The Importance of Relative Customer-Based Label Equity When Signaling Sustainability and Health With Certifications and Tags

Abstract

As a result of increased crowding of the retail landscape with health and sustainability signals and hundreds of different certification and claims, there is a growing need to determine the critical success factors and guidelines for professional practice. The current paper investigates how different combinations of signals impact consumers' choice and willingness to pay (WTP). We identify and test two major certifications from a branding perspective. The results show that consumers will have a preference and higher WTP for fish fillets with signals (certificates/tags or health/sustainability) that hold higher customer-based label equity (familiarity, understanding, trust) when shown in a choice-based situation. The results show the importance of a clear reference point, label equity (familiarity, understanding, trust) as well as customer values when using third-party certifications and/or simple taglines.

1 Introduction

In the realm of sustainability certifications there are currently 455 ecolabels (third-party certifications) listed on the Ecolabel Index (Ecolabel Index, n.d.). It is therefore hard for consumers to build familiarity with all of them, which could diminish the labels' equity.

When making food-related decisions, many consumers are concerned about how the food will affect their health (Brunsø et al., 2002; Yu-Hua, 2008) and environmental sustainability (White et al., 2019). Global sales trends follow this tendency by showing that products positioned in the sweet spot of "healthy for me and healthy for the world" are growing in demand (Nielsen, 2018). Yet, strategies and tactics toward health and sustainability have not been sufficiently integrated into policymaking aimed at working towards either goal, sustainability or health (Giddens, 1984; Hancock, 1993; Kjærgard et al., 2013; Willett et al., 2019). This has often caused undesired and unforeseen health or environmental issues (Kjærgard et al., 2013). It is therefore important to go beyond studying either eco-labels or front of package health labels, as health and sustainability should go together as a duality, where neither should take precedence.

Consumers have increased their value on time and effort in low involvement shopping situations (Davis & Hodges, 2012; Larsen et al., 2020; Nielsen, 2014), which makes it even more important to communicate in a way that saves customers time and effort. Third-party certificates and tags are information that consumers are supposed to be able to apply quickly when assessing a product's potential for them and for the environment. Certified eco-labels have traditionally been used as sustainability signals, but in the last years their effectiveness has been criticized in terms of lack of consumer knowledge (Feucht & Zander, 2014) and understanding (Thøgersen et al., 2010). Currently this has sparked more

interest in what Sigurdsson et al. (2022) has referred to as the underdeveloped "non eco-labels" literature as they point towards increased use of sustainability tagging in e-commerce, possibly as a result of the lack of effectiveness and costs of eco-labels. Several different terms have been used for tags. Following Lemken et al. (2017) we choose to focus both on health and environmental tags (they call them claims), Hoek et al. (2017) call them "product information labels", Liem et al. (2018) call them "descriptive labels". Sigurdsson et al. (2022) define tagging as "the act of placing a word, a short sentence or a simple picture next to the promoted product or on the product". They introduce tags and taglines as unverified claims compared to third-party certificates and show that unverified sustainability tagging increased WTP for fish fillets more than eco-labels (sustainability certifications).Our approach is similar as we define tags and taglines as descriptive unverified claims that can be short or long, abstract or concrete, and used to inform consumers about product benefits.

We explored 107 salmon filet products in a preliminary study consisting of seven physical and online stores in the US to get some clear ideas regarding health and sustainability signaling in retailing. We saw that 43.4% (online) and 25.8% (physical) of the products fitting our criteria had an official third-party sustainability certification and 63.2% (online) and 61.3% (physical) had sustainability tag(s). Third-party health certifications were displayed in 14.5% of the cases online and we did not notice them in the physical stores, while 81.6% (online) and 38.7% (physical) had health tags. In line with Sigurdsson et al. 2022, these snapshots from modern day retailing point toward intensive use of tags; not only in e-commerce, but also in physical retailing. Examples of tags were "sustainable" or "sustainably raised" and sustainability certifications used were "MSC", "ASC", and "B

Corp". The most prevalent health certification in the sample was the "American Heart Association Heart Check" (AHA H-C).

Our approach in the current article is to look at third-party certifications and tags, for health or sustainability, as signaling based on customer-based label equity (CBLE; Carpenter & Larceneux, 2008) where the label knowledge and sufficient credibility should increase the overall perceived quality of a product. The contribution includes a more holistic approach testing if different signals should leverage CBLE to devise programs to identify the impact of third-party certifications and tags on consumer choice through increased familiarity, understanding and trust. From this perspective, when a third-party certification is added to communicate health and/or sustainability attributes, it takes the form of third-party branding involving trust transfer (Doney et al., 1998), showing that the product is in line with consumers' values.

The main research questions guiding this research is: What impact do sustainability and/or health labels with different CBLE (familarity, understanding and trust) have on consumers' preference and willingness to pay (WTP) for fish fillets? Is the effectiveness influenced by the setting, that is with or without a reference point?

Our approach is to look at sustainability and health signals from a CBLE point of view. This includes a holistic approach in terms of third-party brands (health/sustainability certification) and brand tags (health/sustainability tags), as well as the duality of health and sustainability. Research on key consumer factors such as consumer familiarity, knowledge, trust and values has laid the foundation for an empirically grounded theory on CBLE. In Study 1, we examined the influence of the two types of signals (health and sustainability), isolated with a clear baseline comparison within signal domains–tags and certifications–on

several consumption-related variables. In Study 2, we presented the same stimuli without a reference point, examined the effectivness of a combinition of sutstainability and health signals and tested if green consumption values predicted WTP for fish filets. The contributions of this research on health and sustainability branding are listed below.

- Revealing examples of crowded health and sustainability signaling and suggesting improved management practices that can assist consumer choices.
- The research extends previous findings by showing that tagging increases WTP both in sustainability and health signaling
- Effectiveness of certified labels and tags tend to go hand in hand with customer familiarity, understanding and trust.
- The increased WTP for fish filets with health or sustainability tags and certifications seen with a clear frame of reference reveals the importance of point-of-difference (POD)
- The research elaborates the role of choice architecture by showing the increase in WTP when moving from products without tags/certifications (without a reference point) to the ones presented with tags/certifications. This shows that retailers who use these signals should always include a reference point.

First we introduce a theoretical framework showing the main literature on which this research is built on. Next, we present two studies along with a description of methods and results. Finally, we discuss the results including the limitations and suggest avenues for future research.

2. Theoretical framework and hypotheses

2.1. Health and sustainability signaling in retailing

Health for all has been touted as a social goal since the World Health Assembly adopted it in 1977 (Lawn et al., 2008) and sustainable development since the Brundtland Report was published in 1987 (Kjærgard et al., 2013). There are two distinctive forms of health and sustainability labeling: labeling in form of a tag or a tagline (sustainability/health tag) and third-party certification labeling (sustainability/health brand). Third-party certification labeling are validations of claims based on criteria set by independent organizations (governments or private organizations) and come in the form of symbols or logos. Tags are claims that come in the form of self-declarations by manufacturers or retailers which inform consumers about relevant health and sustainability attributes - unverified claims. These can be either a single word (e.g., "healthy" or "sustainable"), or a phrase such as "rich in protein of high biological value" (Liem et al., 2018). Although this kind of signaling has been academically examined from either a health or an environmental sustainability perspective (Hoek et al., 2017; Sigurdsson et al., 2022), the literature points towards the advantage of combining health and sustainability signals (e.g. Hoek et al., 2017; Lemken et al., 2017; White & Brady, 2014).

2.2. The effects of health and sustainability signals as point-of-difference on consumer choice and WTP

Both health and sustainability are intangible product attributes and therefore need to be communicated explicitly (signaled through labeling) to have an effect on consumer choice. Consumers subconsciously allocate their limited amount of time for tasks in the store (Sorensen, 2017) and have limited capacity to process information. They may therefore reduce the number of attributes they consider in order to simplify the decision making.

Grocery shopping further reflects a context where many consumers have limited motivation to spend time looking for information and thus use simple heuristics (Sanjari et al., 2017; Kahneman, 2003). This helps explain why consumers have been found to rely more on information presented in the form of tags (e.g., low fat, high fiber) than for instance mandatory nutrition labels (Nikolova & Inman, 2015). In contrast to detailed nutrition tables, tags and certification symbols (e.g, logos) can be processed more quickly by consumers as they are more visible (e.g., on the front of the packaging) and are less complex and time-consuming to process. As Nikolova & Inman (2015) show, reducing the complexity and difficulty in understanding nutrition information at the point-of-sales can help promote healthier food choices among grocery shoppers. However, as Trudel et al. (2015) argue, the impact of a food label depends heavily on consumers understanding what the information means.

Certification logos are not always indicative of what they stand for and how they should be interpreted. Many logos are low on textual and/or visual design elements describing the type of certification or that activate relevant associations to what they represent (Luffarelli et al., 2019). People look for meaning in logos (Kohli et al., 2002). Logos with high descriptiveness (Luffarelli et al., 2019), more elaborate logos than very simple ones (Henderson & Cote, 1998) and logos that evoke common associations across people (Henderson & Cote, 1998) are evaluated more favorably among consumers. Such logos are also more trusted because they are easier to process and can elicit stronger impressions of authenticity (Luffarelli et al., 2019). Research also indicates that mixed logos (the use of textual and visual design elements) are more effective in generating descriptiveness than icon-only logos (Luffarelli et al., 2019). For example, the American

Heart Association Heart-Check (AHA H-C) logo represents a mix between textual and visual design elements. The shape of a shield resembles a "seal of approval", the word "Certified" gives an air of authority, and the words "Meets criteria for heart-healthy food" is very descriptive. Johnson et al. (2015) reveal survey data from a sample of American respondents, who report being "somewhat concerned" or "very concerned" of nutritional content of food, showing that the AHA H-C symbol was ranked the most trustworthy among ten potential organizations/entities in terms of identifying heart healthy food. Fifty nine percent of all the respondents trusted AHA to decide if a product may display health symbols, messages, or statements on food packaging (Johnson et al., 2015). Similarly, consumer research demonstrates that consumers generally trust the H-C symbol, agree with statements that products having this symbol are good to them and healthier than other brands of the same product, and that this symbol is noticeable on the packages that carry it (Johnson et al., 2015).

In recent years, B Corp has emerged as an objective way for consumers to identify companies with high standards of performance, accountability and transparency. The B Corp logo depicts the letter "B" in a circle and is as such an icon-only logo. This logo has a low level of descriptiveness compared to the more explicative AHA H-C logo. Nothing about the B Corp logo hints to sustainability, and the brand name is not included (apart from the letter "B"). Consumer awareness of this certification seems to be limited and the connections between financial performance and consumer behavior remains unexplored (Guarna, 2019).

The literature on consumers' willingness to pay a price premium for third-party certified seafood shows that consumers in many countries, including the US, are willing to pay a significant price premium for eco-labelled seafood (Bronnmann & Asche, 2016;

Bronnmann & Asche, 2017; Chen et al., 2015; Goyert et al., 2010; Johnston & Roheim, 2006; Roheim et al., 2011; Sogn-Grundvåg et al., 2013). However, the size of the price premium varies significantly between the studies. There can also be considerable differences in WTP between certifications. The study by Janssen & Hamm (2012) indicates that visibility of a third-party certification logo in the marketplace is closely related to consumers' familiarity and trust, and they demonstrate that the logos achieving the highest price premiums were those most well-known and trusted.

2.2.1 Factors determining customer based label equity

The literature indicates that familiarity, understanding and trust are the basic factors determining customer based label equity (Carpenter & Larceneux, 2008). Customer based label equity (CBLE) relates to values and beliefs generated by a label and can be defined as the "capacity of the label to generate positive associations about both intrinsic and extrinsic dimensions of the product quality [..] which, when combined with a sufficient level of credibility for the label, increase overall perceived quality" (Carpenter & Larceneux, 2008, p. 500). Similar to product brand labels, third-party certifications are brands covering products that fulfill certain requirements set by the third-party organization (Larceneux et al., 2012). In the current study we investigate consumer familiarity, understanding and trust for both third-party certifications, tags and taglines from the point of view of CBLE.

Knowing or being familiar with a certification is a prerequisite for consumers using it in decision-making (Thøgersen, 2000). It could also be counterproductive to use a certification logo with which the consumer is not familiar, especially if it appears "fake" to consumers who assume that it is being used to artificially enhance the perception of a

product (Carpenter & Larceneux, 2008). Recently, Sigurdsson et al. (2022) found that consumers were more familiar with and willing to pay more for fish fillets with sustainability tags (i.e., the word "sustainable" on a green background) than for similar products with third-party sustainability certifications (i.e., the Marine Stewardship Council label). However, the trustworthiness of the Marine Stewardship Council (MSC) used in their study has recently been questioned in the media (McVeigh, 2021). Their findings may therefore reflect the declining reputation of this sustainability certification rather than consumers' higher preferences for simple sustainability tags over sustainability certifications. Previous research has also shown that consumers' understanding of what the MSC label stands for is rather limited (Feucht & Zander, 2014; Chen et al., 2015), which also might provide some explanations for the results reported by Sigurdsson et al. (2022). Research shows that consumers' preferences for sustainability certified products increase when consumers have better knowledge and understanding of what the labels stand for (e.g, Aprile and Punzo, 2022; Carpenter & Larceneux, 2008; Marette et al., 2012; Peschel et al., 2016).

Since tags and certifications provide information about the benefits of the product, they should add value to the consumer if they are perceived as credible (Lähteenmäki, 2013). Trust involves a belief or expectation and reflects one's willingness to rely on another party and to act despite uncertainty about the outcome (Doney et al., 1998). The presence of uncertainty is potentially the highest for products containing unobservable (credence) attributes (Boulding & Kirmani, 1993) such as those related to health and sustainability. A certification from known and trusted parties reassures consumers. To establish trust, consumers must be able to identify proof sources and connect these to the appropriate

credence attributes (Doney et al., 1998). Trust transfer occurs when a consumer ascribes trustworthiness to a health or sustainability claim based on the products' association with a trusted third party (Doney et al., 1998).

2.2.2 Consumer values

While the product attributes described above may influence consumer preferences for either type of product, consumer-level attributes also play an important role in consumer tradeoffs between green versus non-green consumption. Consumers would only engage in green consumption if they value the environment and/or want to contribute to environmental protection (Thøgersen, 2000; Vermeir et al., 2020). Therefore, the influence of environmental sustainability labels would depend on personal relevance and motivation to act on such information (Hoek et al.. 2017). For instance, identity-related aspects of consumers, such as environmental concern and green consumption values, have been shown to play an important role in understanding environmental sustainable consumption (see e.g., Haws et al., 2014). Haws et al. (2014, p. 337) define green consumption values as "the tendency to express the value of environmental protection through one's purchases and consumption behaviors". Existing literature has found a positive relationship between green consumption values and willingness to purchase and pay for products with relatively low (vs. high) negative environmental impacts. For example, De Silva et al. (2021) found that environmental consciousness strengthens the positive relationship between consumers' awareness of the benefits of purchasing green products and their intention to purchase those products. Galati et al. (2021) found a positive relationship between altruistic values and consumers' interest in certification schemes that guarantee the protection and safeguarding

of marine ecosystems. Environmental concern also plays a role in other categories and contexts of green consumer behavior, such as intention to visit green hotels (Verma et al., 2019), and in understanding consumers' response to green marketing communication (Bailey et al., 2018).

2.3 The combination of sustainability and health labeling

The extant literature suggests that consumers' preferences for sustainability versus health/nutrition labels differ, but more importantly, a combination of sustainability and health labels can have a larger impact on WTP than individual labels. Liem et al. (2018) included both sustainability and health/nutrition tags, but not in a combination, when examining the effects of tags on consumers liking (taste) and WTP for fresh and smoked salmon compared to the same fish without labels. They found tags to significantly increase consumers' liking for fresh salmon compared to no labeling, but not for smoked salmon. They also found tags to increase WTP for both fresh and smoked salmon compared to no labeling. Sustainability tags did not increase liking and WTP more than health/nutrition tags in this study, even among consumers who rated sustainability as very important. Their results also suggest that sustainability is less considered than health/nutrition when buying fish.

Tait et al. (2016) performed choice experiments to test for differences in consumers' WTP across varying label formats for fruit (text-only, text-plus-graphic, and graphic), including three types of sustainability tags and one health tag. Although this study examines the effects of different combinations of sustainability and health tags (including different levels of e.g., vitamin content and water efficiency), there is no comparison with

sustainability and health tagging in isolation or with the absence of tagging. This study also does not include third-party certifications.

Ghvanidze et al. (2017) compared the effects of social, ecological, nutritional and health attributes on consumers' yogurt and wine choices in the USA, the UK and Germany. They applied tags related to the attributes, and three levels for health and ecological impact (including no tag). The effects of third-party certifications were not examined as this study also focused entirely on tags. Their results indicate that in the United States, ecological tags have greater influence on consumers' food choice than health tags. For wine, the influence of ecological tags were stronger than nutritional tags, while health tags showed no significant utility for consumers in the United States.

Through experimental auctions where consumers bid for a product with or without tags, Lemken et al. (2017) examined the effect of environmental and health tags on consumers' WTP for pasta made out of legumen instead of wheat (environmentally sustainable and healthy). The procedure involved a between-design where each consumer was presented with the product in just one specification and the tags were tested individually and in a combination of both health and environment tags. They found that the tags increased the WTP, but more importantly, that a mix of environmental and health tags was superior to individual tags in increasing the WTP. The effects of third-party labels were not examined as this study also focused entirely on tags.

Loose et al. (2013) included both health and environmental certificates as attributes in their online choice experiment involving oysters, but without testing for the effects of a combination of the health and the sustainability logo. As health and environmental certificates, they applied the Australian "heart tick" and a carbon zero logo from the

company "Atlas Copco", respectively. They found only a small positive effect of the health certificate on consumer choice, and an even smaller positive effect of the environmental certificate.

Hoek et al. (2017) examined the effect of health and/or environment imaginary certificates and health and/or environment tags/taglines on Australian consumers' choices between a standard product within the categories rice, meat and tomatoes, and a more healthy/ sustainable alternative within the same product category. Although their results showed relatively low responsiveness to the certificates and tags relative to type of product and price, the combination of a health and an environmental certificates had a more positive effect than the certificates separately or no certificates for rice and tomatoes. A similar effect, albeit smaller, was observed for taglines regarding rice. Furthermore, the tags had very little attribute importance for meat, and the certifications were more important than tags for tomatoes (Hoek et al., 2017).

We conclude from this review that most of the studies that examine both health and sustainability signaling focus on tags. Although the study by Tait et al. (2016) investigated the effects of a combination of text and graphics, their approach does not involve any form of third-party certification labels (visualization through logos). Similarly, Loose et al. (2013) examined the effects of logos, but does not include any form of tagging. As far as we know, Hoek et al. (2017) is the only study that examines the effects of health and sustainability certifications and tags both individually and in combinations. However, they use imaginary certifications instead of real, third-party certified labels. We therefore contribute to the literature by examining the impact of real certifications, both isolated and as a combination of a health certification and a sustainability tag.

Research foundations and hypotheses

Sigurdsson et al. (2022) have argued that consumers tend to be unfamiliar with eco-labels (e.g. the labels MSC and ASC). Although these signals are frequently displayed, consumers in general are not aware of them. Based on our preliminary study we test other third-party certification labels, B Corp and AHA H-C, using the CBLE framework where we treat certifications and tags as signals. We formulate the following research proposition based on the aforementioned literature:

> Consumers will have a higher WTP for products with signals with higher customer-based label equity when displayed in a choice-based situation.

The first two hypotheses (H1 and H2) relate to preferences for tags vs. certifications:

- H1: Consumers will prefer the sustainability tag ("sustainable") to the sustainable certification (B Corp)
- H2: Consumers will prefer the health certification (AHA H-C) to the health tag ("Healthy")

Hypothesis 3 relates to the effectiveness of tags, testing both health and sustainability tags on WTP in a choice based setting:

- H3: Consumers' WTP will be higher for products with a "sustainable"/"healthy" tag compared to the one with no tag.

Building on the Sigurdsson et al. (2022) which revealed a higher WTP for a green sustainability tag compared to a certification label when mediated by familiarity. In line with

our verification, or CBLB check, revealing that consumers showed higher CBLB towards the AHA HC compared with the B Corp certification we hypothesize the following from a CBLE perspective and argue that signals with higher customer–based label equity (familiarity, knowledge, and trust) shown as a clear point-of-difference in a choice situation will have a higher WTP compared to those without CBLE:

- H4: Consumers' WTP will not be higher for products with the B Corp sustainability certification than no label
- H5: Consumers' WTP will be higher for products with the health (AHA H-C label) certification when compared to the one with no certification (no label)
- H6: Consumers' WTP will be higher for products with health certification (AHA H-C label) than for the one with sustainability certification (B Corp label)

In line with our main research proposition we hypothesize that the WTP increase attached with sustainability and health signals will disappear when a clear comparison is taken out:

- H7: Consumers will not have a higher WTP for products with health and/or sustainability signals when a clear reference point is missing

3 Empirical studies

We conducted two studies to test the signals used by the retailers to communicate the sustainability and health benefits of their fish fillets and whether these signals influence consumers' perceptions and willingness to pay (WTP) for products. In Study 1 we examined the influence of the two types of signals (health and sustainability) on several consumption related variables using tags and certifications, testing hypotheses 1 to 6. Finally, in Study 2,

we tested if consumers WTP for products with health and/or sustainability signals would be indifferent when a clear reference point was missing (H7), even if shown a combination of the two signal types–sustainability tags and health certifications.

3.1 Study 1: Testing signals different level of CBLE

3.1.1.1 Participants

We recruited 417 US participants (203 males; mean age = 37 years, SD = 14) on Prolific Academic from the East Coast of the United States who reported no dietary restrictions and had a minimum submission approval rate of 95%. Seventy percent of participants reported eating fish at least once a month. In determining sample size, we assumed the weakest effect of label type on willingness to pay for fish fillets from previous research (Cohen's d = 0.27; Sigurdsson et al., 2022). Our sample size was large enough to achieve 80% statistical power to detect an effect of this magnitude (α = .05; two-tailed tests).

3.1.1.2 Procedure and materials

The study used a between-within subjects design, with the two conditions based on the type of signal used: tags versus certification, both in health and sustainability domains. The goal of Study 1 was to determine which of the two tags or certifications resulted in more desirable ratings in terms of consumer choice and WTP that served as the basis for developing a combined signal for Study 2. Figure 1 shows an example of a choice task from Study 1.

After agreeing to a consent form, participants were randomly assigned to one of these two conditions and indicated how much they would pay for a salmon fillet with each type of signal ("How much would you pay ($) for this product (per 1 lbs);" range = $0–$25). Here, participants in the "tags" condition reported their WTP (in $) for (a) fillets without any

signal, (b) fillets with the word "sustainable" on a green background, and (c) fillets with the word "healthy," also on a green background. Their peers in the "certification" condition indicated their WTP (in $) for (a) fillets without any signal, (b) fillets with the B Corp certification, and (c) fillets with the AHA H-C.

Next, participants were asked a series of questions about their assigned signal types, i.e., health and sustainability certifications or health and sustainability tags. Specifically, they were asked how much more they would pay for seafood with each signal type ("How much more (if anything) would you pay for seafood with this label than for seafood without it (in percent, %);" range = 0%–100%), their familiarity with a signal ("How familiar are you with this label on food products? (How well you know it);" 0 = *Not at all familiar*; 100 = *Very familiar*), understanding of the message conveyed by a signal ("How well do you understand what this label stands for in the context of food products?;" 1 = *I do not understand it at all*; 7 = *I understand it very well*) and trustworthiness of a signal ("How trustworthy this label looks to you?"; 1 = *Not at all trustworthy*; 7 = *Very trustworthy*).

Then they had to choose between two salmon fillets ("Which of the two products do you prefer now and to what extent?"; 1 = *Strongly Product A*; 9 = *Strongly Product B*), with one pair showing fillets with the AHA H-C versus a health tag and another pair showing fillets with the B Corp certification versus a sustainability tag. Finally, participants provided demographic information, indicated the frequency of fish consumption, and answered an attention check question ("Who is the prime minister or president of your country?").

[INSERT FIGURE 1 HERE]

3.1.2 Results and discussion

Because of the nested structure of our data, we performed a linear mixed-effects analysis using the *lme4* package for R (Bates et al., 2015), with *p* values determined by the *lmerTest* package (Kuznetsova et al., 2017). We used product types (assigned signals or their absence) as fixed effects and added random intercepts for participants. The same analytic approach was used for all dependent measures reported below, except for the final task. Figure 2 and Table 1 summarize key findings.

CBLB check. As anticipated, consumers showed higher CBLB towards the AHA HC compared with the B Corp certification. In terms of familiarity, understanding and trust.

Familiarity with signals. We tested whether participants felt more familiar with either of the signal types. We found no significant differences in perceived familiarity with sustainability and health tags, $b = -2.71$, $SE = 2.14$, $t = -1.27$, $p = .207$. However, participants felt more familiar with the AHA H-C than with the B Corp sustainability certification, $b = 40.47$, $SE = 2.57$, $t = 15.76$, $p < .001$.

Understanding of signals. We also tested for potential differences in understanding what the specific signals stand for. Here, we found no differences between health tags and sustainability tags, $b = -0.14$, $SE = 0.14$, $t = -1.04$, $p = .300$. However, we found significant differences between health certifications (AHA H-C) and sustainability certifications, with participants reporting a better understanding of the former, $b = 3.44$, $SE = 0.14$, $t = 24.60$, $p < .001$.

Trustworthiness of signals. The health tag was considered less trustworthy than the sustainability tag , $b = -0.67$, $SE = 0.12$, $t = -5.83$, $p < .001$. In contrast, the health certification was perceived as more trustworthy than the sustainability certification, $b = 2.44$, $SE = 0.13$, $t = 18.91$, $p < .001$.

Hypothesis testing: Preference toward health and sustainability signals. We examined whether participants preferred fish fillets with health tags vs. health certifications, and sustainability tags vs. sustainability certifications. To make the results more meaningful, we scaled participants' responses so that 0 meant indifference between the products, -4 corresponded to a strong preference for the product A (shown on the left side of the screen), and +4 corresponded to a strong preference for the product B (shown on the right side of the screen).

We conducted a one-sample t-test on the results of the task in which participants indicated preferences for the sustainability certification and the sustainability tag compared to the scale midpoint (indifference between the two products). As anticipated by Hypothesis 1, this analysis revealed that participants preferred the sustainability tag to the B Corp sustainability certification (mean: 0.82, $SD = 2.20$, 95% confidence interval, or CI = [0.61, 1.03]), $t(416) = 7.60$, $p < .001$. A similar analysis conducted for the results of the task in which participants indicated preferences for health certifications and health tags revealed a stronger preference for salmon fillets with the health certification than for the health tag (in line with H2. Mean: -1.55, $SD = 2.02$, 95% CI = [-1.74, -1.35]), $t(416) = -15.60$, $p < .001$).

WTP ($) for fillets with signals. To answer Hypothesis 3 we tested whether participants were willing to pay more for salmon fillets with sustainability or health tags or for fillets without any labeling. Here, we entered product type (fish fillets without labeling, with sustainability tags, and with health tags) as fixed effects in the model. Compared to fish fillets without labeling, as predicted, participants were willing to pay more for products with a sustainability tag, $b = 0.66$, $SE = 0.10$, $t = 6.41$, $p < .001$ and health tag, $b = 0.49$, $SE = 0.10$, $t = 4.75$, $p < .001$. A post-hoc analysis conducted with the *emmeans* package (Lenth,

2021) and Tukey adjustment revealed no differences in WTP for fillets with sustainability and health tags ($p = .221$).

We applied the same analytic approach to test Hypotheses 4 and 5. As predicted (H2), consumers did not show higher WTP for salmon fillets with the B Corp sustainability certification, a brand low in CBLE, than for fillets without any labeling, $b = -0.13$, $SE = 0.14$, $t = -1.00$, $p = .320$. But, the reverse effect was found for the AHA H-C, the brand with high CBLE, as WTP was higher than that for fillets without any labeling, $b = 0.33$, $SE = 0.14$, $t = 2.40$, $p = .017$ (supporting H3). A similar post-hoc analysis revealed a significant difference in WTP for fillets with the B Corp certification and the AHA H-C, with consumers willing to pay less for products with the former label, $b = -0.46$, $SE = 0.14$, $t = -3.40$, $p = .002$ (supporting H6).

WTP extra (%) for fillets with signals. We conducted additional analyzes to test how much more (in percent, %) participants would pay for a fillet with the assigned signal type than without a signal. Participants reported a lower WTP extra (%) for a fillet with health tags than for seafood with sustainability tag, $b = -4.67$, $SE = 1.16$, $t = -4.03$, $p < .001$. A similar analysis on seafood with certifications showed the opposite: participants' WTP extra was higher for seafood with health certification (AHA) than for seafood with sustainability certification (B Corp), $b = 8.42$, $SE = 1.15$, $t = 7.32$, $p < .001$.

[INSERT FIGURE 2 HERE]

[INSERT TABLE 1 HERE]

Discussion

We conducted Study 1 to determine which of the two tags (health vs. sustainability) and the two third-party certifications (health [AHA H-C] vs. sustainability [B Corp]) results in more favorable ratings on consumption-related variables. The results confirmed hypotheses 1 to 7. Sigurdsson et al. (2022) have argued that consumers tend to be unfamiliar with eco-labels (e.g. the labels MSC and ASC) and the findings reveal the same for the B Corp. However, if looked holistically at sustainability and health we have supported this claim in terms of the B Corp, but identified a health certification with high CBLE. The main conclusion from Study 1 is that consumers will have a higher WTP for products with signals with higher customer-based label equity when displayed in a choice-based situation. Study 2 was therefore done to test hypothesis 7, if the effects would be sustained in a non-choice situation, when a clear point of reference is missing.

3.2 Study 2: Testing signals without a clear reference point

3.2.1 Participants

We recruited 993 US participants (408 males; mean age = 36 years, $SD = 14$) on Prolific Academic using the same prescreening criteria as in Study 1. Sixty-five percent of participants reported eating fish at least once a month. Considering that we had four experimental conditions in this study, we wanted to at least double the sample size of the earlier study, to retain similar cell sizes.

3.2.2 Procedure and materials

The procedure in Study 2 closely followed that of the earlier study, with a few exceptions. In the first WTP task ($), we used four experimental conditions in which participants indicated how much they would pay for (a) a salmon fillet without a label, (b) a fillet with the combined signal consisting of both, the health certification and the sustainability tag (see Figure 3), (c) a fillet with the health certification (AHA H-C), and (d) a fillet with the sustainability tag (the word "sustainable" on a green background). Next, participants assigned to one of the conditions in which they saw the products with either label rated the signals using the same measures as these used in Study 1, while their peers who indicated higher WTP for fillets without a label moved directly to the final task, in which all participants completed a six-item GREEN scale (1 = *strongly disagree*; 7 = *strongly disagree*) designed to measure people's propensity to purchase and consume goods and services in a sustainable manner (Haws et al., 2014).

[INSERT FIGURE 3 HERE]

3.2.3 Results and discussion

CBLB check. Consumers showed no difference in terms of familiarity with the signals but there was some difference in understanding and trust.

Familiarity with signals. There were no differences across conditions in perceived familiarity with either signal type, $F(2, 747) = 1.01$, $p = .365$.

Understanding of signals. The analysis conducted for the understanding ratings of the signals yielded a difference between the three conditions, although with a small effect size, $F(2, 747) = 8.31$, $p < .001$, $\eta_p^2 = .02$. A post-hoc analysis reflecting the results of the label understanding ratings found no differences in the understanding of the health certification

and the combined signal ($p = .703$). However, participants reported a lower understanding of what the sustainability tag stands for compared to the health certification ($p < .001$) and the combined signal ($p = .007$).

Trustworthiness of signals. We found a significant and large difference between the three conditions in ratings of signal trustworthiness, $F(2, 747) = 87.18$, $p < .001$, $\eta_p^2 = .19$. Therefore, we performed the post-hoc analysis using the *emmeans* package (Lenth, 2021) and Tukey adjustment, which revealed no differences in the perceived trustworthiness between the health certification and the combined signal ($p = .303$). However, the sustainability tag was deemed as less trustworthy than the health certification ($p < .001$) and the combined signal ($p < .001$).

WTP ($) for fillets. First, we tested for differences in WTP ($) for fillets with either signal type. A one-way ANOVA revealed no significant differences across conditions, $F < 1$.

WTP extra (%) for fillets with signals. A similar analysis revealed no significant differences across conditions in WTP extra (%) for seafood with either of the three labels: combined, health certification, and sustainability tag, F(2, 747) = 1.22, p = .297.

The role of green consumption values. Finally, we tested whether green consumption values predicted WTP ($) for fish fillets– our key dependent measure–and whether this effect differed between conditions. First, we created the green consumption index ($\alpha = .93$, mean: 4.88, SD = 1.30, 95% CI = [4.79, 4.96]) by averaging responses to the GREEN scale items (Haws et al., 2014), which we used in a linear model as a predictor of WTP ($) for fish fillets. This analysis found that the green consumption index was positively related to WTP

($) for fish fillets, b = 0.42, SE = 0.09, t = 4.79, p < .001. The results remained significant after controlling for signal type (all ps > .404) and age (p = .127).

Because previous research has shown that green consumption values predict WTP for seafood with sustainability tags–but not for products with sustainability certification (Sigurdsson et al., 2022)–we performed a simple slope analysis for all signal types. We found that the slopes of the green consumption index were significantly related to WTP ($) for fillets with sustainability tags, $b = 0.80$, $SE = 0.18$, $t = 4.62$, $p < .001$ and health certification, $b = 0.45$, $SE = 0.18$, $t = 2.43$, $p = .015$. However, the slopes of the green consumption index were not significantly related to WTP ($) for fillets with the combined signal, $b = 0.24$, $SE = 0.16$, $t = 1.49$, $p = .137$ and those without any labeling, $b = 0.23$, $SE = 0.18$, $t = 1.25$, $p = .211$. Figure 4 depicts these results.

[INSERT FIGURE 4 HERE]

[INSERT TABLE 2 HERE]

Discussion

The two main objectives of Study 2 were to test whether combining health certifications with sustainability tags has an effect on consumption-related metrics and to investigate the potential role of green consumption values (Haws et al., 2014) on willingness to pay for fish products. With respect to the first overarching objective, we found no significant differences in WTP ($) for fish fillets without labels, fillets with health certifications, sustainability tags, and combined signals. We also found no significant differences between the conditions in the second WTP measure and the measure of familiarity with the signals. However, the

sustainability tag was rated as less trustworthy and less understandable than the health certification and the combined signal, with the latter two producing statistically indifferent results to each other on these measures.

With respect to the second overarching goal of this study, we found green consumption values (Haws et al., 2014) predictive of WTP ($) for fish fillets with sustainability tags and health certifications, but not for products with the combined signal and without any label. These findings align with the research demonstrating that consumers associate health benefits with sustainability (Perkovic & Orquin, 2018).

4 General discussion and conclusions

The aim of the current research was to look at the impact sustainability and health certification and tags -as similar types of signals- have on consumer choice and WTP, and we examined these signals from a branding point of view. Study 1, a choice experiment using a between-within subject design confirmed hypotheses 1 to 6. This is in line with the research proposition, that consumers will have a higher WTP for products with signals with higher customer-based label equity when displayed in a choice-based situation. The main conclusion from Study 1 is that consumers will have a higher WTP for products with signals with higher customer-based label equity when displayed in a choice-based situation. Study 2 tested this further by not including a choice situation as in Study 1. The results supported hypothesis 7, that the differential effects from the signals would not be sustained in a non-choice situation, when a clear point of reference is missing.

4.1 Research contributions

As a result of increased crowding of the retail landscape with health and sustainability signals, there is a growing need in the literature to examine the impact of these signals on consumer behavior. These signals can be divided into genuine, third-party certifications such as the Marine Stewardship Council (MSC) label and *ad-hoc* tags that are non-certified by third parties, such as the word "sustainable" printed on a product packaging. This study investigated how different combinations of signals impact consumers' choice and willingness to pay (WTP). Study 1 demonstrated that fish filets carrying signals with a clear frame of reference, then these signals tend to have a higher WTP for consumers than filets without either of the two signals. However, when consumers are exposed to only one type of signal as reflected by the between-subjects design in Study 2, then this additional WTP from health and sustainability signals on product packaging disappears. Additionally, a simple slopes analysis in Study 2 shows that green consumption values - the propensity to make sustainable consumption choices - predict higher willingness to pay for filets with health certifications and sustainability tags, but not for filets where both signals were used simultaneously and those without any such signals. Taken together, our studies show the importance of having a clear reference point when using third-party certifications and/or simple taglines. Our study shows that the use of these signals do not add any WTP if consumers are unable to compare them to products without such signals. The findings show the need to emphasize customer-related factors of brand equity, such as a clear frame of reference, familiarity, understanding, and trust.

4.2 Practical implications

Replacing some of the red meat-derived protein in consumers' diets with fish is a widely recommended strategy to promote better public health and sustainable consumption (Thomse et al., 2019). At the same time, the seafood industry abounds with environmental sustainability issues, such as overfishing (Ayer et al., 2009) and the disruption of ecosystems through interbreeding, which results in many fish products being healthy, albeit not sustainably sourced. Our preliminary study has shown examples of crowded competition among sustainability and health signals in modern grocery retailing. For instance, 81.6% of fish filets sold online had either a health tag or a third-party health certification. We examined real certificates, similar to Loose et al. (2013), and tags. Hoek et al. (2017) on the other hand used imaginary certificates to control for familiarity effects in their study. Both methods are legitimate, but the more immediate advantage of using real logos is that they better reflect realistic situations and can increase the relevance of the findings.

Our findings demonstrate that signaling sustainability and health benefits based on third-party certifications does not automatically overcome the challenge of information asymmetry inherent in healthy and sustainable food. Among the two certification schemes tested, participants showed the greatest preference for the scheme with the highest level of consumer familiarity, understanding and trust. Thus, being familiar and having favorable values towards the certification schemes seems to be important. However, we found no differences between WTP for fillets without any labels, fillets with the highest rated certification in terms of familiarity, understanding and trust in Study 2, a generic sustainability label, and a combination of the latter two signals when a clear reference point is missing. Based on this we recommend that organizations owning a labeling scheme for healthy and sustainable food invest in marketing communication and public relations so that

their logo becomes more familiar and understood, especially among consumers valuing the attribute that the logo signal. This includes forming positive consumer attitudes towards the certification scheme in a way that builds trust (Thøgersen, 2000).

Our findings showed that green consumption values predicted WTP for salmon fillets with a generic sustainability tag and fillets with the highest rated certification in terms of familiarity, understanding and trust in Study 2. These findings can be used by seafood companies and retailers for choosing how to signal more effectively the health and sustainability attributes inherent in their products.

4.3 Limitations and future research

Many factors affect consumers' acceptance of tags and certifications and these can relate to the consumer, the product and type of tags and certifications (Grunert & Wills, 2007). We recommend further studies to examine more and different types of certifications and tags. We examined only short and rather abstract tags. The terms ``health" and "sustainability" are rather abstract, in the sense that consumers can not tell by these tags alone what makes the product healthy or sustainable. The literature also points out that too short tags may be too vague to be convincing (Taufique et al., 2014; Wansink, 2004). We therefore recommend that future research include longer taglines as well as more certificates when examining effects of combining health and sustainability signals (tags and/or certifications). Future research could also narrow the tags to make them more concrete and expressive, such as "Rich in Omega-3s", "Non-GMO", or "Palm-oil free" and test the effects of these against, and in combination, with third-party certifications. As of January 1, 2022, food manufacturers and importers must label their products with a specific label if the products are bioengineered or somehow

genetically modified (National Bioengineered Food Disclosure Standard, 2018). Many consumers might find such a label off-putting, making it an interesting research subject.

Only two certifications were tested in this research, one of which is relatively unknown while the other is more established. Besides examining a broader number of certificates of different types and design, it would be of interest to test health and sustainability certificates of similar strengths in terms of familiarity, understanding and trust. This would give a further foundation for examining consumers' preferences and WTP for either health or environmental signals, or combined signals.

Future research could also include food products other than fish. We further recommend that future research examine more consumer-related factors. We included for instance green consumption values. Although research demonstrates that consumers associate health benefits with sustainability (Perkovic & Orquin, 2018) we recommend future research to also include health consciousness or related concepts and to segment and profile consumers based on both concerns for personal health and the environment.

In contrast to the results from Study 1, in which consumers reported higher WTP for fish fillets with health tags, health certifications, and sustainability tags than for seafood without such labelling, we found no differences in the two WTP measures between conditions in Study 2 (sustainability tag vs. health certification vs. combined label vs. no label). This result suggests that retailers seeking to increase profits from sustainable seafood sales should consider how consumer choice architectures are designed, as neither certifications nor tags appear to increase WTP when treated in isolation (as opposed to the sequential presentation as in Study 1). However, it is unknown whether using a combined signal, as we used in Study 2, would result in differences in WTP for fillets compared with

unlabeled seafood when consumers are exposed to multiple products as in Study 1. Future research should test this possibility. Additionally, it is plausible that a more sophisticated research design involving a 2 (signal area: health vs. sustainability) x 2 (signal type: tag vs. certification) study would help to better understand the potential interactions between the effects of signal type/area on WTP and other relevant metrics.

References

Aprile, M. C., & Punzo, G. (2022). How environmental sustainability labels affect food choices: Assessing consumer preferences in southern Italy. *Journal of Cleaner Production, 332,* 130046. https://doi.org/10.1016/j.jclepro.2021.130046

Ayer, N., Côté, R. P., Tyedmers, P. H., & Willison, J. H. (2009). Sustainability of seafood production and consumption: An introduction to the special issue. *Journal of Cleaner Production, 17*(3), 321-324. https://doi.org/10.1016/j.jclepro.2008.09.003

Bailey, A. A., Mishra, A. S., & Tiamiyu, M. F. (2018). Application of GREEN scale to understanding US consumer response to green marketing communications. *Psychology and Marketing, 35*(11), 863-875. https://doi.org/10.1002/mar.21140

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67*(1), 1-48. https://doi.org/10.18637/jss.v067.i01

Boulding, W., & Kirmani, A. (1993). A consumer-side experimental examination of signaling theory: Do consumers perceive warranties as signals of quality? *Journal of Consumer Research, 20*(1), 111-123.

Bronnmann, J., & Asche, F. (2016). The value of product attributes, brands and private labels: An analysis of frozen seafood in Germany. *Journal of Agricultural Economics, 67*(1), 231-244. https://doi.org/10.1111/1477-9552.12138

Bronnmann, J., & Asche, F. (2017). Sustainable seafood from aquaculture and wild fisheries: Insights from a discrete choice experiment in Germany. *Ecological Economics, 142,* 113-119. https://doi.org/10.1016/j.ecolecon.2017.06.005

Brunsø, K., Fjord, T. A., & Grunert, K. G. (2002). Consumers' food choice and quality

      perception. Working paper no 77. The Aarhus School of Business, June 2002.

Carpenter, M., & Larceneux, F. (2008). Label equity and the effectiveness of values-based

      labels: An experiment with two French Protected Geographic Indication labels.

      International Journal of Consumer Studies, 32(5), 499-507.

      http://doi.org/10.1111/j.1470-6431.2008.00704.x

Chen, X., Alfnes, F., & Rickersten, K. (2015). Consumer preferences, ecolabels, and effects

      of negative environmental information. *AgBioForum, 18*(3), 327-336.

Davis, L., & Hodges, N. (2012). Consumer shopping value: An investigation of shopping

      trip value, in-store shopping value and retail format. *Journal of Retailing and*

      Consumer Services, 19(2), 22-239. https://doi.org/10.1016/j.jretconser.2012.01.004

De Silva, M., Wang, P., & Kuah, A. T. (2021). Why wouldn't green appeal drive purchase

      intention? Moderation effects of consumption values in the UK and China. *Journal of*

      Business Research, 122, 713-724. https://doi.org/10.1016/j.jbusres.2020.01.016

Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998). Understanding the influence of

      national culture on the development and trust. *Academy of management review,*

      23(3), 601-620. https://doi.org/10.2307/259297

Ecolabel Index. (n.d.). Retrieved January 6, 2022, from https://www.ecolabelindex.com/

Galati, A., Miret-Pastor, L., Siggia, D., Crescimanno, M., & Fiore, M. (2021). Determinants

      affecting consumers' attention to fish eco-labels in purchase decisions: A cross-

      country study. *British Food Journal.* http://doi.org/10.1108/BFJ-05-2021-0498

Ghvanidze, S., Velikova, N., Dodd, T., & Oldewage-Theron, W. (2017). A discrete choice

      experiment of the impact of consumers' environmental values, ethical concerns, and

health consciousness on food choices: A cross-cultural analysis. *British Food Journal, 119*(4)*,* 863-881. https://doi.org/10.1108/BFJ-07-2016-0342

Giddens, A. (1984). *The constitution of society.* Polity Press.

Goyert, W., Sagarin, R., & Annala, J. (2010). The promise and pitfalls of Marine Stewardship Council certification: Maine lobster as a case study. *Marine Policy, 34*(5), 1103-1109. https://doi.org/10.1016/j.marpol.2010.03.010

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*(5), 385-399. http://doi.org/10.1007/s10389-007-0101-9

Guarna, N. (2019). The behavioral case for B corporations. [Master's thesis, University of Pennsilvania]. https://repository.upenn.edu/mbds/3/

Hancock, T. (1993). Health, human development and the community ecosystem: three ecological models. *Health Promotion International, 8*(1), 41-47.

Haws, K. L., Winterich, K. P., & Naylor, R. W. (2014). Seeing the world through greentinted glasses: Green consumption values and responses to environmentally friendly products. *Journal of Consumer Psychology, 24*(3), 336-354. https://doi.org/10.1016/j.jcps.2013.11.002

Henderson, P. W., & Cote, J. A. (1998). Guidelines for selecting or modifying logos. *Journal of Marketing, 62*(2), 14-30. https://doi.org/10.1177%2F002224299806200202

Hoek, A. C., Pearson, D., James, S. W., Lawrence, M. A., & Friel, S. (2017). Healthy and environmentally sustainable food choices: Consumer responses to point-of-purchase

actions. *Food Quality & Preferences, 58*, 94–106.

https://doi.org/10.1016/j.foodqual.2016.12.008

Janssen, M., & Hamm, U. (2012). Product labelling in the market for organic food:

Consumer preferences and willingness-to-pay for different organic certification

logos. *Food Quality and Preference, 25*(1), 9-22.

https://doi.org/10.1016/j.foodqual.2011.12.004

Johnson, R. K., Lichtenstein, A. H., Kris-Etherton, P. M., Carson, J. A., Pappas, A., Rupp,

L., Vafiadis, D. K. (2015). Enhanced and updated American Heart Association heart-

check front-of-package symbol: Efforts to help consumers identify healthier food

choices. *Journal of the Academy of Nutrition Dietetics, 115*(6), 876-880.

https://doi.org/10.1016/j.jand.2015.02.008

Johnston, R. J., & Roheim, C. A. (2006). A battle of taste and environmental convictions for

ecolabeled seafood: A contingent ranking experiment. *Journal of Agricultural and

Resource Economics, 31*(2), 283-300. https://doi.org/10.22004/ag.econ.8617

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality.

American Psychologist, 58(9), 697-70. https://www.doi.org/10.1037/0003-

066X.58.9.697

Kjærgård, B., Land, B., Pedersen, K. B. (2013). Health and sustainability. *Health Promotion

International, 29*(3), 558-568. https://doi.org/10.1093/heapro/das071

Kohli, C., Suri, R., & Tahkor, M. (2002). Creating effective logos: Insights from theory and

practice. *Business Horizons, 45*(3), 58-64. http://doi.org/10.1016/S0007-

6813(02)00203-3

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). ImerTest package: Tests in linear mixed effects models. *Journal of Statistical Software, 82*(13), 1-26. https://doi.org/10.18637/jss.v082.i13

Lähteenmäki, L. (2013). Claiming health in food products. *Food Quality and Preference, 27*(2), 196-201. https://doi.org/10.1016/j.foodqual.2012.03.006

Larceneux, F., Benoit-Moreau, F., & Renaudin, V. (2012). Why might organic labels fail to influence consumer choices? Marginal labelling and brand equity effects. *Journal of Consumer Policy, 35*(1), 85-104. http://doi.org/10.1007/s10603-011-9186-1

Larsen, N. M., Sigurdsson, V., Breivik, J., Fagerstrøm, A., & Foxall, G. R. (2020). The marketing firm: Retailer and consumer contingencies. *Managerial and Decision Economics, 41*(2), 203-215. https://doi.org/10.1002/mde.3053

Lawn, J. E., Rohde, J., Rifkin, S., Were, M., Paul, F. K., & Chopra, M. (2008). Alma-Ata 30 years on: Revolutionary, relevant, and time to revitalise. *The Lancet, 372*(9642), 917-927. https://doi.org/10.1016/s0140-6736(08)61402-6

Lee, E. J., Bae, J., & Kim, K. H. (2020). The effect of environmental cues on the purchase intention of sustainable products. *Journal of Business Research, 120*, 425-433. https://doi.org/10.1016/j.jbusres.2019.10.048

Lemken, D., Knigge, M., Meyerding, S., & Spiller, A. (2017). The value of environmental and health claims on new legume products: A non-hypothetical online auction. *Sustainability, 9*(8), 1340. https://doi.org/10.3390/su9081340

Lenth, R. V. (2021). *Emmeans: Estimated marginal means, aka least-squares means* [R package version 1.6.1]. https://cran.r-project.org/package=emmeans

Liem, D. G., Turchini, G. M., Wanich, U., & Keast, R. (2018). Sustainability descriptive labels on farmed salmon: Do young educated consumers like it more? *Sustainability, 10*, 2397. https://doi.org/10.3390/su10072397

Loose, S. M., Peschel, A., & Grebitus, C. (2013). Quantifying effects of convenience and product packaging on consumer preferences and market share of seafood products: The case of oysters. *Food Quality and Preference, 28*(2), 492-504. https://doi.org/10.1016/j.foodqual.2012.11.004

Luffarelli, J., Mukesh, M., & Mahmood, A. (2019). Let the logo do the talking: The influence of logo descriptiveness on brand equity. *Journal of Marketing Research, 55*(5), 862-878. https://doi.org/10.1177%2F0022243719845000

Marette, S., Messéan, A., & Millet, G. (2012). Consumers' willingness to pay for eco-friendly apples under different labels: Evidences from a lab experiment. *Food Policy, 37*(2), 151-161. https://doi.org/10.1016/j.foodpol.2011.12.001

McVeigh, K. (2021). *Blue ticked off: The controversy over the MSC fish 'ecolabel'.* https://www.theguardian.com/environment/2021/jul/26/blue-ticked-off-the-controversy-over-the-msc-fish-ecolabel

National Bioengineered Food Disclosure Standard, 7 CFR § 66 (2018)

Nielsen. (2014). *Continuous innovation: The key to retail success.* The Nielsen Company. https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/Continuous-Innovation-The-Key-to-Retail-Success.pdf

Nielsen. (2018). *Sustainable shoppers. Buy the change they wish to see in the world.* The Nielsen Company. https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/global-sustainable-shoppers-report-2018.pdf

Nikolova, H. D., & Inman, J. (2015). Healthy choice: The effect of simplified point-of-sale nutritional information on consumer food choice behaviour. *Journal of Marketing Research, 52*(6), 817-835. https://doi.org/10.1509/jmr.13.0270

Perkovic, S., & Orquin, J. L. (2018). Implicit statistical learning in real-world environments leads to ecologically rational decision making. *Psychological Science, 29*(1), 34-44. https://doi.org/10.1177%2F0956797617733831

Peschel, A. O., Grebitus, C., Steiner, B., & Veeman, M. (2016). How does consumer knowledge affect environmentally sustainable choices? Evidence from a cross-country latent class analysis of food labels. *Appetite, 106,* 78-91. https://doi.org/10.1016/j.appet.2016.02.162

Roheim, C., Asche, F., & Insignares Santos, J. (2011). The elusive price premium for ecolabelled products: Evidence from seafood in the UK market. *Journal of Agricultural Economics, 62*(3), 655-668. https://doi.org/10.1111/j.1477-9552.2011.00299.x

Sanjari, S. S., Jahn, S., & Boztug, Y. (2017). Dual-process theory and consumer response to front-of-package nutrition label formats. *Nutr Rev, 75*(11), 871-882. https://doi.org/10.1093/nutrit/nux043

Sigurdsson, V., Larsen, N. M., Pálsdóttir, R. G., Folwarczny, M., Menon, R. G. V., & Fagerstrøm, A. (2022). Increasing the effectiveness of ecological food signalling: Comparing sustainability tags with eco-labels. *Journal of Business Research, 139*, 1099-1110. https://doi.org/10.1016/j.jbusres.2021.10.052

Sogn-Grundvåg, G., Larsen, T. A., & Young, J. A. (2013). The value of line-caught and other attributes: An exploration of price premiums for chilled fish in UK

supermarkets. *Marine Policy, 38*, 41-44.

https://doi.org/10.1016/j.marpol.2012.05.017

Sorensen, H. (2017). *Inside the mind of the shopper: The science of retailing*. (2nd ed.),

Pearson Education.

Tait, P., Saunders, C., Guenther, M., Rutherford, P., & Miller, S. (2016). Exploring the

impacts of food label format on consumer willingness to pay for environmental

sustainability: A choice experiment approach in the United Kingdom and Japan.

International Food Research Journal, 23(4), 1787-1796.

Taufique, K. M. R., Siwar, C., Talib, B., Sarah, F. H., & Chamhuri, N. (2014). Synthesis of

constructs for modelling consumers' understanding and perception of eco-labels.

Sustainability, 6(4), 2176-2200. https://doi.org/10.3390/su6042176

Thomse, S. T., de Boer, W., Pires, S. M., Devleesschauwer, B., Fagt, S., Andersen, R.,

Poulsen, M., & van der Voet, H. (2019). A probabilistic approach for risk-benefit

assessment of food substitutions: A case study on substituting meat by fish. *Food and

Chemical Toxicology, 126,* 79-96. https://doi.org/10.1016/j.fct.2019.02.018

Thøgersen, J. (2000). Psychological determinants of paying attention to eco-labels in

purchase decisions: Model development and multinational validation. *Journal of

Consumer Policy, 23*(3), 285-313. http://dx.doi.org/10.1023/A:1007122319675

Trudel, R., Murray, K. B., Kim, S., & Chen, S. (2015). The impact of traffic light color-

coding on food health perceptions and choice. *Journal of Experimental Psychology:

Applied, 21*(3), 255-275. https://psycnet.apa.org/doi/10.1037/xap0000049

Verma, V. K., Chandra, B., & Kumar, S. (2019). Values and ascribed responsibility to

predict

consumers' attitude and concern towards green hotel visit intention. *Journal of Business Research, 96*, 206-216. https://doi.org/10.1016/j.jbusres.2018.11.021

Vermeir, I., Weijters, B., De Houwer, J., Geuens, M., Slabbinck, H., Spruyt, A., Van Kerckhove, A., Van Lippevelde, W., De Steur, H., & Verbeke, W. (2020). Environmentally sustainable food consumption: A review and research agenda from a goal-directed perspective. *Frontiers in Psychology, 11*, 1603. https://doi.org/10.3389/fpsyg.2020.01603

Wansink, B., Sonka, S. T., & Haster, C. M. (2004). Front-label health claims: when less is more. *Food Policy, 29*(6), 659-667. https://doi.org/10.1016/j.foodpol.2004.10.004

White, R. R., & Brady, M. (2014). Can consumers' willingness to pay incentivize adoption of environmental impact reducing technologies in meat animal production? *Food Policy, 49*(1), 41-49. https://doi.org/10.1016/j.foodpol.2014.06.007

White, K., Habib, R., & Hardisty, D. J. (2019). How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing, 83*(3), 22-49. https://doi.org/10.1177/0022242919825649

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Sibanda, L. M., … Murray, C. J. L. (2019). Food in the Anthropocene: The EAT-Lancet Commission on healthy diets from sustainable food systems. *The Lancet, 393*(10170), 447-492. https://doi.org/10.1016/S0140-6736(18)31788-4

Yu-Hua, C. S. (2008). Health concern, food choice motives, and attitudes toward healthy

    eating: The mediating role of food choice motives. *Appetite, 51*(1), 42-49.

    https://doi.org/10.1016/j.appet.2007.11.004

Zepeda, L., Sirieix, L., Pizarro, A., Corderre, F., & Rodier, F. (2013). A conceptual

    framework for analysing consumers' food label preferences: An exploratory study of

    sustainability labels in France, Quebec, Spain and the US. *International Journal of*

    Consumer Studies, 37(6), 605-616. https://doi.org/10.1111/ijcs.12041

Table 1

Descriptive statistics for Study 1 results

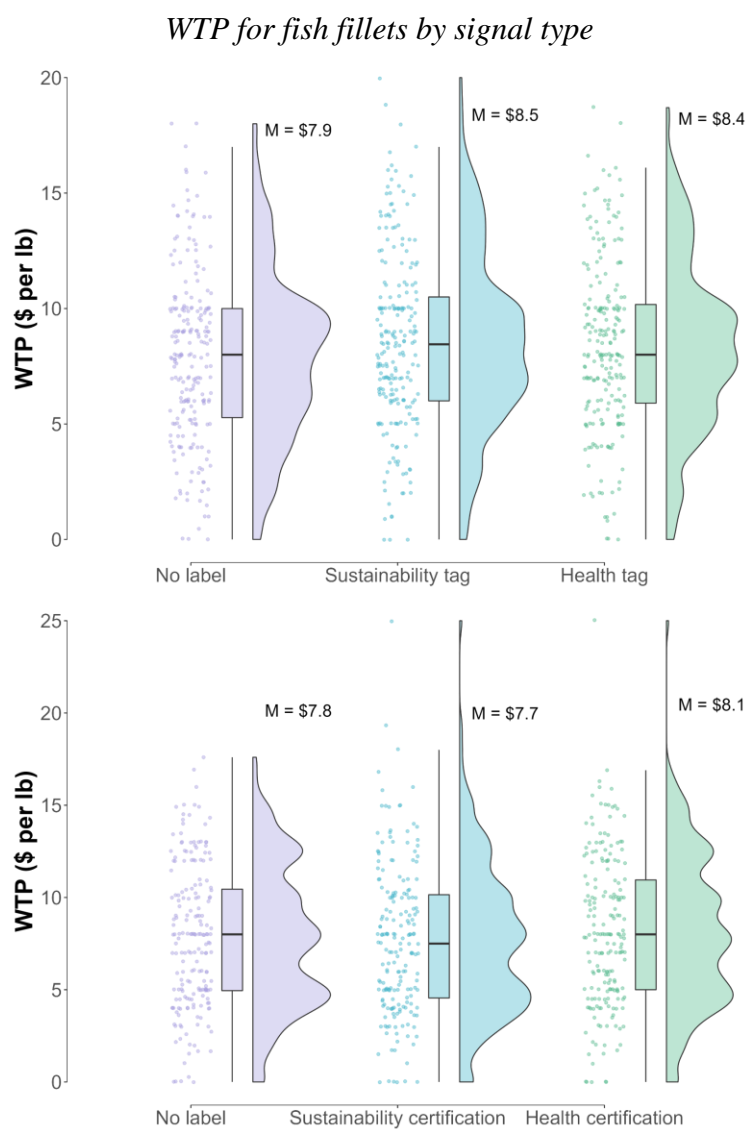| Dependent variable	M	SD	95% CI	M	SD	95% CI
	Health tag			Sustainability tag		
WTP ($0–$25)	8.37	3.70	[7.88, 8.86]	8.54	3.84	[8.03, 9.05]
WTP extra (0%–100%)	12.52	20.66	[9.79, 15.26]	17.19	20.58	[14.47, 19.91]
Familiarity (0–100)	51.43	34.01	[46.93, 55.93]	54.14	32.55	[49.83, 58.45]
Understanding (1-7)	5.05	1.94	[4.79, 5.30]	5.19	1.63	[4.97, 5.40]
Trust (1–7)	3.81	1.82	[3.57, 4.05]	4.48	1.45	[4.29, 4.67]
	Health certification			Sustainability certification		
WTPs ($0–$25)	8.13	4.08	[7.55, 8.70]	7.67	4.09	[7.09, 8.24]
WTP extra (0%–100%)	14.37	20.84	[11.43, 17.32]	5.95	12.33	[4.21, 7.69]
Familiarity (0–100)	52.55	34.83	[47.64, 57.47]	12.08	23.09	[8.82, 15.34]
Understanding (1-7)	5.49	1.04	[5.29, 5.69]	2.05	1.65	[1.82, 2.28]
Trust (1–7)	5.64	1.30	[5.45, 5.82]	3.20	1.55	[2.98, 3.42]

Note. WTP ($) for unlabeled fillets in the condition in which people were exposed to tag (mean: 7.88, *SD* = 3.63, 95% CI = [7.40, 8.36]) was similar to that for unlabeled fillets in the condition in which people were exposed to certification (mean: 7.80, *SD* = 3.84, 95% CI = [7.26, 8.34]).

Table 2

Descriptive statistics for Study 2 results

Dependent variable	M	SD	95% CI	M	SD	95% CI
	No label			Combined signal		
WTP ($0–$25)	8.09	3.56	[7.64, 8.54]	7.80	3.82	[7.32, 8.28]
WTP extra (0%–100%)	-	-	-	14.33	19.64	[11.86, 16.80]
Familiarity (0–100)	-	-	-	42.76	31.24	[38.83, 46.69]
Understanding (1-7)	-	-	-	5.36	1.50	[5.17, 5.55]
Trust (1–7)	-	-	-	5.50	1.44	[5.32, 5.68]
	Health certification			Sustainability tag		
WTPs ($0–$25)	7.88	3.42	[7.46, 8.30]	7.67	4.09	[7.09, 8.24]
WTP extra (0%–100%)	13.05	18.34	[10.79, 15.31]	15.61	17.25	[13.46, 17.76]
Familiarity (0–100)	44.61	31.41	[40.75, 48.48]	46.78	31.68	[42.82, 50.73]
Understanding (1–7)	5.47	1.51	[5.28, 5.65]	4.94	1.59	[4.74, 5.14]
Trust (1–7)	5.68	1.18	[5.54, 5.83]	4.16	1.58	[3.96, 4.36]

Figure 1

An example of a choice task from Study 1

Which of the two products do you prefer now and to what extent?

				Indifferent					
Strongly Product A	○	○	○	○	○	○	○	○	**Strongly Product B**

Figure 2

WTP for fish fillets by signal type

Note. Vertical lines in the centers of the boxplots indicate medians. Areas within the boxplots indicate interquartile ranges. Whiskers extend in the direction of 1.5 × the respective interquartile ranges. The shaded areas in the violin plots show the response densities, which are also represented by individual data points on the left side of each boxplot.
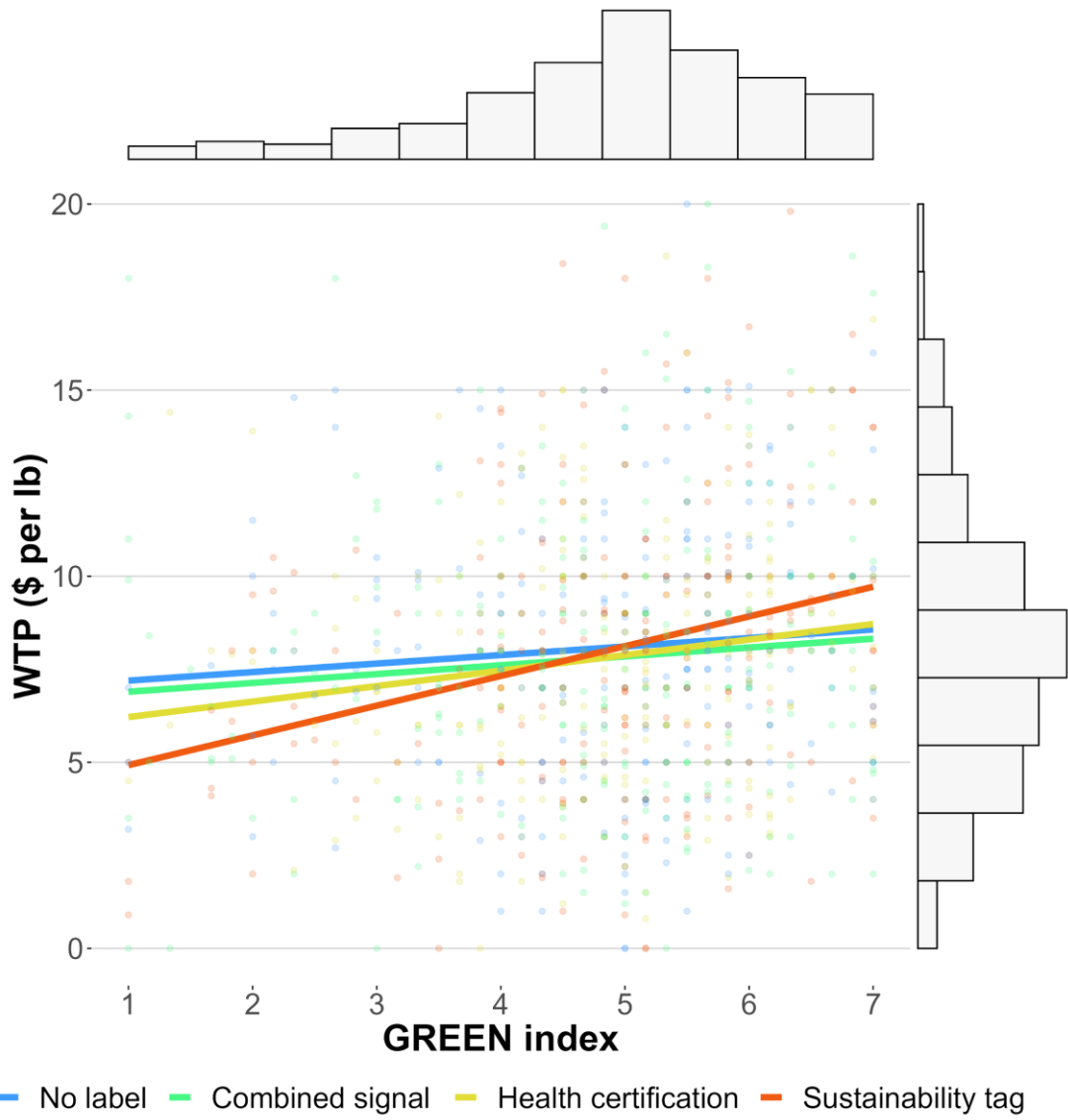
Figure 3

A combined signal: Health certification and sustainability tag

Figure **4**
The relationship between green consumption values and WTP for fish fillets

Note. Simple slopes showing the relationship between the green consumption index and WTP ($) for fish fillets plotted separately for each signal type. Histograms at the edges of the figure show aggregate response densities.