



SEMIOTIC ANALYSIS OF CARBON NEUTRALITY REPRESENTATION IN APPLE'S YOUTUBE ADVERTISEMENT '*EVERY PRODUCT CARBON NEUTRAL BY 2030*': A PERSUASIVE LANGUAGE PERSPECTIVE

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ABSTRACT

Carbon neutrality has emerged as a central focus of corporate environmental communication, particularly in digital advertising, where verbal and visual elements are strategically combined to promote sustainability initiatives. While previous studies have explored persuasive language, semiotics, or multimodal communication separately, limited research has examined how these approaches interact to construct environmental meaning. This study investigates the representation of carbon neutrality in Apple's YouTube advertisement *Every Product Carbon Neutral by 2030* (2021) and examines how it shapes Apple's ecological image and communicates its eco-ideology. Using a qualitative descriptive design, the study analyzes spoken narration, written text, and visual elements through Peirce's semiotic theory, Leech's persuasive language framework, and Kress and van Leeuwen's multimodal approach. The findings show that carbon neutrality is communicated through the integration of symbolic, indexical, and iconic signs, with symbolic signs being the most prominent. Persuasive linguistic features and multimodal resources including color, typography, icons, and layout work together to reinforce Apple's environmental commitment. These interconnected resources portray technological innovation and sustainability as complementary values while presenting environmental responsibility as a shared obligation between corporations and consumers. The study highlights the complementary roles of semiotics, persuasive language, and multimodal communication in constructing environmental meaning in contemporary digital advertising.

Keywords: *carbon neutrality; persuasive language; semiotics; multimodal discourse; ecological image; eco-ideology.*

1. INTRODUCTION

The rapid development of digital advertising has transformed advertisements from product promotion into communicative spaces where corporations construct meanings, values, and ideologies (Ziyadin et al., 2019; Manurung et al., 2021; Becerra-Posada et al., 2022). Beyond marketing products, contemporary advertisements increasingly communicate environmental issues through concepts such as carbon neutrality, renewable energy, and environmental responsibility to position companies as environmentally responsible organizations (Kannan & Li, 2017; Anuari et

al., 2024; Agung, 2021). Consequently, advertising functions not only as a marketing tool but also as a semiotic discourse that shapes public perceptions and constructs environmental values (Kao & Du, 2020; Hamzah et al., 2019; Nghi et al., 2019).

From a linguistic perspective, advertising relies on persuasive language to influence audiences' beliefs, attitudes, and behaviour. Leech (2016) argues that persuasion is achieved through affirmative statements, positive lexical choices, personal pronouns, repetition, and numerical expressions. These characteristics remain relevant in digital advertising, where

persuasive language enhances credibility and audience engagement (Romanova & Smirnova, 2019; Luo et al., 2021). Likewise, Anigbogu and Okere (2021) and Harahap et al. (2025) demonstrate that carefully selected linguistic features strengthen the effectiveness of online advertising through spoken narration and written verbal signs.

Verbal persuasion is reinforced by visual resources such as typography, colour, illustrations, layout, and graphic design, creating multimodal texts in which meaning emerges through the interaction of verbal and visual modes. Kress and van Leeuwen (2006) identify multimodality as fundamental to contemporary communication, while Hidarto (2021) and Ningamah et al. (2026) show that integrating linguistic and visual elements enhances persuasive communication. Furthermore, colour functions as a semiotic resource that reinforces meaning and brand identity, particularly in environmental advertising (Won & Westland, 2017; Yohana, 2021; Halliday, 2019).

Semiotics provides an appropriate framework for analysing how these verbal and visual signs produce meaning. Peirce (1931–1958) explains meaning through the triadic relationship of representamen, object, and interpretant and classifies signs into icons, indexes, and symbols. Combined with Kress and van Leeuwen's (2006) multimodal perspective, this framework explains how verbal and visual resources collaboratively represent abstract concepts such as carbon neutrality. Advertising also functions as an ideological practice that associates products with broader cultural and environmental values (Fairclough, 2023; Shonfeld et al., 2021), allowing environmental messages to communicate eco-ideology as well as persuasion (Stibbe, 2015).

Apple Inc., through its Apple 2030 environmental strategy, aims to make its products, manufacturing supply chain, and corporate operations carbon neutral by 2030. This commitment is communicated in the YouTube advertisement *Every Product Carbon Neutral by 2030* (2021), which combines spoken narration, written verbal signs, typography, colours, illustrations, icons, and other visual resources. Unlike conventional technology advertisements that primarily emphasize product innovation, this campaign positions sustainability as its

central message, making it a suitable object for examining persuasive language and multimodal meaning construction.

Previous studies have examined persuasive language, multimodality, semiotic representation, and environmental advertising from different perspectives. Mahmood et al. (2022) show that verbal and visual signs collaboratively construct ideological meanings, while Hidarto (2021) and Ningamah et al. (2026) demonstrate that persuasive communication is strengthened through multimodal interaction. Firdaus et al. (2025) analyse Apple's advertisements using Peirce's semiotic framework, whereas Kao and Du (2020) highlight the effectiveness of environmental visual design in green advertising. However, these studies largely investigate persuasive language, multimodality, semiotics, and environmental advertising separately. Limited research integrates Leech's persuasive language theory, Peirce's semiotic framework, and Kress and van Leeuwen's multimodal perspective to explain how spoken verbal signs, written verbal signs, and visual signs collaboratively represent carbon neutrality in digital advertising.

Based on this gap, this study investigates how Apple's YouTube advertisement *Every Product Carbon Neutral by 2030* (2021) represents carbon neutrality through persuasive language and multimodal semiotic resources. Specifically, it identifies the verbal and visual signs representing carbon neutrality and analyses how these resources collaboratively construct Apple's ecological image and communicate its eco-ideology. By integrating Peirce's semiotic theory, Leech's persuasive language framework, and Kress and van Leeuwen's multimodal perspective, this study contributes to linguistic semiotics by providing a more comprehensive understanding of how environmental sustainability is represented, communicated, and ideologically constructed in contemporary digital advertising.

2. METHODS

2.1 Research Design

This study employed a qualitative descriptive design to investigate how carbon neutrality is represented in Apple's YouTube

advertisement *Every Product Carbon Neutral by 2030* (2021). Qualitative research aims to interpret meanings embedded in social and cultural phenomena rather than measure variables statistically (Denzin & Lincoln, 2018; Tisdell et al., 2025; Patton, 2020). This approach was appropriate because the study focused on interpreting verbal and visual signs within a multimodal advertising discourse. Following Creswell (2014), the analysis integrated Peirce's (1931–1958) semiotic theory as the primary framework, Leech's (1966) persuasive language theory as the linguistic framework, and Kress and van Leeuwen's (2006) multimodal theory to explain how verbal and visual signs represent carbon neutrality and communicate Apple's environmental commitment.

2.2 Data and Data Source

The data consisted of verbal and visual signs representing carbon neutrality in Apple's YouTube advertisement *Every Product Carbon Neutral by 2030* | Apple. Verbal data included spoken narration and written verbal signs, while visual data comprised colours, typography, illustrations, icons, layout, numerical expressions, arrows, and other graphic elements. The advertisement was published on Apple's official YouTube channel on 22 April 2021 with a duration of approximately 1 minute and 16 seconds. It was selected because it explicitly communicates Apple's environmental commitment and forms part of the Apple 2030 environmental strategy (Apple Inc., 2021), making it an appropriate source for analysing persuasive language and multimodal representation.

2.3 Technique of Collecting Data

The data were collected through documentation and qualitative observation (Bowen, 2009; Creswell & Poth, 2018). The researcher repeatedly observed the advertisement, transcribed the spoken narration, identified written verbal signs, captured relevant visual scenes, recorded their timestamps, and organized the verbal and visual data according to the research questions.

2.4 Technique of Analyzing Data

The data were analysed qualitatively using Peirce's (1931–1958) semiotic theory,

Leech's (1966) persuasive language theory, and Kress and van Leeuwen's (2006) multimodal framework. The analytical procedures followed Miles and Huberman (2019) interactive model of data condensation, data display, and conclusion drawing. First, verbal and visual signs representing carbon neutrality were identified. The verbal signs were then analysed using Leech's persuasive characteristics, while the semiotic meanings were interpreted through Peirce's triadic model and classified into icons, indexes, and symbols. Subsequently, the interaction of verbal and visual resources was examined using Kress and van Leeuwen's multimodal perspective to explain how meaning was constructed. Finally, the findings were interpreted to explain how persuasive language and multimodal signs represent carbon neutrality and communicate Apple's eco-ideology. Each datum was presented with transcript excerpts, screenshots, and timestamps before being discussed narratively.

3. RESULTS AND DISCUSSION

The analysis of Apple's YouTube advertisement *Every Product Carbon Neutral by 2030* | Apple (2021) is presented through seven selected data representing different aspects of the company's carbon neutrality initiative. Each data integrates spoken narration, written verbal signs, and visual representations, which are analyzed using Peirce's (1931–1958) semiotic theory, Leech's (1966) persuasive language framework, and Kress and van Leeuwen's (2006) multimodal perspective. This integrated approach explains how verbal and visual signs collaboratively represent carbon neutrality while constructing Apple's ecological image and communicating its eco-ideology. To facilitate a systematic presentation, each data is discussed through its corresponding transcript, visual evidence, timestamp, and interpretative analysis.

Data 1. Carbon Neutral by 2030

Figure 1. Apple's commitment to achieving carbon neutrality by 2030. Timestamp: 00:06–00:10. Source: Apple (2021)

The advertisement opens with the narration, *“To make every single Apple product carbon neutral by 2030, even yours,”* while the year 2030 is prominently displayed against a green background, introducing carbon neutrality as the central theme of Apple's environmental campaign.

From Peirce's (1931–1958) perspective, *carbon neutral* functions as a symbol representing environmental sustainability, whereas 2030 functions as an index referring to a specific environmental target. The green background and underlined year further emphasize sustainability and direct viewers' attention to Apple's long-term commitment. As argued by Kress and van Leeuwen (2006), colour and typography operate as multimodal resources that enhance salience and meaning.

The narration also reflects Leech's (1966) persuasive characteristics. The affirmative statement presents carbon neutrality as a concrete corporate commitment, while the inclusive expression *“even yours”* directly involves audiences by suggesting that every Apple product contributes to this environmental goal. Consistent with Romanova and Smirnova (2019), these affirmative linguistic choices strengthen the credibility of corporate claims. Combined with the visual emphasis on 2030, the verbal and visual resources reinforce Apple's environmental commitment.

Together, these verbal and visual signs establish carbon neutrality as the

foundation of Apple's sustainability narrative, framing it as a long-term corporate commitment that constructs Apple's ecological image and communicates its eco-ideology.

Data 2. Recycled and Renewable Materials

Figure 2. Apple's commitment to using recycled and renewable materials in product manufacturing. Timestamp: 00:11–00:16. Source: Apple (2021)

The second scene introduces Apple's material strategy through the narration, *“We're working to make every iPhone, iPad, Watch, and Mac with 100 percent recycled or renewable materials.”* The spoken message is reinforced by the written expressions “100% recycled materials” and “or renewable,” highlighting sustainable material sourcing as a key component of Apple's carbon neutrality strategy.

From Peirce's (1931–1958) perspective, *recycled* and *renewable materials* function as symbols representing environmentally responsible production. The enlarged 100% emphasizes the completeness of Apple's commitment, while the handwritten phrase *“or renewable”* broadens the sustainability message. According to Kress and van Leeuwen (2006), typography enhances salience and supports meaning construction.

The narration also reflects Leech's (1966) persuasive characteristics. The progressive construction *“We're working”* presents sustainability as an ongoing corporate commitment, while the numerical expression *“100 percent”* strengthens the credibility and precision of Apple's environmental claim. Positive lexical choices such as *“recycled”* and *“renewable”* further reinforce environmentally responsible values. This finding supports Anigbogu and Okere (2021), who argue that lexical choices and

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quantitative expressions enhance the credibility of corporate advertising.

Together, the verbal and visual resources represent sustainable material sourcing as a measurable corporate practice, reinforcing Apple's ecological image and communicating an eco-ideology grounded in responsible resource management.

Data 3. Sustainable Packaging



Figure 3. Apple's sustainable packaging initiative through forest regeneration and paper recycling. Timestamp: 00:22–00:24. Source: Apple (2021)

The third scene presents Apple's sustainable packaging initiative through the narration, *"We're growing enough trees and recycling enough paper to sustain all our packaging."* Tree illustrations are followed by packaging icons and the written expression "all our packaging," representing sustainable packaging as one of Apple's strategies for achieving carbon neutrality.

From Peirce's (1931–1958) perspective, *"growing enough trees"* and *"recycling enough paper"* function as symbols of environmental conservation, while the tree illustrations and packaging icon operate as icons representing forest regeneration and sustainable packaging. The dominant green colour reinforces these meanings, supporting Kress and van Leeuwen's (2006) view that colour and imagery function as multimodal resources. This interpretation is consistent with Won and Westland (2017), who argue that colour strengthens product meaning and audience interpretation.



Figure 4. Apple's sustainable packaging initiative through forest regeneration and paper recycling. Timestamp: 00:24–00:26. Source: Apple (2021)

The following scene emphasizes the packaging icon and the written expression "all our packaging," indicating that sustainable practices extend across Apple's entire packaging system. This visual transition links forest regeneration with environmentally responsible packaging.

The narration also reflects Leech's (1966) persuasive characteristics. The progressive construction *"We're growing"* presents sustainability as an ongoing commitment, while the repetition of *"enough"* functions as a quantitative expression emphasizing the adequacy of Apple's environmental actions. Positive lexical choices such as *"growing," "recycling,"* and *"sustain"* further reinforce environmentally responsible values.

Together, the verbal and visual resources present sustainable packaging as a continuous environmental practice, reinforcing Apple's ecological image and communicating an eco-ideology centred on responsible resource management.

Data 4. Renewable Energy in Manufacturing

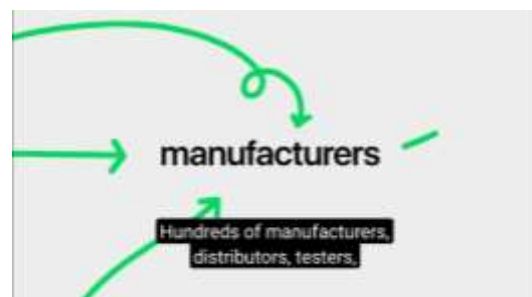


Figure 5. Apple's use of renewable energy across its manufacturing network. Timestamp: 00:31–00:33. Source: Apple (2021)

The fourth scene extends Apple's environmental commitment to its

manufacturing process through the narration, *"It's also how they're made. Hundreds of manufacturers, distributors, testers, assemblers, disassemblers and material makers, all upgrading to 100 renewable energy."* The advertisement shifts from emphasizing production methods to illustrating collaboration across Apple's manufacturing network.

From Peirce's (1931–1958) perspective, *"It's also how they're made"* functions as a symbol representing environmentally responsible manufacturing. The handwritten emphasis on *"HOW"* highlights the production process, while its typography increases the salience of the message (Kress & van Leeuwen, 2006).

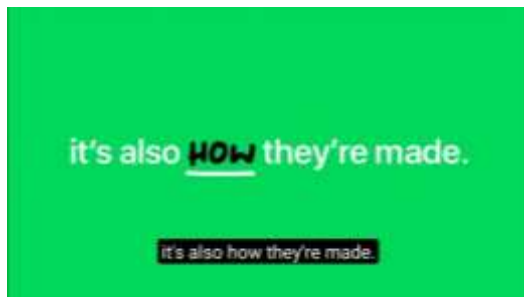


Figure 6. Apple's use of renewable energy across its manufacturing network. Timestamp: 00:33–00:38. Source: Apple (2021)

The following scene presents manufacturers, distributors, testers, assemblers, disassemblers, and material makers connected by directional arrows. The icons symbolize collaboration across Apple's supply chain, while the arrows function as indexes indicating coordinated industrial relationships that support sustainable manufacturing.



Figure 7. Apple's use of renewable energy across its manufacturing network. Timestamp: 00:38–00:40. Source: Apple (2021)

The final scene highlights the written expression *"100 renewable energy"* accompanied by circular arrows. The numerical expression 100 functions as an index of a measurable environmental commitment, while the circular arrows symbolize continuity in renewable energy use throughout Apple's manufacturing system.

The narration also reflects Leech's (1966) persuasive characteristics. The declarative statement presents sustainable manufacturing as an established corporate practice, while the extensive enumeration of manufacturing partners and the quantitative expression *"100 renewable energy"* strengthen the credibility of Apple's environmental commitment. This finding supports Harahap et al. (2025), who argue that affirmative statements and factual information increase the credibility of advertising messages.

Together, the verbal and visual resources present renewable energy as a collaborative manufacturing strategy, reinforcing Apple's ecological image and communicating an eco-ideology based on collective industrial responsibility.

Data 5. Renewable Electricity for Device Charging



Figure 8. Apple's commitment to renewable electricity throughout the product-use phase. Timestamp: 00:49–00:54. Source: Apple (2021)

The fifth scene extends Apple's environmental commitment beyond manufacturing to the product-use phase through the narration, *"Apple devices are all over the world, and by 2030 all of the electricity charging all of your devices will be 100% renewable."* The advertisement illustrates the global distribution of Apple devices before emphasizing renewable

electricity through the written expression “100% renewable.”

From Peirce's (1931–1958) perspective, “*Apple devices are all over the world*” functions as a symbol representing Apple's global presence. The interconnected device illustrations visually depict a worldwide user network, while their spatial organization reinforces the relationship between Apple and its global consumers (Kress & van Leeuwen, 2006).



Figure 9. Apple's commitment to renewable electricity throughout the product-use phase.
Timestamp: 00:54–00:56. Source: Apple (2021)

The following scene highlights the written expression “100% renewable” through enlarged typography connected to the illustrated devices. The numerical expression 100% functions as an index of Apple's measurable commitment, while “renewable” functions as a symbol of sustainable energy, reinforcing renewable electricity as a practical strategy for achieving carbon neutrality.

The narration also reflects Leech's (1966) persuasive characteristics. The declarative statement presents renewable electricity as a credible corporate commitment, while the numerical expression “100%” and the personal pronoun “*your devices*” strengthen message credibility and encourage audience involvement. This finding supports Luo et al. (2021), who argue that quantitative expressions and audience-oriented language enhance persuasive communication in digital advertising.

Together, the verbal and visual resources extend Apple's environmental commitment from corporate operations to consumers' everyday product use, reinforcing Apple's ecological image and communicating an eco-ideology based on collective responsibility.

Data 6. Consumer Participation



Figure 10. Apple's invitation for consumers to participate in its sustainability commitment.
Timestamp: 00:56–00:58. Source: Apple (2021)

The sixth scene shifts the focus from Apple's corporate initiatives to consumer participation through the narration, “*So you're a part of this, too.*” The written emphasis “YOU'RE” and “THIS,” accompanied by handwritten typography and a connecting arrow, reinforces the relationship between Apple and its users.

From Peirce's (1931–1958) perspective, “*you're a part of this*” functions as a symbol representing consumer participation. The handwritten typography and connecting arrow further strengthen the relationship between consumers and Apple's environmental commitment, supporting Kress and van Leeuwen's (2006) view that visual resources organize relationships and construct meaning.

The narration also reflects Leech's (1966) persuasive characteristics. The second-person pronoun “*you*” directly involves audiences, while the affirmative statement “*you're a part of this*” presents consumer participation as an existing reality. The addition of “*too*” reinforces inclusiveness by positioning consumers alongside Apple in achieving environmental sustainability. This finding supports Hidarto (2021), who argues that multimodal advertising strengthens persuasive communication by integrating audience-oriented language with visual elements.

Together, the verbal and visual resources construct sustainability as a shared responsibility, reinforcing Apple's ecological image and communicating an eco-ideology based on collective environmental action.

Data 7. Comprehensive Carbon Neutrality



Figure 11. Apple's overall commitment to achieving carbon neutrality across its operations. Timestamp: 01:00–01:05. Source: Apple (2021)

The final scene concludes the advertisement through the narration, “*Everything Apple is going carbon neutral.*” The written emphasis “EVERYTHING,” accompanied by the Apple logo, green typography, and a minimalist visual design, summarizes Apple's environmental initiatives and positions carbon neutrality as its defining corporate value.

From Peirce's (1931–1958) perspective, “*Everything Apple*” functions as a symbol representing the company's entire ecosystem, while *carbon neutral* symbolizes environmental responsibility. The Apple logo functions as an icon, and the visual emphasis on “EVERYTHING” reinforces the completeness of Apple's commitment. These multimodal resources support Kress and van Leeuwen's (2006) view that typography, colour, and visual prominence strengthen meaning construction.

The narration also reflects Leech's (1966) persuasive characteristics. The absolute quantifier “*Everything*” functions as a positive lexical choice emphasizing comprehensiveness, while the declarative statement “*Everything Apple is going carbon neutral*” presents sustainability as a clear corporate commitment. Together with the visual elements, these resources strengthen the credibility of Apple's environmental message.

The final scene unifies the advertisement's sustainability initiatives into a coherent corporate narrative, connecting product development, manufacturing, renewable energy, packaging, and consumer participation. Through the integration of

persuasive language and multimodal resources, Apple reinforces its ecological image and communicates an eco-ideology in which environmental responsibility becomes an integral part of its corporate identity.

The analysis of the seven selected data demonstrates that Apple's representation of carbon neutrality is constructed through the interaction of spoken narration, written verbal signs, and visual semiotic resources. Rather than functioning independently, these communicative modes work together to develop a coherent environmental narrative that progresses from introducing carbon neutrality to establishing it as Apple's corporate identity. This finding supports Kress and van Leeuwen's (2006) argument that meaning in multimodal communication emerges through the integration of linguistic and visual resources.

From a semiotic perspective, symbolic signs dominate the advertisement. Expressions such as *carbon neutral*, *recycled materials*, *renewable energy*, and *100% renewable* derive their meanings from socially shared environmental discourse (Peirce, 1931–1958). These symbolic meanings are reinforced by indexical signs, including numerical expressions, temporal references, and graphic connections, while iconic signs such as tree illustrations, packaging icons, and the Apple logo make abstract environmental concepts more concrete. Together, these sign types construct a coherent representation of Apple's environmental commitment.

The findings further indicate that persuasive communication is achieved through the integration of verbal and visual resources. Spoken narration introduces environmental commitments, written verbal signs emphasize key messages and measurable targets, and visual elements such as colour, typography, layout, and graphic organization reinforce these meanings. This finding supports previous studies showing that persuasive language becomes more effective when combined with multimodal resources that strengthen audience engagement and message credibility (Anigbogu & Okere, 2021; Harahap et al., 2025; Hidarto, 2021; Luo et al., 2021).

Another important finding is the advertisement's progressive narrative structure. Sustainability is presented as a

continuous process, beginning with carbon neutrality, expanding through sustainable materials, packaging, manufacturing, renewable energy, and product use, before positioning consumers as active participants and concluding that *Everything Apple is going carbon neutral*. This progression transforms individual sustainability initiatives into a unified corporate narrative, constructing Apple's ecological image while communicating an eco-ideology based on collective environmental responsibility.

These findings are consistent with previous studies demonstrating that verbal and visual signs contribute to the construction of corporate identity and environmental legitimacy (Mahmood et al., 2022; Firdaus et al., 2025; Kao & Du, 2020). However, unlike earlier studies that examine persuasive language, multimodality, or semiotic representation separately, this study integrates Peirce's semiotic theory, Leech's persuasive language framework, and Kress and van Leeuwen's multimodal perspective within a single analytical model. This integration demonstrates that carbon neutrality is represented through the interaction of persuasive language, multimodal resources, and semiotic signs that collaboratively construct Apple's ecological image and communicate its eco-ideology (Batrincea et al., 2013; Ishchenko et al., 2025; Lim & Polio, 2020). Consequently, the study provides a more comprehensive understanding of how environmental sustainability is represented in contemporary digital advertising and extends existing research in linguistic semiotics and multimodal advertising discourse.

4. CONCLUSION

This study examined how carbon neutrality is represented in Apple's YouTube advertisement *Every Product Carbon Neutral by 2030* (2021) by integrating Peirce's semiotic theory, Leech's persuasive language framework, and Kress and van Leeuwen's multimodal perspective. The findings show that carbon neutrality is constructed through the interaction of spoken narration, written verbal signs, and visual resources such as colour, typography, icons, and graphic elements. Persuasive language communicates Apple's environmental commitments, while multimodal semiotic resources reinforce and

extend these meanings within the advertisement.

The analysis further reveals that symbolic signs dominate the representation of carbon neutrality, supported by indexical and iconic signs that make Apple's sustainability initiatives appear more concrete and credible. Together, persuasive language and multimodal resources construct Apple's ecological image while communicating an eco-ideology that presents sustainability as a shared commitment between the company and its consumers. These findings demonstrate that environmental meaning in digital advertising is produced through the interaction of linguistic and visual resources rather than through isolated communicative elements.

This study contributes to linguistic semiotics and multimodal advertising research by demonstrating how persuasive language, semiotic representation, and multimodal communication operate as an integrated meaning-making system in sustainability advertising. However, the study is limited to a single advertisement from one technology company and one digital platform. Future research is encouraged to examine sustainability advertisements across different industries, platforms, or cultural contexts to provide broader insights into the representation of environmental sustainability in contemporary advertising.

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