




Revista Prisma Social Nº 50

Reducción de las desigualdades para un desarrollo humano sostenible

3er trimestre, julio 2025 | Sección temática | pp. 123-140

Recibido: 10/05/2025 – Aceptado: 22/7/2025

NEUROCOMMUNICATION AND DISABILITY: IN PURSUIT OF EQUALITY AND INCLUSION

NEUROCOMUNICACIÓN Y DISCAPACIDAD. EN BÚSQUEDA DE LA IGUALDAD Y LA INCLUSIÓN

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This article is part of a Concilium project (931.791) at the Complutense University of Madrid: Validation of Communication Models, Business, Social Networks, and Gender. Additionally, it is part of a project funded by the Community of Madrid (Community of Madrid, Spain) within the framework of the Multiannual Agreement with the Complutense University of Madrid in the line of Research Incentives for Young Doctors, in the context of the V PRICIT (Regional Program for Research and Technological Innovation; PR/27/21 Call, titled "Traceability, Transparency, and Access to Information: Study and Analysis of Dynamics and Trends in the Field," reference PR27/21-017, duration 2022-2024).

prisma social
revista de ciencias sociales

RESUMEN

El neuromarketing estudia los procesos de toma de decisiones de los consumidores, antes, durante y después de la compra. Los especialistas pueden analizar la actividad cerebral de los consumidores y comprender cómo reaccionan a diferentes estímulos. Los críticos defienden que puede ser utilizado para manipular a los consumidores, que las empresas deberían ser más éticas en su uso de estas técnicas y que tiene profundas limitaciones en su análisis con personas discapacitadas. Sin embargo, las posibilidades son mayores que las limitaciones y el neuromarketing puede tener aplicaciones interesantes y positivas en el contexto de la discapacidad. Como estos avances innovadores todavía ocupan poco espacio en los textos académicos, este trabajo tiene el objetivo principal de conocer el estado de la cuestión en neuromarketing y discapacidad para determinar las teorías, ideas y conceptos principales. Para ello se lleva a cabo una investigación de síntesis con el Framework SALSA, bajo la modalidad de *scoping review*, sin límite temporal, en 6 bases de datos: Scopus, Web of Science, Google Scholar, Microsoft Academic (inglés), Dialnet Plus y Bases de datos del CSIC (español). Los hallazgos reflexionan sobre las herramientas útiles para todas las personas, con y sin discapacidad, que ayudan a la plena igualdad e inclusión. Entre los retos de futuro se encuentran las limitaciones de la técnica que dependen de capacidades sensoriales; los diferentes patrones de actividad cerebral de las personas con alguna discapacidad; y la necesidad de nuevos enfoques y técnicas en otras áreas sensoriales (tacto y gusto).

PALABRAS CLAVE

Neuromarketing; discapacidad; igualdad; inclusión; revisión sistemática; técnicas de neurocomunicación.

ABSTRACT

Neuromarketing studies the decision-making processes of consumers before, during and after the purchase. Specialists can analyse consumers' brain activity and understand how they react to different stimuli. Critics argue that it can be used to manipulate consumers, that companies should be more ethical in their use of these techniques and that it has profound limitations in its analysis with disabled people. However, the possibilities outweigh the limitations and neuromarketing can have interesting and positive applications in the context of disability. As these innovative developments still occupy little space in academic texts, this paper has the main objective of getting to know the state of play in neuromarketing and disability in order to determine the main theories, ideas and concepts. To this end, synthesis research is carried out with the SALSA Framework, under the scoping review modality, with no time limit, in 6 databases: Scopus, Web of Science, Google Scholar and Microsoft Academic (English), Dialnet Plus and Bases de datos del CSIC (Spanish). The findings reflect on useful tools for all people, with and without disabilities that help full equality and inclusion. Challenges for the future include the limitations of the technique that depend on sensory abilities; the different brain activity patterns of people with disabilities; and the need for new approaches and techniques in other sensory areas (touch and taste).

KEYWORDS

Neuromarketing; disability; equality; inclusion; systematic review; neurocommunication techniques.

1. INTRODUCTION

Neuromarketing is a discipline within the Social Sciences, specifically within Marketing, that studies consumer decision-making processes before, during, and after purchasing. It uses tools and techniques from neuroscience to understand how the human brain functions in relation to consumer behavior and purchasing decisions (Sánchez Blanco, 2009; Barrientos-Báez et al., 2022; Cristófol-Rodríguez et al., 2024). Brands turn to neuromarketing to gain a better understanding of the emotions that drive people, how their subconscious mind acts, and how their future behaviors can be predicted (Blas et al., 2019; Barrientos-Báez et al., 2022; Del-Ponti et al., 2022; Abuín-Penas & Abuín-Penas, 2022; Matarín et al., 2022; Fondón Ludeña, 2025). Through this interdisciplinary field that combines psychology, neuroscience, and marketing, it's possible to gain a better understanding of how people perceive, and process information related to products and services offered in the market.

Neuromarketing tools may include electroencephalography (EEG)[1], functional magnetic resonance imaging (FMRI)[2], eye tracking (ET)[3] , and measurements of galvanic skin response (GSR)[4], among others. With these instruments, specialists can analyze consumers' brain activity and gain a better understanding of how they react to different stimuli. For example, they can measure brain activity while consumers watch an advertisement or browse a website and analyze how different elements of the advertisement or website affect consumers' brain and emotional responses. With that information, more effective marketing strategies can be developed, directly targeting consumers' brains and motivating them to make purchasing decisions (Moreno & Sanjurjo, 2020; Barrientos-Báez et al., 2022; Cenizo, 2024).

However, neuromarketing has also faced criticisms and controversies (Bhardwaj, 2023; Álvarez Sigüenza, 2024). Some detractors argue that it can be used to manipulate consumers and exploit their emotional vulnerabilities, suggesting that companies should exercise more ethics in their use of these techniques and tools. Others argue that neuromarketing has limitations and that brain activity does not always correlate with actual consumer behavior in the real world (Barrientos-Báez & Caldevilla-Domínguez, 2019; García-Erviti, 2024).

Within this second profile of criticisms, there is a discussion about the limitations of neuromarketing in analyzing individuals with disabilities. As one of the common and widespread

[1] An EEG, or electroencephalogram, is a test used to measure the brain's electrical activity. It involves placing small metal discs called electrodes on the scalp. These electrodes detect the electrical impulses generated by brain cells as they communicate, which appear as wave-like patterns on the EEG recording.

[2] Functional magnetic resonance imaging (fMRI) tracks subtle changes in blood flow associated with brain activity. It can be used to identify which areas of the brain are responsible for essential functions, assess the impact of stroke or other conditions, and help guide treatment. fMRI can also reveal abnormalities in the brain that might not be visible with other imaging methods.

[3] Eye-tracking technology is used to monitor and measure eye movements, pupil dilation, gaze fixation, and blinking. It helps determine where a person focuses their visual attention, what captures their interest, and what they overlook.

[4] Galvanic Skin Response (GSR), also called Electrodermal Activity (EDA), measures changes in the skin's electrical properties triggered by emotional arousal or stress. This is done by passing a small current between two electrodes and evaluating the skin's resistance. The data typically includes components like Skin Conductance Level (SCL) and Skin Conductance Responses (SCR).

classifications of neuromarketing is related to the senses, it becomes necessary to delve into the relationship between this discipline and sensory disability. This classification refers to auditory neuromarketing (hearing), visual neuromarketing (sight), and kinesthetic neuromarketing (touch, smell, and taste). However, the possibilities outweigh the limitations, and neuromarketing stands as an interesting and valuable tool for working with people with different abilities (Barrientos-Báez et al., 2018; Barrientos-Báez & Caldevilla-Domínguez, 2019; Sindhuja & Malik, 2024).

Neuromarketing can have interesting and positive applications in the context of disability. Likewise, it may help understand how people with disabilities perceive and process information related to products and services offered in the market. For example, some studies focus on how people with visual disabilities develop unique and suggestive patterns of visual attention and information processing, which differ from individuals with full visual capabilities.

Additionally, there are specially adapted eye tracking technologies that can help create products and services that are tailored and more accessible for people with disabilities (Chhimpa et al., 2024). Neuromarketing can also help identify barriers and obstacles that may prevent people with disabilities from accessing certain products and services. For example, it may identify design elements of a website that have lower usability or are confusing for individuals with disabilities.

Unfortunately, it can be said that these innovative advancements receive little attention in academic texts on neuromarketing. As it is considered an emerging thematic line with high social value, this work aims to primarily understand the current state of affairs related to neuromarketing and disability, determine the main theories, ideas, and concepts, provide contributions, and debate their prospects and possibilities.

2. MATERIALS AND METHODS

In order to achieve the main objective of this research, a synthesis investigation using the SALSA Framework (Grant & Booth, 2009; Booth et al., 2012; Codina, 2024) has been conducted. Specifically, the methodology commonly used in review papers, under the modality of a scoping review, has been applied. A scoping review is a type of systematic literature review used to examine the breadth and nature of a research topic (Adewunmi, 2023; Crista, 2023). Unlike a traditional systematic review, which focuses on answering specific research questions, a scoping review aims to examine the extent, breadth, and diversity of available literature on a subject (Tajahuerce & Padilla-Castillo, 2015; Díaz et al., 2021; Padilla-Castillo, 2023; McPhail et al., 2024), as it was done in this case.

This scoping review methodology or evidence synthesis is particularly suitable for addressing objectives, such as the one in this work, regarding the characteristics of a specific area of knowledge, whether emerging or established. SALSA is an acronym formed by the words "Search, Appraisal, Synthesis, and Analysis", which correspond to the different phases of a systematic review. Each of these phases follows a rigorous and transparent model, deserving the name of systematic or systematized review (Codina, 2017, 2024).

Search refers to the well-planned search phase that detects documents, identifies those to be evaluated, and those to be rejected (Codina, 2017, 2024). The reasons for rejection are based on inclusion criteria, in this case, academic texts from international and national databases that include the terms "neuromarketing" + "disability" and "neuromarketing" + "discapacidad" in

their title, abstract, or keywords. The inclusion criteria used were quality (granted by inclusion in those databases) and typology (peer-reviewed academic texts or blind peer-reviewed texts); no other inclusion criteria, such as geographic or methodological factors, were introduced.

Appraisal represents how the works obtained in the Search phase are evaluated through various searches and the criteria used to determine if they will ultimately be included in the article bank and, therefore, the review. Double-filter criteria are commonly used, and in this case, date was used (without limits, all years), as well as language (English and Spanish), and type (research article, original article, and review article). All aimed at minimizing the jeopardy of bias, as stated by López-Ornelas (2024) and Montiel Torres & Teruel Rodríguez (2025).

Synthesis and Analysis involve gathering the results (selected and stored articles) and comparing the findings of the articles that have formed the article bank. The analysis is qualitative, as it is a critical review or state of play.

3. FIELD WORK & DATA ANALYSIS

To ensure the optimal systematic review, Codina (2024) recommends using an optimal group of databases for research in Social Communication, a protocol or framework to derive keywords and search equations to carry out rigorous and systematic exploration of the databases. Following this recommendation, the following have been chosen: Scopus, Web of Science, Google Scholar, and Microsoft Academic (in English), as well as Dialnet Plus and Bases de datos del CSIC (in Spanish). By selecting these 6 databases, it is ensured that the search will be representative and relevant. The search process is organized according to Table 1.

Table 1. SALSA framework in the systematic review of neuromarketing and disability

Phases	Used criteria
Search	Databases: Scopus, Web of Science (WOS), Google Scholar, and Microsoft Academic (in English), and Dialnet Plus and CSIC Databases (in Spanish). Search equations: "neuromarketing" + "disability" AND "neuromarketing" + "*discapacidad*". Years of publication: All.
Appraisal	Initial number of documents: 263 (Scopus: 2; WOS: 2; Google Scholar: 167; Microsoft Academic: 88; Dialnet Plus: 2; CSIC Databases: none). Inclusion/exclusion criteria: elimination of false positives; exclusion of non-peer-reviewed or blind peer-reviewed texts; articles with an IMRyD or equivalent structure; articles published in English and Spanish; documents that include any of the concepts "neuromarketing," "disability," or "*discapacidad*" in the title, abstract, or keywords.
Sinthesis	Narrative synthesis based on structured abstracts.
Analysis	Components: • Object of study • Objectives • Questions/Problems/Hypotheses • Methodology • Results • Keywords • Category (Topic)

Source: Grant & Booth, 2009; Booth et al., 2012; Lopezosa et al., 2023.

Once the document bank was obtained, a systematic analysis framework was applied to analyze the references. As a method, the literature review is understood as a study in itself (Gálvez-Toro, 2001; Day, 2005). After reading each article and developing its synthesis, a structural analysis was conducted to allow for a qualitative-descriptive analysis of the texts, in accordance with the research objective: to understand the state of play in neuromarketing and disability, determine the main theories, ideas, and concepts, and provide contributions and discuss their prospects and possibilities.

Inclusion and exclusion criteria were selected by establishing which characteristics documents should have to be considered in the analysis (e.g., date, document type, source, thematic relevance) and which ones should not. We generated coding criteria, comparing documents, and identifying patterns or relationships.

The selected literature review documents on the topic of neuromarketing and disability contain information, ideas, data, and evidence to fulfill the objective of this work or express specific opinions about the nature of the topic and the way it will be investigated. Similarly, they serve to critically evaluate solid and international research on the same topic and to understand the state of play in its full context (Machi & McEvoy, 2009).

4. RESULTS

After employing the SALSA Framework on the detected, selected, and analyzed documents, discussion of the main findings ensues in the following lines to summarize the possibilities and challenges linked to neuromarketing and disability. Firstly, a significant body of scientific literature focuses on neuromarketing methods that can be used to study both customers with disabilities and the general population.

Brunner *et al.* (2011) and later Edelman *et al.* (2024) study and discuss a brain-computer interface (BCI) that provides a non-muscular communication channel for individuals with and without disabilities. BCI devices consist of hardware and software. The hardware records brain signals, either invasively or non-invasively, through a series of components. Subsequently, the BCI software translates these signals into output commands for the device and provides feedback. The different types of BCI applications can be classified into the following four categories: basic research, clinical/translational research, consumer products and emerging applications. The results of their research indicate that this technology is still in transition and requires standardized interfaces.

Valderrama and Ulloa (2012) and Bullock-Palmer (2024) focus on physiological parameters for emotion detection. After studying the different devices most commonly used in neuromarketing -Positron Emission Tomography (PET), Functional Magnetic Resonance Imaging (FMRI), Electroencephalography (EEG), Magnetoencephalography (MEG), Magnetic Resonance Imaging (MRI), and Transcranial Magnetic Stimulation Simulation (TMS) - Valderrama and Ulloa argue that "Electroencephalography (EEG) is the most commonly used due to its ease of use and lower costs compared to the others" (p. 29). They propose bioinformatics techniques for emotion detection and signal classification, aiming to closely approximate the classification performed by the neural network, which constructs a mathematical model for taste distinction.

In 2014, Saposnik and Johnston publish an interesting study on decision-making in moments of healthcare attention demand. They conclude that it is a very challenging time for anyone, involving various cognitive processes. The process includes examining possibilities, risks, uncertainties, and options, comparing them, and choosing a course of action (Saposnik & Johnston, 2014). Incorrect assessments can lead to incorrect expectations from the patient and the family, as well as potentially inappropriate counseling, treatment, or discharge planning.

Cherubino *et al.* (2019) and Capone *et al.* (2024) conduct some of the best literature reviews on consumer behavior using neurophysiological measures. After providing a comprehensive history of neuromarketing, they delve into studies on neuroscience research and various tools for measuring brain activity. After analyzing over 400 references, they conclude that neurophysiological signals present several additional advantages compared to standard methods for evaluating user mental and emotional states, such as behavioral measures (reaction times) and subjective measures (questionnaires). Among the challenges, they identify the need to improve the way measurements are obtained and interpreted, enhance result interpretation, and expand the sample sizes of studies since the lack of reliability may be due to researchers relying solely on studies involving 20-35 participants. Such small groups can lead to opportunistic findings that provide convergent evidence for a specific hypothesis while disregarding alternative explanations.

Libert and Van Hulle (2019) study the monitoring of the mental state of customers, specifically focusing on severely disabled patients. As a novelty, they propose a method for predicting whether individuals decide to skip watching a video trailer using electroencephalography (EEG) recordings: a foreseeable effect of invasive publicity as started by Castañeda Pérez (2024) and storytelling as advertising tool (González-Oñate *et al.*, 2025). They calculate indices measuring viewer engagement and emotional affect based on multiscale sample entropy and signal power. They concluded that it is valuable to determine which scene in an advertisement leads to early skipping, especially when the technique used is based on brain responses rather than verbal messages afterward, as the former are unexpected and immediate, while the latter are socially corrected and prone to the recency effect.

Unal *et al.* (2020) state that contributing to commercial activities such as emotion classification, neuromarketing, and the gaming industry, as well as being able to communicate with individuals who cannot express their feelings due to disabilities, are essential topics for increasing the success of neuromarketing techniques. They conclude that electroencephalography (EEG) is not conclusive for working with individuals with disabilities and that more realistic determinations are needed, such as the DEAP dataset (Dataset for Emotion Analysis using EEG, Physiological and Video Signals). Although others, like Brasales Amores and Proaño Mariño (2025) still see potential in it to improve their standards of living.

In Spain, the publication by Núñez-Gómez *et al.* (2020) stands out, examining how individuals with Asperger's syndrome (AS), a form of autism, perceive advertising material and brands related to organizational communication. The main objective of the study was to understand if the perception of advertising differs between individuals with AS and a neurotypical population. The data revealed significant differences between the two groups in their perception of advertising and organizational communication regarding attention and emotion variables. According to the authors, one of the major challenges society faces is the development of activities that respect

the diverse needs of different individuals. Considering that individuals with Aspergers tend to repeatedly view the audiovisual products they enjoy, it is necessary to evaluate the content disseminated by companies and clarify the underlying intent to persuade this vulnerable audience.

Kaklauskas *et al.* (2022) focus on the detection and recognition of affective, emotional, and physiological states (referred to as AFFECT). They review publications on how techniques using brain sensors and biometrics can be employed for AFFECT recognition and compare the effectiveness of existing methods. They conclude that in the efforts to better achieve the key goals of Society 5.0, Industry 5.0, and human-centered design, recognizing emotional, affective, and physiological states is progressively becoming an important issue and offers tremendous knowledge growth and progress. They dedicate the last part of their research to the most current challenges, highlighting concerns such as AI and machine learning, cyberattacks capable of deciphering biometric systems, and the importance of multimodal biometrics to achieve higher security and accuracy in applications. Since 2022, advances have been made in this area, as can be seen in Anuja *et al.* (2024).

Another part of the papers has been examined and subsequently systematized according to the type of disability of the studied or surveyed audiences. This division warrants the search for total inclusion, which does not distinguish disabilities by typology or severity.

Popa *et al.* (2015) refer to modern neurophysiological methods for measuring various processes of the human brain in response to salient stimuli, with a focus on eye-tracking (ET). By detecting eye position, gaze direction, eye movement sequence, and visual adaptation during cognitive activities, ET is an effective tool for experimental psychology and neurological research as it provides quantitative and qualitative analysis of gaze behavior. They add that discrimination and choice are important processes of human brain activity, and eye-tracking has proven to be an effective tool for behavior analysis, a mirror of consumer behavior that allows studying what was previously unthinkable (Sáez García, 2024).

Soufineyestani *et al.* (2020) and Guamán Chuquitarco & Minta Jami (2024) study Brain-Computer Interfaces (BCIs), which are commonly used as a human-machine interface to assist individuals with motor disabilities ranging from mild to severe, including those who cannot communicate with others. These BCI devices designed for disabled individuals are not based on muscular movements but rather utilize specific brain activities, such as imagining performing an activity or focusing on an object on the screen, translating them into control functions and commands.

Yadav *et al.* (2021) provide a comprehensive review of recent trends and applications of Brain-Computer Interfaces (BCI). Based on a systematic search strategy, they consult major technical databases for research papers of moderate to outstanding interest. They review 188 research papers and identify several prominent applications of BCIs in both medical and non-medical fields, including neuromarketing, neurorehabilitation, and neuroergonomics. They conclude that BCIs are in an embryonic phase and require further research for maturity. With further studies since not having found improvement on this trend (Alonso-Miñón Muñoz, 2024)

Polat *et al.* (2021) also analyze BCIs and define them as a tool that enables user requests to be made to computerized systems through direct processing of brain signals. They provide summarized information in a table regarding the classification methods used in brain-computer interface control applications in recent years.

Cerdá-Suárez *et al.* (2022) studied the Young Music Fest 2019 as a paradigmatic model of social intervention that impacts the quality of life of specific groups, in this case, individuals with hearing disabilities. They conclude that these festivals constitute an effective strategy for creating experiences since music directly evokes emotions. According to these authors, festivals help communities join forces, increase a sense of belonging, and promote accessibility and diversity. Analyzing the results in a generic manner (deaf and hearing individuals), findings were extracted, such as festival attendance, which was 72.3% for deaf individuals compared to 89% for hearing individuals. Additionally, 58.5% of the surveyed deaf individuals had never attended a music event accessible to those with hearing disabilities. The study recommended a new method of experiential evaluation to assess the true effects of events and propose evaluation based on objectives framed within the event's brand experience. This method includes auditing discussions about the festival and the organization, seeking shared passion, building a follower base, keeping them engaged through news updates, using survey and game applications, publicly showing recognition from like-minded individuals, and promoting user-generated content.

In the third classification line, works that include ethical and deontological perspectives were identified. Javor *et al.* (2013) delve into the ethical issues of neuromarketing, considering individuals with disabilities. With a positive approach, like this work, they defend the need for its study by recognizing that the positive contributions to scientific discourse often go unnoticed in the development of a biological model that explains contextualized human behaviors such as consumption. The authors advocate for differentiated terminology, labeling the commercial applications of neuroscientific methods as "neuromarketing" and scientific applications as "consumer neuroscience". While marketing scholars have enthusiastically integrated neuroscientific evidence into their theoretical framework, they argue that neuroscience has only recently begun to pay attention to the results of consumer neuroscience (Ching-Ruíz *et al.*, 2024).

In that context, they identify and discuss four areas in which consumer neuroscience could contribute to the field of neurology: 1) Studies using gaming paradigms could help better understand the underlying pathophysiology of pathological gambling in Parkinson's disease, frontotemporal dementia, epilepsy, and Huntington's disease; 2) Compulsive buying is an interesting problem for study from both neurology and consumer neuroscience perspectives. The paradigms commonly used in consumer neuroscience could be applied to patients with Parkinson's disease and frontotemporal dementia to advance knowledge of this important behavioral symptom; 3) Research on trust in the medical context lacks behavioral and neuroscientific empirical evidence. Neurologists venturing into this field could benefit from the extensive knowledge about the biological foundations of trust acquired by economists focused on neuroscience; 4) Neurologists could contribute to the ethical debate on invasive methods in neuromarketing and consumer neuroscience. Additionally, they should investigate the biological and behavioral reactions of neurological patients to marketing and advertising measures, as they may exhibit a particular vulnerability as consumers (Javor *et al.*, 2013).

Feenstra and Pallarés-Domínguez (2017) present and discuss the ethical debates surrounding political neuromarketing. They describe how this discipline is characterized by studying the human brain with the aim of improving political communication and garnering more votes. They argue that the debate around neuromarketing emerges at the very moment of its development, and the definition of neuromarketing itself sparks opposing tendencies between those emphasizing its

scientific nature and those focusing on the strategic/commercial component. They conclude that a transparent use of these techniques could lead to a broader understanding of neuromarketing, one that is not solely focused on its strategic purpose but on its potential as a scientific discipline. Only by advancing along this ethical line, it would be possible to ensure that the technological advancements in neuroscience allow to understand (not manipulate) an essential pillar of the democratic system: public opinion.

The work of Hensel *et al.* (2017) is particularly suggestive, as it argues that since its promising inception, neuromarketing has faced ethical problems. According to the authors, these problems stem from the absence of regulation and lack of transparency. However, they believe that the potential of neuromarketing can only be effectively exploited if trust in the field is increased, which is closely related to ethical behavior. In their study, they assess the validity of the ethical code of the NMSBA (Neuromarketing Science & Business Association) as outlined in the EGNM (Ethical Guideline in Neuromarketing), determining if there is consensus among professionals in the field of neuromarketing.

They pursue these objectives through 10 in-depth interviews with professionals in the sector and enumerate 7 key aspects: 1) Incentives should be appropriate to avoid distorting participants' behavior; 2) Prevent manipulation of consumer behavior ("covert marketing"); 3) Protect vulnerable groups (e.g. elderly, children, disabled) from commercial exploitation; 4) The participation of vulnerable groups (e.g., disabled, teenagers, elderly) should receive special attention; 5) Avoid covert data collection/incomplete disclosure; 6) Disclosure of tools and measurement scales whenever possible; 7) Ensure detailed standards for ethically communicating neuromarketing results.

Bernal-Camargo *et al.* (2018) explore the ethical implications of socio-legal research. Focusing on neuromarketing, they refer to it as a hybrid research genre. They use this term because discipline combines consumer customs and behaviors with neuroscience, requiring the integration of biomedical and socio-humanistic ethics. Regarding research involving human subjects, they emphasize that regulations have traditionally been a reaction to abuses in biomedical research. However, they argue that it is necessary to address the issues proactively rather than waiting for problems or scandals to arise. Ethics in medical research involve ethical standards, legal norms, and the actions of five scenarios: 1) International norms, declarations, and documents that have been accepted as essential for assessing the ethics of a research project; 2) Legal norms and documents of each country, from their constitutions to any regulations or guidelines; 3) Research ethics committees, which ensure compliance with norms and the protection of participants' rights and well-being; 4) The mechanism of informed consent, which ensures respect for individuals participating in research; 5) The ethical character of the researcher or investigator.

In the field of Social Sciences, Bernal-Camargo *et al.* (2018) emphasize the lack of documentation, which has led to the traditional and dangerous mistake of believing that research in this area does not involve risks or harm. However, they cite paradigmatic cases such as the Foote Whyte study and the Milgram study to underscore the importance of ethics from the very formulation of the research, especially in qualitative research.

Cardoso *et al.* (2022) analyze the use of neuroscience to understand and influence consumer behavior and the various ethical controversies it has created. They also posit the need to demysti-

fy the use of neuroscience for marketing purposes and provide useful insights for neuromarketing researchers seeking funding opportunities, which are typically associated with topics within the upper percentile of prominence or emerging topics, as portrayed by Patiño Mazo (2024).

More recently, Alsharif *et al.* (2023) study the limitations, challenges, and potential solutions of applying neuromarketing in the Malaysian context. Through a semi-structured interview with 16 academics, they identify that ethical concerns and manipulation are among the primary reasons that have hindered the growth of neuromarketing, along with high costs, lack of adequate knowledge, the need for infrastructure that requires substantial investment, and time requirements. Among the proposed solutions, the respondents suggest collaboration networks to reduce costs and, above all, compliance with laws and regulations. They consider it crucial to increase awareness of potential difficulties in the application of neuromarketing techniques and help guide future research and development. In general, as shown by Matos Agudo *et al.* (2025) neurocommunication is considered a relevant theme and skill in any health-related matter.

5. DISCUSSION & CONCLUSIONS

This work aimed to understand the state of play in neuromarketing and disability, in order to determine the main theories, ideas, and concepts and provide contributions and debate their prospects and possibilities. After conducting synthesis research using the SALSA Framework, under the modality of a scoping review, without a time limit, and across 6 databases (Scopus, Web of Science, Google Scholar, Microsoft Academic, Dialnet Plus, and CSIC Databases), the challenges and possibilities of neuromarketing to aid the full inclusion of people with disabilities are identified.

The main challenge concerns neuromarketing with individuals with visual and auditory disabilities. People with visual disabilities have limited or different visual capabilities, which limits the applicability in blind individuals. For example, FMRI (Functional Magnetic Resonance Imaging) relies on vision to display images that stimulate brain activity, and EEG (electroencephalogram) utilizes electrodes on the head, which may interfere with vision assistive devices used by blind individuals. Moreover, individuals with visual disabilities have different patterns of brain activity compared to sighted individuals. Therefore, reference models for their brain activity may not be equally applicable in the case of blind individuals. Sensory deprivation of sight leads to brain reorganization, manifested in noticeable changes in functional and structural connectivity, as well as activation of different brain areas that fully capable individuals do not develop.

For instance, in individuals with visual disabilities, visual areas of the brain are reassigned to process tactile and auditory information, which become more sensitive and intelligent. This translates into greater activation of these areas compared to individuals who can see. Additionally, blind individuals tend to have increased activation in the frontal areas of the brain involved in planning and attention. Based on the above, reference models for brain activity that rely on individuals who can see may not be directly applicable to blind individuals. Studies using neuroimaging techniques to investigate brain activity in blind individuals need to consider these unique patterns of brain activity and make necessary adjustments to the reference models used.

On the other hand, neuromarketing for blind individuals requires new approaches and techniques that do not rely on vision, such as measuring brain activity in other sensory areas like

hearing or touch. It is an area of research that needs more attention and development to be effectively applied in the market and improve the experience of blind consumers.

Beyond abilities and disabilities, the ethical and deontological challenges of neuromarketing are the same for all sectors and any interviewed person. The literature review has shown the need for transparency from companies and the obligation to avoid covert marketing and unethical use of data, among other practices. Additionally, it has been shown that if neuromarketing does not progress in this transparency, it will not improve its perceived trustworthiness, and unfortunately, society will be missing out on all the positive potential that its use can bring in various fields.

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