

Neuromarketing as an object in the scholarly field of Communication in Spain: an approach to its study within doctoral theses

El neuromarketing como objeto del campo académico de la Comunicación en España: una aproximación a su estudio desde las tesis doctorales

Neuromarketing como objeto do campo acadêmico da Comunicação na Espanha: uma abordagem para seu estudo a partir de teses de doutorado

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Abstract

Neuromarketing as an object of study in the field of Communication is gaining more and more academic attention in the Spanish context, especially in recent years. In this text we analyze the evolution of this research topic in doctoral theses during the period 2007-2018, at the precise moment of transition of regulations on postgraduate studies at the national level. From a mixed typology meta-analysis methodology, the scientific production centres on the authors, the configurations of the thematic lines, the most common concepts and objectives, as well as the methodological design in terms of samples, data, dominant techniques and triangulations, all of which are evaluated. Although neuromarketing continues to have a residual presence in the academic field, the epistemological interest it generates continues to increase, particularly in border research areas directly linked to institutional or organizational communication, event communication and brand communication.

Keywords: Neuromarketing; Neurocommunication; Object of study; Meta-analysis; Academic field; Doctoral theses

Resumo

O neuromarketing como objeto de estudo na área da Comunicação vem ganhando cada vez mais atenção acadêmica no contexto espanhol, especialmente nos últimos anos. Neste texto analisamos a evolução desta temática de investigação nas teses de doutorado durante o período 2007-2018, justamente em um momento de transição da regulamentação da pós-graduação a nível nacional. A partir de uma metodologia de meta-análise de tipologia mista, são avaliados os centros de produção científica e os autores, as configurações das linhas temáticas, os conceitos e objetivos mais comuns, bem como o desenho metodológico em termos de amostras, dados, técnicas e triangulações dominantes. Embora o neuromarketing continue tendo uma presença residual no meio acadêmico, o interesse epistemológico que ele gera continua crescendo, principalmente nas áreas de pesquisa de fronteira diretamente ligadas à comunicação institucional ou organizacional, comunicação de eventos e comunicação de marca.

Palavras-chave: Neuromarketing; Neurocomunicação; Objeto de estudo; Meta-análise; Campo acadêmico; Teses de doutorado

Resumen

El neuromarketing como objeto de estudio en el campo de la Comunicación está ganando cada vez más atención académica en el contexto español, sobre todo en los últimos años. En este texto analizamos la evolución de este tema de investigación en las tesis doctorales durante el período 2007-2018, justo en el momento de transición de las normativas sobre estudios de postgrado a nivel nacional. A partir de una metodología de metaanálisis, de tipología mixta, se evalúan los centros científicos de producción y los autores, las configuraciones de las líneas temáticas, los conceptos y objetivos más comunes, así como el diseño metodológico en cuanto a muestras, datos, técnicas y triangulaciones dominantes. Aunque el neuromarketing continúa teniendo una presencia residual en el campo académico, el interés epistemológico que genera sigue en aumento, en particular en ámbitos de investigación fronterizos directamente vinculados con la comunicación institucional u organizacional, la comunicación de eventos y la comunicación de marca.

Palabras clave: Neuromarketing; Neurocomunicación; Objeto de estudio; Metaanálisis; Campo académico; Tesis doctorales

1. Introduction

Since the end of the last century, we have witnessed the remarkable evolution of new neuromarketing techniques as a new strategic resource in advertising communication and marketing techniques. In this context, neuroscience has provided a new way of analyzing the processes of decision-making of different publics (Norton et al., 2007).

The discipline of neuromarketing has provided advertising communication with new tools and techniques which are linked to the area of marketing, and which help predict and interpret consumer behaviour. “The development of neuroscience is paving the way for a better understanding of the brain and human thinking” (Baños-González *et al.*, 2021, p. 16). It is along this line, where behaviour and the workings of the brain take on great relevance, that the statement of Graves comes to the fore (2011, p. 41) “social psychologists never cease to explore the ways in which we are unaware of what really makes up our behaviour”.

The term “neuromarketing” was first coined by Ale Smidts in 2002 to describe studies related to neuroscience techniques applied to the marketing industry (Bastiaanssen et al., 2018). However, it is generally accepted that the starting point of this discipline coincided with the creation of the Society for Neuroscience in 1969 (Deza *et al.*, 2012). Currently, in the words of Professor Ubaldo Cuesta (2021), it can be defined as the activity of developing and researching marketing by applying the methods, techniques and theoretical foundations of the theories of neuroscience. As such, it has as its main purpose, the use of the mechanisms of the brain to predict and understand consumer behaviour. (Plassmann *et al.*, 2010). Similarly, Lindstrom (2010) defines it as “the key to what has been called ‘the logic of buying’: the feelings, thoughts, subconscious desires which move purchasing decisions which we make every day of our lives” (p. 15).

It is obvious that one of the main missions of neuromarketing techniques is to find out the biological and neuronal reactions to advertising stimuli (Tapia *et al.*, 2016; Tapia y Martín, 2017). However, neuromarketing as a science goes beyond that and attempts to understand how human psychology, emotions and decision-making itself behave (Gani *et al.*, 2018). It is for that reason that we seek to find behavioural patterns (Suomala, 2018), irrespective of the brand content in question (Núñez *et al.*, 2020) thus producing objective and scientifically measurable, emotional and cognitive results for consumers (Cuesta *et al.*, 2018). In order to do so nowadays, diverse techniques are used to follow and monitor eye patterns - eye-tracking (ET) (Wedel y Pieters, 2008) and other technologies such as Electroencephalography (EEG) (Kumar y Bhuvaneshwari, 2012), functional magnetic resonance imaging (fMRI) (Bakalash y Riemer, 2013) or the galvanic response of the skin (GRS) (Cuesta *et al.*, 2018), among others, with the aim of obtaining information about the consumer (Monge y Fernández, 2011).

Neuromarketing techniques should be understood as an alternative to, or something supplementary to, conventional research techniques (Vecchiato *et al.*, 2014). This supplementary quality serves to enrich the market research processes and study consumer emotions in greater depth (Cherubino *et al.*, 2019). In that sense, Antonio Damasio favours the hypothesis that first we exist and then we think (Damasio, 2020).

The current reality shows how transcendental the use of emotions in advertising techniques is (Shen y Morris, 2016; Tapia, 2021) having a direct impact on the positioning and memory of brands. This could confirm the theory, set out by William James, which linked each emotion directly to the corresponding body sensations which it provoked (Pineda, 2019), in the same way that the advertising industry recognizes that most human decision-making is becoming more and more intuitive, automatic and lacking in any conscious control (Matukin *et al.*, 2016). The key is to know some of the emotional components which are activated in the consumer and that is where neuromarketing techniques come into play (Damasio, 2018).

1.1. The academic and scientific evolution of neuromarketing

The field of neuroscience has evolved unevenly from the professional and academic perspective. It is true that the developments in neuromarketing techniques have been a supplement for traditional market research, opening new channels which “provide information about the mentality of the consumer which traditional marketing methods cannot offer” (Singh y Jain, 2018, p. 102). However, many companies are still reluctant when it comes to employing these techniques and others are even unaware of how applicable they really are. As some directors of multinational advertising companies have stated “professionals are not aware of these techniques and only the large companies know how to interpret them” (Baños-González *et al.*, 2020, p. 6).

It is the opposite case in the academic world, where they have become a rising discipline. Precisely, in Spain, “one quarter of all Spanish universities are carrying out research into neuromarketing” (Andreu-Sánchez *et al.*, 2014, p. 156). Many researchers carry out in-depth empirical and theoretical studies into the benefits of this field in the academic and professional environments. This is even more the case when results have a direct effect on increasing sales and brand memory (Ghorpade, 2017; Martínez-Fiestas *et al.*, 2015) or reaching conclusions which are directly applicable to product communication (Wood, 2012; Klarić, 2011).

The uneven development of this discipline between the two fields – professional and academic – is clear, and one of the main challenges is to find hybrid models in which neuromarketing techniques may be extended to the professional environment more regularly and uniformly. From the area of Communication Sciences, the positive effects of neuroscience and neuromarketing techniques, as applied to advertising and persuasive communication, are beyond doubt. In addition, the empirical potential in models of neobehavioural psychology and learning theories should not be forgotten. Unquestionably, the developments in recent years have opened the way and strengthened existing channels in the area of market research, in the words of Racine and Illes (2007), neuroscience studies have evolved notably in recent decades, with special attention being given to the areas of neurogenetics and neurology.

Neuroscience has also “expanded to other areas, such as, communication, economics, criminal law and religion, to name but a few” (Andreu-Sánchez *et al.*, 2014, p. 152). In that sense, and with the aim of referencing the scientific areas which combine neuroscience with other fields of study, we could coin the term “neuroculture” (Javor *et al.*, 2013). Consequently, we can state that neuromarketing is in a phase of development within the scientific and university community and, in addition, it is a topic of interest in academic journals of advertising and marketing (Lee *et al.*, 2007). However, notwithstanding the fact that this discipline offers many benefits regarding the interpretation of different features of human behaviour, the challenge of ethical issues should not be forgotten, in particular when it comes to preserving personal privacy (Shahriari *et al.*, 2020).

2. Materials and methods

In this article, we deal with the main features of the evolution of scientific research, as well as the configuration of the subjects and study methodologies of neuromarketing in doctoral theses in the academic area of communication in Spain in the period between 2007 and 2018.

The work is built upon three research questions:

- (1) How can we express the evolution of research into neuromarketing in doctoral theses in the academic area of communication in Spain based on the scientific centers of production and authors?
- (2) What are the most common study subjects, concepts and aims of the research?
- (3) What are the dominant trends in methodological design as regards samples, data, techniques and triangulation?

This research work focuses on the theory-methodology features of the scientific discourse, taking as read that the conceptual behaviour used by the research is directly related to the aims, how the study subject is treated and the analysis categories or variables, among other elements.

Any research subject, no matter how biased and limited, cannot be defined and built other than on the basis of a theoretical problem which permits a systematic examination of all aspects of the reality which become linked as a consequence of the problems which are set out (Bourdieu *et al.*, 1988, p. 54).

The period of analysis has been decided bearing in mind the transformations which have taken place in doctoral programs throughout Spain, and which led to peaks in production in the years during which the rules were changing. We can locate those circumstances between 2016 and 2017.

Generally speaking, between 2007 and 2014, altogether, there were 2,784 communication-themed doctoral theses in Spain. Consequently, we used the online database about doctoral theses in the academic field of communication available at <http://www.mapcom.es/> which was produced by communication-based research at Spanish universities maps (MapCom, 2017; 2020).

The sample was obtained from a keyword-based search, choosing, firstly, those with “marketing”, which numbered 36 doctoral theses – 1% of the total. Fifteen of those (0.54%) belonged to lines of research specifically linked to neuromarketing. Consequently, we have considered not only the prefix “neuro” but also those which contained terms such as “sensorial” and “experience” marketing.

We are talking, therefore, of an area which is still residual in the academic field of communication in Spain but which, undoubtedly, offers up an interesting analysis opportunity thanks to the growing interest which has been apparent over recent years.

Using a mixed, meta-analysis design, which combines qualitative and quantitative analysis we have focused on the scientific consensus regarding one of the means of academic output which best expresses the epistemological change in a scientific field: doctoral theses.

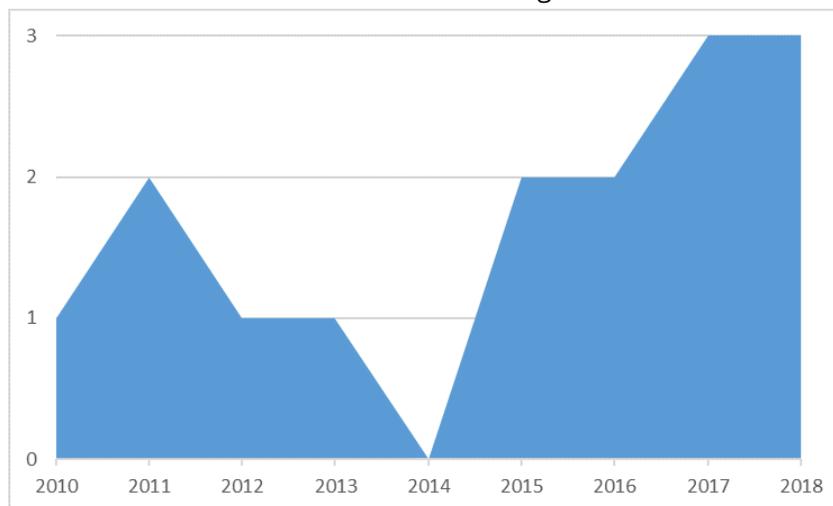
As far as the analysis goes, the recommendations of the *Preferred Reporting Items for Systematic reviews and Meta-Analyses* statement for reports on systematic and meta analysis reviews – PRISMA – were followed (Urrútia y Bonfill, 2010; Moher et al., 2015). The PRISMA 2020 declaration is the most up-to-date international version of the *Quality Of Reporting Of Meta-analysis*, or “QUORUM”, declaration, and seeks to give transparency and scientific consistency to this type of studies (Page et al., 2021).

3. Results

3.1 Evolution of doctoral theses about neuromarketing from the field of communication

There has been a rising trend in neuromarketing as a subject for study in recent years judging by its recurrence in doctoral theses from the academic world. In particular, between 2014 and 2018, we have noted a rise which can be explained not only by the greater number of theses in general in those years, due to the change in the law and the end of the Ph.D. cycle, but also for the interest in neuromarketing which has been become the norm, albeit in an irregular way since 2010.

Figure 1. Evolution of doctoral theses on neuromarketing from the area of communication by year

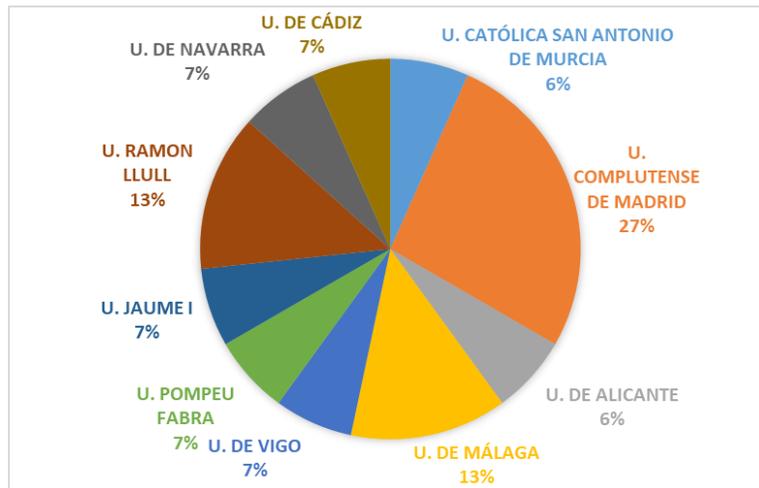


Source: author's own material

Among the most noteworthy universities in the defence of doctoral theses on neuromarketing from the area of communication, we find key institutions in Spain, for example, Universidad Complutense de Madrid, with a strong presence of studies in the subject. However, other centres, such as the Universidad de Málaga or the Universidad Ramón Llull also show a striking interest in research into neuromarketing. This indicates a

certain spread in the number of doctoral candidates researching this topic, the emerging nature of which may account for its popularity in different universities irrespective of their research tradition in this area of knowledge.

Figure 2. Universities with an output of doctoral theses on neuromarketing from the area of communication



Source: author's own material

As regards the above, the autonomous communities (regions) of Spain with a higher number of doctoral theses on neuromarketing from the area of communication are Madrid, with 27%, Catalonia and Andalusia (both 20%) without forgetting the Community of Valencia, in third position, with 13% from its higher education centres: the Universidad de Alicante and the Universitat Jaume I, in Castellón.

As far as the gender of doctoral candidates is concerned, females dominate the authorship of doctoral theses on neuromarketing from the area of communication, representing 80% of the total. This result indicates how women in the academic world are involved in cutting edge issues despite not being able to break the so-called “glass ceiling” or, even worse, the vertigo of the glass cliff (Morgenroth *et al.*, 2020).

3.2. Analysis of titles, summary and descriptions

From the sample analysed, we can conclude that the term “neuromarketing” is not always used as a reference in the titles of the doctoral theses studied. This serves to highlight the scarce uniformity in the terminology used when it comes to categorizing a piece of research within the area of neuromarketing and neuroscience.

Table 1. Theses analysed by year, author and title

Year	Author	Title
2010	Arbaiza Rodríguez, Francisco Antonio	<p>“El marketing experiencial: una aproximación al marketing desde las experiencias del consumidor en un entorno postmoderno”</p> <p>Experimented marketing: an approach to marketing from the experiences of the consumer in a postmodern environment.</p>
2011	De Balanzó Bono, Cristina	<p>“Los consumer insight y las neurociencias. La relación entre las variables neurobiológicas y la eficacia publicitaria”</p> <p>Insight consumers and neurosciences. The relationship between neurobiological variables and advertising efficiency.</p>
2011	Galmes Cerezo, María	<p>“La organización de eventos como herramienta de comunicación de marketing modelo integrado y experiencial”</p> <p>The organization of events as an integrated and experience-based model for marketing communication tool.</p>
2012	García Catalán, Shaila	<p>“Hipertexto y modelización cinematográfica en la divulgación neurocientífica audiovisual. A propósito de redes de Eduard Punset”</p> <p>Hypertext and cinematographic modeling in the audiovisual neuroscientific communication. Based on the work of Eduard Punset.</p>

Table 1 (cont.) Theses analysed by year, author and title

Year	Author	Title
2013	Serrano Abad, Nuria	<p>“Publicidad y memoria, una nueva visión desde las neurociencias”</p> <p>Advertising and memory - a new vision based on neurosciences.</p>
2015	López Moreno, Elisa	<p>“Marketing experiencial: una aplicación a la experiencia de compra online en el sector de la moda”</p> <p>Experience-based marketing as applied to the experience of online purchasing in the fashion sector.</p>
2015	Lacave García, María Blanca	<p>“Efectos del envase genérico y las advertencias sanitarias de los productos del tabaco sobre el comportamiento del consumidor: un estudio desde el campo del marketing social”</p> <p>The effects of generic packaging and health warnings on tobacco products on consumer behaviour: a study from the field of social marketing.</p>
2016	Morena Gómez, Alexia de la	<p>“Neuromarketing y nuevas estrategias de la mercadotecnia: análisis de la eficacia publicitaria en la diferenciación de género y la influencia del marketing sensorial y experiencial en la decisión de compra”</p> <p>Neuromarketing and new marketing strategies: an analysis of advertising efficiency in the differentiation by gender and the influence of sensorial and experience-based marketing in purchasing decisions.</p>

Table 1 (cont.) Theses analysed by year, author and title

Year	Author	Title
2016	Grau Rafel, Marta	<p>“Pervivencia del model narrativo clásico en el cine independiente de Estados Unidos (una perspectiva neuropsicológica)”</p> <p>The persistence of the classic narrative model in independent cinema in the USA (a neuropsychological perspective).</p>
2017	Carrillo González, Carmen María	<p>“El neuromarketing como instrumento para la eficacia de la publicidad en televisión”</p> <p>Neuromarketing as an instrument for advertising efficiency in television.</p>
2017	Gil Ochando, Juan Carlos	<p>“Neurocomunicación audiovisual: intereses comunes entre la neurociencia y la comunicación audiovisual”</p> <p>Audiovisual neurocommunication: common interests between neuroscience and audiovisual.</p>
2017	Raposo Correia, María Do Rosario	<p>“Marketing y consumo: dimensiones afectivas y racionales de compra”</p> <p>Marketing and consumption: affective and rational dimensions of purchasing</p>
2018	Juárez Varon, David	<p>“Neuromarketing aplicado al packaging de juguetes educativos. Estudio de caso del juego aprendo inglés (Educa)”</p> <p>Neuromarketing applied to the packaging of educational games. Case study of a game for learning English (Educa).</p>

Table 1 (cont.) Theses analysed by year, author and title

Year	Author	Title
2018	Canal Eguiazabal, Mercedes	<p>“Relaciones públicas y neurociencia. Una aproximación a la realidad de las técnicas de neuroimaging”</p> <p>Public relations and neuroscience. A study of the reality of neuroimaging techniques.</p>
2018	Crespo Pereira, Verónica	<p>“La neurociencia en el contexto televisivo europeo: nuevas metodologías en el estudio de la audiencia y el diseño de contenidos”</p> <p>Neuroscience in the European television context: new methods in the study of audiences and the design of content.</p>

Source: author’s own material

Only three of the 15 theses analysed used the term “neuromarketing” to put the title and theme of the research into context. Having said that, most of the remaining theses did use the prefix “neuro-” as a distinctive element in the title with the main aim of addressing the issue and putting it into context. Terms such as “neuroscience”, “neurocommunication”, “*neuroimaging*”, “neuropsychology”, “neurobiology”, among others, are used in the remaining titles to broaden the field of study and fit them into the area of neuroscience.

This reveals the need to consider whether or not researchers use the exact, specific term when it comes to referring to pieces of research into neuromarketing, itself, and not in a much wider field such as neuroscience. In fact, the thematic descriptions of the titles still fail to properly establish the context of the doctoral theses set out in the sample. These descriptive categories should focus the theme on several descriptors or “tags” within the area of research in question, taking as their reference one of the two terms -neuromarketing or neuroscience - and setting their own criteria and objectives so that the classification is as transparent and universal as possible.

In that sense, only 6 added the term “neuroscience” to their respective descriptor. By contrast, the remaining 9 theses, despite focusing a large part of their research on the application of neuromarketing and neuroscience techniques, do not mention any of these

terms in their descriptors. Similarly, none uses the category of neuromarketing in the descriptor of the category.

Along the same lines, when it comes to analyzing the most-used keywords by researchers in their respective theses, we find a clear difference between the descriptors used. In this specific case, and with the exception of two of the theses studies which do not have keywords, the most-used keyword is “neuroscience”, followed by “neuromarketing”, “advertising”, “purchase” and “audiovisual”.

Figure 3. Most-used keywords in the theses studied



Source: author's own material

These results show that researchers classify and frame the subjects of their respective research work satisfactorily with keywords. However, this is not the case with titles and descriptors, which are even more important indicators.

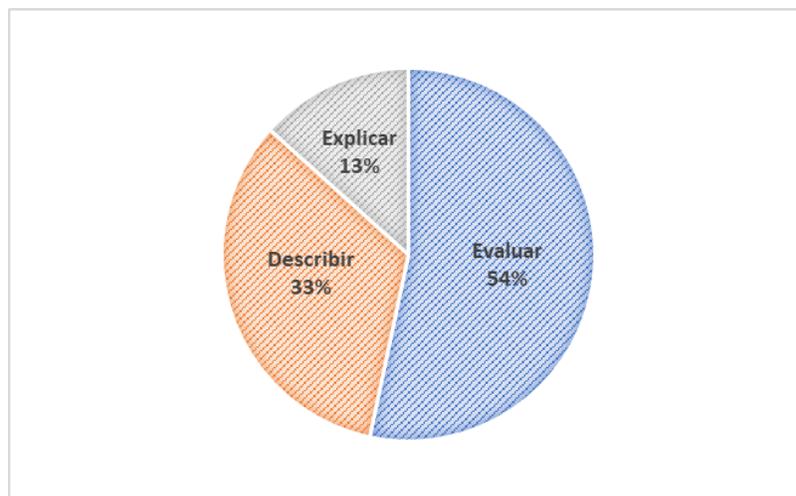
3.3. Analysis of the typology of aims, subjects being studied and levels of communication

From the point of view of the types of aims, we can frame the theses in three different typologies. The first of the categories, assessment, has, as its aim, that the research in question should test, contrast and validate the theoretical and methodological methods. Along that line, we find research studies which refute or confirm the reduction of cognitive dissonance in the change of attitudes and behaviour of the consumer. 54% of all theses – 8, in all – used as their main typology the aim of assessing. 33% - 5 tesis – fell into the category of describing, directing their research towards registering, classifying, cataloguing, or defining specific communicative processes, according to the established study aim. Finally, and being the least-used type of objective (13%), we find “explaining” (two theses), where

a relationship is drawn between the features of the correlations, causes or effects, among other areas of study, and, at the same time, offering models for showing correlations, either using established theories or models, or setting out a new one.

Assessing and describing, respectively, are the most-used categories, which is a feature to bear in mind in this qualitative analysis, since it reveals that most research in doctoral theses has been in the areas of neuroscience and neuromarketing during the established time frame, reflecting studies about the change in attitudes and consumer behaviour. This aspect acquires special relevance with the awareness that neuromarketing techniques and tools seek to predict and analyze human behaviour and stimuli.

Figure 4. Distribution of the typology of objectives of the theses analysed



Source: author's own material

Continuing with the analysis of the objectives of the sample, it is important to highlight the study objectives of the research. The data are in line with the typology of objectives and confirm the hypothesis that most research in this field is carried out to know the response of the consumer in certain situations.

However, it is surprising that research is not carried in a more generic way in organizations (Table 2). We also observe another type of research which is recorded in "Others" where, even though they could be linked to the category of "Mass research", we have chosen to classify it in this way because it has particular conditioning factors when it comes to using one particular methodology, specific tools or techniques or, simply, the sample, of any given experiment cannot – quantitatively – be classified as "Mass study".

Table 2. Classification of the study subjects by theses analysed

Study subject	Number of theses
Mass study	6
Interpersonal	2
Organizations	1
Others	5

Source: author's own material

It is also worth noting the fact that a large number of theses continue to use offline or in-person techniques in their experiments (Table 3). Altogether, 11 theses were offline and only one was online. Clearly, this is indicative of the challenge of technological progress which this type of research, in terms of methodology, techniques and tools, must take on in the future.

Table 3. Classification of location of the research

Research location	Number of theses
Offline	10
Online	1
Both	1
NP / NC	2

Source: author's own material.

3.4. Break-down of methodology and data treatment

Among the studies which make up the sample, there was a prevalence of bibliographical or document-based research, with this being the most common field of research (40%). Of the theses included in this field, as can be seen in Table 4, all studies were carried out using

document analysis, which is a coherent technique and in line with the predominant field of research.

Table 4. Field of research v. Predominant techniques

Research field/technique	Document-based	Experiments	Conversations	Observations	Surveys	Not stated
Document	100%	0%	0%	0%	0%	0%
Experiment	0%	25%	25%	25%	25%	0%
Ethnographic	50%	0%	50%	0%	0%	0%
Action	0%	50%	0%	0%	0%	50%
Mixed	100%	0%	0%	0%	0%	0%

Source: author's own material

In the case of experiment-type doctoral theses, which account for 26.7% of the sample, we see a greater variety of research techniques employed, in addition to experiments (25%). Techniques of a qualitative nature, such as conversation and observation, and those of a quantitative approach, such as surveys, are used equally.

As far as the ethnographic field of research, which makes up 13.3%, is concerned, there is an even distribution of qualitative methods – document analysis and conversations, to be precise. It is worth highlighting that, in the framework of ethnographic-type research studies, no direct, indirect, participant-based or structured observation, was used.

As regards the field of research called “action”, the nature of which is the transformation of the current situation as can be seen by the studies classified in this category (13.3%), the predominant technique which was observed in the methodology of these pieces of work was, “experiments”, accounting for 50% of the doctoral theses in this area. However, half of the studies carried out did not identify clearly or exactly, of all the methods used, which was the predominant technique in their research design.

In the case of studies with a mixed field of research, indicating that the methodology is triangular in terms of the application of methods and research techniques, the absolute

predominance of document analysis as a central technique, making up the backbone of the studies belonging to this field, is apparent.

Table 5. Types of sample v. data

SAMPLES/DATA	ATTRIBUTE DATA	LOGICAL	PARAMETRIC	MEASURE OF VARIATION	NON-REPORTED
Intentional	33,3%	11,1%	11,1%	11,1%	33,3%
Significant	50%	50%	0%	0%	0%
Structured	0%	0%	0%	0%	100%
No sample	33,3%	0%	0%	0%	66,7%

Source: author's own material

Considering the research carried out based on selections of samples, which are then analysed using the different techniques mentioned above, it is worth pointing out the predominance of intention-type samples. This is because of their convenience and, consequently, they have a non-representative value with regard to the universe (60%). 20% of theses analysed have no type of sample, since they are based on case studies as their methodology.

Data gathered from the study of samples, tend to be treated in a qualitative sense (40%). Here, we observe a positive correlation between the most commonly used research techniques and the clearly qualitative focus of the results obtained from the studies carried out.

On the other hand, a quantitative perspective is noted in 13.4% of the doctoral theses. In 6.7% of cases, a mixed treatment is favored, using a triangulation methodology which leads to the gathering of data which are both quantitative and qualitative. The other half, however, focus on a purely quantitative analysis with statistically relevant samples

As indicated in Table 5, most of the data obtained from the intentional configuration of samples are qualitative, derived from a content analysis with a qualitative perspective (33.3%) and discourse analysis (11.1%). The same trend is seen in the studies which are based on significant population samples, where the sampling is done for segmentation,

depending on the aims or variables of the research. In that case, all the data processes is treated with a qualitative approach.

As regards structural samples, the selection of which is carried by categorizing the universe, it has not been possible to clearly identify the nature of the data obtained during the field work. The same is true of the 66.7% of studies carried out without a sample selection.

Finally, it should be pointed out that 46.6% of the doctoral theses analysed produce conclusions based on the application of a triangular methodology, the predominant technique of which is qualitative, as is the case of the specialized literature review or the gathering of data from previous work where the subject studied is framed in the themes of neuromarketing or sensorial marketing. 6.6% of those theses have contributions from primary sources, such as experts in the matter.

4. Discussion and Conclusions

Neuromarketing has emerged as a theme of recent epistemological interest in the academic field of communication sciences, as can be shown by the analysis of doctoral theses, these being an acknowledged way of institutionalizing scientific knowledge. As a cutting edge subject of study, closely linked to institutional or organizational communication, the communication of events and the communication of brands, we can see how a certain decentralization has appeared when it comes to studying it, not only in institutions with a long tradition in the academic field in Spain, for example, the Universidad Complutense de Madrid, but also entities where the activity is more recent, such as the Universidad Pompeu Fabra or the Universidad Ramón Llull. Within the collective of doctoral candidates, women are still pioneers in our academic field, incorporating revolutionary study subjects as is the case with neuromarketing itself which has not yet become established in our discipline.

As a consequence, there are elements of research which stress the need to strive for a precise terminology when it comes to referring to the discipline of neuromarketing. During the research process, the results have confirmed the clear fact that none of the theses in the sample, and which relate to the area of neuroscience, use the term “neuromarketing” in their titles. This is, without doubt, quite relevant when we are saying that most pieces of research assess and/or describe processes which reflect the change in attitudes and consumer behaviour. These results indicate a need for experts and researchers in the area to begin to unify their criteria when it comes to specifying or positioning the processes of scientific relevance in the area of neuroscience – a term which is much wider and covers other themes which may not be directly related to neuromarketing. Along those lines, the researchers Baños-González *et al.* (2021) state that:

Neuromarketing, as a discipline which incorporates the techniques of neuroscience to the context of marketing, is closely related with the theories and scientific models set out in other disciplines, thus making an interdisciplinary approach a must when dealing with and bringing solutions to decision-making processes (pp. 9-10).

Likewise, and despite the good results obtained – both quantitative and qualitative - in scientifically relevant research work published by experienced researchers, the output of doctoral theses related to the area of neuroscience or neuromarketing over a specific time framework, represents poor scientific production. Among doctoral students and trainee researchers these disciplines are still sparsely developed, giving a result of only 15 doctoral theses, many of which – over 87% - focus on area-specific aims, i.e., assessing or describing different cognitive processes and consumer responses to specific facts. The techniques and tools which are inherent in this discipline offer researchers numerous possibilities for driving the quality of research, leaving behind that which is common and no longer researching questions which are somewhat repetitious.

In that sense it is barely credible that only one of the theses used the online channel as a key to its investigation, with the offline mode being predominant in the rest of studies. This truth confirms the hypothesis that even researchers who are training for their doctorate have little experience in that area and it is a discipline which has expanded little throughout this collective and is much better positioned among experienced researchers. In addition, and as one of the features worth highlighting in qualitative analysis of research, is the fact that there are few research studies to be found in the field of organizations – this is a field which may become more prolific mid- and long-term.

In methodological terms, there is a trend towards the predominant use of qualitative research techniques, focusing, in particular, on documentation and bibliographic searches in existing studies in the area of neuromarketing. On the one hand, it could be said that doctoral theses offer a panoramic vision of existing research in the area we are considering, offering a state-of-the-art which could be the basis for future hypotheses and studies. On the other hand, that trend often leads to descriptive studies, with few initiatives of their own taking the study subject from pragmatics to experimentations. Bearing in mind that it is a field, the evolution of which depends on putting into practice the innovative technologies and actions in order to design and apply new techniques and analyze their effects on target publics, researchers are encouraged to trace methodological routes which promote an approach from praxis, articulating different research which produce useful findings techniques which can then be applied in online and offline communication.

Therefore, and going into more depth with that hypothesis, we must bear in mind that the needs of the sector, especially for persuasive communication to adapt to the changes in the social environment, are empowering a new process of searching for constant efficiency and revealing neuromarketing as a very important tool in the efficiency of research into the advertising market (Baraybar et al., 2017).

However, the need for an essential, multidisciplinary focus which, without any doubt, research demands in this area, with contributions from the fields of psychology, neurophysiology, neurolinguistics, amongst others, may explain the still emerging nature of the presence of this subject for study in our discipline of communication, at least in the Spanish context. The inherent epistemological weakness of the academic field which we are dealing with - which might also be influencing the limited involvement which we have detected in the theme, despite the growing socio-economic and cultural importance which neuromarketing enjoys more and more for the practice of communication nowadays - is also a factor.

Contributing authors

Sandro Arrufat-Martín: Conceptualization, Formal analysis, Research, Data management, Supervision, Validation, Visuals, Original Draft, revision and editing. **Rainer Rubira-García:** Conceptualization, Formal analysis, Funding, Research, Methodology, Data management, Supervision, Validation, Visuals, Original draft, revision and editing. **Flávia Gomes-Franco e Silva:** Formal analysis, research, data management, funding, Validation, Visuals, Original draft, revision and editing. **Jacqueline Venet-Gutiérrez:** Data management, research, Validation, Visuals, revision and editing. All authors have read and agreed to the published version of the manuscript. Conflicts of Interest: The authors declare no conflict of interest.

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