

ETHICS IN NEUROMARKETING: A LITERATURE REVIEW

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Abstract

Neuromarketing (the intersection of neuroscience and marketing) is a concept gaining increasing attention from both companies and researchers, due to its potential to provide insights into the decision-making process during purchases by analyzing brain responses. In this context, the study aims to analyze the concept of ethics in neuromarketing, identifying the key factors that shape this concept and exploring relevant solutions. This research is based on a semi-systematic literature review, following a stepwise methodological approach that included database selection, keyword-based search, inclusion and exclusion criteria, and thematic synthesis of results. This research reviews the existing literature on neuromarketing and ethics, identifying core themes to deepen in the search for solutions. Four ethical dilemmas are highlighted: consumer privacy, consumer consent, manipulation, and corporate integrity and transparency. Through this analysis, the study identifies the main actions researchers and marketers must undertake to ensure their work aligns with ethical principles. This paper contributes to the relatively limited research on ethics in neuromarketing and may serve as a reference for researchers interested in conducting studies with neuromarketing-specific techniques.

Keywords: Neuromarketing, Ethics, Transparency, Ethical dilemmas.

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1. INTRODUCTION

Decoding the consumer mind has become a central focus for both researchers and practitioners aiming to understand how the human brain responds to marketing stimuli and how these responses influence purchasing decisions (Meyerding & Mehlose, 2020, Schneider & Woolgar, 2012). The integration of neuroscience into business and management has led to the emergence of new interdisciplinary research areas (Lee et al., 2007). Among them, neuromarketing stands out as a field that combines neuroscience

and marketing, applying neuroscientific methods to understand, predict, and influence consumer behavior. By using techniques such as fMRI, EEG, and eye-tracking, neuromarketing explores the neural processes that underlie perception, emotion, and decision-making, thus offering a neuroscientific foundation for understanding how consumers interact with brands and advertising stimuli (Lim, 2018).

Over the past two decades, scholars have examined neuromarketing from several perspectives—its potential to improve marketing effectiveness, its methodological rigor, and, increasingly, its ethical implications. Ethical considerations emerged as a central theme as the use of neuroscientific tools in marketing raised questions regarding privacy, manipulation, and consent. Researchers such as Ariely and Berns (2010), Fisher et al. (2010), and Murphy et al. (2008) emphasized the importance of ensuring that neuromarketing practices respect human rights and maintain transparency. As a result, a growing body of literature now focuses on the ethical dilemmas associated with neuromarketing, addressing topics such as consumer consent, confidentiality, corporate responsibility, and integrity. These ethical challenges form one of the most debated and conceptually rich areas in the field.

Given the increasing academic and commercial attention devoted to neuromarketing, this paper aims to systematically review the literature on ethics in neuromarketing, identifying the key ethical dilemmas that researchers and practitioners face. The study's originality lies in consolidating the fragmented discussion on ethical concerns into a coherent framework that highlights four major dimensions: consumer privacy, consumer consent, manipulation, and corporate integrity and transparency. By synthesizing the existing body of work, this review not only clarifies how ethical principles are interpreted in neuromarketing research but also provides recommendations for ensuring that such studies are conducted responsibly.

Ethical concerns are the core of this research, as neuromarketing inherently involves accessing and interpreting neural and psychological data—information closely tied to individuals' thoughts, emotions, and intentions. This proximity to the subconscious raises questions about consumer autonomy, manipulation, and data protection. Therefore, understanding the ethical dilemmas in neuromarketing is essential for the sustainable and credible development of the field. This study aims to contribute to this ongoing discussion by identifying and analyzing the ethical challenges that arise when applying neuroscientific methods to marketing contexts.

2. ETHICAL DILEMMA IN NEUROMARKETING

Ethics in neuromarketing is often regarded as a set of guidelines that companies or researchers must adhere to when applying neuroscience in marketing. They are required to comply with ethical standards and current laws to avoid exploiting human rights (Lim, 2008). Although the impact of neuroscience in marketing is evident, some critics argue that neuromarketing negatively affects consumers. They claim

that neuromarketing can lead to consumer mind manipulation, influencing purchasing decisions (Berlinska & Kaszycka, 2016). For instance, through neuromarketing, Microsoft can understand consumer preferences and attitudes, enabling the development of new products and increasing company profitability. According to Ariely & Berns (2010), the application of neuromarketing techniques by profit-focused companies is the primary reason ethical considerations in marketing must be addressed. Additionally, researchers employing neuromarketing techniques have access to personal and confidential information, heightening concerns about privacy. Ethical challenges associated with this concept are frequently highlighted (Mouammine & Azdimouse, 2023). Analyzing the concept of ethics in neuromarketing helps construct a reference framework and provide solutions largely rooted in neuroscience. Neuroscience, which studies the nervous system and its functions (Clark, 2020), has seen rapid advancement, raising numerous ethical challenges. This rapid technological development has opened new frontiers for neuroscience, sometimes resulting in controversies and heightened concerns among researchers and the public. Techniques such as fMRI and EEG have already demonstrated the ability to consolidate data on our identities and emotions (Mouammine & Azdimousa, 2023). These technological advancements have paved the way for studies on ethics in neuromarketing.

The ethical dilemmas arising from neuroscience's development have led to the emergence of a new field of study: neuroethics. The term "neuroethics" was introduced in 2002 to express a cross disciplinary area which connects together experts from various areas of neuroscience, cognitive sciences, law, and philosophy (Clark, 2020) to address the legal, moral, and social concerns that have surfaced with advancements in neuroscience (Mouammine & Azdimousa, 2023).

3. LITERATURE REVIEW

There is a common agreement among researchers that ethics in neuromarketing must be treated with the utmost seriousness. A superficial or negligent approach can have negative consequences, not only for researchers but also for the research study itself, potentially harming the image of the involved brand (Lee et al., 2018).

Studies on ethics in neuromarketing began in the early 2000s, when the risks associated with certain neuromarketing methods were first analyzed (Lim, 2018). Subsequently, other researchers continued to explore ethics in neuromarketing to examine the main factors contributing to concerns regarding studies that apply neuromarketing techniques (Meyerding & Mehlhose, 2020, Plassman et al., 2012).

Isa et al. (2019) conceptualized the ethical issues in neuromarketing, highlighting the main factors that contribute to risks in this field: the "buy button," consumer decisions and preferences, and consumer brain

engagement. Mouammine & Azdimousa (2023) expanded on these by adding new concepts such as subject confidentiality, manipulation, corporate integrity and transparency, participant consent, and free will.

Recent contributions have further emphasized the multidimensional nature of ethical dilemmas in neuromarketing, drawing insights from behavioral science, psychology, and digital ethics. For instance, Casado-Aranda et al. (2018) demonstrated how neuroimaging and biometric data are increasingly being applied in digital marketing and online advertising, raising renewed ethical concerns regarding informed consent and subconscious influence. Similarly, Gupta et al., (2025) highlighted that neuromarketing's methodological overlap with cognitive neuroscience necessitates more robust ethical frameworks to ensure participants' autonomy and data protection. Moreover, contemporary scholars such as Mouammine & Azdimousa (2023) have argued that the expansion of neuromarketing beyond traditional media—into areas like social media engagement, AI-driven advertising, and virtual reality—demands a cross-disciplinary understanding of ethics involving technology, law, and consumer psychology.

TABLE 1. MAIN RESEARCH ON NEUROMARKETING ETHICS

	Participants' consent	Consumer confidentiality	Manipulation	Integrity and transparency
Welcome to the jungle! The neuromarketing literature through the eyes of a newcomer. (Lee et al. 2018)	x	x	x	
Examining the influence of fame in the presence of beauty: An electrodermal „neuromarketing“ study. (Lee et al. 2018)			x	
Demystifying neuromarketing. (Lim 2018)	x	x		x
Neuromarketing: Ethical implications of its use and potential misuse. (Sinnott-Armstrong & Huette, 2017)	x		x	x
Neuromarketing and consumer free will. (Wilson et al. 2008, Plassman et al., 2011)			x	
Defining neuromarketing: Practices and professional challenges. (Fisher et al. 2010)	x	x		x
Neuroethics of neuromarketing (Murphy et al., 2008)			x	

Source: Authors' research.

The growing body of research in consumer neuroscience and behavioral economics also supports the ethical dimensions explored in neuromarketing. For example, Ariely and Berns' (2010) foundational work on the neurobiology of decision-making has been expanded by more recent research investigating emotional activation, moral reasoning, and subconscious responses during exposure to advertising stimuli (Morin, 2011; Spence, 2019; Izaguirre-Torres et al., 2020). These studies collectively reinforce that

neuromarketing does not operate in isolation—it interacts with broader questions of consumer autonomy, persuasion ethics, and corporate social responsibility (CSR).

Beyond marketing and neuroscience, interdisciplinary studies from information systems and data privacy research (Lim, 2018) have linked neuromarketing practices with digital consumer rights and algorithmic transparency. This suggests that ethical neuromarketing must also integrate the principles of data minimization, explainability, and fairness common to the fields of AI and data science. Consequently, ethics in neuromarketing has evolved from being a niche academic debate to a central discussion in the governance of consumer data and psychological research.

The primary researchers who have addressed ethics in neuromarketing and the main themes they discussed are shown in Table 1.

Based on an analysis of the ethical dilemmas discussed in existing literature, four concepts predominate in most studies and will be addressed in the following sections: participant consent, consumer confidentiality, manipulation, and corporate integrity and transparency. These four concepts are not mutually exclusive but rather interrelated dimensions of ethical responsibility. Participant consent and consumer confidentiality represent the individual-level protection of subjects and data, while manipulation and the “buy button” relate to the cognitive and psychological mechanisms of persuasion. Corporate integrity and transparency, in turn, provide the institutional safeguard ensuring that organizations act responsibly and disclose both their objectives and their use of neuroscientific data. Together, these pillars provide the foundation for developing an ethical framework for neuromarketing practices (Fortunato et al., 2014; Cassado et al., 2014).

3.1 Participant consent

One of the primary ethical concerns in neuromarketing involves the protection of participants in studies, specifically regarding testing consent, data security, and vulnerability. Measuring neural signals in response to marketing campaigns in the human brain poses a risk to the autonomy of subjects, as certain information is perceived before obtaining consent (Alsmadi & Hailat, 2019). Although prior briefing and obtaining consent from participants are mandatory steps researchers must follow before conducting tests involving neuromarketing techniques on the human brain, the issue of adequate protection arises when researchers do not take sufficient measures to inform and safeguard personal data (Murphy et al., 2008; Ulman et al., 2015). Such measures include informing participants about the testing procedure, the risks and benefits of participating in such a study, the types of information that may be gathered, and the subjects' rights (Lim, 2018).

The impact of these measures is especially significant concerning vulnerable groups (patients with neurological issues, children), as these individuals may be more susceptible, easily influenced, or negatively affected by such technologies (Lim, 2018). A heightened risk emerges when protective measures are absent, particularly when no ethical review (by a committee or institution) is in place (Lim, 2018). These cases occur notably in studies conducted for commercial purposes by companies operating in countries without regulatory bodies overseeing this aspect (WHO, 2015). Similarly, such measures may also be absent in academic research if researchers do not provide—or only provide minimal—ethical information.

3.2 Consumer confidentiality

Protecting clients' personal information is an essential part of conducting effective market research, as it involves handling sensitive data. Article 12 of the Universal Declaration of Human Rights of 1948 clearly states each person's right to privacy, making it evident that neuromarketing firms must respect this right when establishing their research protocols. Like medical institutions, they should take precautions to protect the confidentiality of collected data, ensuring its storage and transfer under complete anonymization conditions (Fisher et al., 2010).

Furthermore, research findings should not be disclosed or sold to third parties, especially if they contain sensitive participant information; doing so under the guise of commercial activity would be unethical. Although ethical codes mandate that the collection of personal information be limited to defined objectives and not used for other purposes, researchers must also ensure adequate security mechanisms are in place to prevent unauthorized access to results. This includes ensuring that neuroimaging data remains the exclusive property of the research firm and is not disclosed. The pertinent question is whether post-study methods exist to verify and validate that the research was conducted in full compliance with all applicable legal and institutional requirements (Lee et al., 2007).

3.3 Manipulation

The use of neuroscience technologies to manipulate customer decisions is recognized as a crucial ethical issue in numerous academic works. Some cited sources express concern that neuromarketing may possess the capacity to manipulate individuals and dictate their decisions, which we consider an exaggerated and premature assertion (Clark, 2020).

For instance, Alsmadi & Hailat (2021) argue that advances in neuroscience could allow for influencing consumers without their knowledge, noting that suggestions for using brain waves to assess promotional impact have been around for over two decades. They claim that neuroimaging technologies might be used

in public spaces to read thoughts and identify stimuli that trigger emotions such as excitement, trust, or pleasure in consumers—emotions that might lead to purchasing. However, this is not entirely accurate; while emotions play an essential role in some decision-making processes, they do not directly cause purchasing, and the possibility of reading consumers' thoughts via public brain scanning seems unlikely in the near future (Lim, 2008).

Alexander & Shenoy (2021) suggest that the ethical issues attributed to neuromarketing are, in fact, relevant to other areas such as sales and advertising. The kind of consumer choice manipulation the public imagines would require significant technology and costs. It is important to distinguish between influence and manipulation—marketing actions aim to legitimately influence choices, not alter consumer autonomy (Ariely & Berns, 2010; Clark, 2020).

3.4 Corporate integrity and transparency

How companies adopt and integrate neuroscience in marketing will determine whether ethical concerns are mitigated or amplified. Neuromarketing firms and their clients need to communicate openly and honestly about data and conclusions with test subjects and other involved parties. Alexander & Shenoy (2019) argue that despite the potential benefits, neuromarketing firms are unlikely to achieve full transparency, as they are primarily for-profit businesses. The authors also highlight the lack of peer review for results presented to clients, which could reduce exaggerated claims and maintain scientific integrity.

Although implementing such solutions may be challenging, neuromarketing firms' willingness to openly share protocols and findings is also questionable. Therefore, an independent external audit could help ensure adherence to ethical policies. Transparency can be upheld through clear explanations to subjects regarding protocols, objectives, and data collected—a process known as "debriefing" (Mouammine & Azdimousa, 2023). For neuroimaging-based neuromarketing studies, a more direct explanation in accessible terms—including information about procedures, benefits, risks, and incidental findings—is essential (Mouammine & Azdimousa, 2023; Lee et al., 2007; Lim, 2018; Isa et al., 2019). The researcher-participant relationship is critical, and companies are responsible for adopting policies rooted in integrity and transparency, benefiting both themselves and the industry.

4. RESEARCH METHODOLOGY

This paper adopts a semi-systematic literature review approach, positioned between a fully systematic and a purely narrative review. The semi-systematic approach was chosen because the topic—ethics in neuromarketing—is an emerging and interdisciplinary area, combining marketing, neuroscience, and

ethics. The review process followed a stepwise methodological approach that included: (1) defining the research questions and objectives; (2) identifying relevant keywords and databases; (3) systematically searching the literature; (4) screening and applying inclusion and exclusion criteria; (5) analyzing and synthesizing the results thematically. This approach ensured both methodological rigor and flexibility, allowing the inclusion of conceptual and theoretical studies relevant to the ethical dimensions of neuromarketing.

The review followed the principles of the systematic review model proposed by Tranfield et al., (2003), complemented by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, to ensure transparency, replicability, and rigor in the selection and synthesis of sources.

4.1 Search strategy and databases

The literature search was conducted between January and March 2025 across major academic databases, including Scopus, Web of Science, and Google Scholar. Additional references were identified through citation tracking from key publications. The following keywords were used: ("neuromarketing" OR "consumer neuroscience") AND ("ethics" OR "ethical issues" OR "ethical implications" OR "neuroethics" OR "transparency" OR "manipulation" OR "privacy" OR "consent").

The search was limited to peer-reviewed journal articles, conference papers, and book chapters published in English between 2000 and 2025, reflecting the relatively recent development of neuromarketing as a research field.

4.2 Inclusion and exclusion criteria

Studies were included if they discussed ethical aspects related to the use of neuromarketing or consumer neuroscience; addressed one or more ethical dimensions such as consent, manipulation, confidentiality, or transparency; were based on empirical studies, conceptual frameworks, or theoretical analyses.

Studies were excluded if they: focused solely on the technical or commercial applications of neuromarketing without addressing ethics; were duplicates, non-English publications, or lacked peer review; did not provide sufficient methodological or ethical discussion.

4.3 Screening and selection process

The initial database search yielded approximately 220 records. After removing duplicates and applying the inclusion/exclusion criteria, 78 articles were retained for title and abstract screening. A further review of full texts resulted in 42 publications being included in the final analysis. These papers were categorized

thematically into the main ethical dilemmas addressed in the literature—namely, participant consent, consumer confidentiality, manipulation, and corporate integrity and transparency.

4.4 Data extraction and synthesis

For each selected study, relevant data were extracted regarding the author(s), year of publication, research focus, ethical dimensions discussed, and key findings. A thematic synthesis approach was applied to identify recurring patterns and emerging perspectives on ethics in neuromarketing. The analysis focused on consolidating the most frequently cited ethical concerns and proposing directions for responsible implementation of neuromarketing practices.

5. ETHICAL IMPLEMENTATION PLAN

The way researchers ensure their studies align with ethical principles defines the impact of their research and assures that risks are mitigated. Anticipating these risks guarantees the proper conduct of studies while adhering to existing laws and ethical guidelines.

5.1 Research's transparency and objective

Given the risks that may arise from research using neuromarketing techniques, researchers must ensure that subjects tested with specific neuromarketing methods are informed about the study's objective, potential implications, and how the research data will be used (Clark, 2020). Neglecting clear disclosure of these aspects can affect study results, the involved brands, and may also have legal repercussions (Lee et al., 2018). It is also the researcher's responsibility to protect and secure the personal data of subjects, in line with GDPR.

5.2 Data confidentiality and participant consent

To respect participant confidentiality, researchers using neuromarketing techniques should disclose essential information to potential subjects prior to the study, including the study's purpose, the techniques to be used, how data will be interpreted, and where results will be published. Obtaining prior consent from subjects before beginning the study is essential for complying with both legal and ethical standards.

5.3 Alignment with international standards

To ensure the study meets ethical principles and the applied methodology does not exceed ethical boundaries, it is recommended to align with existing international standards such as the Helsinki

Declaration of the World Medical Association (1964). Given the potential risks associated with neuromarketing studies, adherence to these standards ensures that researchers anticipate possible issues and conduct studies in a way that respects participants' rights, while also fulfilling the studies' interests and objectives (Alsmadi & Hailat, 2021, ESOMAR, 2016).

6. CONCLUSIONS

Neuromarketing is becoming an essential tool for marketers aiming to predict how consumers make decisions. Research on various aspects of neuromarketing has expanded significantly over the past decade. As studies in this field grow, so do ethical concerns, particularly regarding the type of information that can be gathered from such studies. Although the importance of neuromarketing discoveries is indisputable, ethical principles remain crucial factors that both researchers and marketers must consider. Subjects who will undergo testing must be informed in advance about the study's objective, analysis methods, how their personal information will be handled, and how the study results will be used. Participants must give their consent on all these aspects before the research begins. Additionally, data confidentiality is a highly sensitive issue, regulated by law in some regions, and must be addressed before starting neuromarketing studies.

For companies conducting neuromarketing studies, ensuring transparency regarding the obtained results and their intended market use is essential to comply with defined ethical principles. This research has identified organizations that support researchers and companies by providing a structural framework and highlighting the steps needed to adhere to ethical principles in neuromarketing.

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