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RESEARCH

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NEUROMARKETING METHODOLOGY: SOCIOGRAPH MEASUREMENT APPLIED TO THE ANALYSIS OF THE EROTIC AUDIOVISUAL NARRATIVE AND ITS APPLICATIONS TO THE MARKETING STRATEGY

Metodología de neuromarketing: medición de sociograph aplicada al análisis de la narrativa audiovisual erótica y sus aplicaciones a la estrategia de mercadotecnia

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ABSTRACT

We present a neuromarketing research study with the intention of verifying the ability of the Sociograph technique so we can evaluate the reactions (attention and emotion-wise) in the viewing of erotic material and verify if the technique is capable of discriminating differential reactions that can be effectively applied in marketing strategies. A practical application of the electrodermal signal (EDA) is presented as a methodology to measure group behavior, using Sociograph technology. An exploratory study is proposed in which the attention and emotional response of two groups (males N=8 and women N=8) in the viewing of erotic material is analyzed. The results indicate a differentiated activation pattern. While both groups show high initial activation, only the male group reduces their activation during the most erotic parts. Possible applications to marketing strategies according to the results and the need to include methodologies from the field of neuroscience to consumer study are proposed in which the different scenarios of the viewing of the material are contemplated, which allow evaluating the subjects' responses both in situations of individual viewing and in group viewings.

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KEY WORDS: neuroscience – Sociograph – neuromarketing – advertising – consumer neuropsychology – consumer neuropsychology – advertising strategies.

RESUMEN

Presentamos un estudio de investigación desde el enfoque del neuromarketing cuyo objetivo es verificar la capacidad de la tecnología Sociograph para evaluar las reacciones de atención y emoción en el visionado de material erótico y verificar si la metodología empleada es capaz de discriminar reacciones diferenciales aplicables a las estrategias de marketing. Se presenta una aplicación práctica de la señal electrodérmica (EDA) como metodología para medir la conducta grupal mediante la tecnología Sociograph. Considerando las variables emoción y atención determinantes en el proceso de persuasión se propone un estudio exploratorio en el que se analiza la respuesta atencional y emocional de dos grupos (varones N=8 y mujeres N=8) en el visionado de material erótico. Los resultados indican un patrón de activación diferenciado. Mientras que ambos grupos muestran alta activación inicial, solo el grupo de varones reduce su activación durante el tramo más erótico. Se plantean posibles aplicaciones a las estrategias de marketing según resultados, así como la necesidad de incluir metodologías procedentes de la neurociencia al estudio del consumidor, que contemplen distintos escenarios del visionado del material para poder evaluar respuestas tanto en situaciones de visionado individual como grupal.

PALABRAS CLAVE: neurociencia – Sociograph – neuromarketing – publicidad – neuropsicología del consumidor – neuropsicología del consumidor – estrategias publicitarias.

METODOLOGIA DE NEUROMARKETING: MEDIÇÃO DE SOCIOGRAPH APLICADA A ANÁLISES DA NARRATIVA AUDIOVISUAL ERÓTICA E SUAS APLICAÇOES A ESTRATÉGIA DE MERCADOTECNIA

RESUME

Apresentamos um estudo de investigação desde o enfoque do neuromarketing cujo objetivo é verificar a capacidade da tecnologia Sociograph para valorar as reações de atenção e emoção no visionado de material erótico e verificar si a metodologia empregada é capaz de discriminar reações diferenciais aplicáveis às estratégias de marketing. Se apresenta uma aplicação prática do sinal eletro-dérmico EDA como metodologia para medir a conduta grupal mediante a tecnologia Sociograph. Considerando as variáveis emoção e atenção determinantes no processo de persuasão se propõe um estudo exploratório no qual se analisa a resposta de atenção e emocional de dois grupos (homens N=8 e mulheres N=8) no visionado de material erótico. Os

resultados indicam um padrão de ativação diferenciado. Enquanto que ambos grupos mostram alta ativação inicial, somente o grupo de homens reduz sua ativação durante uma parte mais erótica. Se propõe possíveis aplicações ás estratégias de marketing segundo os resultados, assim como a necessidade de incluir metodologias procedentes da neurociência ao estudo do consumidor, que contemplem distintos cenários do visionado do material para poder valorar respostas tanto em situações de visionado individual como grupal.

PALAVRAS CHAVE: neurociência – Sociograph – neuromarketing – publicidade – neuropsicológica do consumidor – estratégias publicitarias.

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1. INTRODUCTION

The emergence of new technologies during the first years of the new century in different areas of the social sciences is an important revolution in the knowledge of our brain and its superior functions. This not only opens conceptual boundaries but also methodological boundaries; this is the case of the emergence of neuroimaging techniques that are revolutionizing social research (Alcover, 2008; Harmon-Jones and Beer, 2009; Ramachandran, 2011). All this has given rise to the concept of neurosciences, representing the emergence of new paradigms, new working models, new questions and new fields of knowledge. Terms like neuromarketing, neuroeconomics, neuroethics, neuropolitics, and others open the door to new questions and different ways of seeking answers from more interdisciplinary perspectives. Thus, the new discipline of neuromarketing began to be built with authors such as Ale Smith, Nobel Prize in Economics, with his theoretical applications of neuropsychology to marketing; Garry Zaltman, first neuroscientist to apply fRMI techniques to the study of the consumer; Herbert Krugman, pioneer in decision-making study and neurophysiological responses through pupilometry and eye movement techniques, or McClure, Li, Tomlin, Cypert, Montage and Read who, in 2004, published what is possibly the first neuromarketing article: Correlates of Behavioral Preference for culturally familiar drinks.

Theoretical contributions such as the one raised by Antonio Damasio from his Somatic Markers or the Nobel Prize Daniel Kahneman on human judgment and decision-making, have been key to break the anthropological dualism that conditioned the analysis of the receptor to surface and little or not objective parameters. In less than a decade the weight of emotions in the study of the consumer has gained great relevance; we now know that the receiver does not make decisions based solely on rationality and, in addition, traditional methodologies based on social sciences such as the interview, surveys, or focus group are insufficient to study the behavior of the subject, since it is the consumer himself, whom we cannot accuse of lying but rather of not knowingly knowing the origin of their behavior, which can lead us to erroneous results.

The scientific community begins to assume the need to implement mixed research systems that respond to the new conceptual approaches and are necessarily conditioned to the application of methodologies that allow an optimal analysis by measuring activations of the nervous system to clarify the basic processes in the construction of decision making. The new advances in technologies and the evolution in the applications in the study of brain functions allow neuromarketing to access the necessary tools to be able to solve the gap produced by the application of more classical methodologies, providing more complete and complex studies on non-conscious processing, largely responsible for our behavior.

2. JUSTIFICATION OF THE SUBJECT AND OBJECTIVES

In recent years, the neuroscience revolution has reached the professional world in the hands of the marketing consultants. Traditional research methods used in copy testers have shown shortcomings that have often entailed substantial losses for advertisers. The arrival of the new theoretical approaches together with innovative methodologies are allowing research around consumer behavior much closer to the reality of brain functioning, achieving a more optimal approach to the knowledge of processes such as perception, memory, attention, emotion or decision making, fundamental variables in the development of the marketing strategy. Predicting the consumer response is a key element in the task prior to the strategic approach, each and every one of the actions we carry out will depend on it.

Until now, the use of methodologies such as the interview, the focus group or the survey were key pieces to predict the behavior of the receiver, obtaining results always associated with the most conscious part of the subject. With the arrival of the new paradigms we began to discover the essential role of non-conscious processes in decision making and, with them, in the acts of users' loyalty and purchase. The real problem is that, through classical techniques, we were asking the less influential part in decision-making: "The mind does not know what the tongue wants" (Gladwell, 2004) and, as

advocated by advertising experts, consumers often hold opposing views to those they really defend publicly (Walker 2014).

Kahneman explains that the decisions made by the subject conform to a double processing based on two systems. Our system 2, which works with the data obtained from memory through an involuntary automatic operation of system 1 or automatic system The conscious mind, to which we ask through classical techniques, is loaded with biases caused by our heuristic thinking systems, whose role is to justify and argue the decisions made from our automatic or non-conscious processing (Kahneman, 2015). Thus, when we ask our system 2 for our brands, or spot, we get little or no answers consistent with the origin of the decision-making process, since the subject does not really know that start.

The experiment conducted by Professor Soon's team by monitoring the frontopolar cortex with fMRI techniques had as a basic objective to know what was happening at the exact moment in which decisions were made. The monitored activity showed that the choice occurred seven seconds before the participant made the decision conscious. (Soon, Brass, Heinze and Haynes, 2008). Therefore, everything points to think that attention and emotion play a key role in the processing of system 1.

The somatic marker hypothesis, formulated by Antonio Damasio (2012), describes the process of emotion from markers that cause a sensation of alarm at a non-conscious level, generating feelings whose initial origin is emotions, innate or learned. When making a decision, our brain turns to the knowledge and experiences acquired in the course of life. This search results in somatic reactions (vegetative, muscle, neuroendocrine, neurophysiological changes) associated to an emotional state, generating automatic signals that condition decision making even before the subject is aware of it, preventing the receive , in large part of the statements, from stating what the real origin of the behavior has been. Damasio defines these signals as somatic markers, since they are produced by the body itself.

The emotion we associate with our brand or product will be part of the whole neural map of the organism, it can entail an association with cheerful emotions and their variants or based on emotions of sadness, fear or anguish, these associations will condition decision making in relation to our marketing actions. Thus, our organism shows a behavioral preference based on these neuronal maps that have their origin in signals sent by emotions and they are produced in a non-conscious plane that we can reach with many difficulties through more classical study methodologies. This process often makes it difficult to explain our decision making.

There is another circumstance added in the case of research on certain taboo issues in society that lead to the appearance of biases such as social desirability, or tendency that

the individual has to respond in a way that will be seen as favorable by the others (Salgado, 2005) that hinder research with traditional techniques.

The new neuromarketing techniques allow a more reliable approach to consumer behavior by eliminating manipulation in the response and managing to reach basic processes in decision making such as emotion and attention that takes place at a non-conscious level.

The aim of this study is to show a practical example of the possible applications of measurements with the Sociograph methodology to marketing strategies.

3. THEORETICAL FRAMEWORK

This paper proposes a practical application of Sociograph technology developed by our team (Martínez-Herrador and Garrido-Martín, 2003, 2005) for use in the analysis of the behavior of the receiver when faced with the audiovisual narrative. This new social research technology was patented by the University of Salamanca. The Sociograph is based on the measurement of electrodermal activity and livelihood in the Systemic Approach.

Electrodermal activity -EDA- is a psychophysiological measure with long experience in multiple fields of psychological research and with a broad methodological tradition (Boucsein, 1992, 2010; Roy, Boucsein, Fowles and Gruzelier, 1992). It has been used in the measurement of interpersonal processes, attitudes, cortical activation (arousal), in emotional and attentional reactions to stimuli, anxiety, personality traits and in psychopathology. It shows a high level of sensitivity that depends on sympathetic-adrenergic activation and can be considered empirical evidence of modifications in the cognitive or emotional state of people, being a good indicator of psychosocial significance (Hugdahl, 1995; Smith and Ruiz, 2002).

EDA is configured in three basic elements: 1) the EDL activity (Electrodermal Level), the tonic level of the activity and related to the attention or cortical tone, the basis of the cortical activity both involuntary and voluntary; 2) the NSA activity (Non Specific Activity) indicates the variations of the vegetative spontaneous activity or vegetative arousal, closely related to personality traits and emotional states, and 3) the EDR (Electrodermal Response) activity, which shows phasic changes arising as a reaction to external activating stimuli, both in EDL and in EDR - and, consequently, it is shown as a reliable indicator of reactions to the environment (Fernández-Abascal, 2003; Sánchez-Navarro, Martínez-Selva, Román and Torrente, 2006; Sánchez-Navarro, Martínez-Selva, Torrente and Román, 2008). EDA, therefore, is presented as a good indicator of activation, attention, emotional and cognitive processes (Dawson, Schell and Filion, 2007; Hugdahl, 1995). Its variations are understood as evidence of changes in the cognitive-emotional

state of people and it is an appropriate measure for cortical and emotional alert states, thus becoming an adequate somatic marker (Damasio, 1995, 1998).

The Sociograph methodology provides an instrumentation adapted to an optimal group registration measure since it allows to deepen the group topics from another perspective, giving a meaning to the group processes and structures that can revert in knowledge and in the contribution of theoretical approaches from a biopsychosocial model, assuming the systemic paradigm of the groups.

People's emotional reactions can suffer significant variations in a group situation, not only because of mutual influences and expectations about the behavior of others, but also because of what each group member thinks they perceive as to how others perceive or hope to perceive their responses. It seems clear that a technology that can measure the changes of the psychophysiological markers of the group as a whole can become an interesting methodological contribution to the discipline of neuromarketing. This new support may involve modifying the parameters of audience studies and strategic planning of media, limited so far to the study of the subject as an individual entity, leaving aside the variations in response that may occur taking into account the circumstances of viewing in a group situation .

The Sociograph, as a group research technology, is a methodological innovation the purpose of which is the simultaneous and time-synchronized measurement of EDA in a group of individuals, not limited in principle in their number, making it possible to obtain the average value and the changes of the EDLg activity in resistance or conductance values, according to the method chosen (Constant Current (CC) or Alternating Current (AC)), indicating the level of cortical activation (arousal) involved in the activation-relaxation and attention processes; these levels will be the averages of the group. The derivative of this activity is obtained, separated and amplified by a capacitive system in order to evaluate the NSAg and EDRg activity and allow data processing.

3.1. Basic fundations of Sociograph

The NSA activity is, by its own definition, random and representative of the vegetative arousal of each subject, and its innervation is fundamentally sympathetic. A wide variety of studies show its high and linear relationship with the stimuli of emotional content, personality and affective states (Crider, 2008; Kucera, Goldenberg and Kurca, 2004; Papousek and Schulter, 2001; Sánchez-Navarro, *et al.*, 2006; Sánchez-Navarro, *et al.*, 2008). Different cortical and subcortical structures such as the prefrontal areas, the orbitofrontal cortex, both tonsils and the isles take part in its functionality. We have, therefore, a signal with great psychological content but at the same time with a wide range of randomness typical of the variability of the individual and idiosyncratic vegetative arousal of each individual, that is, not linked to specific

stimuli; thus, we can find subjects with very low values of vegetative activity or with very high levels of activity. In the first case, the presentation of a stimulus elicits a response -EDR-, easily detectable and quantifiable on the baseline of the NSA activity; otherwise, in individuals with a very high spontaneous activity, the EDR response is subsumed within the high level of vegetative activity or noise, thus detecting and quantifying it is difficult. In the Sociograph, the NSA activity of each subject is amplified and its processing is carried out in real time with a time-series methodology. That is, each individual value is added at the same time of the record and its sampling. If a sampling of 20 values per second is used, the resulting one will be a variable composed of the sum of the values of the 12 or 24 subjects at each moment of the time series (every twenty-second part of the second) but with the particularity that, being an algebraic sum, the increases in value in some subjects would be annulled with a decrease in the values of the rest so, in principle, the resulting signal would tend to zero. If the signals coincide in time they are added; if they diverge, due to their randomness over time, they are subtracted or canceled. For this reason, to the extent that the number of subjects measured simultaneously increases, the signal-noise ratio increases, thereby improving amplification, sensitivity and resolution. A temporal and synchronous relationship is established between the signals of each subject.

In this sense, it could be understood that the group eliminates the noise of the group signal, or in other words, the randomness of the signal is very attenuated. Now, if at any given moment, and before a given stimulus or controlled situation, all the individuals reacted at the same time, the sum of the changes would go in a single direction and we would obtain a signal of high rank, proportional to the sum of all the reactions of the group at any given time. The Sociograph works as an amplifier, with predetermined gain, of any signal shared by the group, allowing detection of reactions that would otherwise be very difficult to obtain, since in the event they existed, they may not be detectable, as a result of the vegetative arousal of each of the subjects. Therefore, to the extent that the number of individuals measured simultaneously increases, the signal-noise ratio increases the possibilities of amplification and resolution. The subjects behave as controls among themselves in such a way that the respective NSA activity will tend to be reduced, highlighting the most shared and representative values of the group.

In summary, the technique makes it possible to quantify the variables EDLg, NSAg, EDRg, and Asymmetry, both in real and deferred time, by applying different statistical analyses, signal components and integrals (Román-Lapuente, García-Sanchez and Gómez-Amor, 1986). These variables will allow more precise information on the emotion and attention of the subjects to visual content, without the subjects consciously intervening on the responses, eliminating the desirability bias and providing more objective and reliable results in researching the behavior of the receiver.

4. METHODOLOGY

4.1. Participants

The subjects were selected through a non-probabilistic sample of voluntary participants directed by gender criteria. The sample was formed by 16 university students (8 men and 8 women), aged 20-21 years.

4.2. Instruments and variables

The instrument used was a prototype of Sociograph developed by the team and already experimented in other studies (Martínez-Herrador, Monge-Benito and Valdunquillo-Carlón, 2012). For the signal processing, a PowerLab 425 data acquisition device from ADinstruments was used with LabChart 6 software.

In Sociograph, data are temporally related. The electrodes used were similar to the MLT116 model of the same company. They were used in a dry record and placed in the second phalanges of the middle and ring fingers of both hands. The measurement system of the Sociograph's EDA is that of Constant Current (CC), which has the Kilohm (KΩ) as a unit of measurement.

Denominations proper to the traditional variables of electrodermal activity were generated, as they are group signals. Thus, the variables EDL and NSA become EDLg and NSAg or group signals.

The variables recorded and configured in the software were five, as reflected in Table 1:

Table 1. Configured and transformed variables.

1.	***EDLg.HD*** *(Electrodermal Activity Level*	HD
2.	***EDLg.HI*** *(Electrodermal Activity Level)*	HI
3.	***NSAg.HD*** *(EDRg.HD) (Non Specific Activity)*	HI
4.	***NSAg.HI*** *(EDRg.HI) (Non Specific Activity)*	HI
5.	***Coeficiente de Asimetría***	

Source: own elaboration.

The activity of responses to stimuli -EDR- will be evaluated differentially in relation to the stimuli that elicit it. In this case, we would designate it EDRg, as it is also a group.

A calculated 5th variable (channel 5) was generated as a measure of differential hemispheric activation, whose denomination is Ratio of Asymmetry or Lateralization (Roman-Lapuente, et al., 1986), applying the proportional differences formula of the EDL activity:

$$\frac{(EDLg.HD - EDLg.HI)}{(EDLg.HD + EDLg.HI)}$$

This equation assumes an index of proportionality - Asymmetry - that indicates when the activation of one hemisphere is equal to or greater than the other. Values can range from +1 to -1. Positive values indicate left asymmetry and negative values right asymmetry (Freixa and Baqué, Bonis, 1983).

Variables 3 and 4 - NSAg.HD and NSAg.HI - are transformed since they have been extracted from the variables EDLg.HD and EDLg.HI whose means are not equal and, therefore, must be converted into proportions; since they are reactions, they will be called EDRg.HD and EDRg.HI . In order to obtain and compare them statistically, they are transformed by the operation:

$$EDRg.HD = \frac{(EDLg.HD - NSAg.HD) * 100}{EDLg.HD}$$

and

$$EDRg.HI = \frac{(EDLg.HI - NSAg.HI) * 100}{EDLg.HI}$$

The results will be proportional and make it possible to compare the data of each hemisphere and between genders. The same will be done with the left hemisphere.

The five records were processed with a sample of 20 data per second, with a total of 12,000 data per channel, although, for subsequent analysis, a sample of 600 data (one data per second) was considered sufficient. In turn, these five registers were subdivided into two sections: 1) without erotic content and 2) with erotic content; each being five minutes long.

EDL activity values are shown in resistance values (Kilohms)., high values show low cortical activation or arousal -parasympathicotonia- and low values show high cortical activation or arousal -sympathicotonia-. Thus, the different resistance values indicate cortical activation values.

The two NSAg variables reflect the small changes or momentary fluctuations of the EDA. They are extracted and isolated from the main EDLg signal by way of electronic

processing (calculation of derivatives). They are, therefore, fluctuations (phasic) of the tonic signal and can be, in turn, reactions to stimuli - EDRg - or spontaneous activity - NSAg -. In this second case, the NSA activity, whether individual or group, is a good indicator of lability or vegetative stress and, consequently, of emotional reactivity, unlike the EDRg that represents changes in resistivity to given stimuli. The Asymmetry variable deserves a special mention since it has been a poorly evaluated indicator and applied to this type of research.

The Asymmetry Ratio shows, in the first place, in what proportion one hemisphere is more activated in each group and section with respect to the other and, secondly, the Slope indicates the magnitude, intensity, direction and speed of the change as a reaction to the situations or stimuli. This variable represents the difference in ohms as a function of time. If there was a change in resistance, it would occur for a time and the greater the change and the less time, the greater the value of the slope. These changes can show an increase or decrease in resistance; if the value of the slope is positive it indicates increased resistance and therefore decreased activation; otherwise, if the value of the slope is negative , it would reflect an increase in activation. In the same way, it could indicate which of the hemispheres responds with greater activation to a situation or stimulus, regardless of the baseline asymmetry of the group. This type of analysis can open new fields to questions about how each hemisphere participates in cognitive, emotional, and behavioral processes.

4.3. Procedure

The experimental task consisted in viewing a fragment of the erotic film Expectation (Robert Mc Callum, 1982). The fragment was selected due to its high erotic content for both genders. Its duration was 10 minutes, divided into two parts of 5 minutes each. In the first one, some young people interact with each other without sexual activity. In the second one, the group began a sexual approach that is gaining tension with multiple sexual practices until it finally results in mutual orgasms and with very explicit sexual images.

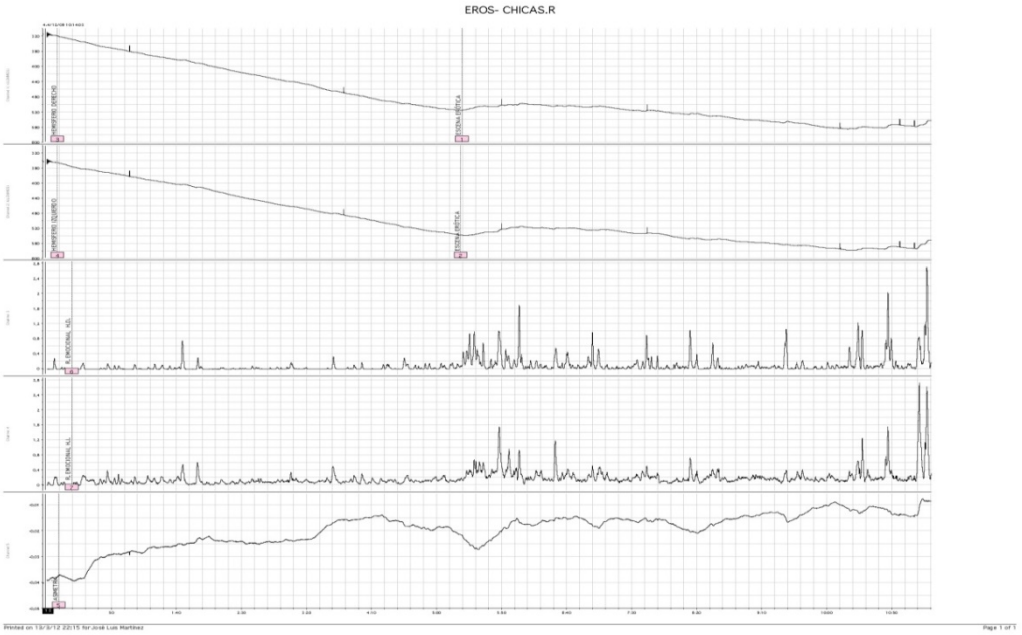
The experiment was conducted in an ad hoc conditioned room. Participants were previously informed of what they were going to see, and they were asked to make their behavior as spontaneous as possible. Similarly, they were told that there would be no other activities or evaluation because we only wanted to assess their emotions when viewing the film. There were two independent sessions in time, one for men and one for women.

5. RESULTS

Once the tests were carried out and the records obtained, the data from the five channels of assessed records were processed, plus the time variable. The data recorded through the LabChart software were exported to Excel and from there to the statistical

program SPSS 16 for a later analysis that could made it possible to compare the differences between the two fragments with each other, and in turn, the differences between genders in both situations.

For the analysis of results, we present, first of all, a graphic view of the data obtained in the records presented visually. Although the data we obtained are very abundant, we will focus only on the most relevant. Figures 1 and 2 show the results. The first corresponds to the records of the five variables in the sample of the 8 women; the second corresponds to the registration of the 8 men. In them you can see the various registered channels: 1st. EDLg.HD , 2nd. EDLg.HI, 3rd. NSAg.HD , 4th. NSAg.HI and 5th. Asymmetry ratio. Also, it reflected the beginning and end of each section.



Note: Compressed Record.

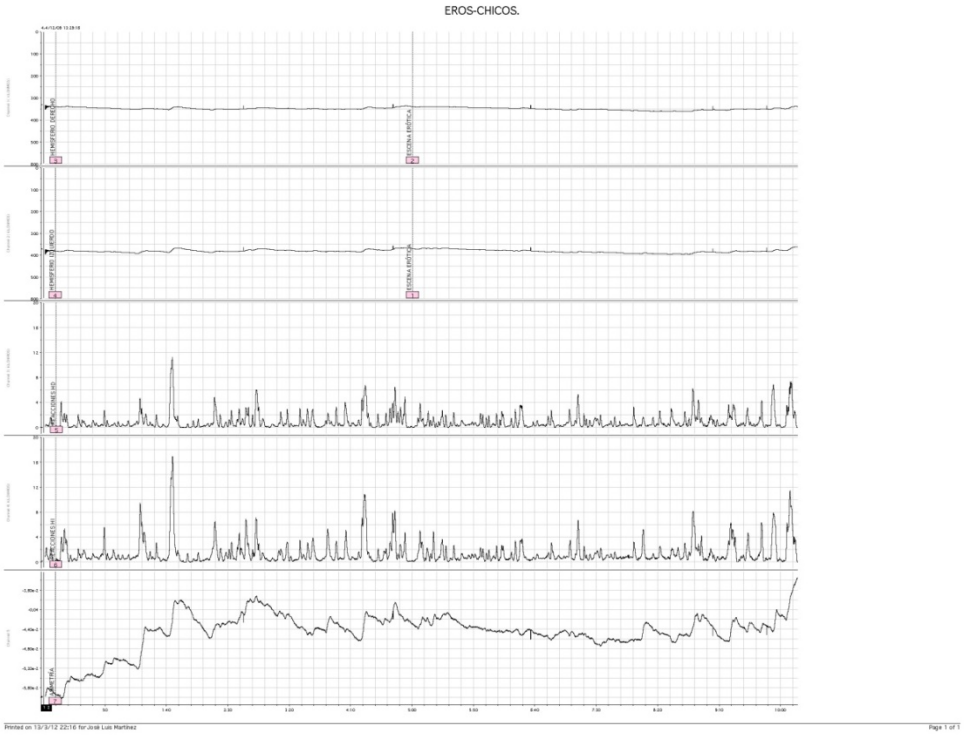
Figure 1. Record of the EDA and EDA-D obtained by the group of women.
Source: own elaboration.

If we focus on the first two channels - EDLg - we can observe that, in the first section (without erotic content), a steep slope appears indicating an increase in the level of resistance corresponding to lower activation over the initial high value (arousal), reflecting a tendency towards relaxation. The result of the second section suggests greater stability of the variable, although, in the first scene and its contents, there is clearly increased activation that decreases slightly until it increases again in the final section of the erotic scene. Channels 3 and 4, phasic or spontaneous electrodermal activity, NSAg or vegetative arousal, an indicator of emotional states, show a stable difference in activity

between the two sections, the second (with erotic content) having more variability. The appearance of a clear and evident EDRg response can be observed.

When visually comparing the two sections (without erotic content and with erotic content), obvious differences are observed. Channels 1 and 2 (EDLg) show increased activation with fluctuations that appear more sharply in the end, corresponding to the final scene of orgasm. In channels 3 and 4 (NSAg) there is a difference in spontaneous activity that shows very intense peaks of EDRg activity related to the different sexual practices that appear in the film, showing greater reactivity in the last scene.

Channel 5 corresponding to the variable Asymmetry ratio shows a right asymmetry with negative values but with a trend towards less participation of the hemisphere, although without a left domain. This change is accentuated at the end of the erotic section in which a marked increase towards the left hemisphere is reflected. This variable could be an interesting valence evaluation system, given the implications that various authors attribute to HI more participation in positive emotions and to HD in negative ones. (Damasio 2012, Davidson 2003), In this specific case, the tendency towards less participation of HD and a greater tendency towards HI would seem to go in that direction.



Notes: Compressed Record.

Figure 2. Record of the EDA obtained by the group of men.
Source: own elaboration.

Figure 2 shows the results obtained in the male group. Following the same explanatory line of the previous graph, it can be seen visually that the behavior of the male group is different from that of the female group. The activation levels EDLg.HD and EDLg.HI start from high initial values and very similar to those of the group of women; however, in this case, there are no changes that indicate relaxation during the first section. In the second section there are also no evident changes in activation, while the activation of attention is maintained.

In channels 3 and 4 the results of the activity NSAg.HD and NSAg.HI are shown. A visual inspection indicates a very similar activity (at the expense of its confirmation by statistical analysis) between the neutral and erotic sections. While channel 5 of the variable asymmetry ratio indicates values very marked to right activation, more intense in the first minutes and stabilized later with a significant slope approaching to a left activation coinciding with the last moment of the erotic outcome; a result similar to that observed in the registry of the group of women, although in neither case was it passed to the domain of the left hemisphere.

For the visual analysis of the results to make sense, we presented a statistical analysis of the results globally, although it could be a more detailed analysis of the different reactions to each of the sexual behaviors. This type of analysis would be possible given the synchronization between images and records, but it is outside the objectives of this article.

Next, table 1 shows the values obtained by the two groups in each of the five variables and in each of the fragments projected in the experiment session.

Table 1. Results of means and standard deviations in both groups.

	Grupo Mujeres		**Grupo Varones**	
	Tramo Neutro (n=300)	Tramo Erótico (n=313)	Tramo Neutro	Tramo Erótico
EDLg.HD	419,0 (61,4)	528,4 (23,2)	346,6 (4,2)	350,0 (6,2)
EDLg.HI	439,6 (59,8)	545,2 (21.2)	379,7 (5,4)	382,3 (7,9)
NSAg.HD	,0139 (,063)	,1446 (,263)	,2606 (373)	,2481 (296)
NSAg.HI	,0917 (,069)	,2572 (,261)	,3812 (518)	,3485 (388)
Asimetría	-,0248 (,006)	-,0157 (,003)	-,0453 (,005)	-,0440 (002)

Note: the SD of the five variables evaluated in both groups and sections (in parentheses). The values are expressed in Kilohms, except the variable *Asymmetry,* expressed in proportions, according to the formula indicated. Sections in parentheses, number of samples of the signals.

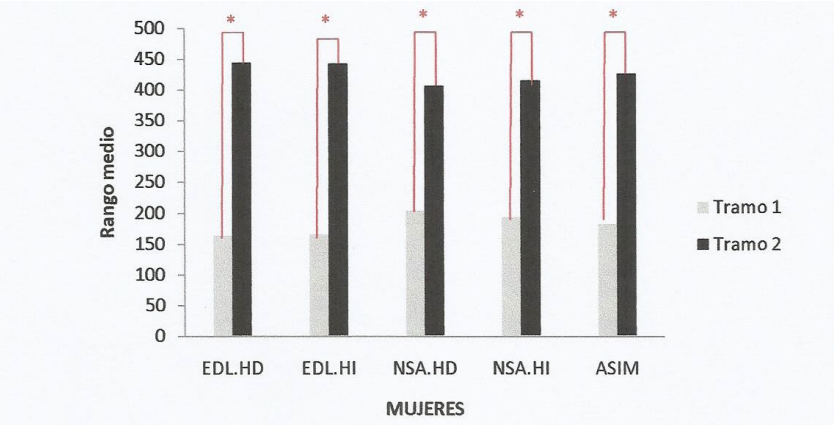
Source: own elaboration.

We can observe the differences in the means and standard deviations between the two sections of the registry and between women and men. The data suggest a higher level of initial activation in men as compared to women.

Similarly, the results reveal that the value of the activation of the right hemisphere is lower than that of the left, which suggests an asymmetry towards the predominance of the right hemisphere in both groups. Also, the differences observed in the standard deviations of the two groups should be emphasized. A clearly differentiating data of both genders is the so-called average slope, (AS) or "average slope" that refers to the trend and the rate of change of the EDLg activity, either towards the decrease in its values or its increase. Psychophysiologically, a decrease in resistance would indicate an increase in activation-attention and an increase in resistance would refer to processes of relaxation or habituation.

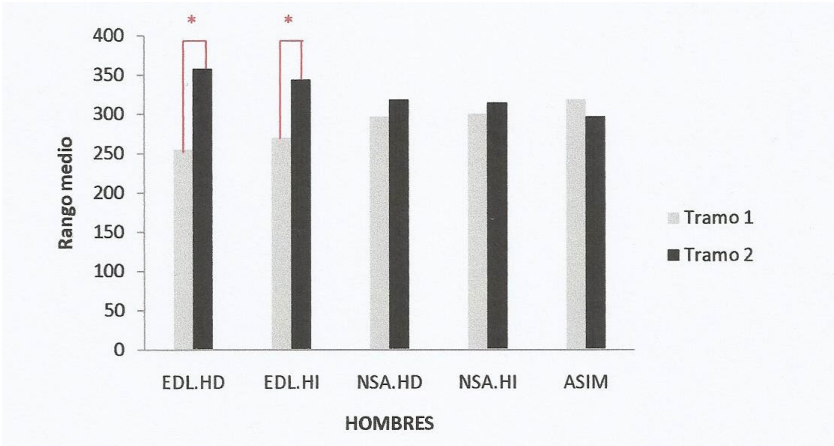
In the case of the group of women, the "average slope" during the first section (without erotic content) is (AS.HD = 0.6488KΩ / second and AS.HI = 0.6274 KΩ / second); in the male group, it is (AS.HD = 0.0068 KΩ / second and AS.HI = 0.0265KΩ / second). This reveals the process by which the group of women appears activated at the beginning of the session but quickly adapts and relaxes, while in the group of men there is no initial relaxation in the first part of the experiment, but rather they maintain their activation level. In the results of the second section (with erotic content), the group of women has very different values (AS.HD = 0.2026K Ω and AS.HI = 0.1784K Ω) to that of men (AS.HD = 0, 0388K Ω and AS.HI = 0.0406K Ω), and make it possible to verify that the slopes have decreased; in the case of the group of women there is an increase in activation in the first part of this second section, not evident in the group of men. It is in the final part, coinciding with the situation of orgasm in the couple, when there is an increase in the slope towards greater activation.

We can ask ourselves if the results obtained in the two sections and in each gender have significant differences that indicate that the groups have reacted differently to a neutral stimulation and to another with a high emotional content. First, we analyzed whether there are significant differences in each variable in two sections or experimental situation, differentiated by gender. To do this, we used the Mann-Whitney U test for two unrelated samples. The results obtained in the two groups (women and men) are shown graphically in Figures 3 and 4, respectively.



Note: The asterisk indicates a significant difference between women and men (P <0.0005).

Figure 3. Results of the Mann-Whitney U test between the two sections in each variable in the group of women.
Source: own elaboration.



Note: the asterisk indicates a significant difference between women and men (P <0.0005)

Figure 4. Results of the Mann-Whitney U test between the two sections in each variable in the group of men.
Source: own elaboration.

If we analyze these results and focus on the NSAg activity, an indicator of activity and emotional reactivity (vegetative *arousal*), we can observe that the group of women has less *NSAg* activity in the neutral section, increasing significantly during the erotic section. On the contrary, in men the increase experienced by *NSAg* activity in the second section is slight and not significant.

6. DISCUSSION AND CONCLUSIONS

The "Pepsi Challenge", launched by the soft drink company in 1975, clearly showed that the subjects do not know the origin of a large part of their decisions: while their emotion was oriented in favor of the Coca Cola brand, the decision made in a blind test was in favor of the Pepsi brand. We had to wait until 2004 to understand, at the hands of researchers McClure, Li, Tomlin, Cypert, Montage and Read, that it was the areas of pleasure and reward that assumed the greatest weight in decision-making. Sensory information played a minor role, with cultural and emotional information leading to the creation of thoughts, beliefs and, subsequently, behavioral habits, which finally tipped the scales towards Coca-Cola.

Both social desirability and ignorance of the origin of the decision leads researchers to data analysis that very often does not correspond to the reality of the subject's behavior. The emotions responsible for the semantic markers built by our experiences and very dependent on the social imagination is a key element in the study of the behavior of the consumer, allowing an approach more efficient to the actual characteristics of our target, enabling more optimal segmentation

Our aim was to document a practical example of an application of the Sociograph methodology to marketing strategies. From the results obtained, the technique has allowed us to demonstrate clear differences in the forms of reaction of both groups, not necessarily coinciding with the social expectation. There is evidence that shows significantly different reactions to two situations, one with low emotional content and one with a high emotional level (Amezúa, 2000).

It is possible that if we had to insert a brand, via product placement, in an erotic film we would do it at the moments of greatest sexual climax (fragment 2) if we thought of a male target; however, this thought would not flow the same in presence of a female target. The social imaginariness in the face of different gender behaviors would lead us to make this wrong decision from the marketing strategy. However, as the results reveal, it is the female gender that shows a greater activation in fragment 2 and, consequently, the placement could be more effective in this group within this section, contrary to what we could imagine. It is possible that, in an interview format, women might not clearly show the increase in emotion, for social desirability would imply an opposite response than expected, and reserve or shame would conceal very useful results for the analysis of behavior and the real effect of viewing. This technique, therefore, allows us to approach the emotional activation of the subject with quantifiable evidence, ruling out possible manipulations, more or less intentional on the part of the participants in an experimental situation.

The results also show significant differences between the group of men and women in relation to the activation of attention. The group of women responds to what would be

expected, that is, high activation initially due to expectations and a decrease in activation when viewing the erotic material. On the contrary, the group of men also begins with a high level of arousal, greater than in the group of women, but unlike them, men do not relax during the neutral section, maintaining an alt or level of activation, with hardly any variations, except in the final scene (reaction similar to that of the group of women). During the erotic section, contrary to what might be expected, the level of this vegetative activation is reduced. In this sense, we would like to venture that certain scenes or sexual practices motivate different levels of activation depending on the gender variable (Burgos-Gil, 2013; Lasa-Aristu, Vallejo-Pareja and Domínguez-Sánchez, 2007).

If we had to opt for a strategy with true view ads, we could venture in this way that a pre roll would be very suitable for women because of their activation level in the first section, a mid roll being a rather wrong strategy, while if the target was masculine, both pre roll and mid roll could be quite effective. Knowing both emotional and attentive activation can allow us to opt for more efficient strategies to insert a brand, a product, or a claim.

Following the systemic approach, as a hypothesis, we might think that the results obtained in this study may be due to the group, who generates differentiated expectations according to gender (Yela-García, 1998). In the case of the group of women, it is possible that this acts as a system of complicity, communicative and reducing anxiety, enabling a decrease in activation as viewing progresses. On the other hand, it is possible to think that, in the group of men, the social expectations and the fear generated by them, as well as those of the group's own peers, may have influenced their response, keeping the levels of activation and the vegetative arousal high, and perhaps, self-control. In any case, it is worth asking ourselves what the group's influence has been in the emotional processes involved in watching the DVD with respect to those that would have occurred if the viewing had been done individually.

Thus, media planning approaches should be subject to the conditions of the joint or individual viewing, as the data in relation to the characteristics of the target could vary significantly in relation to the context. It is possible that, under the influence of the group, a football match does not activate our nervous system in the same way as if we watch it with friends or alone.

In recent years, media consumption patterns are constantly evolving, at a rate exceeding 21% worldwide; consequently, taking these criteria into account would be nothing more than an intelligent way to buy advertising spaces based on the big data. It is not a sale of cold impacts but of real-time purchases of spaces from specific people, with the aim of impacting an audience in a more personalized way, which means a better planned system. So far, this sale of spaces does not consider the behavior of the subject in a group, but the individual behavior.

Therefore, this paper opens a new path towards a new perspective in relation to the reaction of the subjects to the group that should be considered in hypersegmentation, as consumption patterns are constantly evolving, so it is necessary to consider all and each of the displaying variables and conditions.

The Sociograph methodology makes it possible, from a systemic viewpoint, to analyze and quantify psychophysiological variables as they can provide evidence about emotional and attentional activation in the persuasion process, eliminating or controlling strange variables such as social desirability, or making it possible to analyze the activation variability dependent on the influence of the group. In addition, the possibility of measuring hemispheric activation in a differentiated way can explain what participation each cerebral hemisphere has in emotional and / or cognitive processes; this, without a doubt, can expand and discover new ways of understanding the processes involved in making decisions. It can therefore be a new way to approach consumer behavior from a more effective methodology, with new variables, new ways of working and new forms of data analysis. In short, the new concept of marketing, the new media and the changes in patterns of media consumption necessitate the use of new methodologies such as that presented herein, which approach the analysis of the consumer more effectively.

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