

When multi-labelling backfires: The influence of sustainability FOP labels valence and orientation

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ABSTRACT

To inform and encourage responsible consumer choices, the use of sustainability (i.e., health and/or environmental), front-of-package labels on food products is becoming increasingly widespread. While the benefits of a single label are well-documented, less is known about the effects of multi-labelling – when multiple front-of-package labels are displayed on packaging – especially when these labels differ in valence (i.e., positive versus negative) and orientation (i.e., self-oriented versus others-oriented). Through two experimental studies, we examine how consumers respond to multi-labelling in this context. We show that conflicting labels, displaying opposite valences, cause confusion, regardless of their orientation, without affecting purchase intentions. Furthermore, they reduce moral satisfaction when both are others-oriented, which decreases purchase intentions. Finally, same-valence labels, regardless of their orientation, do not impact the mediating psychological mechanisms (moral satisfaction and consumer confusion) but instead directly influence purchase intentions, positively when both labels are others-oriented and negatively when the labels differ in orientation. In line with Kahneman's dual process theory, consumers process multi-labelling differently depending on labels valence and orientation: similar-valence labels seem to prompt automatic processing (System 1), whereas opposite-valence labels appear to require more deliberate cognitive processing (System 2). These findings provide new insights on multi-labelling, offering practical implications for managers and policymakers seeking to optimize labelling strategies for health and environmental sustainability.

1. Introduction

As defined by the Food and Agriculture Organization of the United Nations (2007), a food label is any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food or food product. This information, which includes items such as ingredients, quality and nutritional value, can accompany the food or be displayed near the food to promote its sale. In line with a definition from the French ministry of the economy and finance (DGCCRF, 2024), Front-Of-Package (FOP) labels certify that a product meets specific criteria defined by a set of standards, ensuring a high level of quality. Ratings are specific labels that provide scores for food products, enabling comparison (Gorissen & Weijters, 2016), such as the Nutri-Score. Sustainability FOP labels highlight either self-oriented benefits (e.g., health, price, taste) or others-oriented benefits (e.g., animal welfare, fair trade, climate protection) depending on whether they address individual interests

(self-oriented) or collective interests (others-oriented) (Weinand, 2022; Yadav, 2016). Sustainability FOP labels help reduce uncertainty by providing concise and easily understandable information (Thøgersen & Nielsen, 2016). By empowering individuals to make more sustainable food choices for themselves and/or for the planet (De Temmerman et al., 2021; Weber, 2021), they guide consumers (De Bauw et al., 2021), support policymakers in promoting more responsible food decisions, and offer businesses a potential competitive advantage (Dufeu et al., 2014).

Sustainability FOP labels can display the same orientation (e.g., fair-trade and animal welfare labels, which are both others-oriented labels), and even deal with the same topic (e.g., the environment for both the Marine Stewardship Council MSC label, a label about sustainable fishing, and the Eco-Score, a scoring indicating the environmental footprint of a product) or they can display different orientations (e.g., health and the environment for the Nutri-Score and the Eco-Score respectively, which are self-oriented vs. others-oriented labels respectively). They

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have proliferated in response to increasing consumer concerns regarding health and the environment (Annunziata et al., 2019; Fenko et al., 2018). In 2017, over 450 recognized sustainability labels were reported (Delmas & Lessem, 2017). Consequently, multi-labelling that involves multiple sustainability FOP labels on the same product (Dufeu et al., 2014) has become increasingly common (Sonntag et al., 2023). Theoretically, multi-labelling offers advantages, as consumers gain access to more information to guide their purchasing decisions, ultimately encouraging sustainable and healthy food choices, and empowering them (Sonntag et al., 2023). However, the proliferation of labels can also lead to challenges, including causing confusion and skepticism among consumers (Lemken et al., 2021).

One of the key drawbacks of label proliferation is the increasing likelihood of displaying combined labels with opposing valences. At first glance, it may seem counterintuitive for a manufacturer or a retailer to include a negative label (e.g., a Nutri-Score E) on product packaging. However, this practice is becoming more common for three main reasons. First, some retailers actively promote the use of scoring systems. For example, Colruyt, a Belgian retailer, displays both the Nutri-Score and the Eco-Score on many of its food products. Second, some companies systematically display certain labels, regardless of their valence. Gerblé, for instance, includes the Nutri-Score on all its products. These two factors implicitly encourage other manufacturers and retailers to follow suit. As labels become more widespread, they begin to establish an industry norm that becomes increasingly difficult for others to ignore without raising consumer suspicion. Third, official bodies strongly advocate for their adoption. Discussions about making the Nutri-Score mandatory have taken place at both the national level and the European level. As a result, the likelihood of a product featuring both positive and negative labels increases, potentially leading to consumer confusion and other unintended negative effects.

It is therefore crucial for researchers to critically assess the effectiveness of this policy in empowering consumers. Additionally, we must explore ways to help manufacturers and retailers navigate this constraint while minimizing consumer confusion. To date, research has rarely assessed how consumers respond to multi-labelling (Berden & Hung, 2025; De Bauw et al., 2022; Majer et al., 2022; Mazzù et al., 2023; Pérez y Pérez et al., 2020; Weinand, 2022), particularly when labels conflict in terms of their valence (Sonntag et al., 2023). Moreover, there is limited insight into the psychological mechanisms involved in these situations. Existing research suggests that multi-labelling incorporating positive others-oriented labels may enhance the moral satisfaction derived from supporting meaningful causes (Andreoni, 1990, 1993; Kahneman & Knetsch, 1992). However, it also suggests that labels that provide “too much, too complex, too similar, and too ambiguous information” can contribute to consumer confusion (Torma & Thøgersen, 2024, p. 283). Fitzgerald et al. (2019) define consumer confusion as “a negatively valenced state of mind with emotional and cognitive components in which consumers lack comprehension or understanding of marketplace stimuli” (p. 308) and emphasize the importance of incorporating confusion as a key factor when modeling consumer reactions to marketplace information. Such confusion can disrupt information processing (Mitchell & Papavassiliou, 1999), reduce the informativeness of labels (Harbaugh et al., 2011), erode consumer confidence in decision-making (Chernev et al., 2015), and even lead to purchase abandonment (Wobker et al., 2015).

In the end, although stakeholders advocate for labels to assist consumer choices, multi-labelling may hinder consumers from making informed and confident decisions, ultimately disempowering them and becoming counterproductive because it increases the risk of conflicting valences (positive vs. negative) and orientations (self-vs. others). In this research, we therefore examine the impact of multi-labelling on consumer empowerment, focusing on label valence and orientation. We also explore the underlying mechanisms, considering the roles of moral satisfaction and confusion. To do so, we carry out two experimental studies. The first examines how same-orientation labels, whether of

positive or opposing valences, affect moral satisfaction, consumer confusion, and purchase intentions, compared to a single positive others-oriented label. The second explores the effects of different orientation labels, with either positive or opposing valences, relative to a single positive self-oriented label.

Our contributions to information processing literature, and specifically in multi-labelling contexts are four-fold. First, we show how multiple labels influence product preferences and choices compared to single labels, insights called for by Branković et al. (2025). Specifically, we highlight the interplay of valence and orientation, reconciling conflicting findings (Berden & Hung, 2025; D'Angelo Campos et al., 2024; De Bauw et al., 2021; Jürkenbeck et al., 2024). Second, we extend research on information processing, demonstrating that conflicting labels engage the effortful System 2, whereas literature considers that labels are typically processed via the automated System 1 (Kahneman, 2011). Third, we identify distinct yet simultaneous decision-making pathways, nuancing and, as such, explaining, previous conflicting research findings (e.g., De Bauw et al., 2021; Sonntag et al., 2023). Lastly, integrating fast evolving contexts, we expand Sirieix et al.'s (2013) classification of contradictory label combinations.

Then, we also offer managerial contributions, our findings stressing the need to minimize consumer confusion in labelling design and implementation. Then, we recommend making sustainability FOP labels mandatory as it would not only push manufacturers to improve their products (Le Figaro, 2023), but also the probability of conflicting labels, thereby enhancing consumer clarity and informed decision-making. Finally, we emphasize the importance of educational initiatives to improve label literacy. Helping consumers better interpret labels and understand their health and environmental implications will empower them to make more informed choices.

2. Theoretical background

2.1. Information processing theories

The overarching information processing theory explains consumer behavior by focusing on cognitive operations. Unlike earlier theories, it doesn't simply attribute behavior to subjective states like traits or attitudes. Instead, it aims to offer a more mechanistic explanation. Behavior results not only from what people think about, but also from how they think about it. According to this theory, incoming information is represented in active memory in a generally accurate way. This information can trigger the retrieval of relevant thoughts that were processed earlier. Since active memory has a limited capacity, information stored there must be transferred to long-term memory to be accessible for future use. Both new and previously processed information in active memory can be stored through a process known as rehearsal, which involves actively linking attributes to an object. The storage process is systematic, with information about an object stored as associations in various memory locations (Tybout et al., 1981).

Among the theories that explain how humans process information, the system theory from Kahneman (2011) is one of the famous two-way models. This theory states that individual judgment and decision-making, including food choices, are influenced by two cognitive systems that function simultaneously. One system is based on intuition, emotions, and past experiences (System 1), while the other depends on reasoning, evaluation of available information, and logical thinking (System 2). System 1 operates using heuristics, which are mental shortcuts that help individuals make quick decisions in uncertain situations (Tversky & Kahneman, 1974). System 2 is a slower path that observes System 1's outputs, and intervenes when intuition is insufficient, especially “when an event is detected that violates the model of the world that System 1 maintains” (Kahneman, 2011, p. 24). This theory is useful to understand how consumers process labels and why this format is effective to inform consumers.

2.2. Food labels effectiveness

To fully grasp our research objectives, it is essential to provide a comprehensive overview of sustainability labels and their main characteristics. First, sustainability food labels can be initiated by public or private entities (Hawley et al., 2013). Second, these labels may display either a positive valence, like organic certification, or a negative valence, such as a red traffic light (Weinrich & Spiller, 2016). Third, some labels, like the Nutri-Score in Europe, are used on a voluntary basis (Merz et al., 2024), while others, such as Chile's nutrition "warning" labels, are mandatory (Reyes et al., 2019). As of now, there are no mandatory FOP labels in Europe. However, 90 % of French consumers are in favor of a compulsory Nutri-Score (Benz, 2024) and ongoing political discussions suggest a potential shift toward making it mandatory at both national and European levels (Merz et al., 2024). Additionally, manufacturers and retailers are increasingly adopting these labels voluntarily (Benz, 2024), which could eventually create a ripple effect that encourages others to follow suit. Indeed, as labelling practices like the Nutri-Score become widespread, they establish a descriptive norm, by representing what is commonly done in the food industry (Cialdini, 2007; 2009). As such, they shape consumers' expectations, which encourages the generalization of the practice (Cialdini, 2007; Monnot et al., 2019; Singhapakdi & Vitell, 1993). Concretely, products lacking such labels may be perceived as deviating from the norm, raising doubts about their quality or the manufacturer's transparency. This reflects a social proof mechanism, where individuals rely on the majority's behavior to guide judgments and view deviations from the norm negatively (Cialdini, 2009; Venema et al., 2020). Moreover, the absence of expected information is often interpreted as a deliberate omission, which signals potential deception (Hastak & Mazis, 2011). In the end, deviating from the norm may trigger consumer suspicion and deter purchasing decisions, explaining why manufacturers and distributors who adopt these labelling systems have a knock-on effect on their competitors. As such, although it may seem counterintuitive for businesses to display a negative label like an Eco-Score E, this practice is becoming more widespread.

As a fourth characteristic, labels can be categorized according to their orientation. Label orientation refers to consumption motives, which can generally be categorized into two main types: "self-oriented" (or "self-centered") and "others-oriented" (or "altruistic") motives (Naderi & Van Steenburg, 2018). While self-oriented motives focus on personal benefits such as taste, health, or affordability, others-oriented motives emphasize societal benefits like environmental sustainability. To many consumers, these motives can appear paradoxical, creating a perceived trade-off between pursuing personal well-being and acting responsibly toward society and the environment (Aschemann-Witzel, 2015). Notably, consumers often believe that more sustainable products compromise other quality attributes, such as taste, convenience, or even healthfulness (Grunert, 2011; Siegrist et al., 2015). For instance, some perceive organic or eco-friendly foods as being less palatable or nutritionally inferior, despite scientific evidence showing that sustainable foods can match or even exceed conventional products in nutritional value (Willer & Lernoud, 2019). Furthermore, the higher cost often associated with sustainable options amplifies the tension and perceived trade-off between self-oriented and others-oriented motives. Based on the distinction between self-oriented and others-oriented motives (Aschemann-Witzel, 2015; Naderi & Van Steenburg, 2018), we propose to distinguish self-oriented labels from others-oriented labels. Self-oriented labels, such as the Nutri-Score, provide nutritional information highlighting the health benefits or risks associated with consuming the product. Others-oriented labels, such as the Max Havelaar label, certify practices like fair trade that benefit external stakeholders or the environment. Research suggests that self-oriented labels may exert a stronger influence on consumers' decisions, as egoistic values tend to outweigh altruistic ones in driving purchase behavior (Yadav, 2016).

Labels function as signals (Brach et al., 2018), empowering consumers in their decision-making by offering two primary benefits: they reveal a product's hidden qualities (Bauer et al., 2013), aiding in product differentiation and emphasizing desirable attributes (Golan et al., 2001); and they provide simple heuristics that reduce complexity and alleviate choice overload (Thøgersen & Nielsen, 2016). Labels are generally easy to read (Thøgersen & Nielsen, 2016), understand (Grunert & Wills, 2007), and can even be processed unconsciously (De Bauw et al., 2024). All of these attributes contribute to making labels processed automatically, without provoking additional cognitive efforts. Therefore, according to Kahneman's dual-process theory (2011), labels are typically processed by the brain's automatic and intuitive System 1 rather than the more deliberate, evidence-based System 2.

Labels positively influence consumer behavior, including purchase intentions and willingness to pay (Majer et al., 2022). This effect can be attributed to the psychological benefits associated with labels, such as a heightened sense of good conscience, reduced anticipated guilt (Bradu et al., 2014), and feelings of moral righteousness (Sörqvist et al., 2015). Consumers often perceive supporting a social cause through their purchases as the morally right choice (Bratanova et al., 2015). As a result, purchasing a product that advocates a cause (e.g., a fair-trade item) generates moral satisfaction (Bratanova et al., 2015).

2.3. Multi-labelling effectiveness

Multi-labelling refers to the practice of combining multiple labels on a single product. Sonntag et al. (2023) found that when consumers encounter multiple labels with the same valence, they evaluate each label individually and rationally. Their study shows that combining two positive labels (e.g., a climate-friendly label and a Nutri-Score B) increases the willingness to pay for a product that is both ecological and healthy compared to using a single label. Conversely, combining two negative labels consistently reduces purchase intentions for products with poor nutritional value and negative environmental impacts. This is consistent with D'Angelo Campos et al. (2024) who found that combined "ultraprocessed" and "high in sugar" labels discourage consumers more than the "ultraprocessed" label alone.

However, these findings should be interpreted with caution. According to Janßen and Langen (2017), the impact of a second label depends on consumers' price sensitivity and their awareness of label redundancy. Similarly, Pérez y Pérez et al. (2020) found that the combination of two positive labels is not valued when consumers perceive them as substitutes, which may sometimes indicate a lack of food literacy. De Bauw et al. (2021) compared multi-labelling to no-labelling and observed that displaying both nutrition and environmental labels increased purchase intentions for healthy products but not for ecological ones. They suggest that this preference for nutrition labels over environmental labels may be attributed to the complexity, cognitive burden, and confusion caused by combining two scores (Mitchell & Papavassiliou, 1999). In such cases, consumers tend to focus on one label, typically prioritizing nutrition labels, as personal health often outweighs altruistic concerns in trade-off situations.

Furthermore, multi-labelling increases the likelihood of displaying conflicting labels. Sirieix et al. (2013) identify three types of contradiction: (1) contradiction between the labels' orientations (e.g., self-oriented versus others-oriented), (2) contradiction between the labels' content (e.g., fair trade in developing countries versus local production), and (3) contradiction between the labels' credibility (e.g., a certified label versus a private brand label). Perceived contradictions among labels can lead to mistrust, confusion, caution, and disinterest, all of which can have detrimental effects on consumer behavior. It appears that a fourth type of conflict may arise from the valence of the labels (i.e., a positive label versus a negative label), which forces consumers to make trade-offs (Luchs & Kumar, 2017). In such situations, Sonntag et al. (2023) argue that the effects of a negative label cannot be compensated by a positive label. However, Jürkenbeck et al. (2024)

suggest that the two labels can influence each other: for example, the nutrition label can affect the perceived environmental friendliness of a product, while the environmental label can influence its perceived healthiness, leading to biased consumer perceptions. Even when they are both others-oriented, conflicting labels can create deception and negatively impact purchase intentions (Steenis et al., 2023). Ultimately, while multi-labelling aims to assist consumers in making better choices, it can introduce cognitive biases and hinder informed decision-making, revealing significant drawbacks. The presentation of excessive information through multi-labelling may lead to confusion (Torma & Thøgersen, 2024).

Despite its prevalence, research still has gaps in understanding the impact of multi-labelling, particularly regarding labels with differing valences (positive versus negative) and orientations (self-oriented versus others-oriented), as well as the psychological mechanisms at play. Given that multi-labelling is intended to enhance consumer decision-making, it is crucial to investigate under which conditions – specifically regarding labels valence and orientation – it is effective and when it could be counterproductive.

3. Conceptual model

Based on the literature, we have stressed above that multi-labelling implies mixed consumers responses. We argue that the valence and the orientation of the different labels presented on the one product explain those different responses, as the information is processed differently according to the similarity across valence and orientation. In the context of adding a second positive others-oriented label, it has been shown that moral satisfaction is triggered as soon as the first positive others-oriented label is detected (Sörqvist et al., 2015). The labels might be perceived as conveying a redundant information (Pérez y Pérez et al., 2020). Ufer et al. (2022) show that consumers do not view labels as separable and, consequently, additive in value. This is evident in the average premiums, where the combined premiums for individual attributes—organic, non-GMO, and animal-friendly—do not match the premiums observed for products carrying redundant or dual labels. These discrepancies suggest a substitutive relationship between the non-GMO and animal-friendly labels, explaining that these two labels may simultaneously contribute to the same purchase motive of consumers. Bernard et al. (2019) showed that the presence of an additional label only increased marginally the willingness to pay compared to a single label. As such, we postulate that the combination of two positive others-oriented labels may not generate greater moral satisfaction than a single positive others-oriented label.

In contrast, the presence of a negative others-oriented label alongside a positive one may diminish moral satisfaction, as the negative label undermines the ethical value signalled by the positive label. According to the commitment and consistency principle (Cialdini, 1984), individuals prefer to act in ways that align with their values. When a product displays conflicting labels, this inconsistency disrupts their ability to see their choice as morally coherent, creating discomfort. This also challenges self-perception theory (Bem, 1972), which suggests that people align their behaviors with their identity. Since moral satisfaction arises from acting in accordance with one's values, a product featuring labels with opposing valence on a personally significant issue (e.g., environmental impact or animal welfare) may weaken the psychological reward, hence, moral satisfaction derived from its purchase and use. We therefore hypothesize:

H1. The effect of the combination of two others-oriented labels in comparison with one positive others-oriented label on moral satisfaction depends on the second label valence, such that (a) adding a positive label has no impact on moral satisfaction whereas (b) adding a negative label decreases it.

As highlighted above, moral satisfaction is triggered as soon as a (first) positive others-oriented label is detected (Sörqvist et al., 2015).

While we have argued that moral satisfaction does not increase with the addition of a second others-oriented label, a positive self-oriented label does not inherently generate moral satisfaction, as it emphasizes individual rather than collective benefits (Weinand, 2022; Yadav, 2016). However, adding a positive others-oriented label to a positive self-oriented one is expected to trigger and therefore enhance moral satisfaction.

Conversely, since a positive self-oriented label does not inherently generate moral satisfaction (Weinand, 2022; Yadav, 2016), the presence of a negative others-oriented label should not diminish it. Moral satisfaction, by definition, stems from acting in alignment with ethical values related to collective well-being. If no moral satisfaction was initially triggered by the self-oriented label, then there is no psychological reward to be undermined by the addition of a negative others-oriented label. This aligns with the notion that negative moral dissonance arises only when an individual perceives a direct contradiction to a previously established moral benefit (Gawronski & Strack, 2012). Since the self-oriented label did not establish such a benefit, the negative others-oriented label lacks the psychological leverage to reduce moral satisfaction. An others-oriented label cannot negatively affect a construct that is not generated. Thus, we hypothesize:

H2. The effect of the combination of a self-oriented label and an others-oriented label in comparison with one positive self-oriented label on moral satisfaction depends on the second label valence, such that (a) adding a positive label increases moral satisfaction whereas (b) adding a negative label has no impact on moral satisfaction.

Furthermore, conflicting labels may lead to consumer confusion. By suggesting a clash between opposing forces (Little et al., 2018), such labels could require more deliberate, evidence-based and deeper analysis, and engage System 2, according to Kahneman's dual-process theory. System 2 is a slower, more deliberate system that monitors the outputs of System 1 and intervenes when intuition alone is inadequate. This intervention occurs "when an event is detected that violates the model of the world that System 1 maintains" (Kahneman, 2011, p. 24), with conflicting labels serving as such an event. The assumption that conflicting labels could stimulate cognitive responses is in line with the attribution theory (Heider, 1944), which suggests that individuals "search for the causes of an event" (Heider, 1958, p. 79), be it their own behavior, the behavior of another person or more general events (Mizerski et al., 1979), with the aim of ordering their perceptual field in a coherent, stable and meaningful way.

Concretely, conflicting labels are unexpected and could threaten control beliefs (Wong & Weiner, 1981), potentially creating "cognitive unrest" (Lichtenstein & Bearden, 1986, p. 295). As consumers must reconcile both positive and negative information, conflicting labels make information processing more challenging (Allen & Brooks, 1991). This difficulty arises from potential information overload (Torma & Thøgersen, 2024) and ambiguous product information (Walsh et al., 2007), both of which have been shown to cause consumer confusion in food-related contexts (Mick et al., 2004; Mitchell & Papavassiliou, 1999). Consequently, conflicting multi-labelling, whether involving labels of the same orientation or different orientations, should generate more confusion compared to any positive label. In contrast, multi-labelling that includes only positive labels is unlikely to provoke such confusion, as the consistent information would be processed and integrated smoothly, resulting in a positive evaluation. In contrast, multi-labelling that includes only positive labels is unlikely to provoke such confusion, as the consistent information would be processed and integrated smoothly, resulting in a positive evaluation. Thus, we hypothesize:

H3. The effect of the combination of two others-oriented labels in comparison with one positive others-oriented label on consumer confusion depends on the second label valence, such that (a) adding a positive label has no impact on consumer confusion whereas (b) adding

a negative label increases it.

H4. The effect of the combination of a self-oriented label and an others-oriented label in comparison with one positive self-oriented label on consumer confusion depends on the second label valence, such that (a) adding a positive label has no impact on consumer confusion whereas (b) adding a negative label increases it.

Certain product labels, such as fair-trade and traceability certifications, provide consumers with more than just factual information: they also deliver psychological benefits. These labels can reinforce a sense of good conscience, alleviating any anticipated guilt associated with consumption choices (Bradú et al., 2014). Furthermore, they foster a sense of moral satisfaction by allowing consumers to align their purchasing behaviors with their ethical values and social responsibilities (Bratanova et al., 2015; Sörqvist et al., 2015). These emotional and psychological advantages not only improve consumers' perceptions of labeled products but also have a direct positive impact on purchase intentions, as consumers feel reassured and virtuous in their choices (de Lima et al., 2019). On the other hand, conflicting or ambiguous labelling can lead to consumer confusion, a psychological state characterized by discomfort and uncertainty. This confusion arises when consumers struggle to process or reconcile inconsistent information provided by the labels, resulting in slower decision-making, errors, or outright avoidance of the purchase (Mitchell & Papavassiliou, 1999; Wobker et al., 2015). Unlike the positive effects of moral satisfaction, confusion undermines consumers' confidence in their choices, diminishing their likelihood of purchasing the product.

Given these dynamics, we argue that the effects of multi-labelling (as opposed to single labelling) on moral satisfaction and consumer confusion will translate directly into changes in purchase intentions. Specifically, an increase in moral satisfaction stemming from effective multi-labelling (i.e., a combination of a positive self-oriented label and a positive others-oriented label) will positively influence purchase intentions, as consumers feel more aligned with their ethical or personal values. Conversely, consumer confusion induced by conflicting multi-labelling (i.e., a combination of opposite-valence labels) will reduce purchase intentions, as the discomfort and uncertainty deter consumers from making a commitment. Thus, we hypothesize:

H5. Moral satisfaction mediates the impact of multi-labelling (versus single labelling) on purchase intentions, such that (a) adding a negative others-oriented label to a positive others-oriented one decreases moral satisfaction, which in turn decreases purchase intention, and (b) adding a positive others-oriented label to a positive self-oriented one increases

moral satisfaction, which in turn increases purchase intention.

H6. Consumer confusion mediates the impact of multi-labelling (versus single labelling) on purchase intentions, such that adding a negative others-oriented label (a) to a positive others-oriented one or (b) to a positive self-oriented one increases consumer confusion, which in turn decreases purchase intention.

Fig. 1 displays the conceptual model that results from our hypotheses.

To test our conceptual model, we conducted two experimental studies. Study 1 compares the effects of the combination of two others-oriented labels (alternatively with positive valence or opposite valences) with the effects of a single positive others-oriented label. Study 2 compares the effects of the combination of an others-oriented label (alternatively with a positive or a negative valence) and a positive self-oriented label with the effects of a single positive self-oriented label. The studies received ethical approval from the Ethics Committee of the research institute of the authors.

4. Study 1

The aim of Study 1 is to investigate consumers' psychological processes and responses when they face the combination of two others-oriented labels displaying both positive valence or opposite valences.

4.1. Method

Procedure. We conducted a single factor randomized controlled online experiment with three conditions: (1) a control condition featuring only the MSC label, (2) a “both positive valence” condition featuring the MSC label and an Eco-Score A, and (3) an “opposite valences” condition featuring the MSC label and an Eco-Score E.

Both MSC and Eco-Score labels address sustainability, though they assess different criteria: The MSC label guarantees that the fish is caught sustainably, which means that there is no overfishing, that the marine eco-system is respected and that the people who depend on fishing earn a living (MSC official website, 2024). It is widely recognized in the fishing industry (Bronnmann et al., 2023). In contrast, the Eco-Score, introduced in France in 2021, serves as a straightforward tool to assess the environmental footprint of a product. It evaluates the product throughout its entire life cycle, covering six stages: raw materials, production, distribution, consumption, and waste disposal. The score uses a plus-minus system to account for various factors, such as production methods, country of origin, environmental policy, packaging, and

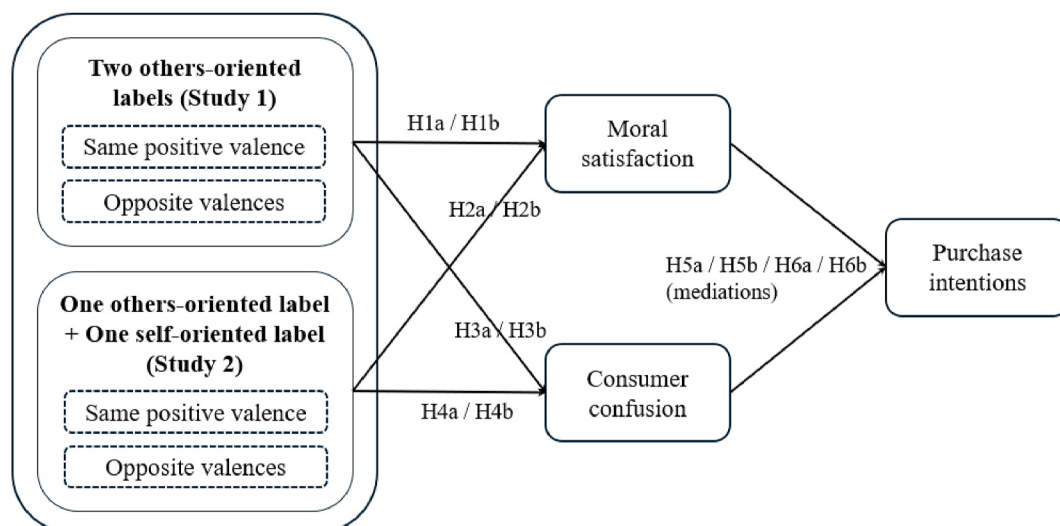


Fig. 1. Conceptual model.

biodiversity impact. The Eco-Score can be adjusted to reflect either positive or negative assessments (Colruyt Group official website, 2024). As the MSC label and the Eco-Score do not assess the same criteria, they can have opposite valences (in case of Eco-Score C, D or E) for a same product. Although currently limited in scope, the Eco-Score is slated for broader implementation across the European Union in the near future. This experiment allows us to examine the effects of these labelling combinations on consumer perceptions, particularly focusing on the interplay of valence and orientation in shaping moral satisfaction, consumer confusion, and purchase intentions.

In line with De Bauw et al. (2021), participants were placed in a simulated shopping context by asking them to consider purchasing a piece of fish. Fish was chosen as the target product due to its widespread consumption in the European Union, with an average per capita consumption of 24 kg in 2018 (European Market Observatory for Fisheries and Aquaculture Products, 2020). Additionally, fish is particularly well-suited for our experimental design, as it can credibly be associated with both a Nutri-Score A and a range of Eco-Scores, from Eco-Score B to Eco-Score E. To create realistic stimuli for the experiment, we reproduced typical elements found on online retailer websites. The experimental materials featured the product's picture, price, name, weight, and label(s), alongside a fictitious brand designed to mimic real-world branding practices. This approach ensured that the stimuli reflected actual consumer experiences while maintaining experimental control. The design of the stimuli was modeled closely on real-life examples to enhance ecological validity (see Fig. 2). This setup allowed us to simulate a realistic decision-making environment, enabling participants to evaluate the product as they might during an actual online shopping experience.

Consent was explicitly obtained, and anonymity was assured at the beginning of the questionnaire. Participants answered a filter question to confirm that they purchase fish at least occasionally (with options ranging from “never” to “very regularly”). Participants were subsequently asked to select one of three possible interpretations of each label's meaning. Those who did not select the correct interpretation were excluded from the study.

Participants were then invited to imagine they were shopping for fish either in a physical store or on their usual online retailer's website and

randomly assigned to one of the three experimental conditions. To make sure of respondents' attention to the stimuli, we measured perceived conflict between the information provided by the labels using three items adapted from Chang (2015): “The information on this fish is conflicting/in opposition/consistent” ($\alpha = .88$). Respondents perceived the information provided as significantly more conflictual in the opposite-valence label condition than in the control condition ($M_{MSC + E} = 4.26$ vs. $M_{MSC} = 2.87$, $F_{(1,130)} = 27.71$, $p < .001$, $\eta^2 = .18$). However, no difference appeared between the similar-valence label condition and the control condition ($M_{MSC + A} = 2.57$ vs. $M_{MSC} = 2.87$, $F_{(1,130)} = 1.68$, ns). This suggests respondents' attention to the stimuli.

We measured moral satisfaction using three items from Bratanova et al. (2015): “By buying this fish, I feel I am doing something morally right/I feel like a better person/I feel like I am personally contributing to something better” ($\alpha = .85$). We then assessed consumer confusion, reflecting participants' overall difficulty with food choices, using three items adapted from Walsh et al. (2007): “It is more and more complicated to identify good food products,” “It's getting harder and harder to find your way around food products,” and “There is so much information on food products that one can feel more and more lost” ($\alpha = .88$). Participants also indicated their purchase intentions for the fish using a single item adapted from Hou and Sarigöllü (2022): “I could definitely buy this fish.”

We then controlled for environmental concern using three items from Iqbal et al. (2021): “It is very important to me that the food has been prepared in an environmentally friendly way/has been produced in a way that does not disturb the balance of nature/is packed in an eco-friendly way” ($\alpha = .91$), and participants' age, and gender. All questions used 7-point Likert scales to assess the key constructs. All scales demonstrated reliability (i.e., alphas above .7) and unidimensionality (i.e., the first component explains at least 60 % of the variance). Finally, to evaluate our assumption regarding Kahneman's dual-process theory in the context of multi-labelling, we measured the total time participants volitionally spent exposed to the experimental stimuli. We propose that longer exposure, indicative of greater cognitive effort (Cooper-Martin, 1994), suggests engagement with System 2.

Participants. Participants were recruited from the Belgian panel of a professional marketing research institute. To ensure data reliability, individuals who reported not consuming fish, failed the attention



Fig. 2. Stimuli used for Study 1.

checks, or completed the survey in an implausibly short or long time (i.e., less than 160 s or more than 1500 s) were excluded. To ensure that all participants understood each label clearly, we provided a brief explanation of what each label represented. Participants were subsequently asked to select one of three possible interpretations of each label's meaning. Those who did not select the correct interpretation were excluded from the study. The final sample comprised 202 participants, representative of the Belgian population in terms of socioeconomic status, and involved 60 % women ($M_{\text{age}} = 44$ years, $SD = 13.77$). Participants were distributed equally between the conditions ($N_{\text{MSC}} = 64$, $N_{\text{MSC} + \text{A}} = 69$, $N_{\text{MSC} + \text{E}} = 69$).

4.2. Results

To test our conceptual model, we used the recommended indirect bootstrapping procedure (SPSS Macro Process Model 4, 5,000 bootstrap samples; Hayes, 2012) and included respondents' age, gender, fish consumption frequency and environmental concern as covariates. We first compared the impact of the control condition versus the multi-labelling involving two positive others-oriented labels on purchase intentions through moral satisfaction and consumer confusion. Controlling for respondents' age, gender, fish consumption and environmental concern, we found no significant effect of the combination of a MSC label and an Eco-Score A (compared with a single MSC label) on moral satisfaction ($\beta = .30$, $SE = .23$, $t = 1.30$, $p = .19$), nor on consumer confusion ($\beta = .23$, $SE = .28$, $t = .82$, $p = .41$). As such, the combination of two positive others-oriented labels does not increase moral satisfaction, nor confusion. H1a and H3a are therefore corroborated. Interestingly, the display of a second positive others-oriented label tends to directly increase purchase intentions ($\beta = .40$, $SE = .21$, $t = 1.88$, $p = .06$, 90 % LLCI = .0477, 90 % ULCI = .7601), suggesting a heuristic influence.

Going further, we found a negative effect of the combination of a MSC label and an Eco-Score E (compared with a single MSC label) on moral satisfaction ($\beta = -.31$, $SE = .12$, $t = -2.53$, $p < .05$) and a positive effect on consumer confusion ($\beta = .40$, $SE = .13$, $t = 3.07$, $p < .01$), but no direct effect on purchase intentions ($\beta = .05$, $SE = .13$, $t = .36$, $p = .72$). We then found a significant positive effect of moral satisfaction on purchase intentions ($\beta = .60$, $SE = .09$, $t = 6.36$, $p < .01$) but no effect of consumer confusion on purchase intentions ($\beta = -.01$, $SE = .09$, $t = -.07$, $p = .94$). The analysis further shows a significant indirect negative effect through moral satisfaction ($ab = -.19$, $SE = .08$, 95 % LLCI = $-.3570$, 95 % ULCI = $-.0420$). H1b, H3b and H5a are therefore corroborated, but not H6a.

As ancillary analyses, we first explored the potential role of our covariates (i.e., respondents' age, gender, fish consumption and environmental concern) as potential moderators and found that none of them robustly moderate the influence of our manipulations on our model's variables (i.e., moral satisfaction, consumer confusion, purchase intentions). Second, we measured the time during which participants volitionally remained exposed to the stimuli, using the duration as a measure of their level of efforts, hence, the amount of cognitive elaboration required to process the information. After having excluded extreme values, we found that the total time spent processing the stimuli in seconds is marginally higher in the condition with conflicting labels than in the condition with only positive labels ($M_{\text{MSC} + \text{A}} = 162.21$ vs. $M_{\text{MSC} + \text{E}} = 177.50$, $F_{(1,126)} = 2.46$, $p = .06$, $\eta^2 = .02$). This suggests that conflicting labels demand greater cognitive efforts to process than similar-valence labels, supporting the idea that conflicting labels in the context of multi-labelling would require System 2 to be processed instead of System 1.

5. Study 2

The aim of Study 2 is to investigate consumers' psychological processes and behaviours when they face a combination of conflicting labels

from different orientations.

5.1. Method

Procedure. We conducted a single-factor randomized controlled online experiment with three conditions: (1) a control condition featuring only the Nutri-Score A, (2) a "both positive valence" condition featuring the Nutri-Score A and Eco-Score B, and (3) an "opposite valences" condition featuring the Nutri-Score A and Eco-Score E.

The Nutri-Score is a front-of-pack labelling system that summarizes the nutritional value of a product using a graded scale from A (healthiest) to E (least healthy) (Merz et al., 2024). Designed to promote healthier food choices, the Nutri-Score primarily addresses health at an individual level, making it a self-oriented label. Although its adoption remains voluntary, the Nutri-Score is gaining traction across Europe, with countries such as Belgium, Germany, and Switzerland integrating it into their food labelling practices (Merz et al., 2024).

As in Study 1, Study 2 participants were instructed to imagine themselves in a shopping situation and to consider purchasing fish. The use of fish as the target product in this second experiment served two key objectives. First, it ensured plausibility when presenting products with varying levels of Nutri-Score and Eco-Score, as fish can credibly align with these labels. Second, it helped maintain consistency with Study 1 by avoiding the introduction of a differentiating factor that could serve as an alternative explanation for the observed results. The experimental stimuli were carefully designed to replicate real-life shopping scenarios, enhancing ecological validity. Each stimulus featured the product's picture, price, name, weight, label(s), and a fictitious brand modeled after existing branding practices. This approach ensured that the presentation closely resembled what participants might encounter in an actual shopping context, facilitating more natural decision-making processes (see Fig. 3).

The experimental protocol was identical to Study 1. To ensure that all respondents were familiar with the product, we filtered out non-fish consumers. Participants answered a screening question to confirm that they purchase fish at least occasionally, with response options ranging from "never" to "very regularly." To make sure that most respondents correctly understood the meanings of the labels, we asked them to select the correct definition from five possible choices. We measured the perceived conflict between the provided information as in Study 1 ($\alpha = .90$) and found that respondents perceived the information provided as significantly more conflictual in the opposite-valence label condition than in the control condition ($M_{\text{A} + \text{E}} = 2.89$ vs. $M_{\text{A}} = 2.34$, $F_{(1,106)} = 3.67$, $p = .03$, $\eta^2 = .03$). However, no difference appeared between the similar-valence label condition and the control condition ($M_{\text{A} + \text{B}} = 2.62$ vs. $M_{\text{A}} = 2.34$, $F_{(1,108)} = 1.20$, ns), suggesting successful understanding of the stimuli.

We measured moral satisfaction ($\alpha = .83$), consumer confusion ($\alpha = .87$) and purchase intentions as in Study 1. We finally collected participants' age, gender and environmental concern using the same items as in Study 1 ($\alpha = .92$) as control variables. All questions used 7-point Likert scales. All scales demonstrated reliability (i.e., alphas above .7) and unidimensionality (i.e., the first component explains at least 60 % of the variance). Finally, as in Study 1, we collected the time participants spent exposed to the experimental stimuli.

Participants. Data collection involved 167 participants representative of the French population in terms of socioeconomic status ($N_{\text{A}} = 57$, $N_{\text{A} + \text{B}} = 59$, $N_{\text{A} + \text{E}} = 51$; 47 % women, $M_{\text{age}} = 46$ years, $SD = 14.03$), recruited from a French panel institute after the exclusion of those who failed the attention checks or answered in an extreme timeframe.

5.2. Results

Hypotheses were tested as in Study 1. We first compared the impact of the control condition versus the multi-labelling involving two positive labels on purchase intentions through moral satisfaction and consumer



Fig. 3. Stimuli used for Study 2.

confusion. Controlling for respondents' age, gender, fish consumption and environmental concern, a regression analysis showed no effect of the combination of a Nutri-Score A with an Eco-Score B on moral satisfaction compared with a single Nutri-Score A ($\beta = .17$, $SE = .11$, $t = 1.53$, $p = .13$), nor on consumer confusion ($\beta = .13$, $SE = .14$, $t = .90$, $p = .37$). As such, the combination of a positive others-oriented label and a positive self-oriented label does not increase moral satisfaction, nor confusion, which therefore cannot transfer to purchase intentions. H4a is therefore corroborated, but not H2a nor H5b. However, the addition of an Eco-Score B to a Nutri-Score A tend to directly decrease purchase intentions ($\beta = -.20$, $SE = .11$, $t = -1.90$, $p = .06$, 90 % LLCI = $-.3837$, 90 % ULCI = $-.0262$), suggesting an interesting heuristic influence.

To test H2b, H4b and H6b, we replicated the mediation analysis but considered the combination of a Nutri-Score A with an Eco-Score E compared with a single Nutri-Score A as the independent variable. We found a positive effect on consumer confusion ($\beta = .61$, $SE = .29$, $t = 2.08$, $p = .04$), but no effect on moral satisfaction ($\beta = -.01$, $SE = .25$, $t = -.07$, $p = .94$), nor on purchase intentions ($\beta = .05$, $SE = .18$, $t = .27$, $p = .79$). The analysis did not indicate a significant indirect mediation effect through moral satisfaction ($ab = -.00$, $SE = .07$, 95 % LLCI = $-.1386$, 95 % ULCI = $.1314$), nor through consumer confusion ($ab = .03$, $SE = .03$, 95 % LLCI = $-.0076$, 95 % ULCI = $.1106$). H2b and H4b are therefore corroborated, but not H6b.

As in Study 1, we explored the potential moderating effect of our covariates (i.e., respondents' age, gender, fish consumption and environmental concern) in the influence of our manipulations on our model's variables (i.e., moral satisfaction, consumer confusion, purchase intentions) and found no robust moderating effect. We also considered the time participants were exposed to stimuli as a proxy to their level of efforts, hence, cognitive elaboration. After having excluded extreme values, we found that the total time spent processing the stimuli in seconds is higher in the condition with conflicting labels than in the condition with only positive labels ($M_{A+E} = 36.5$ vs. $M_{A+B} = 31.53$, $F_{(1,96)} = 2.97$, $p = .04$, $\eta^2 = .03$). This corroborates that conflicting labels demand greater cognitive efforts to be processed, replicating Study 1's finding that multi-labelling would require System 2 to be processed when labels are conflicting.

6. Discussion

This research examines consumers' psychological processes and responses to multi-labelling, focusing on labels with varying valences

(positive vs. negative) and orientations (self-vs. others-oriented). The findings are derived from two studies that explore these dynamics.

Study 1 investigates the effects of combining positive others-oriented labels. The results indicate that a second positive others-oriented label does not significantly influence moral satisfaction or consumer confusion but tends to increase purchase intentions compared to a single positive others-oriented label. Conversely, combining others-oriented conflicting labels (i.e., a positive and a negative label) reduces moral satisfaction compared to a single positive others-oriented label, which in turn indirectly decreases purchase intentions. Additionally, such combination increases consumer confusion, although this confusion does not directly affect purchase intentions. Study 2 shifts the focus to labels with different orientations (self- and others-oriented). The findings reveal that adding a positive others-oriented label to a positive self-oriented one does not significantly influence moral satisfaction or consumer confusion but tends to decrease purchase intentions compared to a single positive self-oriented label. Furthermore, combining a negative others-oriented label with a positive self-oriented one does not reduce moral satisfaction compared to a single positive self-oriented label but does trigger consumer confusion. This combination does not affect purchase intentions, either directly or through confusion.

In summary, our research demonstrates that conflicting labels, regardless of their orientation, generate consumer confusion. When the labels are others-oriented, they also reduce moral satisfaction, which negatively impacts purchase intentions. In other cases, conflicting labels do not appear to influence purchase intentions directly or indirectly. By contrast, same-valence labels, regardless of their orientation, do not affect the mediating psychological mechanisms (moral satisfaction and consumer confusion) but tend to directly influence purchase intentions: positively when labels are both others-oriented and negatively when they differ in their orientation. Finally, the findings show that consumers voluntarily spend more time engaging with conflicting labels compared to those with similar valences. We interpret this increased exposure time as evidence of deeper cognitive processing, as consumers attempt to reconcile conflicting information. Table 1 and Fig. 4 summarize all our results, which offer insightful theoretical contributions and recommendations for public policymakers, manufacturers and retailers.

6.1. Theoretical contributions

Labels are widely recognized as valuable tools for consumers, providing benefits such as streamlining purchasing decisions, reducing

Table 1
Summary of our experimental results.

Labels	Impact compared with the control condition on ...		
	... consumer confusion	... moral satisfaction	... purchase intentions
Study 1 (positive others-oriented label as the control condition)			
Positive others-oriented label	n.s.	n.s.	Positive impact
+ Positive others-oriented label			
Positive others-oriented label	Positive impact	Negative impact	Negative impact through decreased moral satisfaction
+ Negative others-oriented label			
Study 2 (positive self-oriented label as the control condition)			
Positive self-oriented label	n.s.	n.s.	Negative impact
+ Positive others-oriented label			
Positive self-oriented label	Positive impact	n.s.	n.s.
+ Negative others-oriented label			

perceived risks, and alleviating choice overload (Thøgersen et al., 2010; Thøgersen & Nielsen, 2016). However, our research on multi-labelling challenges this perspective by deepening our understanding of the conditions under which these benefits may not hold true and the underlying reasons for such limitations. Specifically, our study advances the labelling literature in four key ways.

First, we show that conflicting labels activate two distinct mechanisms: moral satisfaction and consumer confusion. Here, we corroborate Bratanova et al.'s (2015) findings on the influence of moral satisfaction on purchase decisions but do not observe the anticipated impact of consumer confusion on choices (Torma & Thøgersen, 2024). This suggests that confusion may hinder the formation of a coherent decision framework, reinforcing the idea that multi-labelling is not merely additive but interacts dynamically to shape decision-making (contrary to Sonntag et al., 2023). Our results align with De Bauw et al. (2021), who demonstrated that purchase intentions remain unaffected when label orientations differ (self-vs. others-oriented).

Second, we directly address Branković et al., 2025 recent call by demonstrating how multiple labels influence product preferences and purchase intentions differently from single labels. Crucially, by examining the interplay of label valence (positive vs. negative) and orientation (self-vs. others-oriented), we identify the conditions under which multi-labelling is either effective or counterproductive (see Table 1) and reconcile conflicting findings in prior multi-labelling research (e.g., Berden and Hung, 2025; D'Angelo Campos et al., 2024; De Bauw et al., 2021; Jürkenbeck et al., 2024). Incorporating label valence, we refine insights into the synergy of others-oriented labels (e.g., Steenis et al., 2023) and interactions between self- and others-oriented labels (e.g., Jürkenbeck, 2023). Precisely, pairing a positive others-oriented label with a second positive others-oriented label increases purchase intentions, but pairing it with a second negative others-oriented label decreases them. Interestingly, we show that even combinations of exclusively positive labels can yield unintended negative effects. While pairing a Score A with an MSC label tends to increase purchase intentions, adding a Score B to a Score A tends to have the opposite effect. Since Score B ranks lower, it may heuristically lower the product's overall perceived value. To our knowledge, this is the first study to demonstrate that multi-labelling, despite its potential benefits (Thøgersen et al., 2010; Thøgersen & Nielsen, 2016), can also be counterproductive.

Third, we contribute to information processing theory by advancing understanding of how consumers navigate complex and conflicting information in multi-labelling contexts. Building on models such as the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and the Heuristic-Systematic Model (Chaiken, 1980), which posit that individuals process information either heuristically (low effort) or systematically (high effort) depending, notably, on factors such as information complexity, Kahneman's dual-processing theory (2011) similarly proposed that intuitive, fast System 1 processing gives way to deliberate, effortful System 2 processing when information complexity demands. While labels are typically associated with heuristic, automatic decision-making (System 1), our findings show that multi-labelling, especially when involving conflicting labels, can prompt a shift toward more systematic, System 2 processing, as indicated by increased decision-making times. This aligns with Kahneman's (2011) dual-process framework, wherein congruent information facilitates fast, intuitive processing, while conflicting information triggers deeper cognitive engagement. Our results also suggest a boundary condition: when the level of conflict or confusion becomes too high, consumers

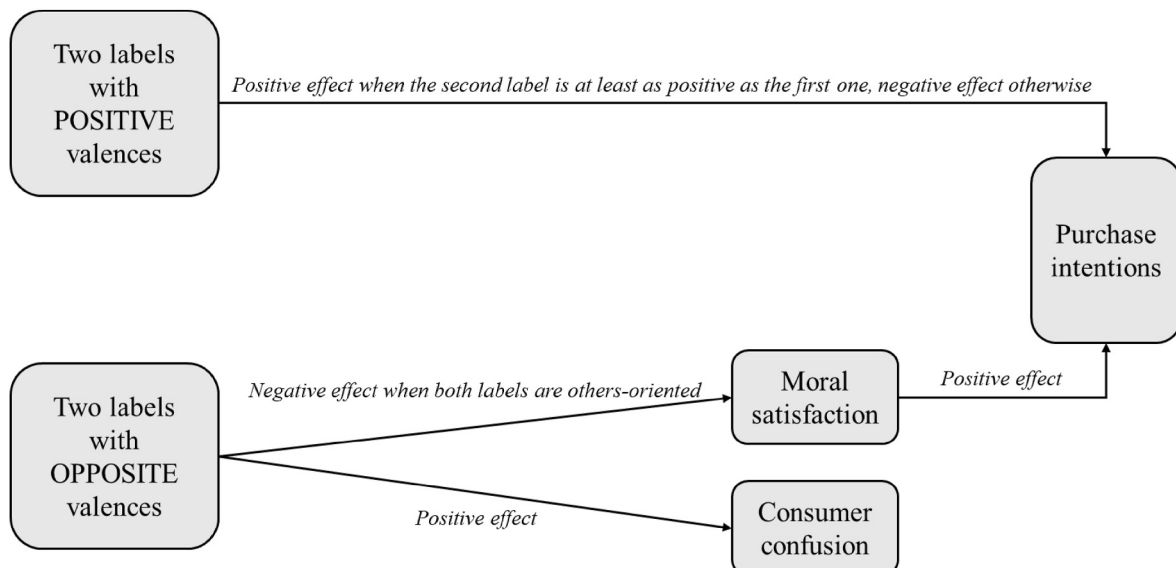


Fig. 4. Visual summary of our experimental results.

may manage cognitive overload by reverting to heuristic strategies, selectively focusing on labels that are more familiar or self-relevant (e. g., the Nutri-Score in our study). Thus, our study extends information processing theory by demonstrating that while conflict initially promotes System 2 processing, excessive confusion can inhibit it, leading to a reactivation of System 1. This insight challenges the assumption that providing more information necessarily leads to better-informed, sustainable choices and highlights the unintended counterproductive effects of multi-labelling.

Finally, by emphasizing the role of label valence in multi-labelling, our study extends [Sirieix et al.'s \(2013\)](#) classification of contradictions in label combinations. We integrate the challenges posed by labels with opposing valences into the broader discourse on the unintended consequences of multi-labelling.

6.2. Practical implications

Our research demonstrates that consumers exposed to conflicting labels experience confusion, which could undermine the effectiveness of product claims, diminishes perceived quality, and damages brand credibility ([Fitzgerald et al., 2019](#)), ultimately eroding business performance. When confronted with confusion, consumers often adopt coping strategies such as abandoning purchases ([Lu & Gursoy, 2015](#); [Mitchell et al., 2005](#); [Mitchell & Papavassiliou, 1997](#); [Stanton & Paolo, 2012](#)). In our studies, participants responded non-rationally by disregarding the negative environmental label in their decision-making. This shift towards simplified decision-making is particularly problematic in an era that necessitates greater reflexivity and thoughtful consideration to facilitate the transition toward more sustainable consumption patterns. Consumer confusion also presents a significant challenge for public policymakers striving to enhance transparency through labelling initiatives (e.g., Nutri-Score, Eco-Score) as it risks eroding trust in labels altogether, potentially undermining efforts to promote sustainable consumer behaviors. The potential counterproductive effects of multi-labelling on consumer decision-making highlight the necessity of clear recommendations for public policymakers, product managers, and retailers.

To public policymakers, we first recommend mandating sustainability labels for manufacturers, as labels remain an effective tool for empowering consumers by reducing information asymmetry. As such, we support the project of a mandatory and harmonized system of sustainability labelling throughout the European Union as it is called for by official instances such as the [The Economic, Social and Environmental Council, 2025](#). However, this mandate should be implemented within a timeline that allows manufacturers sufficient time to improve their products in terms of nutritional and environmental impact, thereby minimizing the risk of conflicting labels and reducing consumer confusion. In the long term, this approach will cultivate a market in which most labels are positive, thereby reducing confusion and enabling consumers to make more informed choices that benefit both their health and the environment.

In the meantime, predominantly positive labels can prompt consumers to average their evaluations across similar scales. As suggested by our findings, displaying both an A and a B score tends to lower sales compared to presenting only an A score. This effect is problematic, as a B grade remains objectively favorable, yet its presence diminishes perceived value and unfairly disadvantages products that are otherwise strong contenders in terms of sustainability. To address this issue, labelling systems should avoid employing identical grading scales for different attributes or should integrate multiple dimensions into a single, comprehensive certified assessment to streamline consumer decision-making. Public policymakers should lead the development and implementation of such meta-labels, ensuring that they incorporate key sustainability criteria while maintaining clarity and trustworthiness. From this perspective, managers should consider adopting the promising Planet-Score meta-label, a color-coded grading system ranging from A to

E, incorporating three sub-dimensions (i.e., pesticides, biodiversity, climate) along with a pictogram indicating the level of animal welfare. Designed to help consumers make more sustainable choices, it enables companies to credibly communicate their broader commitment to the United Nations' Sustainable Development Goals ([Torma & Thøgersen, 2024](#)), as illustrated by the example of the brand Bjorg, which actively promotes its use as part of its sustainability strategy.

Establishing clear guidelines for the presentation of multiple labels could further mitigate consumer confusion, particularly in cases of conflicting labels. This could be achieved by mandating contextual explanations on packaging to clarify why labels with the same orientation may sometimes present conflicting information, as consumers typically expect such labels to align. Concurrently, increasing consumer literacy and fostering critical label-reading skills through public awareness campaigns could empower individuals to interpret labels more effectively and make informed purchasing decisions. These initiatives would be particularly valuable for budget-conscious consumers, who may be less inclined to seek additional information when confronted with conflicting labels due to financial constraints or limited food literacy. Educational programs could include accessible resources such as guides, FAQs, and interactive digital tools designed to elucidate the meaning of various labels and their intended influence on purchasing behavior. These resources should aim to demystify labelling systems and provide practical advice on how consumers can use them effectively in their decision-making process. Some companies have started taking steps to enhance consumer understanding of labelling. As an example, the Belgian retailer Colruyt dedicates an entire page of its website to explain the Nutri-Score and Eco-Score to contribute to consumer literacy in a practical and effective manner.

To manufacturers and retailers, we recommend displaying official scoring systems, such as Nutri-Score and Eco-Score, on all products both in-store and online. Positive scores could attract consumers, as there is growing demand for healthier and more sustainable products, thereby offering a competitive advantage to responsible companies. Negative scores, despite their potential drawbacks, also contribute to transparency and trust-building. The food manufacturer Gerblé pioneeredly understood this and decided to implement the Nutri-Score on all its products, regardless of the score. In cases of conflicting labels, manufacturers and retailers should conduct consumer research before implementing multi-label strategies to assess how consumers respond to different label combinations, ensuring that these do not inadvertently reduce purchase intentions. Additionally, QR codes or digital tools could be employed to provide clear explanations when labels conflict, enabling consumers to process the information more effectively. Manufacturers and retailers should also strategically position labels on packaging to align with the personal values of their target audiences, placing positive environmental labels prominently for ethically conscious consumers and positive health labels prominently for health-conscious consumers, thereby mitigating consumer confusion.

A food labelling strategy must account for the specificities of different market contexts, particularly variations in regulatory frameworks, food industry practices, consumer demand for information, and potential barriers such as low consumer literacy, label legibility, and socio-economic constraints that limit purchasing options ([Southey, 2021](#)). In some developing countries, certain health claims are not legally permitted, reducing the likelihood of conflicting labels. Conversely, countries such as some in Latin America employ strict warning labelling systems ([Rigby, 2024](#)), which increase the prevalence of negative valence labels and, consequently, the probability of conflicting information. Our recommendations must therefore be adapted to the specific market context.

By implementing these recommendations, both public policymakers and industry stakeholders can ensure that consumers receive relevant and comprehensible information without feeling overwhelmed. This approach minimizes confusion, strengthens trust in labelling systems, and supports consumers in making informed, sustainable purchasing

decisions.

6.3. Limitations and further research

Several avenues for future research could be pursued. First, the effects of multi-labelling involving a negative self-oriented label remain unexplored. We hypothesize that conflicting self-oriented labels would not influence moral satisfaction, as these labels do not address others-oriented concerns. However, such labels are likely to increase consumer confusion, especially when they share the same orientation. Similarly, investigating the combination of a negative self-oriented label with a positive others-oriented label would provide valuable insights. Future studies could address these questions to expand our understanding of multi-labelling dynamics.

Second, conducting experiments in real-world shopping environments or online marketplaces would be particularly valuable. These settings could better capture authentic consumer behavior, addressing concerns about ecological validity that arise in controlled online experiments. Replicating and validating findings in such environments would strengthen the robustness of the conclusions drawn.

Third, future studies could also address possible cognitive processes at work in the influence of multi-labelling on consumer confusion, such as cognitive load or skepticism, to expand our understanding of multi-labelling dynamics. To go deeper, future research could collect consumers' cognitive responses (i.e., thoughts, perceptions, and justifications) to identify the loci of causality to which consumers attribute the conflict at stake in conflictual labels. For example, do consumers attribute the conflict to one label or the other, the product or the brand, the broader industry, or even societal factors? Understanding these attributions could reinforce the argument that conflictual labels can lead to adverse consumer reactions by clarifying the psychological mechanisms driving those responses.

Fourth, as "a critical contributor to physical well-being, a major source of pleasure, worry and stress, a major occupant of waking time, and, across the world, the single greatest category of expenditure" (Rozin et al., 1999, p. 163), food products are generally high-involvement products. We have therefore no reason to believe that the findings of our research could not be generalized to other food categories. However, while our research focused on a single product category, fish, to ensure a strict comparison of results across our two studies, future research could explore other food categories that are both potentially beneficial to health and have varying environmental impacts. Examples include fruits and vegetables, which may or may not be imported; cereals, which can be overpackaged and vary in their level of processing; eggs, whose production methods differ significantly in terms of environmental impact and animal welfare; and water, depending on whether it is packaged in plastic bottles or in reusable containers.

Fifth, we expect our results to generalize across different cultural contexts. Labels can indeed be considered as nudges because they steer consumer behavior by altering the presentation of information without restricting choice or significantly changing economic incentives (Thaler & Sunstein, 2009; Sunstein, 2014; van Kleef et al., 2005) and existing research suggests that the underlying behavioral responses to nudges remain robust across cultures (Hagman et al., 2015; Sunstein, 2019) as nudges are primarily grounded in universal psychological mechanisms, such as cognitive biases and heuristics, that are considered intrinsic to human cognition (Kahneman & Tversky, 1979; Thaler & Sunstein, 2009). Nevertheless, food purchasing behaviors are strongly influenced by cultural factors (Djekic et al., 2021), it would therefore be valuable to examine whether dimensions such as individualism versus collectivism affect purchasing decisions in the presence of conflicting labels. For instance, individualistic consumers may be less inclined to avoid products with questionable, other-oriented labels, than collectivist consumers, who might be more likely to align with ethical considerations. To further enhance the consideration of individual differences in the impact of multi-labelling, future research could also control consumers'

expertise and level of involvement across product categories and investigate its potential moderating effect.

Finally, exploring the impact of meta-labels on consumers' psychological processes and behaviors would be highly relevant, especially given the growing prevalence of meta-labels in supermarkets. Understanding how meta-labels influence decision-making could offer innovative solutions to the challenges posed by traditional multi-labelling systems. By addressing these research directions, scholars can further elucidate how multi-labelling affects consumer behavior and decision-making. This would enable the development of more precise and actionable recommendations for managers and policymakers, ultimately enhancing the effectiveness of labelling strategies.

7. Conclusion

While it might be assumed that providing more information always facilitates informed decisions and promotes more sustainable behaviors, multi-labelling introduces significant challenges in guiding consumer choices. First, combining positive labels does not consistently lead to more sustainable food choices; for instance, pairing a B score with an A score can reduce purchase intentions. Second, conflicting labels consistently generate consumer confusion, which undermines the goal of empowering consumers to make informed decisions about their food purchases. This study provides a nuanced understanding of how multi-labelling, along with label valence and orientation, affects consumers' psychological processes and behaviors. It advances theoretical understanding of these dynamics while offering actionable insights for the strategic use of labels in marketing, ensuring they effectively shape consumer decision-making.

CRediT authorship contribution statement

Axelle Dorisse: Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Karine Charry:** Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Béatrice Parguel:** Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Statement

During the preparation of this work, the authors used ChatGPT to improve the readability and language of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Ethical statement

This research obtained ethics approval from the Ethics Committee of the Catholic University of Louvain (number 2023/02).

Declaration of competing interest

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Data availability

Data will be made available on request.

References

- Allen, S. W., & Brooks, L. R. (1991). Specializing the operation of an explicit rule. *Journal of Experimental Psychology*, 120(1), 3. <https://doi.org/10.1037/0096-3445.120.1.3>
- Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. *The Economic Journal*, 100(401), 464–477. <https://doi.org/10.2307/2234133>
- Andreoni, J. (1993). An experimental test of the public-goods crowding-out hypothesis. *The American Economic Review*, 83(5), 1317–1327. <https://www.jstor.org/stable/2117563>
- Annunziata, A., Mariani, A., & Vecchio, R. (2019). Effectiveness of sustainability labels in guiding food choices: Analysis of visibility and understanding among young adults. *Sustainable Production and Consumption*, 17, 108–115. <https://doi.org/10.1016/j.spc.2018.09.005>
- Aschemann-Witzel, J. (2015). Consumer perception and trends about health and sustainability: Trade-offs and synergies of two pivotal issues. *Current Opinion in Food Science*, 3, 6–10. <https://doi.org/10.1016/j.cofs.2014.08.002>
- Bauer, H. H., Heinrich, D., & Schäfer, D. B. (2013). The effects of organic labels on global, local, and private brands: More hype than substance? *Journal of Business Research*, 66(8), 1035–1043. <https://doi.org/10.1016/j.jbusres.2011.12.028>
- Bem, D. J. (1972). Self-perception theory. In Vol. 6. *Advances in experimental social psychology* (pp. 1–62). Academic Press.
- Benz, S. (2024). Danone controversy: Why it's urgent to make the nutri-score compulsory. *L'Express*.
- Berden, J., & Hung, Y. (2025). Effectiveness of the Eco-score food label: An information experiment combined with Nutri-score label in Belgium. *Appetite*, 204, Article 107759. <https://doi.org/10.1016/j.appet.2024.107759>
- Bernard, J. C., Duke, J. M., & Albrecht, S. E. (2019). Do labels that convey minimal, redundant, or no information affect consumer perceptions and willingness to pay? *Food Quality and Preference*, 71, 149–157. <https://doi.org/10.1016/j.foodqual.2018.06.012>
- Brach, S., Walsh, G., & Shaw, D. (2018). Sustainable consumption and third-party certification labels: Consumers' perceptions and reactions. *European Management Journal*, 36(2), 254–265. <https://doi.org/10.1016/j.emj.2017.03.005>
- Bradru, C., Orquin, J. L., & Thøgersen, J. (2014). The mediated influence of a traceability label on consumer's willingness to buy the labelled product. *Journal of Business Ethics*, 124, 283–295. <https://doi.org/10.1007/s10551-013-1872-2>
- Branković, M., Budžak, A., Đurašković, I., & Vlajin, B. (2025). What is in a label: Effects of labeling on the preference for plant-based products. *Appetite*, 206, Article 107837. <https://doi.org/10.1016/j.appet.2024.107837>
- Bratanova, B., Vauclair, C. M., Kervyn, N., Schumann, S., Wood, R., & Klein, O. (2015). Savouring morality. Moral satisfaction renders food of ethical origin subjectively tastier. *Appetite*, 91, 137–149. <https://doi.org/10.1016/j.appet.2015.04.006>
- Bronnmann, J., Asche, F., Pettersen, I. K., & Sogn-Grundvåg, G. (2023). Certify or not? The effect of the MSC certification on the ex-vessel prices for atlantic cod in Norway. *Ecological Economics*, 212, Article 107940. <https://doi.org/10.1016/j.ecolecon.2023.107940>
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39(5), 752.
- Chang, C. (2015). Motivated processing: How people perceive news covering novel or contradictory health research findings. *Science Communication*, 37(5), 602–634. <https://doi.org/10.1177/1075547015597914>
- Chernev, A., Böckenholt, U., & Goodman, J. (2015). Choice overload: A conceptual review and meta-analysis. *Journal of Consumer Psychology*, 25(2), 333–358. <https://doi.org/10.1016/j.jcps.2014.08.002>
- Cialdini, R. B. (1984). *Influence. The psychology of persuasion*. New York: Quill William Morrow and Company.
- Cialdini, R. B. (2007). Descriptive social norms as underappreciated sources of social control. *Psychometrika*, 72(2), 263–268. <https://doi.org/10.1007/s11336-006-1560-6>
- Cialdini, R. B. (2009). *Influence: Science and practice* (Vol. 4, pp. 51–96). Boston: Pearson education.
- Colruyt Group official website. (2024). What is the Eco-Score?. In Retrieved from *L'écocore, c'est quoi ? | Colruyt. December 24th, 2024*.
- Cooper-Martin, E. (1994). Measures of cognitive effort. *Marketing Letters*, 5, 43–56. <https://doi.org/10.1007/bf00993957>
- D'Angelo Campos, A., Ng, S. W., McNeel, K., & Hall, M. G. (2024). How promising are “ultraprocessed” front-of-package labels? A formative study with us adults. *Nutrients*, 16(7), 1072. <https://doi.org/10.3390/nu16071072>
- De Bauw, M., De La Revilla, L. S., Poppe, V., Matthys, C., & Vranken, L. (2022). Digital nudges to stimulate healthy and pro-environmental food choices in E-groceries. *Appetite*, 172, Article 105971. <https://doi.org/10.1016/j.appet.2022.105971>
- De Bauw, M., Matthys, C., Poppe, V., Franssens, S., & Vranken, L. (2021). A combined nutri-score and 'eco-score' approach for more nutritious and more environmentally friendly food choices? Evidence from a consumer experiment in Belgium. *Food Quality and Preference*, 93, Article 104276. <https://doi.org/10.1016/j.foodqual.2021.104276>
- De Bauw, M., Moner, A. P., Santa Cruz, E., & Vranken, L. (2024). Please don't throw me in the briar patch! Empirical evidence on the role of instructional cues on eco-label usage in fish consumption decisions. *Appetite*, Article 107291. <https://doi.org/10.1016/j.appet.2024.107291>
- de Lima, E. B., Costa, C. S. R., & Félix, G. R. (2019). Guilt and pride emotions and their influence on the intention of purchasing green products. *Consumer Behavior Review*, 3, 70–84. <https://doi.org/10.51359/2526-7884.2019.240028>
- De Temmerman, J., Heeremans, E., Slabbinck, H., & Vermeir, I. (2021). The impact of the Nutri-Score nutrition label on perceived healthiness and purchase intentions. *Appetite*, 157, Article 104995. <https://doi.org/10.1016/j.appet.2020.104995>
- Delmas, M. A., & Lessem, N. (2017). Eco-premium or eco-penalty? Eco-Labels and quality in the organic wine market. *Business & Society*, 56, 318–356. <https://doi.org/10.1177/0007650315576119>
- Djekic, I., Bartkne, E., Szűcs, V., Tarcea, M., Klarin, I., Černelić-Bizjak, M., ... Guiné, R. P. (2021). Cultural dimensions associated with food choice: A survey based multi-country study. *International Journal of Gastronomy and Food Science*, 26, Article 100414. <https://doi.org/10.1016/j.ijgfs.2021.100414>
- Dufeu, I., Ferrandi, J.-M., Gabriel, P., & Le Gall-Ely, M. (2014). Socio-environmental multi-labelling and consumer willingness to pay. *Recherche et Applications en Marketing*, 29(3), 35–56. <https://doi.org/10.1177/2051570714542063>
- European Market Observatory for Fisheries and Aquaculture Products. (2020). *The European fish market*.
- Fenko, A., Nicolaas, I., & Galetzka, M. (2018). Does attention to health labels predict a healthy food choice? An eye-tracking study. *Food Quality and Preference*, 69, 57–65. <https://doi.org/10.1016/j.foodqual.2018.05.012>
- Fitzgerald, M. P., Donovan, K. R., Kees, J., & Kozup, J. (2019). How confusion impacts product labeling perceptions. *Journal of Consumer Marketing*, 36(2), 306–316. <https://doi.org/10.1108/JCM-08-2017-2307>
- Food and Agriculture Organization of the United Nations. (2007). *Food labelling*. Food and Agriculture Organization of the United Nations. <https://www.fao.org/food-labelling/en/>
- Gawronski, B., & Strack, F. (Eds.). (2012). *Cognitive consistency: A fundamental principle in social cognition*. Guilford Press.
- Golan, E., Kuchler, F., Mitchell, L., Greene, C., & Jessup, A. (2001). Economics of food labeling. *Journal of Consumer Policy*, 24(2), 117–184. <https://doi.org/10.1023/A:1012272504846>
- Gorissen, K., & Weijters, B. (2016). The negative footprint illusion: Perceptual bias in sustainable food consumption. *Journal of Environmental Psychology*, 45, 50–65. <https://doi.org/10.1016/j.jenvp.2015.11.009>
- Grunert, K. G. (2011). Sustainability in the food sector: A consumer behaviour perspective. *International Journal of Food System Dynamics*, 2(3), 207–218. <https://doi.org/10.22004/ag.econ.121943>
- Grunert, K. G., & Wills, J. M. (2007). A review of European research on consumer response to nutrition information on food labels. *Journal of Public Health*, 15, 385–399. <https://doi.org/10.1007/s10389-007-0101-9>
- Hagman, W., Andersson, D., Västfjäll, D., & Tinghög, G. (2015). Public views on policies involving nudges. *Review of Philosophy and Psychology*, 6, 439–453. <https://doi.org/10.1007/s13164-015-0263-2>
- Harbaugh, R., Maxwell, J. W., & Roussillon, B. (2011). Label confusion: The Groucho effect of uncertain standards. *Management Science*, 57(9), 1512–1527. <https://doi.org/10.1287/mnsc.1110.1412>
- Hastak, M., & Mazis, M. B. (2011). Deception by implication: A typology of truthful but misleading advertising and labeling claims. *Journal of Public Policy and Marketing*, 30(2), 157–167. <https://doi.org/10.1509/jppm.30.2.157>
- Hawley, K. L., Roberto, C. A., Bragg, M. A., Liu, P. J., Schwartz, M. B., & Brownell, K. D. (2013). The science on front-of-package food labels. *Public Health Nutrition*, 16(3), 430–439. <https://doi.org/10.1017/S1368980012000754>
- Hayes, A. F. (2012). *Process: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling*. Retrieved from Andrew F. Hayes, Ph.D. - Home.
- Heider, F. (1944). Social perception and phenomenal causality. *Psychological Review*, 51(6), 358–374. <https://doi.org/10.1037/h0055425>
- Heider, F. (1958). *The psychology of interpersonal relations*. New York: Wiley.
- Hou, C., & Sarigöllü, E. (2022). Is bigger better? How the scale effect influences green purchase intention: The case of washing machine. *Journal of Retailing and Consumer Services*, 65, Article 102894. <https://doi.org/10.1016/j.jretconser.2021.102894>
- Iqbal, J., Yu, D., Zubair, M., Rasheed, M. I., Khizar, H. M. U., & Imran, M. (2021). Health consciousness, food safety concern, and consumer purchase intentions toward organic food: The role of consumer involvement and ecological motives. *Sage Open*, 11(2). <https://doi.org/10.1177/21582440211015727>
- Janßen, D., & Langen, N. (2017). The bunch of sustainability labels—Do consumers differentiate? *Journal of Cleaner Production*, 143, 1233–1245. <https://doi.org/10.1016/j.jclepro.2016.11.171>
- Jürkenbeck, K. (2023). The effect of information among established and new sustainability labelling on consumers' preference and willingness to pay. *Cleaner and Responsible Consumption*, 10, Article 100131. <https://doi.org/10.1016/j.clrc.2023.100131>
- Jürkenbeck, K., Sanchez-Siles, L., & Siegrist, M. (2024). Nutri-Score and Eco-Score: Consumers' trade-offs when facing two sustainability labels. *Food Quality and Preference*, 118, 105200.
- Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan. Thinking, Fast and Slow.
- Kahneman, D., & Knetsch, J. L. (1992). Valuing public goods: The purchase of moral satisfaction. *Journal of Environmental Economics and Management*, 22(1), 57–70. [https://doi.org/10.1016/0095-0696\(92\)90019-S](https://doi.org/10.1016/0095-0696(92)90019-S)
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 363–391.
- Le Figaro. (2023). The Nutri-Score encourages manufacturers to improve their industrial products, according to UFC-Que Choisir. *Le Figaro*.
- Lemken, D., Zühlsdorf, A., & Spiller, A. (2021). Improving consumers' understanding and use of carbon footprint labels on food: Proposal for a climate score label. *EuroChoices*, 20(2), 23–29. <https://doi.org/10.1111/1746-692X.12321>

- Lichtenstein, D. R., & Bearden, W. O. (1986). Measurement and structure of Kelley's covariance theory. *Journal of Consumer Research*, 13(2), 290–296. <https://doi.org/10.1086/209069>
- Little, D. R., Eidels, A., Fifić, M., & Wang, T. S. (2018). How do information processing systems deal with conflicting information? Differential predictions for serial, parallel, and coactive models. *Computational Brain & Behavior*, 1, 1–21. <https://doi.org/10.1007/s42113-018-0001-9>
- Lu, A. C. C., & Gursoy, D. (2015). A conceptual model of consumers' online tourism confusion. *International Journal of Contemporary Hospitality Management*, 27(6), 1320–1342. <https://doi.org/10.1108/IJCHM-04-2014-0171>
- Luchs, M. G., & Kumar, M. (2017). "Yes, but this other one looks better/works better": How do consumers respond to trade-offs between sustainability and other valued attributes? *Journal of Business Ethics*, 140, 567–584. <https://doi.org/10.1007/s10551-015-2695-0>
- Majer, J. M., Henschler, H. A., Reuber, P., Fischer-Kreier, D., & Fischer, D. (2022). The effects of visual sustainability labels on consumer perception and behavior: A systematic review of the empirical literature. *Sustainable Production and Consumption*, 33, 1–14. <https://doi.org/10.1016/j.spc.2022.06.012>
- Mazzù, M. F., Marozzo, V., Baccelloni, A., & Giambaresi, A. (2023). The effects of combining front-of-pack nutritional labels on consumers' subjective understanding, trust, and preferences. *Psychology and Marketing*, 40(8), 1484–1500. <https://doi.org/10.1002/mar.21838>
- Merz, B., Temme, E., Alexiou, H., Beulens, J. W. J., Buyken, A. E., Bohn, T., ... Julia, C. (2024). Nutri-Score 2023 update. *Nature Food*, 5(2), 102–110. <https://doi.org/10.1038/s43016-024-00920-3>
- Mick, D. G., Broniarczyk, S. M., & Haidt, J. (2004). Choose, choose, choose, choose, choose, choose, choose: Emerging and prospective research on the deleterious effects of living in consumer hyperchoice. *Journal of Business Ethics*, 52, 207–211. <https://doi.org/10.1023/B:BUSI.0000035906.74034.d4>
- Mitchell, V. W., & Papavassiliou, V. (1997). Exploring consumer confusion in the watch market. *Marketing Intelligence & Planning*, 15(4), 164–172. <https://doi.org/10.1108/02634509710185270>
- Mitchell, V. W., & Papavassiliou, V. (1999). Marketing causes and implications of consumer confusion. *The Journal of Product and Brand Management*, 8(4), 319–342. <https://doi.org/10.1108/10610429910284300>
- Mitchell, V.-W., Walsh, G., & Yamin, M. (2005). Towards a conceptual model of consumer confusion. *Advances in Consumer Research*, 32(1), 143–150.
- Mizerski, R. W., Golden, L. L., & Kernan, J. B. (1979). The attribution process in consumer decision making. *Journal of Consumer Research*, 6(2), 123–140. <https://doi.org/10.1086/208756>
- Monnot, E., Reniou, F., Parguel, B., & Elgaied-Gambier, L. (2019). Thinking outside the packaging box": Should brands consider store shelf context when eliminating overpackaging? *Journal of Business Ethics*, 154, 355–370. <https://doi.org/10.1007/s10551-017-3439-0>
- MSC official website. (2024). What does the MSC label mean?. <https://www.msc.org/en-us/what-we-are-doing/our-approach/the-blue-fish-label>
- Naderi, I., & Van Steenburg, E. (2018). Me first, then the environment: Young Millennials as green consumers. *Young Consumers*, 19(3), 280–295. <https://doi.org/10.1108/yc-08-2017-00722>
- Pérez y Pérez, L., Gracia, A., & Barreiro-Hurlé, J. (2020). Not seeing the forest for the trees: The impact of multiple labelling on consumer choices for olive oil. *Foods*, 9(2), 186. <https://doi.org/10.3390/foods9020186>
- Petty, R. E., & Cacioppo, J. T. (1986). *The elaboration likelihood model of persuasion* (pp. 1–24). New York: Springer.
- Reyes, M., Garmendia, M. L., Olivares, S., Aqueveque, C., Zacarías, I., & Corvalán, C. (2019). Development of the Chilean front-of-package food warning label. *BMC Public Health*, 19, 1–11. <https://doi.org/10.1186/s12889-019-7118-1>
- Rigby, J. (2024). *Food packaging should have labels on front about health impact, says WHO*. Reuters.
- Rozin, P., Fischler, C., Imada, S., Sarubin, A., & Wrzesniewski, A. (1999). Attitudes to food and the role of food in life in the U.S.A., Japan, Flemish Belgium and France: Possible implications for the diet–health debate. *Appetite*, 33, 163–180. <https://doi.org/10.1006/appe.1999.0244>
- Siegrist, M., Visschers, V. H., & Hartmann, C. (2015). Factors influencing changes in sustainability perception of various food behaviors: Results of a longitudinal study. *Food Quality and Preference*, 46, 33–39. <https://doi.org/10.1016/j.foodqual.2015.07.006>
- Singhapakdi, A., & Vitell, S. J. (1993). Personal and professional values underlying the ethical judgments of marketers. *Journal of Business Ethics*, 12, 525–533. <https://doi.org/10.1007/BF00872374>
- Sirieux, L., Delanchy, M., Remaud, H., Zepeda, L., & Gurviez, P. (2013). Consumers' perceptions of individual and combined sustainable food labels: A UK pilot investigation. *International Journal of Consumer Studies*, 37(2), 143–151. <https://doi.org/10.1111/j.1470-6431.2012.01109.x>
- Sonntag, W. I., Lemken, D., Spiller, A., & Schulze, M. (2023). Welcome to the (label) jungle? Analyzing how consumers deal with intra-sustainability label trade-offs on food. *Food Quality and Preference*, 104, Article 104746. <https://doi.org/10.1016/j.foodqual.2022.104746>
- Sörqvist, P., Haga, A., Langeborg, L., Holmgren, M., Wallinder, M., Nösti, A., ... Marsh, J. E. (2015). The green halo: Mechanisms and limits of the eco-label effect. *Food Quality and Preference*, 43, 1–9. <https://doi.org/10.1016/j.foodqual.2015.02.001>
- Southey, F. (2021). Health claims in a developing country context: 'Food labels are not a silver bullet to solve the NCD challenge'. *FoodNavigator*. August 3.
- Stanton, J. V., & Paolo, D. M. (2012). Information overload in the context of apparel: Effects on confidence, shopper orientation and leadership. *Journal of Fashion Marketing and Management: International Journal*, 16(4), 454–476. <https://doi.org/10.1108/13612021211265854>
- Steenis, N. D., van Herpen, E., van der Lans, I. A., & van Trijp, H. C. (2023). Partially green, wholly deceptive? How consumers respond to (in) consistently sustainable packaged products in the presence of sustainability claims. *Journal of Advertising*, 52(2), 159–178. <https://doi.org/10.1080/00913367.2022.2047841>
- Sunstein, C. R. (2014). Nudging: a very short guide. In *The Handbook of Privacy Studies* (pp. 173–180).
- Sunstein, C. R. (2019). *How change happens*. Mit Press.
- Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. Penguin.
- The Economic, Social and Environmental Council. (2025). *Making healthy, high-quality food a major national cause*. The Economic, Social and Environmental Council. April 22.
- Thøgersen, J., Haugaard, P., & Olesen, A. (2010). Consumer responses to ecolabels. *European Journal of Marketing*, 44(11/12), 1787–1810. <https://doi.org/10.1108/03090561011079882>
- Thøgersen, J., & Nielsen, K. S. (2016). A better carbon footprint label. *Journal of Cleaner Production*, 125, 86–94. <https://doi.org/10.1016/j.jclepro.2016.03.098>
- Torma, G., & Thøgersen, J. (2024). Can a meta sustainability label facilitate more sustainable consumer choices? *Business Strategy and the Environment*, 33(2), 283–306. <https://doi.org/10.1002/bse.3488>
- Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *Science*, 185(4157), 1124–1131. <https://doi.org/10.1126/science.185.4157.1124>
- Tybout, A. M., Calder, B. J., & Sternthal, B. (1981). Using information processing theory to design marketing strategies. *Journal of Marketing Research*, 18(1), 73–79. <https://doi.org/10.1177/00222437810180010>
- Ufer, D., Ortega, D. L., & Wolf, C. A. (2022). Information and consumer demand for milk attributes: Are redundant labels an effective marketing strategy? *Applied Economic Perspectives and Policy*, 44(2), 960–981. <https://doi.org/10.1002/aep.13155>
- van Kleef, E., van Trijp, H. C. M., & Luning, P. (2005). Functional foods: Health claim-food product compatibility and the impact of health claim framing on consumer evaluation. *Appetite*, 44(3), 299–308. <https://doi.org/10.1016/j.appet.2005.01.009>
- Venema, T. A., Kroese, F. M., Benjamins, J. S., & De Ridder, D. T. (2020). When in doubt, follow the crowd? Responsiveness to social proof nudges in the absence of clear preferences. *Frontiers in Psychology*, 11, 1385. <https://doi.org/10.3389/fpsyg.2020.01385>
- Walsh, G., Hennig-Thurau, T., & Mitchell, V. W. (2007). Consumer confusion proneness: Scale development, validation, and application. *Journal of Marketing Management*, 23(7–8), 697–721. <https://doi.org/10.1362/026725707X230009>
- Weber, A. (2021). Mobile apps as a sustainable shopping guide: The effect of eco-score rankings on sustainable food choice. *Appetite*, 167, Article 105616. <https://doi.org/10.1016/j.appet.2021.105616>
- Weinand, J. M. (2022). Let's (not) put a label on it: Interaction effects of multiple front-of-package labels and the moderating role of consumer value orientation: An abstract. In *Academy of marketing science annual conference*, 79–80.
- Weinrich, R., & Spiller, A. (2016). Developing food labelling strategies: Multi-level labelling. *Journal of Cleaner Production*, 137, 1138–1148. <https://doi.org/10.1016/j.jclepro.2016.07.156>
- Willer, H., & Lernoud, J. (Eds.). (2019). *The world of organic agriculture: Statistics and emerging trends 2019*. International: Research Institute of Organic Agriculture FiBL and IFOAM – Organics.
- Wobker, I., Eberhardt, T., & Kenning, P. (2015). Consumer confusion in German food retailing: The moderating role of trust. *International Journal of Retail & Distribution Management*, 43(8), 752–774. <https://doi.org/10.1108/IJRDM-07-2012-0061>
- Wong, P. T., & Weiner, B. (1981). When people ask "why" questions, and the heuristics of attributional search. *Journal of Personality and Social Psychology*, 40(4), 650. <https://doi.org/10.1037/0022-3514.40.4.650>
- Yadav, R. (2016). Altruistic or egoistic: Which value promotes organic food consumption among young consumers? A study in the context of a developing nation. *Journal of Retailing and Consumer Services*, 33, 92–97. <https://doi.org/10.1016/j.jretconser.2016.08.008>