case, the Background Screen, T-Shirts, and the Banner were optimal ad placements, while sticker were the less effective location.

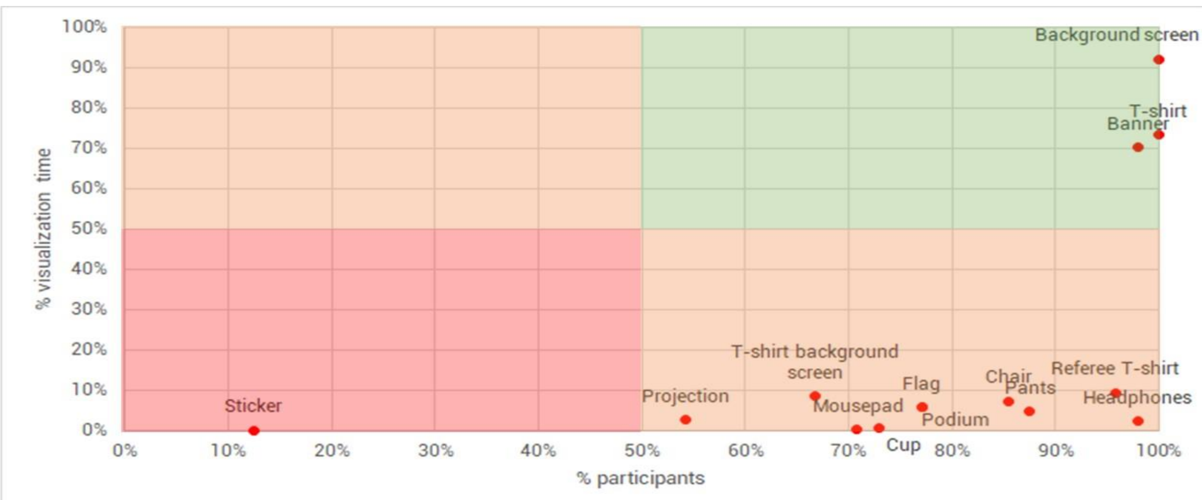

Figure 5. Number of participants that visualize the brand placements vs. mean visualization time of brand placements.

When including emotional and cognitive metrics (see Figure 6), the background screen is indicated as an optimal area for brand placement, while the mousepad and stickers are not effective at all. Emotional and cognitive metrics help distinguish locations and highlight the lower-right area of the $N_j^s(\%) \times T_j^{loc}(\%)$ space. For instance, although the mousepad was located in the lower- right area of the space, no effectiveness was verified. The most effective places for advertising are the Background Screen and the Banner.

Considering ad placement on clothes and accessories (players, referees, coaches) and on different surfaces, the following results were obtained: (1) On average, when ads were placed on people, 87.50% of participants visualized them during 151.79 seconds (24.02% of the total time). When ads were placed on other surfaces (not on players, referees, or coaches), these were visualized by 74.58% of participants for 118.44 seconds (18.74% of the total time). Therefore, effectiveness (in terms of visualization time and number of participants) is higher when ads are placed on clothes and accessories. (2) Based on the cognitive and emotional metrics, ad placement on people’s clothes and accessories are also the most effective, with 13.42% average emotional impact, 14.21% attention, and 13.81% memorization. When ads were placed on other surfaces, these parameters were 10.14%, 11.07% and 13.81% respectively.

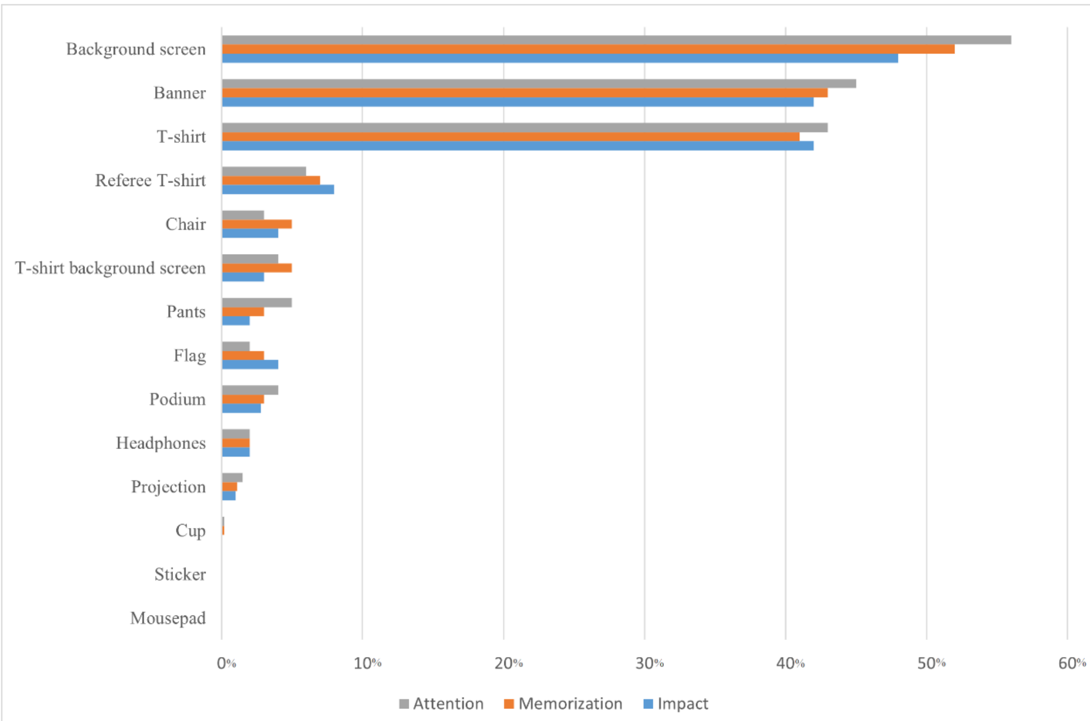

Figure 6. Non-conscious emotional and cognitive reactions depending on brand placement

4. DISCUSSION

This study addressed an important issue for marketing: how to assess the real effectiveness of esports sponsorship for a brand. The main result of this study is an implicit research methodology to evaluate ad effectiveness in esports streaming from a non-conscious point of view. This methodology is based on EEG, GSR, and eye-tracking measurements to build a set of visual, emotional, and cognitive metrics, which up to date had not been explored before in esports. A case study was developed to demonstrate the methodology, aimed at assessing ad effectiveness for 14 brands during a match of League of Legends, with 48 participants. Non-conscious metrics are be used to establish evaluation procedures for brand effectiveness, based on the amount of people visualizing the ads and the duration of visualization, the emotional impact generated, the attention attracted, and the probability of ad memorization. An additional result of this study refers to the exposition time of a brand. In TV (Arafar & Saleem, 2010) and sports (Liao et al., 2017), brands classically used exposition time as a key metric, obtained manually or by computer vision algorithms that automated brand detection in video streaming (examples of these companies include http://www.gumgum.com, or http://www.blinkfire.com). The findings presented herein suggest that the exposition time metric has an error of 60.18% when capturing the real visualization of a brand, and of 60.09% in the visualization of a specific location. This error is relevant and directly affects the main effectiveness metric used so far.

It was also shown that the ad placement of a brand plays a decisive role in advertising when considering esports streaming. When not focusing on ads placed on clothes, the Background screen is the most effective placement. The background screen stands out significantly and changes throughout the course of the video, showing different advertising stimuli and occupying most of the space in the scene. This is consistent with the findings of Berlyne (1970), who states that more complex stimuli attract more attention (hence, greater visualization by the subjects). Under the same premise, Butler (1953) indicates that larger objects are eye-catching and naturally attract attention first. When ads were placed on clothes or accessories (players, referees, coaches), the players' shirts are the most remarkable placements, because considerable streaming time is dedicated to the player in the center of the screen. This corroborates the research of Namahn, 2001, who found that subjects look first at the center of the screen and then to the logos (first fixations) (Djamasbi & Tullis, 2010). According to the results presented herein, the optimal locations for brand placement are Background screen, shirts, and Banner. These are the locations for optimal ad placement when transmitting advertising information (brands) during esports streaming, generating positive changes especially at the levels of attention, memorization, and emotional impact.

The practical shortcoming of the proposed methodology is its high implementation cost, due to the equipment, and because participants must be personally at the lab for the research. The methodology presented herein is more accurate than automated technologies but entails a higher monetary cost. The main limitation of this study is the generalization of secondary results (those related to exposition time and optimal ad placement). It was assumed that esports streaming is homogeneous across games and platforms, and thus the study relied on the evaluation of one audiovisual only. So, all the conclusions reached herein are constrained to the stimuli used. Future work will employ different and greater stimuli in the analysis, to delve more deeply into the implications of the two secondary results of this study.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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