Packed and claimed for sustainability: A multi experiment test of how consumers perceive soft drink packaging sustainability

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Consumers have a growing preference for packaging that is eco-friendly, but have difficulties assessing the sustainability of packaging. They rely on cues, which can either hinder or facilitate their recognition of sustainable packaging. We conducted three online experiments to investigate how two packaging cues (i.e., packaging material, sustainability claims) shape sustainability perceptions, product expectations and choices. Across our studies, we focused on the four materials used for beverage packaging (i.e., glass, plastic, carton, metal) and claims about the sustainability of the material (e.g., '100% recycled'). Our findings showed that packaging material is a significant driver of product expectations and choices, but that misconceptions exist about the sustainability of some materials. However, sustainability claims succeed at making materials seem more sustainable, and are most effective for materials that are typically believed to be unsustainable (e.g., plastic).

Keywords: *Packaging, Sustainability, Product expectations*

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1. Introduction

Consumers have a growing preference for packaging that is eco-friendly. To make sustainable choices, it is essential that consumers are able to correctly assess the sustainability of different packaging alternatives. Consumers' knowledge about packaging sustainability tends to be quite limited though (Ketelsen et al., 2020). For instance, they perceive the environmental impact of glass to be lower than the impact of plastic, although it is actually the other way around (Otto et al., 2021). A correct assessment of packaging sustainability can be facilitated through the presence of a communicative cue, such as a sustainability claim or label (Herbes et al., 2020). One issue with this is that brands often exaggerate or simplify the information about the sustainability of their packaging, a practice referred to as 'greenwashing' (Naderer et al., 2017). It is essential to investigate the impact of sustainability communication, since it can either hinder or facilitate recognition and subsequent choice of sustainable packaging options.

The aim of the current research is to shed light on how packaging elements shape consumers' product perceptions, intentions and choices. We focus on the two elements that are most commonly used to judge the environmental-friendliness of packaging: packaging material and sustainability claims (Herbes et al., 2020). We address the following research questions:

1. How do packaging material and packaging sustainability claims impact the sustainability perceptions of consumers?
2. How do packaging material and packaging sustainability claims interact with each other to affect sustainability perceptions?
3. How do packaging material and packaging sustainability claims impact expectations about product healthiness, tastiness and expensiveness?
4. How do packaging material and packaging sustainability claims impact willingness to consume and product choices?

2. Literature Review

2.1 Sustainable packaging cues

Sustainability is an abstract, intrinsic feature that cannot be directly assessed. The Cue Utilization Theory posits that people resolve this issue by gathering information from cues in their immediate environment (Olson & Jacoby, 1972). This information gathering is assumed to be an automatic, cognitive process where people scan the cues in their environment, and then

use the most salient cues to formulate a belief about the product. Product packaging contains several cues that can play a role in these belief formation processes.

2.2 Impact of the material and the claims on sustainability perceptions (RQ1)

Claims are important sources of information to evaluate packaging sustainability (Herbes et al., 2020). The literature on this topic is still developing, but the studies so far suggest that different types of claims succeed at influencing perceptions of packaging sustainability (Magnier & Schoormans, 2017; Spack et al., 2012). Regarding our first research question, we expect that claims about packaging sustainability will positively impact sustainability perceptions (H1).

2.3 Interaction between the material and the claims (RQ2)

The effectiveness of a packaging sustainability claim might depend on the level of fit with the packaging material (Magnier & Schoormans, 2015). In his research on Schema Congruity, Mandler (1982) theorizes that product responses will be more favorable when some mismatch exists between elements. Following this theory, we expect that a packaging sustainability claim will have a stronger effect on sustainability perceptions when it is mildly incongruent with the packaging material compared to when these elements are congruent (H2).

2.4 Impact of the material and the claims on product expectations (RQ3)

In an extension of the Cue Utilization Theory, Olsen (1978) proposes that cue processing can lead people to develop ideas about elements not contained in the message. In later literature, this effect has been referenced as a spillover effect. There is some evidence that consumers associate eco-friendly packaging with benefits related to healthiness and tastiness, but also with a higher financial cost (Steenis et al., 2017). Our third research question explores whether packaging material and sustainability claims influence expectations about the healthiness, tastiness and expensiveness of drink products.

2.5 Impact of the material and the claims on product willingness and choices (RQ4)

The question remains how the packaging material and sustainability claims impact product choices. Even if these cues positively impact sustainability perceptions, this does not necessarily translate to more sustainable intentions and choices (Vermeir & Verbeke, 2006). Given the limited and mixed findings in the literature concerning these outcomes, we will explore whether packaging material and sustainability claims impact willingness to consume the product, and hypothetical product choices.

2.6 Overview of Studies

We conduct three experiments to address our research questions. Across our studies, we focus on the four materials most often used for beverage packaging: glass, carton, plastic, and metal (Otto et al., 2021). In each study, we include a packaging material that consumers believe to be sustainable (i.e., congruent with a sustainability claim), and a material they believe to be unsustainable (i.e., mild incongruent with a sustainability claim). Findings from a recent review suggest that glass and carton are seen as sustainable materials, while plastic and metal are seen as unsustainable materials (Otto et al., 2021). We obtained similar results in a pre-test among 54 young consumers (16 - 19 years old).

Study 1 includes all four packaging materials, but is split up into two parts to avoid complexity in the design and interpretation of the findings. Study 1a zooms in on the difference between glass and plastic, while Study 1b zooms in on the difference between carton and metal. We also explore the impact of a visual cue (i.e., packaging color).

3. Study 1a

3.1 Methods

Study 1a had a 2 (packaging material: glass vs plastic) x 2 (packaging sustainability claim: present vs absent) x 2 (packaging color: green vs red) x 4 (product combination set) design. 798 young consumers (16 - 19 years old; M = 17.15, SD = 1.01) participated in the study.

After providing informed consent, participants completed a choice task. The choice task included 8 drinks, representing the 2 (material) x 2 (claim) x 2 (color) cue conditions. We included a strong packaging sustainability claim (i.e., '100% recycled bottle'). To distinguish between the effects of our cue manipulations, and the effects attributable to specific brand elements, we created 4 different cue-product combination sets. More specifically, we varied between-subjects which cues were combined with which brand. One drink from the choice task was then randomly selected, and participants answered a series of questions about this drink.

We measured *perceived packaging sustainability* with two items: 'How do you estimate the [eco-friendliness / sustainability] of the packaging' on a slider scale from 0 (very low) to 100 (very high). We also measured *perceived brand sustainability* with 2 items on a 5-point semantic differential scale (e.g., not environment-friendly - environment-friendly).

We measured product expectations with single items on a 5-point semantic differential scale: *expected healthiness* (i.e., unhealthy - healthy), *expected tastiness* (i.e., not tasty - tasty), and *expected expensiveness* (i.e., cheap - expensive). *Willingness to consume the product* was

measured with two items on a 5-point Likert scale (i.e., 'I would like to try this product'; 'I would consider buying this product').

We also measured several psychological characteristics related to sustainability, using 5-point Likert scales (completely disagree - completely agree). *Environmental concern* was measured with 6 items (e.g., 'People are severely abusing the environment'), s*elf-reported environmental behavior* with 4 items (e.g., 'I reduce my household waste as much as possible'), s*ubjective knowledge* with 3 items (e.g., 'I know a lot about the sustainability of packaging'), and *Attitude towards eco claims* with 3 items (e.g., I believe in the quality of eco claims').

We conducted multilevel analyses to calculate the impact of our cue manipulations. We included the following covariates: *environmental concern, self-reported environmental behavior, subjective knowledge, attitude towards eco claims, age, gender, BMI* and *thirst*. We used chi square tests to explore the impact of our cue manipulations on product choices.

3.2 Results

3.2.1 Impact of the material and the claim on sustainability perceptions (RQ1)

As expected, participants perceived glass to be more sustainable than plastic (b = .82, p < .001). In line with H1, packaging with a sustainability claim was perceived to be more sustainable (b = .62, p < .001). The brand was also perceived to be more sustainable when drinks were packed in a glass bottle (b = .56, p < .001) and with a claim (b = .41, p < .001).

3.2.2 Interaction between material and claim regarding sustainability perceptions (RQ2)

In line with H2, there were significant interactions between the packaging material and the claim with regards to the perceived sustainability of the packaging (b = -.76, p < .001) and the brand (b = -.57, p < .001). With regards to the packaging, the sustainability claim had a positive impact on the perceived sustainability of the glass (p = .004) and plastic (p < .001) packaging, but the effect was stronger for the plastic packaging. The claim significantly improved brand perceptions for the plastic (p < .001), but not for the glass (p = .189) bottles.

3.2.3 Impact of the material and the claim on product expectations (RQ3)

Drinks in glass bottles were expected to be more expensive (b = .51, p < .001). The packaging material did not impact the expected healthiness (b = .07, p = .18) or tastiness (b = .14, p = .07) of the drinks. The claim did not significantly impact expectations regarding the healthiness (b = .02, p = .69), tastiness (b = -.01, p = .84) or expensiveness (b = .09, p = .20) of the products.

3.2.4 Impact of the material and the claim on product willingness and choice (RQ4)

Participants were more willing to consume (b = .26, p < .001), but not more likely to choose (i.e., 52%, X^2 = 1.08, p = .297) drinks in glass bottles. Participants were not more willing to consume (b = .06, p = .41) or choose (i.e., 52.3%, X^2 = 1.43, p = .23) drinks with a claim.

4. Study 1b

4.1 Methods

The materials, methods and participants were the same as in Study 1a. Participants completed a second choice task where they chose between drinks packed in carton vs metal. They then answered questions about one of the drinks in their choice task.

4.2 Results

4.2.1 Impact of the material and the claim on sustainability perceptions (RQ1)

As expected, participants believed drink carton to be more sustainable than metal (b = .41, p < .001). In line with H1, packaging with a claim was believed to be more sustainable (b = .76, p < .001). Brands were also perceived to be more sustainable when beverages were packed in carton (b = .25, p < .001) and with a claim (b = .62, p < .001).

4.2.2 Interaction between material and claim regarding sustainability perceptions (RQ2)

In line with H2, there was a significant interaction between the material and the claim regarding the perceived packaging sustainability (b = -.53, p < .001). The claim had a significant impact both for glass (p < .001) and plastic (p < .001) bottles, but the effect was stronger for plastic.

4.2.3 Impact of the material and the claim on product expectations (RQ3)

Beverages in a drink carton were expected to be less tasty (b = -.20, p < .05) than beverages in a can. Beverages with a packaging sustainability claim were expected to be healthier (b = .13, p = .015), but also more expensive (b = .21, p < .01) than beverages without this claim.

4.2.4 Impact of the material and the claim on product willingness and choice (RQ4)

Participants were more willing to consume (b = -.16, p < .05) and choose (i.e., 61.5%, X^2 = 3.56, p < .001) drinks in a can. They were also more willing to consume (b = .27, p < .001), but not more likely to choose (i.e., 51.9%, X^2 = .85, p = .357) beverages with a claim.

5. Study 2

5.1 Methods

In Study 2, we aim to replicate the results of Study 1a. Given that we did not find any impact of packaging color, we did not include this cue further. The experiment had a 2 (material: glass vs plastic) x 2 (sustainability claim: present vs absent) x 4 (product combination set) mixed design. The material and claim factors were manipulated within-subjects. Participants were 207 young consumers (16 - 25 years, M = 20.86 , SD = 2.39).

The procedure was similar to Study 1. The choice task included 4 drinks, representing the 2 (material) x 2 (claim) conditions. Participants answered questions about all four drinks. All variables were measured in the same way as in Study 1. We did not include perceived brand sustainability in this study. The data analyses were also similar to Study 1.

5.2 Results

5.2.1 Impact of the material and the claim on sustainability perceptions (RQ1)

Similar to the results of Study 1a, glass bottles were perceived to be more sustainable than plastic bottles (b = 1.14, p < .001). In line with H1, bottles with a sustainability claim were perceived to be more sustainable (b = .57, p < .001) than bottles without this claim.

5.2.2 Interaction between material and claim regarding sustainability perceptions (RQ2)

In line with H2, there was a significant interaction between the packaging material and the claim regarding the perceived sustainability of the packaging (b = -.53, p < .001). The claim had a significant impact both for glass (p < .001) and plastic (p < .001), but the effect was stronger for plastic.

5.2.3 Impact of the material and the claim on product expectations (RQ3)

Drinks in glass bottles were expected to be healthier (b = .47, p < .001), tastier (b = .34, p < .001), and more expensive (b = .75, p < .001). Drinks with a claim were also expected to be healthier (b = .16, p < .01), tastier (b = .13, p < .05) and more expensive (b = .31, p < .001).

5.2.4 Impact of the material and the claim on product willingness and choice (RQ4)

Participants were more willing to consume (b = .45, p < .001), and choose (i.e., 65%; X^2 = 18.70, p < .001) glass bottles. They were also more willing to consume (b = .24, p < .001), and nearly significantly more likely to choose (i.e., 65%; X^2 = 3.66, p = .056) drinks with a claim.

6. Study 3

6.1 Methods

Our findings so far suggest that a strong sustainability claim (i.e., '100% recycled') has a positive effect on sustainability perceptions. In Study 3, we want to see whether similar results are obtained when using a weaker claim. This is important given that many brands currently use claims that exaggerate packaging sustainability.

The method was similar to Study 2, with some differences. First, we focused on carton vs plastic. Second, we included a weaker claim (i.e., '80% recycled') compared to Studies 1 and 2 (i.e., '100 recycled'). Participants were 257 young consumers (M = 20.91, SD = 2.96).

6.2 Results

6.2.1 Impact of the material and the claim on sustainability perceptions (RQ1)

Drink cartons were perceived to be more sustainable (b = .67, p < .001) than plastic bottles. Packages with a claim were perceived to be more sustainable (b = .67, p < .001). The size of this effect (i.e., b = .67) is similar to the effect sizes found for the strong claims.

6.2.2 Interaction between material and claim regarding sustainability perceptions (RQ2)

In line with H2, there was a significant interaction between the material and the claim regarding packaging sustainability (b = -.27, p < .01). The claim had an effect both for drink cartons (p < .001) and plastic bottles (p < .001), but the effect was somewhat stronger for the plastic bottles.

6.2.3 Impact of the material and the claim on product expectations (RQ3)

Beverages packed in a drink carton were expected to be healthier (b = .45, p < .001), less tasty (b = -.38, p < .001) and more expensive (b = .40, p < .001) than beverages in a plastic bottle. Similar to the results of Study 2, drinks with a sustainability claim were expected to be healthier (b = .12, p < .05), tastier (b = .11, p < .05), and more expensive (b = .29, p < .001).

6.2.4 Impact of the material and the claim on product willingness and choice (RQ4)

Participants were more willing to consume (b = -.30, p < .001), and choose (i.e., 76%, X^2 = 70.62, p < .001) drinks in a plastic bottle. Participants were also more willing to consume (b = .21, p < .001) and choose (i.e., 60%, X^2 = 10.70, p = .001) beverages with a claim.

7. General discussion

The aims of the current research were to shed light on how packaging materials and sustainability claims shape sustainability perceptions (RQ1 and RQ2), product expectations (RQ3) and willingness to consume / product choices (RQ4).

Regarding our first research question, we found that packaging material was a significant driver of sustainability perceptions. Glass and carton were believed to be more sustainable than plastic and metal. This is problematic given that these perceptions do not align with the actual sustainability of those materials. For instance, glass had a higher environmental impact compared to plastic (Otto et al., 2021a). In the same lines as previous studies (Magnier & Schoormans, 2017), we found that the presence of a packaging sustainability claim had a direct positive effect on sustainability perceptions. We found that a strong (i.e., '100% recycled') and a weaker (i.e., '80% recycled') claim were equally effective, similar to the results of one previous study (Spack et al., 2012).

To address our second research question, we investigated the effectiveness of sustainability claims when combined with different packaging materials. In line with expectations, we found that the claim improved sustainability perceptions, and that this effect was stronger for materials that seem unsustainable (i.e., plastic and metal). This effect is consistent with Mandler's theory of Schema Congruity (1982) that a mild incongruence induces more favorable responses. It is relevant to see that a packaging sustainability claim does not backfire when combined with a seemingly unsustainable material (i.e., plastic, metal), which might happen if the claim were to evoke suspicions of greenwashing.

Regarding our third research question, we found evidence that the material and the claims spilled over to influence expectations about the product. Our results align with previous findings that eco-friendly packaging is associated with an improved product healthiness and tastiness, but also with a higher product cost (Steenis et al., 2017). For instance drinks with a sustainability claim were believed to be healthier and tastier, but also more expensive.

Finally, regarding our fourth research question, our results show that packaging cues affect consumers' intentions and choices. Young consumers favored packaging materials that are unsustainable (Otto et al., 2021b). For instance, they were more willing to consume drinks in a glass (vs plastic) bottle. In addition, they were less willing to consume and choose drinks in a drink carton, although this is actually the most sustainable material for beverages (Otto et al., 2021b). Nevertheless, we also found evidence that consumers were more willing to consume drinks with a packaging sustainability claim.

7.1 Implications

Our findings have implications for policymakers and product designers. Even though carton and plastic are the most sustainable packaging materials for beverages (Otto et al., 2021), our studies show that young consumers are less likely to choose drinks packed in these materials. It is important to correct or lower the costs that are currently associated with these materials. Our results suggest that sustainable packaging claims are valuable tools to achieve these goals.

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