DRIVING DEMAND FOR RECYCLED PLASTICS

INCREACE

Practical steps to influence consumer choice

DRIVING DEMAND FOR RECYCLED PLASTICS

Improving the effectiveness of plastics recycling is not only a technical and economic challenge. Consumer preferences, attitudes and purchase behaviour also play an important role in determining whether companies will adopt and use recycled materials in practice.

A product made with recycled plastics will not contribute to circularity if consumers are unwilling to buy it instead of a non-recycled alternative. Encouraging people to buy recycled plastic products improves the demand for secondary plastics, expands their use and helps to build a more circular economy.

This three-step guide supports designers and decision makers in developing and testing concepts and interventions to improve consumer acceptance of recycled plastics in products. The guide was created for the INCREACE project and is the result of research and concept testing conducted throughout the project.

The INCREACE project focuses on increasing the use of recycled plastics in electrical and electronic equipment (EEE) by improving the collection, tracing, recycling, and reapplication of plastics from electronic waste. It brings together knowledge and action across the value chain to make high-quality recycled plastics safer, more reliable and easier to use in practice.

One objective of the project was to translate research on consumer acceptance[1] of recycled plastics and related design guidelines[2] into practice in a concrete product context. This guide presents that work through a case study in oral care.

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1. Polyportis et al. (2022)
2. Polyportis et al. (2023)

CLOSING THE ATTITUDE-BEHAVIOUR GAP

Consumers tend to express positive attitudes towards recycled products. When asked, they will often say they like recycled products, but research has shown that this does not always translate into actual purchase behaviour[3]. This inconsistency between consumers' values and actions is called 'the attitude-behaviour gap'. To help explain this apparent contradiction, a literature review[4] identified several factors that can influence responses to recycled products at different stages of the purchase decision-making process. These factors are illustrated in Figure 1.

An experiment with recycled fashion[5] for example, found that concerns about appearance and hygiene had a strong negative effect on how consumers responded to garments made from recycled materials. By contrast, concerns about value for money and product performance had less influence in that context. Different product categories can trigger different forms of perceived risk. Products that touch the user's skin or are in contact with food may raise concerns about hygiene, safety and contamination. While products that are used to express one's identity or personal style are more likely to trigger concerns about appearance and desirability.

Individual, demographic and sociocultural factors also shape consumer responses to recycled (plastic) products. For instance, people with greater disgust sensitivity may respond less positively to products made from recycled materials, such as clothing made from r-PET bottles.[6] At the same time, environmental values, norms, and beliefs about environmental benefits can positively influence preference.[7]

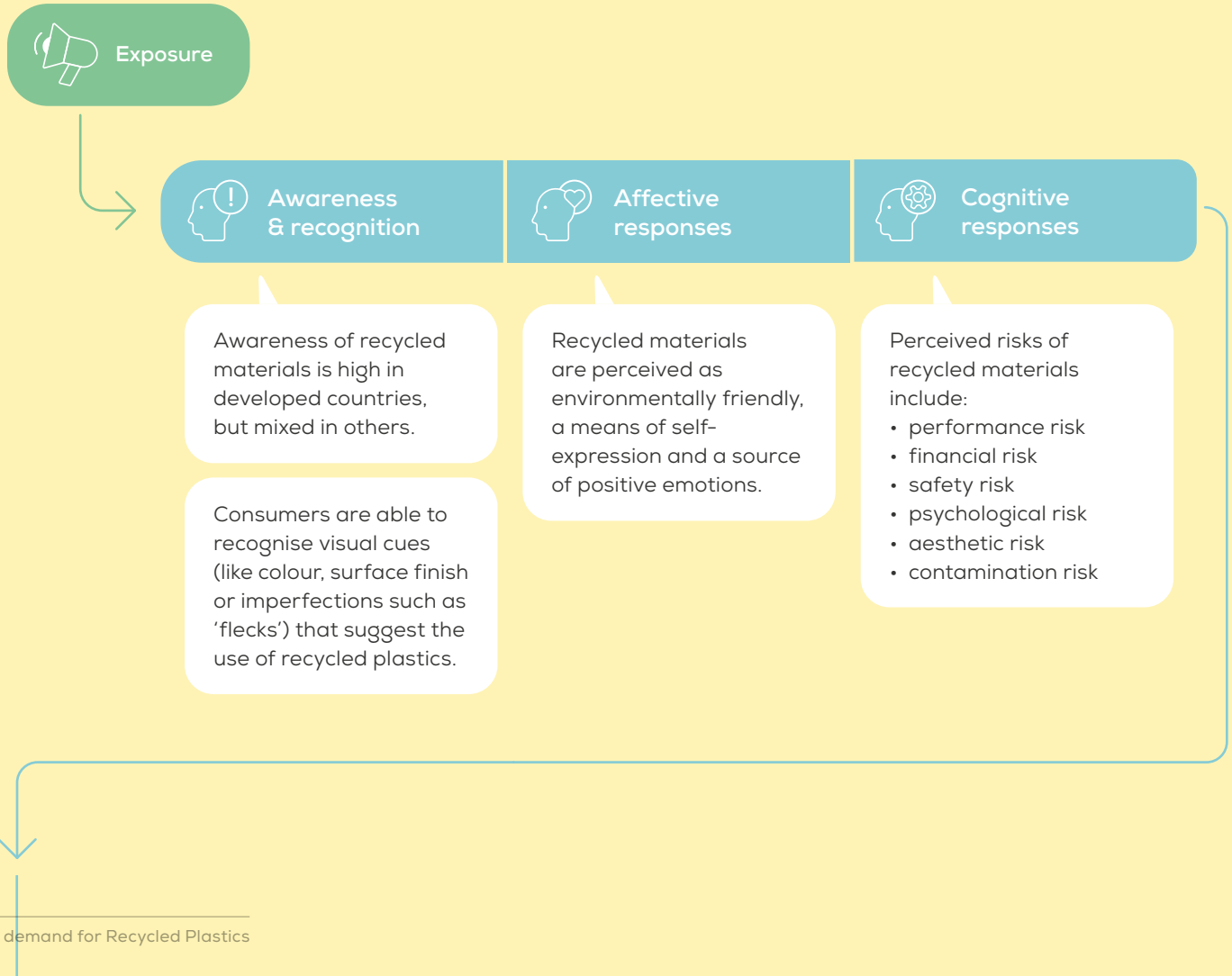
Understanding how these risk perceptions can shape purchase decisions is important for both market uptake and circularity. The most appropriate design or communication strategy will vary depending on the product type and target group. For that reason, user research is needed to identify which concerns are most relevant in a specific context and how to address them effectively. See Table 1.

3. Park & Lin (2020)
4. See footnote 1
5. Kim et al. (2021)
6. Meng & Leary (2021)
7. Bulut & Nazli (2020)

Table 1 Types of perceived risks associated with recycled materials

Type of perceived risk	Consumers may...
Performance risk	worry that a recycled product won't last as long or work as well.
Financial risk	believe a recycled product doesn't offer good value for money.
Psychological risk	fear that they will regret their purchase later on.
Aesthetic risk	think that a recycled product won't look as good or won't fit their style.
Safety risk	worry about a lack of hygiene or health concerns related to recycled plastics.
Contamination risk	experience a certain 'ick factor' because the recycled material was touched before by other people.

Fig. 1 Factors that may influence consumers at different stages in the purchase decision-making process



Preferences & attitudes

Consumers' environmental predisposition, norms, beliefs, and emotional and social values predict attitudes towards recycled materials.

Perceived aesthetic and hygiene risks can negatively influence attitudes.

Purchase intention & willingness to pay

Perceived risks, attitudes, eco-labels and eco-friendly packaging can influence consumers' purchase intention.

Similarly, recognition (of the recycled material), eco-labels, emotions and the perceived quality and safety of the material can influence the consumers' willingness to pay.

Purchase behaviour

Consumers usually report high purchase intentions. Yet this does not automatically translate into purchase behaviour.

Factors that were found to predict actual purchase behaviour include quality, affect, past behaviours and subjective norms (f.i. 'is buying a recycled product socially expected')

Influencing factors

Consumers' degree of environmental concern, how much they believe in the effectiveness of their consumption choices and their sensitivity to disgust may affect their responses to recycled materials.

Age, gender and income can play a role, with younger female consumers more likely to respond favourably. Income level produced in mixed responses across studies.

Adapted from Polyportis et al. (2022), inspired by the Hierarchy of Effects Theory.

STEP 1
CHECK YOUR ASSUMPTIONS

The first step is to validate assumptions about consumer responses to recycled plastics through user research, rather than relying on internal opinions. Interviews with manufacturers of electrical and electronic equipment[8] revealed that, in some cases, decisions were based on unverified perceptions of consumer attitudes toward recycled plastics. Such an approach can lead to ineffective, and sometimes counterproductive, design and communication choices.

"ONE COMPANY MENTIONED USING THEIR OWN EMPLOYEES AS A STAND-IN FOR CONSUMERS IN 'USER-TESTS'. BYPASSING PROPER USER RESEARCH CAN EASILY LEAD TO INEFFECTIVE OR EVEN COUNTERPRODUCTIVE CONCEPTS AND MESSAGING."

8. Poppelaars et al. (2023)

CASE

RECYCLED PLASTICS IN ORAL CARE PRODUCTS

Oral care offers a particularly relevant context for studying consumer responses to recycled plastics, as products such as electric toothbrushes are used frequently and come into close contact with the skin and mouth.

To explore how consumers perceive the use of recycled plastics in this context, generative design research was conducted with consumers from two key target groups across three European markets: Germany, the United Kingdom, and the Netherlands.

The participants completed three creative tasks aligned with the main research questions (Figure 2). First, they evaluated a range of electric toothbrush concepts labelled as 'recycled' to examine preferences and interpretations of visual material cues, followed by a question on preferred filler materials for recycled plastics. Second, they created a persuasive product website by selecting and arranging pre-prepared narrative and visual elements, revealing which messages and images resonated most strongly. Third, they ranked different sustainable material sources according to their preferences.

The research revealed concerns relating to performance, including durability and the perceived sustainability of the recycling process; aesthetics, including the overall attractiveness of the product; safety and hygiene, particularly where the material comes into contact with the skin or the inside of the mouth; and contamination, especially regarding the cleanliness of the recycling process. See Figure 3.

These concerns were not always aligned and could sometimes contradict one another. For example, consumers generally regarded plastic waste from WEEE or packaging as a positive source for new materials, often reasoning that it made sense to use what already existed. At the same time, they responded negatively to images of used brush heads collected for recycling, suggesting that acceptance of recycled content depends not only on the source itself, but also on how that source is framed and visualised.

Fig. 2 Example of a make toolkit for generative design research

TASK 1

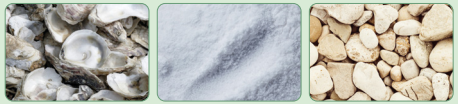
› Imagine you are about to buy an electric toothbrush. Which of these would you choose and why?

Write down the feedback

› Recycled plastics contain filler materials to improve functionality or durability. Which of the following would you prefer?

Organic materials

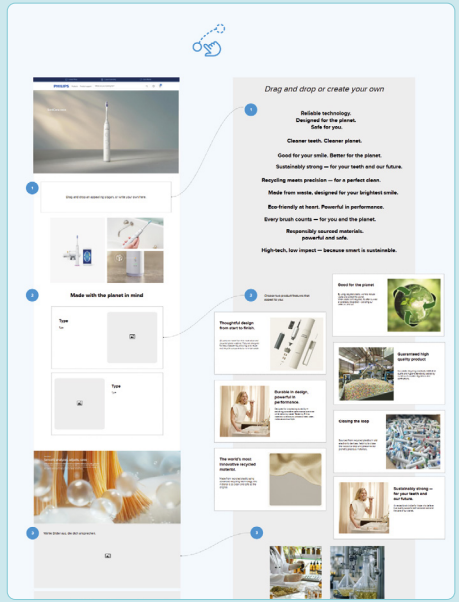
Inorganic materials



Write down the feedback

TASK 2

› Drag and drop design elements, text and images, onto the website template in the tool. You can also use your own texts and images.

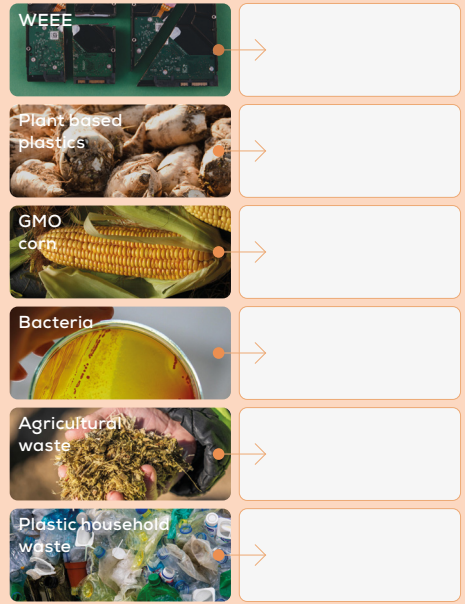


Creating a demo website

TASK 3

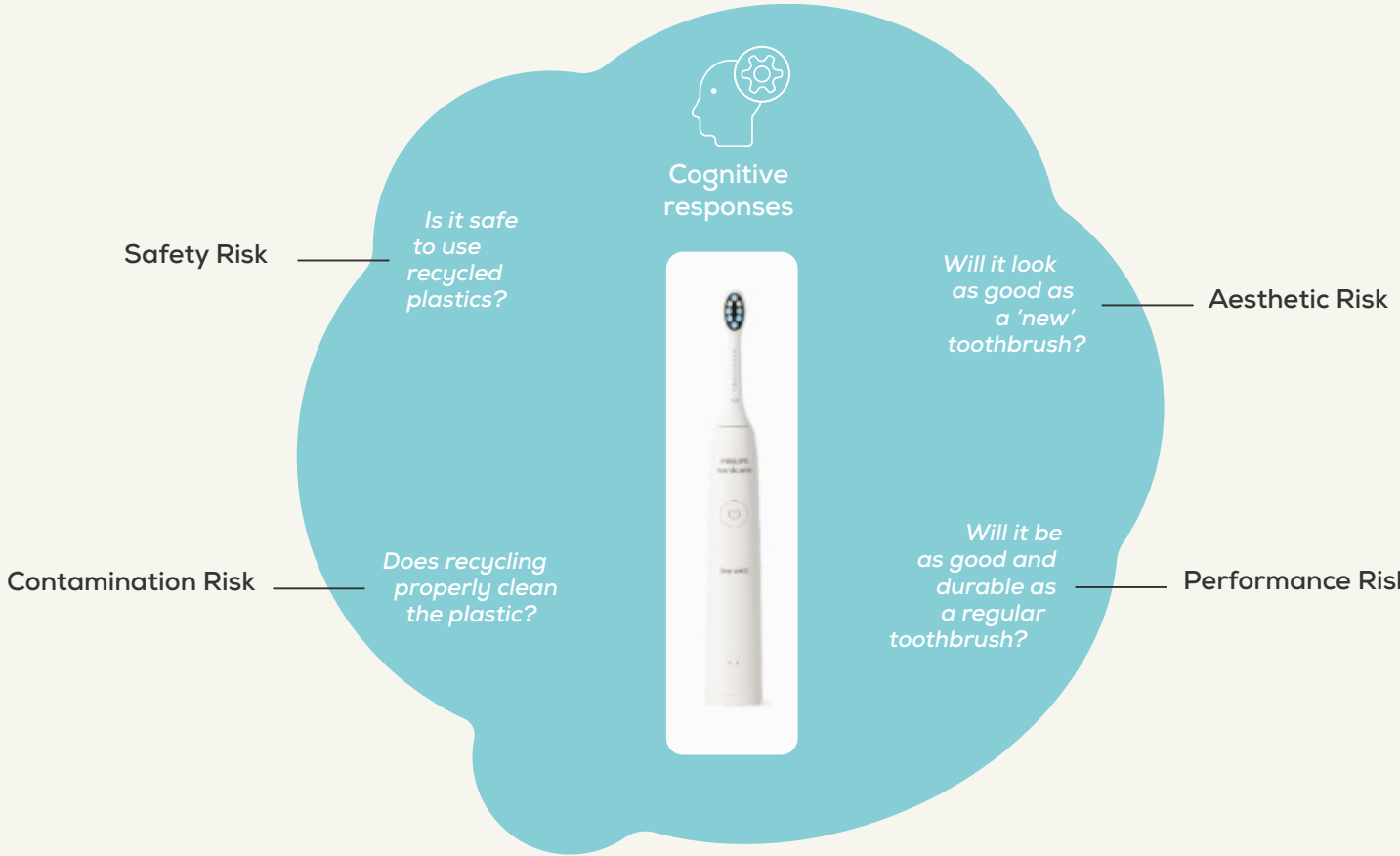
› Rank material options from best to worst.

Best +++



Worst ---

Fig. 3 Types of perceived risks associated with recycled materials



STEP 2

DEVELOP DESIGN AND COMMUNICATION INTERVENTIONS

The second step is to develop interventions that address the concerns identified in step one. Involving users in an early stage of the design process can help uncover blind spots and generate more grounded directions for design and communication. Co-creation can therefore be a useful method for exploring how (new) sustainability narratives, such as recycled content, can be introduced in ways that feel credible and relevant.

Earlier research[9] proposes a set of guidelines to set directions that can support consumer acceptance of recycled plastics. We analysed a collection of examples from the electronics industry to explore whether these guidelines are already applied in practice, and, if so, how.[10]

9. Polyportis et al. (2023)
10. Poppelaars et al. (2023)

1. Ensure trust in environmental impact by communicating corporate environmental performance, using eco-labels and quantifying impacts in an understandable way.

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This approach is widely used in electrical and electronic products. For example, a power tool manufacturer launched a product line made from recycled plastics and built credibility by stating exactly how many recycled plastic bottles were used to produce each tool, making the environmental benefit concrete and easy to understand.

2. Bring the environmental impact closer to the individual consumer by addressing local concerns through the product's use of recycled plastics.

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In our sample we found no clear examples of this approach for consumer electronics. This may be due to product complexity and highly globalised supply chains, which make it difficult to connect recycled materials with local environmental benefits that feel directly relevant to consumers.

3. Inform consumers about the history of the recycled content by communicating the product, waste stream or location it was sourced from.

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Many brands highlight the origins of their recycled plastics by naming specific source products (such as car parts, fishing nets, or industrial packaging), waste streams (for example post-consumer plastic, WEEE, or previously non-recyclable plastics), or locations (such as the UK or so-called "ocean plastic"). A commonly used term is ocean-bound plastic, which refers to plastic at high risk of entering the ocean rather than material recovered from it, which can be confusing or even misleading if not clearly explained.

4. Signal personal environmental identity through visual cues that communicate recycled content.

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In electronic products, recycled plastics are often highlighted through distinctive visual features such as speckled or marble-like textures, muted colours and matte finishes. Several brands deliberately develop a recognisable "recycled" aesthetic, making the material choice visible at a glance. Some go further by explicitly appealing to consumers' environmental identity, for example, marketing computer accessories as the "ideal choice for green PC owners."

5. Tackle perceived quality and performance risks by emphasising advanced recycling technology, warranties, and product-as-a-service options.

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Several electronics brands address quality concerns by highlighting advanced recycling processes and performance guarantees. For example, some brands present plastics recycling as a process that turns waste into high-quality materials. Product descriptions often state that recycled components perform as well as or better than conventional ones, supported by standard warranties. In some cases, products are positioned as "responsible premium" to counter the idea that recycled materials imply lower quality.

6. Reduce perceived contamination risk by emphasising high safety standards and cleanliness.

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Contamination risks are usually addressed indirectly. For instance, a few brands describe advanced recycling processes with terms such as "molecular recycling". This framing can reassure consumers that the material is clean and safe. Other companies highlight the use of recyclate that is certified to meet high safety standards, which may similarly reduce contamination concerns even when the issue is not mentioned directly.

7. Highlight the innovativeness of recycled content by framing it as novel and forward-looking.

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Several brands position recycled plastics as a driver of innovation rather than a constraint. They describe their use of recycled materials as a source of "creative edge," or a way to "push design boundaries" and "break new ground." This language presents recycled content as a progressive design choice and reinforces the idea that sustainability goes hand in hand with innovation.

By reviewing examples from the EEE industry, our research identified an additional guideline:

8. Use a 'silent green' strategy when appropriate, avoiding explicit communication about recycled content in situations where such messaging may activate negative risk perceptions.

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Some brands provided little consumer-facing communication about recycled plastics. A manufacturer of pressure washers, for instance, emphasises the novelty, quality, and certification of its recycled materials mainly in press releases or professional communications, while these aspects are not highlighted in its online store.

One possible explanation for the 'silent green' approach is that these brands simply prefer to highlight qualities other than sustainability. Another is that manufacturers may prioritise attributes like strength and reliability over sustainability, anticipating that highlighting recycled content could negatively affect consumer preference for products where robustness is the primary concern. This effect is known as the 'sustainability liability' hypothesis.[11]

11. Luchs et al. (2010)

INSIGHT

RECOGNISABILITY OF RECYCLED PLASTICS

Consumers often recognise recycled plastics and other sustainable materials as less intensely coloured, more matte, rougher in texture, or marked by visible speckles (or flecks).[12] In some contexts, visibly recognisable recycled content (following Guideline 4) can increase purchase intention.[13] However, this strategy is not without risk. If the appearance and feel of a recycled plastic seem incongruent with what consumers expect from the product, the material may be judged negatively. Research also suggests that materials designed to look non-recycled may be rated lower in sensory evaluations than materials that more openly communicate their recycled status.[14]

The implication is not that visible recycled content is always preferable. Rather, the material expression needs to fit both the product category and the expectations of the intended user group.

12. Du Bois et al. (2021)
13. Polyportis et al. (2024)
14. Abella et al. (2022)

STEP 3

TEST AND IMPROVE YOUR INTERVENTIONS

The last step is to validate interventions through quantitative user research and refine them iteratively. Design and communication choices are best tested in real-world settings rather than relying solely on surveys, interviews, or focus groups. Monitoring sales in stores or through e-commerce channels, for example, can reveal actual purchase behaviour rather than stated intentions.

As with any design project, product category, use context and target group remain essential. There is no universal strategy for improving consumer acceptance of recycled plastics. Risk perceptions differ between product types, and the effectiveness of any intervention will vary across user groups.

CASE

RECYCLED PLASTICS IN ORAL CARE PRODUCTS

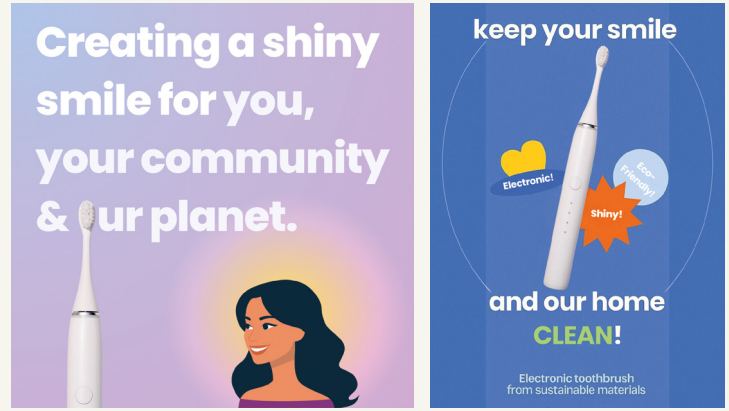
To evaluate the category-specific effectiveness of the guidelines for electric toothbrushes, two qualitative experiments were conducted by master's students in psychology at the University of Amsterdam.

The first experiment tested participants' responses to mock-up advertisements designed by applying each of the guidelines, compared against neutral control ads[15]. The second experiment examined the effect of communicating cues related to hygiene, quality and value at relevant touchpoints in the customer journey, specifically the product packaging and website[16].

Advertisements emphasising innovativeness and engineering excellence (Figure 4), in line with Guideline 7, were found to significantly increase purchase intention. Framing recycled plastics as innovative or high-tech – in addition to being more sustainable – may therefore make their use in electric toothbrushes more appealing to consumers.

Fig. 4 Mock-ups designed according to Guideline 7 (created with AI)

Fig. 5 Mock-ups designed according to Guideline 2 (created with AI)

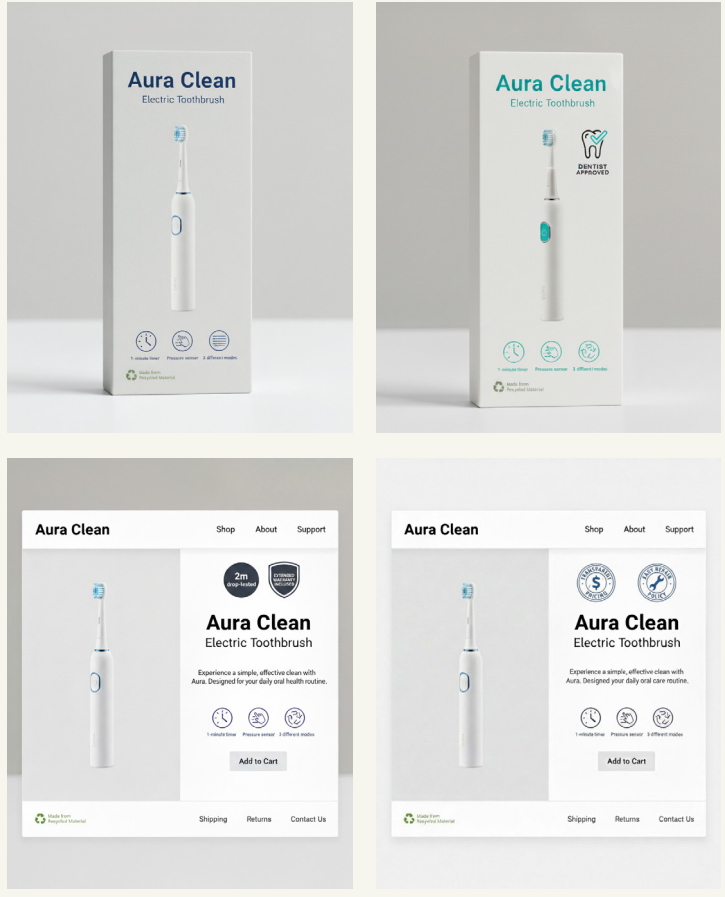


15. Rijnveld et al. (2025)
16. Visser et al. (2025)

Guideline 2, which brings the environmental impact closer to the individual consumer, interacted with participants' degree of existing environmental behaviour. This suggests that shared-values messaging – for instance, evoking a sense of contributing to a cleaner community or planet – resonates most strongly with consumers already engaged in eco-friendly behaviour. Less environmentally conscious consumers may require different forms of reassurance, such as quality or performance cues (Figure 5).

Regarding the effect of hygiene, quality and value cues across touchpoints, the second experiment found that value and quality cues on the packaging (Figure 6) were most effective in driving purchase intent and price acceptance. Hygiene cues performed less strongly overall, but were most effective when communicated through the product website. Across both experiments, packaging proved to be the most impactful communication channel. The findings also suggest aligning each touchpoint's design with specific marketing objectives: value cues for conversion, quality cues for price acceptance, and hygiene cues for reassurance.

Fig. 6 Mock-ups of product's packaging and website (created with AI)



WORKING WITH THE GUIDE

The case study above illustrates how designers and marketers can use consumer acceptance guidelines when integrating recycled plastics into products and their communication. It also underscores that these guidelines cannot be applied in a one-size-fits-all way; their value depends on how they are tailored to a specific product category, the context of use, and the target group.

For that reason, testing remains essential. The most effective interventions will grow from a combination of research, design development and validation in real-world practice.

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