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Neuromarketing for sustainable product adoption & eco-friendly consumer behaviour

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Abstract
As environmental challenges continue to escalate, promoting sustainable product adoption and encouraging ecofriendly consumer behavior has become increasingly vital. Neuromarketing, an interdisciplinary field that merges neuroscience, psychology, and marketing, provides powerful insights into the complexities of consumer decision-making. This paper explores how various neuromarketing techniques—such as brain imaging, eye-tracking, and biometric analysis—can be effectively utilized to understand and influence consumer preferences for sustainable products. By decoding the unconscious emotional and cognitive triggers that drive purchasing behavior, marketers can design more impactful campaigns that resonate with consumers' values and encourage long-term behavioral change. For instance, brain imaging can reveal how consumers emotionally respond to sustainable branding, while eye-tracking can identify which product features capture their attention. Additionally, the study examines the ethical implications of using neuromarketing in green marketing strategies, emphasizing the necessity for transparency and consumer empowerment. It is crucial that consumers feel informed and engaged in their purchasing decisions, ensuring that marketing strategies do not manipulate their emotions unduly. Ultimately, this research underscores the potential of neuromarketing to drive sustainable consumption and support global initiatives aimed at enhancing environmental responsibility. By leveraging these insights, businesses can inspire consumers to make choices that benefit both themselves and the planet, fostering a shift toward environmentally responsible behavior and contributing to a more sustainable future for all. Through effective neuromarketing strategies, we can create a positive impact on consumer habits and promote a culture of sustainability.

Keywords: Neuromarketing, sustainable consumption, ecofriendly behaviour, consumer decision-making, green marketing

1. Introduction
The growing awareness of environmental degradation, climate change, and unsustainable consumption patterns has urged industries and consumers alike to adopt greener practices. Sustainable products — those designed with minimal environmental impact across their lifecycle — are vital to achieving global sustainability goals. However, despite increased awareness, a significant gap persists between consumers' attitudes and their actual purchasing behaviour, commonly known as the attitude-behaviour gap. Consumers often express concern for the environment but fail to translate these concerns into eco-conscious purchasing decisions. Traditional marketing techniques, which rely heavily on rational appeals and product attributes, often fall short in influencing these complex behaviours. They tend to overlook the underlying psychological and emotional factors that drive decision-making.

This persistent attitude-behavior gap is a central challenge in promoting sustainable consumption, where consumers often express positive environmental attitudes but fail to translate them into actual purchasing decisions [3], [4]. Research indicates that this disconnect is not merely a lack of awareness but stems from complex psychological, social, economic, and contextual factors [13], [14], [15]. These barriers can include the perceived higher cost of sustainable alternatives (the 'green premium'), a lack of easily accessible sustainable options, social norms that do not strongly endorse eco-friendly choices, or simply the cognitive effort required to evaluate complex environmental information. Furthermore, consumers may experience 'green fatigue' or a sense of helplessness when confronted with

the scale of environmental problems, leading to inaction. Traditional marketing's rational appeals, focused primarily on product attributes and environmental benefits, frequently miss the mark by failing to address these underlying behavioral barriers, highlighting the need for more sophisticated approaches that engage consumers on a deeper, often subconscious, level.

This is where neuromarketing, an emerging field that combines neuroscience, psychology, and marketing, offers a compelling alternative. By exploring how the human brain processes marketing stimuli, neuromarketing helps uncover unconscious drivers of consumer behaviour, such as emotional engagement, trust, attention, and memory retention. Neuromarketing tools like functional Magnetic Resonance Imaging (fMRI), Electroencephalography (EEG), eye-tracking, galvanic skin response (GSR), and facial coding provide measurable data on consumers' physiological and neurological reactions. These techniques enable marketers to refine their strategies by emphasizing subconscious motivations rather than solely relying on self-reported feedback, which is often biased or incomplete. In the context of sustainability, neuromarketing can help design marketing campaigns that effectively communicate the value of eco-friendly products by activating brain regions associated with empathy, social responsibility, and future-oriented thinking. For instance, neuroinsights can guide the selection of imagery, colours, messaging tone, and even the sequence of advertisement elements to maximize impact. Furthermore, neuromarketing enables brands to bridge the gap between environmental values and actual consumer behaviour by fostering deeper emotional connections and positive associations with sustainable choices.

This paper seeks to explore how neuromarketing can serve as a strategic tool for enhancing sustainable product adoption and cultivating long-term eco-friendly consumer behaviour. By presenting a synthesis of academic findings, real-world case studies, and experimental insights, this research aims to offer a comprehensive understanding of how neuromarketing can reshape the sustainability marketing landscape and empower both businesses and consumers to make more responsible choices. This paper aims to contribute to the evolving discourse by synthesizing the fragmented body of knowledge on neuromarketing's application in sustainable consumption. We specifically highlight how neuroscientific insights can be leveraged to move beyond superficial green messaging, fostering genuine, long-term shifts in consumer behavior towards eco-friendly alternatives. By presenting a robust theoretical framework, informed by recent academic findings and practical observations, this research seeks to not only underscore the strategic value of neuromarketing in green marketing but also to critically examine its ethical boundaries, ensuring responsible innovation in this interdisciplinary field. Ultimately, this work envisions a future where consumer decision-making for sustainability is not merely a conscious choice, but a deeply ingrained preference, driven by a nuanced understanding of the human brain.

2. Neuromarketing: an overview

Neuromarketing is an interdisciplinary field that merges neuroscience, psychology, and marketing to study how consumers respond to marketing stimuli at both conscious and unconscious levels. Unlike traditional marketing research methods such as surveys and focus groups, neuromarketing delves deeper into the brain's response mechanisms to uncover implicit preferences, emotional engagement, and cognitive load during decision-making. The central premise of neuromarketing is that consumer behavior is not solely driven by rational thought processes, but significantly influenced by subconscious emotions, habits, and neural responses. By leveraging

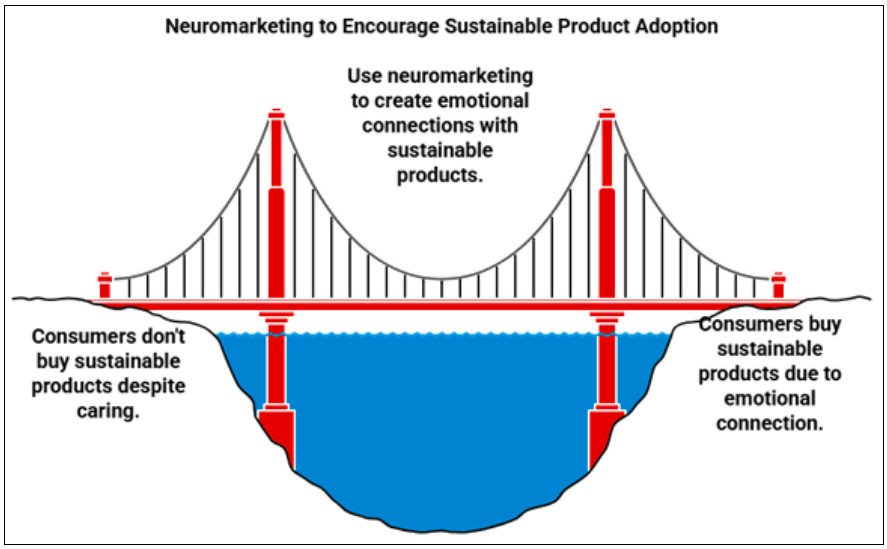

Fig 1: Neuromarketing to Encourage Sustainable Product Adoption.

neuroscientific tools, researchers can gather quantifiable and objective data on consumer attention, emotional resonance, and memory retention.

Key technologies employed in neuromarketing include

Electroencephalography (EEG): Measures electrical activity in the brain to evaluate real-time responses to marketing content. EEG helps determine the level of engagement, attention span, and emotional arousal experienced by the viewer. Functional Magnetic Resonance Imaging (fMRI): Provides detailed images of brain regions activated during exposure to specific stimuli. fMRI is particularly useful for

understanding deeper emotional and reward-related responses linked to brand perception and ethical decision-making. Eye-Tracking: Captures gaze patterns and visual attention, indicating which parts of an advertisement or product packaging attract the most interest. It is often used to optimize visual layouts for better message delivery. Galvanic Skin Response (GSR): Detects changes in skin conductivity caused by emotional arousal. It is helpful in understanding the intensity of emotional reactions. Facial Expression Analysis: Monitors facial muscle movement to interpret emotional states such as happiness, surprise, or disgust.

The unique strength of neuromarketing lies in its ability to bypass conscious biases and provide objective insights into consumer processing of sustainable stimuli. For instance, EEG's high temporal resolution allows for real-time tracking of attentional engagement and emotional arousal when consumers encounter eco-friendly product labels or advertisements. Specific brainwave patterns (e.g., alpha asymmetry for approach/avoidance, frontal theta for cognitive effort) can indicate whether a green message is effectively capturing attention and triggering positive emotional responses or, conversely, inducing fatigue or confusion. Similarly, fMRI, with its superior spatial resolution, can map activations in deep brain structures. When consumers are presented with products marketed as sustainable, fMRI studies can reveal activation in the ventromedial prefrontal cortex (vmPFC), often associated with subjective valuation and reward, suggesting a favorable predisposition. Furthermore, activity in the insula, linked to emotional processing and empathy, can indicate a strong emotional connection to environmental causes, potentially driving prosocial purchasing decisions [9].

Eye-tracking offers complementary insights into visual

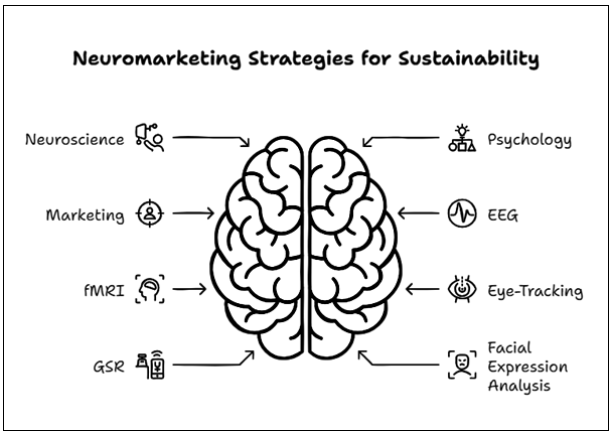

Fig 2: Neuromarketing Strategies for Sustainability.

attention, revealing where consumers look first and longest on sustainable packaging or digital interfaces. This data is invaluable for optimizing the prominence of eco-labels, green certifications, and key environmental benefits. For example, if eye-tracking shows that consumers consistently miss the recyclable symbol on a product, redesigning its placement can significantly improve message delivery and influence purchase intent. Coupled with Galvanic Skin Response (GSR), which measures physiological arousal, these techniques provide a comprehensive picture of both attention and emotional intensity, helping marketers understand which elements of a sustainable campaign truly resonate at a subconscious level [6].

These tools together offer a holistic view of how consumers process, react to, and form preferences for marketing messages — often before they can consciously articulate them. This is particularly relevant in sustainability marketing, where consumers may experience moral conflict, green fatigue, or information overload. Neuromarketing enables brands to craft emotionally resonant, ethical, and cognitively appealing campaigns that align with consumer values while nudging them toward sustainable behaviour. Recent studies have demonstrated that brain regions such as the amygdala (associated with emotional processing), prefrontal cortex (decisionmaking and social behaviour), and ventromedial prefrontal cortex (valuation of products) are significantly activated when individuals are exposed to pro-environmental messages. Understanding these neural activations can help brands tailor their communication to amplify emotional connection and drive eco-conscious action. Moreover, neuromarketing provides actionable insights for product design, branding, messaging strategy, and user experience. For example, the colour green, nature-based visuals, and emotionally charged narratives about climate impact have shown greater effectiveness in evoking positive neural responses toward sustainable products. In sum, neuromarketing is not just a marketing tool — it is a strategic framework for developing evidence-based, consumer centered communication that bridges the intention-action gap in sustainability. When applied ethically, it can transform how businesses influence societal norms and contribute to longterm environmental stewardship.

3. Linking neuromarketing and sustainability

In the era of global environmental crises, the challenge is not just producing sustainable goods but also ensuring their adoption by mainstream consumers. While traditional green marketing focuses on rational appeals—such as product labels, certifications, and environmental benefits—such strategies often fail to overcome the intention-action gap in consumer behaviour. Many individuals claim to support sustainability but do not consistently purchase eco-friendly products. This disconnect highlights the need for emotionally compelling and neurologically resonant communication strategies—precisely where neuromarketing adds value.

Neuromarketing, when integrated with green marketing, offers a powerful approach to enhance the visibility, appeal, and memorability of sustainable products. Neuroscientific tools such as fMRI and EEG allow researchers to decode how consumers react emotionally and cognitively to environmental messages. For example, fMRI studies have shown that narratives emphasizing moral responsibility or the well-being of future generations activate the medial prefrontal cortex and anterior insula, areas associated with empathy, ethical reasoning, and prosocial behaviour. This activation increases the likelihood of choosing sustainable alternatives, even when they are priced higher or less convenient than conventional options.

Furthermore, neuromarketing insights enable marketers to craft message framing strategies that resonate with consumers' values and identities. For instance, messages that appeal to communal goals, health, and legacy are more effective than those based solely on statistics or environmental jargon. Emotional storytelling, combined

with visuals of nature or children, can elicit stronger neural responses and reinforce positive associations with green products. From a brand positioning perspective, neuromarketing also helps determine how sustainability attributes—such as recyclable packaging, ethical sourcing, or carbon neutrality—are perceived subconsciously. Eye-tracking and EEG data can reveal whether these attributes capture attention, trigger emotional arousal, or build trust. This data can then be used to redesign product packaging, digital campaigns, and in-store layouts to maximize the impact of sustainable messaging.

Real-world case studies have shown that brands employing neuromarketing-driven green campaigns see increased consumer engagement, higher conversion rates, and improved brand loyalty. For instance, companies that tested advertisement versions using brain-based metrics were able to identify the most persuasive elements and optimize their campaigns accordingly. In some cases, even small adjustments—like changing the placement of a sustainability label or the tone of voice—led to measurable changes in consumer preference.

The synergy between neuromarketing and sustainability extends beyond mere message optimization; it offers profound implications for fostering genuine behavioral change. By understanding the neural underpinnings of pro-environmental behavior, marketers can design interventions that not only promote short-term adoption but also cultivate long-term eco-friendly habits. For example, reinforcing positive emotional associations with sustainable choices through consistent messaging and sensory experiences can help build implicit brand loyalty for green products. This approach moves beyond transactional motivations, tapping into deeply ingrained values and identity formation, which are often resistant to traditional persuasive techniques [10]. Moreover, neuromarketing insights can inform the development of gamified sustainable initiatives or community programs that activate reward pathways in the brain, making eco-friendly actions feel inherently gratifying. By transforming sustainable consumption from a perceived sacrifice into a positive, emotionally rewarding experience, neuromarketing provides a powerful toolkit for accelerating societal shifts towards environmental responsibility. In summary, neuromarketing provides the missing link between consumer neuroscience and sustainable behaviour change. It shifts the focus from merely informing consumers to influencing them at a deeper, neurological level, thereby transforming sustainability marketing into a science-driven, empathy-enhancing practice. This synergy can play a vital role in accelerating the transition toward a more conscious, eco-friendly economy.

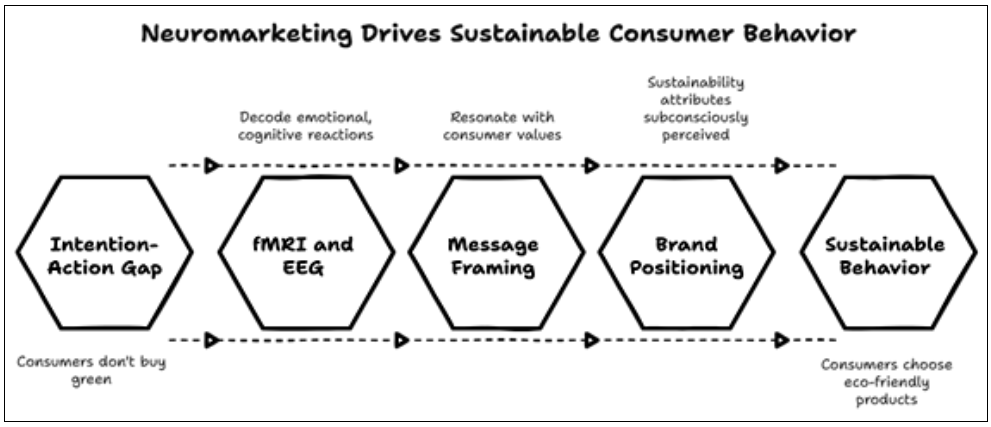

Fig 3: Neuromarketing Drives Sustainable Consumer Behavior.

Crucially, neuromarketing allows for a nuanced understanding of how to balance emotional and cognitive appeals in sustainable messaging. While emotionally charged narratives about environmental impact or the well-being of future generations can effectively activate empathy and moral reasoning areas of the brain [11], purely emotional appeals might sometimes lead to 'green guilt' or message avoidance. Conversely, overly cognitive messages detailing complex certifications or environmental data can lead to information overload and disengagement. Neuromarketing enables marketers to identify the optimal blend, ensuring that messages are both emotionally resonant enough to capture attention and sufficiently clear to provide cognitive reassurance about a product's genuine environmental benefits. For instance, fMRI studies can gauge the emotional response to a sustainability claim, while eyetracking can confirm if consumers are actually processing the accompanying rational information (e.g., carbon footprint labels), thereby informing a holistic communication strategy that speaks to both the heart and the mind, driving more robust and consistent sustainable choices.

4. Ethical considerations in neuromarketing for sustainability

While the potential of neuromarketing to drive sustainable consumption is significant, its application raises crucial ethical considerations that must be addressed to ensure transparency and consumer empowerment [2], [17], [19].

The granular level of insight provided by neuromarketing tools into the subconscious mind raises specific concerns regarding data privacy and informed consent. Neurological data, unlike traditional survey responses, can reveal highly personal and sensitive information about an individual's preferences, fears, and biases without explicit awareness [2]. Safeguarding this data against misuse or unauthorized access is paramount. Furthermore, the concept of 'informed consent' becomes more complex when dealing with implicit responses; consumers might consent to participate in a study but not fully grasp the extent to which their unconscious reactions are being analyzed and potentially leveraged. There is also the risk of 'neuromanipulation,' where marketing messages are so precisely tailored to bypass conscious resistance that they could be perceived as coercive, undermining consumer autonomy and ethical

decision-making, particularly in areas like sustainable choices where genuine conviction is desired [17], [20]. This underscores the critical need for robust regulatory frameworks and industry best practices.

To mitigate these risks, a commitment to ethical neuromarketing practices is paramount. This includes ensuring transparency in research methodologies, safeguarding consumer privacy, and prioritizing consumer well-being over purely commercial gains [2], [19]. Researchers and marketers must adhere to strict ethical guidelines, obtain informed consent for neurostudies, and avoid techniques that could create false beliefs or undue psychological pressure. The long-term success of neuromarketing in promoting sustainability hinges on building trust with consumers. If perceived as manipulative, it could lead to a backlash, eroding the very trust necessary for fostering genuine, long-term eco-friendly behaviors. Therefore, the ethical application of neuromarketing should aim to empower consumers to make informed, responsible choices by aligning their subconscious motivations with their stated environmental values, rather than overriding their autonomy.

5. Practical implications and managerial insights

The insights derived from neuromarketing studies hold significant practical implications for various stakeholders involved in promoting sustainable consumption, including businesses, policymakers, and non-profit organizations.

A. For Businesses and Marketers

Neuromarketing offers a data-driven approach to enhance the effectiveness of green marketing strategies. Brands can utilize neuro-insights to:

Optimize Product Design and Packaging: Understand which design elements (colors, textures, shapes) and sustainability cues (labels, certifications) evoke the strongest positive emotional and cognitive responses related to eco-friendliness [7]. This can lead to packaging that intuitively communicates sustainable value.

- **Refine Advertising Campaigns:** Develop advertisements that tap into subconscious motivations, such as empathy, altruism, and a sense of responsibility for future generations, rather than solely relying on rational appeals. This involves selecting compelling visuals, narratives, and auditory elements that resonate neurologically [11].
- **Enhance In-Store and Digital Experiences:** Design retail environments and e-commerce platforms that minimize cognitive load and create positive emotional associations with sustainable choices. Eye-tracking can guide optimal product placement and information hierarchy, while biometric feedback can refine customer journey touchpoints.
- **Build Authentic Green Brands:** By focusing on the intrinsic emotional value of sustainability, companies can foster deeper connections with consumers, leading to increased brand loyalty and advocacy for eco-friendly products. This moves beyond 'greenwashing' to genuinely aligning brand identity with environmental values.
- **Pricing Strategies:** Understand the neural processing of price premiums for sustainable products. Neuromarketing can help identify consumer segments willing to pay more for green products due to their perceived ethical value or social benefits, aiding in more effective pricing strategies.

B. For Policymakers and Non-Profit Organizations

Neuromarketing's insights can also inform public policy and awareness campaigns aimed at fostering sustainable behaviors on a larger scale:

- **Design Effective Public Health Campaigns:** Craft messages that resonate emotionally and psychologically with citizens to encourage environmentally responsible actions, such as waste reduction, energy conservation, or sustainable transportation choices.
- **Promote Behavioral Nudges:** Develop subtle interventions in public spaces or digital environments that subconsciously guide individuals towards more sustainable decisions, drawing on insights into cognitive biases and habitual behaviors. Shape Environmental Education: Create educational materials that utilize neuro-scientific principles to enhance engagement, memory retention, and emotional connection to environmental issues from an early age.

C. Challenges of Neuromarketing Implementation in Sustain-ability

While the theoretical promise of neuromarketing in promoting sustainability is considerable, its practical implementation faces several significant challenges.

- **High Costs and Technical Expertise:** The specialized equipment (fMRI, EEG labs) and skilled personnel required for neuromarketing studies represent a substantial financial investment, making it largely inaccessible for small and medium-sized enterprises (SMEs) or nonprofit organizations. The interpretation of neural data also requires specific neuroscientific expertise, which is not commonly found within traditional marketing teams [19].
- **Scalability and Sample Sizes:** Lab-based neuroscientific studies typically involve small sample sizes due to resource constraints. This can limit the statistical power and generalizability of findings to broader consumer populations or diverse market segments. Scaling neuromarketing research to large-scale consumer studies remains a significant hurdle.
- **Data Interpretation Complexity:** Translating complex neurological data into actionable marketing insights requires sophisticated analytical models and a deep understanding of both brain function and consumer psychology. Misinterpretation of neural signals can lead to ineffective or even counterproductive marketing strategies.
- **Ethical Scrutiny and Public Perception:** The very nature of neuromarketing, delving into subconscious processes, can evoke skepticism or even public distrust if not handled transparently. Perceptions of 'mind control' or manipulative practices can damage brand reputation, especially for sustainable brands that rely on trust and authenticity.
- **Integration with Existing Marketing Ecosystems:** Successfully integrating neuromarketing insights into existing marketing frameworks, creative processes, and campaign deployment requires significant organizational change management and cross-functional collaboration.

Addressing these practical challenges will be crucial for the widespread adoption and successful leveraging of neuromarketing in the sustainability domain.

6. Limitations and future research

Despite the promising applications of neuromarketing in driving sustainable product adoption, it is essential to acknowledge the inherent limitations of current research and propose avenues for future inquiry.

A. Methodological and Generalizability Limitations

A primary limitation often stems from the high cost and complexity of neuroscientific tools such as fMRI, which restrict sample sizes and ecological validity. Many neuromarketing studies are conducted in controlled laboratory environments, which may not perfectly replicate real-world purchasing situations, potentially impacting the generalizability of findings [19]. Furthermore, while EEG provides high temporal resolution, its spatial resolution is limited, making it challenging to pinpoint exact brain regions with absolute certainty. Future research should strive to integrate diverse methodologies, combining neuroimaging with behavioral experiments in more naturalistic settings to enhance the external validity of findings. Longitudinal studies are also critical to assess the long-term effectiveness of neuro-informed sustainable marketing campaigns, moving beyond short-term behavioral shifts.

B. Ethical and Privacy Concerns

As previously discussed, the ethical implications of manipulating subconscious consumer behavior remain a significant area of concern. The potential for misuse of neuro-insights, particularly concerning consumer privacy and autonomous decision-making, necessitates ongoing ethical frameworks and regulations [2], [20]. Future research must prioritize the development of robust ethical guidelines that protect consumer rights while still allowing for responsible innovation in neuromarketing. Exploring consumer perceptions of neuromarketing techniques in sustainability campaigns can also provide valuable insights into building trust and acceptance.

C. Interdisciplinary Integration and Holistic Models

Current research often examines individual neuromarketing tools or specific aspects of sustainable consumption in isolation. Future studies should aim for more holistic, interdisciplinary models that integrate neuroscientific findings with insights from environmental psychology, behavioral economics, and sociology. This could lead to a more comprehensive understanding of the interplay between internal (neural) and external (social, economic, policy) factors influencing sustainable behavior. For instance, investigating how social norms or peer influence modulate neural responses to green product messages could offer richer insights for communitybased sustainability initiatives.

D. Expanding the Scope of Sustainable Consumption

While this paper focuses on product adoption, future research could expand to other facets of sustainable consumption, such as sustainable services, sharing economy participation, or pro-environmental civic engagement. Understanding the neural drivers behind broader sustainable lifestyle choices beyond product purchases would significantly enhance the field. Additionally, exploring cultural differences in neural responses to sustainable stimuli could provide tailored insights for global green marketing strategies.

7. Conclusion

In conclusion, this paper has thoroughly explored the transformative potential of neuromarketing in bridging the persistent attitude-behavior gap in sustainable consumption. By delving into the subconscious cognitive and emotional processes that drive consumer decision-making, neuromarketing provides an unparalleled opportunity to design more impactful and resonant green marketing strategies. From optimizing product design and advertising campaigns to informing public policy, the insights derived from neuroscientific tools offer a scientific, evidence-based approach to fostering eco-friendly behaviors. However, the path forward necessitates a critical commitment to ethical application, ensuring transparency, privacy, and consumer empowerment. While limitations in generalizability and methodological complexity exist, the future of neuromarketing in sustainability holds immense promise for cultivating a more conscious, responsible, and ultimately, a more sustainable global economy. Continued interdisciplinary research, grounded in ethical principles, will be pivotal in unlocking the full potential of this powerful field to accelerate the transition towards a greener future.

References

1. de Oliveira JHC. Neuromarketing and sustainability: challenges and opportunities for Latin America. ResGate. 2014. https://www.researchgate.net/publication/264439189
2. Alsharif RMN, Jahani S, Hizam SMS, Al-Shorbagy A. Neuromarketing algorithms' consumer privacy and ethical considerations: challenges and opportunities. Taylor & Francis Online. 2024. https://www.tandfonline.com/doi/full/10.1080/23311975.2024.2333063
3. Park HJ, Lin LM. Exploring attitude-behavior gap in sustainable consumption: comparison of recycled and upcycled fashion products. J Bus Res. 2020;117:623-8.
4. Wintschnig L. The Attitude-Behavior Gap - Drivers and Barriers of Sustainable Consumption. Junior Manag Sci. 2021. https://jums.academy/wp-content/uploads/2021/06/BA-Wintschnig.pdf
5. Xu Y, Zhao B, Zhang B, Li X. A Bibliometric Analysis of Consumer Neuroscience towards Sustainable Consumption. MDPI. 2023;13(4):298.
6. Dwivedi A, Sharma V. Exploring the Role of Neuromarketing in Consumer Decision-Making. ShodhKosh: J Vis Perform Arts. 2024;5(7):253-60.
7. Nilashi M, Samad S, Ahani A, M. bin, Ahmadi H, Al-Ghazali BM, *et al*. Decision to Adopt Neuromarketing Techniques for Sustainable Product Marketing: A Fuzzy Decision-Making Approach. Symmetry. 2020;12(2):305.
8. Chandwaskar P. A Review on: Neuromarketing as an emerging field in consumer research. 2019.
9. Liu Y, Zhao B, Zhang B, Li X. A Bibliometric Analysis of Consumer Neuroscience towards Sustainable Consumption. Behav Sci (Basel). 2023;13(4):298.

10. Ghouri SSA. Accelerating sustainable consumption by putting "simplicity" and consumer neuroscience to work: a conceptual framework. ResGate. 2024. https://www.researchgate.net/publication/382682931_Accelerating_sustainable_consumption_by_putting_simplicity_and_consumer_neuroscience_to_work_a_conceptual_framework
11. Leeuwis MMI, Giebels E, de Vlieg E. Neuromarketing as a tool for environmental conditioning and sustainable consumption. ResGate. 2022. https://www.researchgate.net/publication/361247828_Neuromarketing_as_a_tool_for_environmental_conditioning_and_sustainable_consumption
12. Papi HK, Shah NS. Green concept of neuromarketing based on a systematic review using the bibliometric method. AIMS Press. 2023. https://www.aimspress.com/article/doi/10.3934/GF.2023016
13. Khan MI, Qureshi S, Hussain W, Shah T, Ali W, Iqbal T. Determinants of Green Consumer Behavior: Psychological, Social, Economic, and Contextual Factors. ARSS J. 2025. https://www.arssjournal.org/index.php/arss/article/download/4286/7620
14. Vashishth IS. Psychological, functional, and social factors influencing the purchasing decision of circular economy products: Case ResqClub. Univ East Finl eRepo. 2024. https://erepo.uef.fi/bitstreams/de062f7b-87c9-4f79-9de8-d10f3c05ba72/download
15. Learning Loop Blog. The psychology of sustainable consumption. 2024. https://learningloop.io/blog/psychology-of-sustainable-consumption
16. Chu YL, Shen J, Wu S, Wei J, Li Y, Han X, *et al*. On the Factors Influencing Green Purchase Intention: A Meta-Analysis Approach. Front Psychol. 2021;12:644020.
17. de Oliveira JHC. What Are the Ethical Implications of Neuromarketing? Sustain Dir. 2025. https://lifestyle.sustainability-directory.com/question/what-are-the-ethical-implications-of-neuromarketing/
18. Salleh HZM. The Impact of Neuromarketing From an Environmental Perspective: Strengths and Opportunities to Promote a Sustainable Society in the Modern Era. ResGate. 2025. https://www.researchgate.net/publication/388787838_The_Impact_of_Neuromarketing_From_an_Environmental_Perspective_Strengths_and_Opportunities_To_Promote_a_Sustainable_Society_in_the_Modern_Era
19. Isak DT, Adela MJ. An overview of ethical issues in neuromarketing: Discussion and possible solutions. MSI J. 2023. https://msijournal.com/overview-ethical-issues-neuromarketing/
20. Fiveable. 7.1 Ethical considerations in neuromarketing. https://library.fiveable.me/neuromarketing/unit-7/ethical-considerations-neuromarketing/study-guide/59UdJtrOwjWOH26Z