Greening Consumption: Decoding the Influence of Vegan Label and 'Rescued' Claim

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To my grandma and grandpa, for laying the foundation for this journey.

To my parents, for always believing in me.

To Melany, who inspired me to dare to take this path.

To Steffen, whose support was more important than he probably imagined.

To Ainslee, for the funny office hours.

To Tom, whose profound passion for knowledge inspired me to go the extra mile.

To Anna, Dani, Nicole, and Nora, for helping me maintain a personal life.
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<tbody>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
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<td>CI</td>
<td>Confidence Interval</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<tr>
<td>OOH</td>
<td>Out-of-Home</td>
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<tr>
<td>PBMA</td>
<td>Plant-Based Meat Alternative</td>
</tr>
<tr>
<td>SD</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>WTP</td>
<td>Willingness to Pay</td>
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General Introduction

1.1 Relevance

The global food system plays a significant role in climate change, contributing to between 23 and 42% of total greenhouse gas (GHG) emissions (IPCC, 2022). In light of the growing population and the objective of limiting global warming to 1.5° or 2°C, the transition towards sustainable food systems is crucial to ensure the adequate nourishment of people within the planetary boundaries (Takacs et al., 2022). This transformation demands coordinated efforts of governments, companies, and individuals. Governments must establish and implement clear pathways to achieve this goal. Companies must offer sustainably produced food products, while individuals must adapt their food habits towards more sustainable ones (Habib et al., 2021).

Building upon these challenges, the Intergovernmental Panel on Climate Change (IPCC) identifies two key strategies for reducing GHG emissions in the food system, thereby making it more sustainable: shifting to diets with a low amount of animal-derived foods and reducing food waste along the supply chain (IPCC, 2022). Following these strategies, companies are adapting their products. For example, from 2021 to 2023, the number of vegan-labeled foods increased by 72% (EMR, 2023; Statista, 2021). Similarly, from 2016 to 2021, the number of foods and beverages advertising as made with ingredients that would otherwise end up wasted, so-called upcycled foods, increased by 122% (Innova Trends Survey, 2021).

Despite their growing availability, achieving broad consumer acceptance is fundamental to their success. This acceptance depends on understanding the potential obstacles that may arise from both consumers’ and marketers’ sides, such as conflict with personal values or among marketed product characteristics. While informing consumers that a product is vegan or upcycled is not mandatory, companies frequently display this information as a marketing
strategy to signal social responsibility, differentiate their products from competitors, and increase product preference (Hermundsdottir & Aspelund, 2021).

As environmental concern rises among consumers, who increasingly prefer products with a low environmental impact (Bangsa & Schlegelmilch, 2020), highlighting a product’s environmentally friendly characteristics might help companies stand out in the market. Research has shown that sustainability attributes are generally viewed positively (Bangsa & Schlegelmilch, 2020), with sustainable foods commonly preferred over conventional ones (Holenweger et al., 2023).

However, most of the literature on sustainable food attributes reporting a positive effect of those attributes on consumer behavior investigates attributes that do not change a food’s characteristics, such as organic, fair trade, or local (Van Bussel et al., 2022). When considering a sustainability attribute that might alter a food’s characteristics, preferences often shift, with consumers typically favoring the conventional option (Onwezen et al., 2021). For example, regular meat products are still preferred to hybrid meat (i.e., meat products added with plant protein) despite their higher environmental impact (Grasso & Goksen, 2023).

The contradictory findings might be explained by the fact that inferences about one attribute usually spill over to another. Therefore, highlighting a product attribute may have consequences beyond the information it conveys, potentially leading to backfire effects. This backfire effect has been found, for example, when a food is marketed as containing “less sugar,” leading individuals to expect the food to be also less tasty (Jahn et al., 2023).

Many sustainability products are commonly perceived as intrinsically virtuous (Spielmann, 2021), and acting pro-environmentally can positively affect how consumers feel and see themselves. For instance, signing up for green electricity, supporting a tax on carbon dioxide emissions, and recycling plastic bottles trigger positive self-affects (Chatelain et al., 2018; Hartmann et al., 2017). Even purchasing sustainable products increases happiness (Spielmann, 2021) and restores self-esteem (Trudel et al., 2020). Moreover, sustainability
attributes generally positively impact product perception. For example, organic and fair trade foods are usually considered tastier and healthier (Berry & Romero, 2021; Nadricka et al., 2020).

Despite consumers' declarations of environmental concern and opposition to the exploitation of animals or food waste, the acceptance of vegan or upcycled foods remains debatable. While some studies report positive results (e.g., Rosenfeld et al., 2022), indicating that a vegan label generally increases product evaluation and behavioral intention, other studies highlight potential backfire effects, with the addition of a vegan label significantly reducing preference for these foods (Berke & Larson, 2023), even though diets centered around plant-based whole foods are known to have environmental and health benefits (Ipsos, 2018). Regarding upcycled foods, consumers generally exhibit positive attitudes toward this category (de Visser-Amundson et al., 2021). However, when choosing between an upcycled and a conventional product, the latter is usually preferred (Grasso et al., 2023). Despite these observations, few studies delve into the mechanisms underlying these effects (Aschemann-Witzel & Peschel, 2019; de Visser-Amundson et al., 2021). Consequently, further research is warranted in both areas.

Vegan and upcycled foods play a crucial role in mitigating the food system's environmental impact. However, there is a gap in the literature regarding how information about these characteristics influences consumers, the products carrying them, and their effect on behavioral intention. This dissertation addresses these research gaps by analyzing the impact of the information indicating that food is vegan or upcycled on consumers' feelings and product perception. Our work demonstrates that marketers can benefit from incorporating this information into their products. Addressing this question is crucial for marketers, safeguarding them from unnecessary additional effort and potential disappointment due to unexpectedly poor product acceptance. Additionally, policymakers need to be cognizant of possible information misuse.
1.2 Literature Review

The following sections will briefly overview the existing vegan and upcycled foods literature. Subsequently, a more in-depth analysis will be conducted on the research surrounding the drivers of consumer behavior, with a particular focus on the influence of emotional and cognitive pathways on purchase intentions.

1.2.1 Vegan Foods

Animal-derived products are typically responsible for 38 to 52% of the GHG emissions from individuals’ diets in developed countries (EAT-Lancet Commission, 2019). However, cutting these products completely from one's diet is ambivalently perceived in Western society. On the one hand, it is admired for its high moral commitment to animal welfare, environmental preservation, and associated health benefits (De Groeve et al., 2021; Judge & Wilson, 2019). On the other hand, it evokes feelings of rejection due to its association with a lifestyle choice that conflicts with many societal norms and represents a cultural threat (MacInnis & Hodson, 2015). Furthermore, the concept of veganism is identified as a trigger for internal moral conflicts, such as the contradiction between opposing animal exploitation and indirectly promoting it through one’s own consumption of meat products. These internal conflicts result in feelings of discomfort and guilt in individuals (Rothgerber, 2014). To circumvent the internal conflicts that may arise from consuming animal-derived products, individuals may employ a range of strategies, such as disliking, ridiculing, and excluding those who adhere to a vegan regimen (De Groeve & Rosenfeld, 2022; Markowski & Roxburgh, 2019).

This adverse reaction to veganism extends to vegan products, which are usually perceived more negatively than their non-vegan counterparts (Michel et al., 2021). This phenomenon can be observed in the reduced appeal of foods described as vegan (Berke & Larson, 2023; Demartini et al., 2022; Greene et al., 2024). Accordingly, researchers propose that vegan foods will be more accepted if the term vegan is avoided and, instead, their benefits
are highlighted by using terms like “healthy” and “sustainable” (Sleboda et al., 2024). However, these findings are contradicted by recent studies demonstrating that labeling a product as vegan increases its evaluation and purchase intention (Rosenfeld et al., 2022; Stremmel et al., 2022).

One possible explanation for this phenomenon might be the increasing public discourse about the environmental impact of animal-derived foods and campaigns advocating a reevaluation and normalization of vegan foods. For example, Veganuary is a global campaign that commenced in 2014, intending to encourage individuals to incorporate vegan cuisine into their diet during January and beyond. This campaign has witnessed a consistent increase in its number of adherents (Veganuary, 2024). In a related development, some governmental agencies have publicly declared that they will only provide vegetarian meals during business meetings. This action is intended to demonstrate support for a more sustainable lifestyle and to challenge the status quo (Bundestag, 2023). These initiatives aim to reduce resistance towards vegan foods and enable them to be viewed more positively like other sustainable foods (Stremmel et al., 2022).

Moreover, such actions reshape the perception of vegans as a “socially applauded group” (Plante et al., 2019). As individuals aspire to be part of a group to develop a more positive sense of self (Rosenfeld et al., 2022), these initiatives may explain why some studies have reported a preference for vegan products. Nevertheless, these explanations are speculative, and further research is needed to understand the underlying rationale behind the intention to purchase vegan foods.

1.2.2 Upcycled Foods

Approximately 30% of all food produced is discarded (UNEP, 2024), primarily due to overproduction, aesthetic flaws, and underutilization (Priefer et al., 2016). To address this issue, some companies are adopting strategies to reduce food waste by rescuing these foods and incorporating them as ingredients. While this approach is not entirely new - for example, whey
protein emerged as a solution to utilize the rest of dairy production (Aschemann-Witzel et al., 2023) - it is relatively new to highlight that a product is made with ingredients otherwise destined for waste. Companies highlight this information using different terms, such as upcycled or rescued. In the literature, these products are also referred to as waste-to-value or value-added surplus (Aschemann-Witzel et al., 2022; Bhatt et al., 2017; de Visser-Amundson et al., 2021). Since upcycled is the most commonly used term to refer to this food category (Aschemann-Witzel et al., 2023), it will be used further for simplicity.

Despite heightened consumer concerns about food waste, certain studies have reported adverse effects, indicating that the acceptance of upcycled foods remains a contentious issue. These studies point out that consumers may associate the upcycled characteristic with spoiled food, leading to a diminished expectation of taste (Aschemann-Witzel & Peschel, 2019), heightening perceived health risks, and diminished perceived value of the product (Hellali et al., 2023). These negative associations might help to explain why, when given a choice between conventional and upcycled food options, the majority of consumers are inclined to select the conventional option (Bhatt et al., 2020; Grasso et al., 2023; Grasso & Asioli, 2020; Peschel & Aschemann-Witzel, 2020) or do not demonstrate any clear preference (de Visser-Amundson et al., 2021).

However, research on consumer perception of upcycled foods also indicates that individuals have positive attitudes and behavioral intentions toward this food category, similar to what is observed for other sustainable attributes (de Visser-Amundson et al., 2021). For example, consumers evaluate the concept of food made from fruits and vegetables that would otherwise be discarded due to aesthetic flaws as high-quality, harmless to health, and appetizing (Nitzko & Spiller, 2019). These positive quality perceptions and purchasing intentions are consistent across different age groups (Zhang et al., 2020). Additionally, foods enriched with upcycled ingredients are considered beneficial for the environment (Coderoni & Perito, 2020).
While past research has explored various communication strategies (Asioli & Grasso, 2021; Bhatt et al., 2020; Peschel & Aschemann-Witzel, 2020) and personal characteristics (Coderoni & Perito, 2020; Grasso & Asioli, 2020; Hellali & Korai, 2023; McCarthy et al., 2020) influencing the acceptance of upcycled foods, few studies have investigated the mechanisms underlying these effects (Aschemann-Witzel & Peschel, 2019; Bhatt et al., 2021; de Visser-Amundson et al., 2021). Therefore, further research is needed to understand how informing consumers about upcycled characteristics affects their perceptions.

1.2.3 The Paths to Consumer Behavior

There are many ways to inform consumers about a product's attributes, with one of the most common methods being labels or claims on the product packaging (White et al., 2019). Labels and claims are frequently used because they capture consumers’ attention and are easily understood. Consequently, they enable individuals to make more informed decisions (Asioli et al., 2020).

Individuals process information in two ways: affective, which is more subconscious and emotionally driven, and cognitive, which is more analytical based on rules of reasoning. Both information processing paths influence consumer behaviors, such as their purchase decisions (White et al., 2019). While the affective information processing path is often considered more relevant due to its potential to generate biases and positive spillover effects (Chatelain et al., 2018), both paths play an essential role (Arvola et al., 2008). This dissertation will investigate these two information processing paths, starting with the affective aspect. Specifically, it will explore the effect of emotions and then analytical reasoning on sustainable behaviors.

Haidt (2001) introduced the idea that individuals use their emotions to intuitively evaluate behaviors as right or wrong. Negative emotions, such as disgust or shame, signal that a behavior is wrong. In contrast, positive emotions, such as happiness and pride, signal that a behavior is right, leading individuals to act accordingly. The act of undertaking the right course
of action results in a positive emotional state that persists even after the action is over. In the context of consumer behavior, this state is commonly called the “warm glow” (Ferguson & Flynn, 2016). The feeling of warm glow has been observed in numerous prosocial behaviors, like charity donation (Andrews et al., 2014), recycling (Brekke et al., 2003), contracting green electricity, and supporting CO2 taxes (Hartmann et al., 2017), and can also be triggered by sustainability cues, such as claims and labels (Spielmann, 2021; van’t Veld, 2020). Moreover, research indicates that the warm glow also influences product evaluation and purchase intention. For example, products made with recyclable materials (Bezençon et al., 2020) or natural ingredients (Spielmann, 2021) are better evaluated and preferred over their counterparts because individuals experience a warm glow upon consuming them. Similarly, warm glow also helps to explain why the purchase of organic, fair trade, and carbon-neutral foods is higher than those without these characteristics (Iweala et al., 2019).

The selection of vegan products may be perceived as prosocial behavior due to their avoidance of animal exploitation and lower environmental impact compared to non-vegan alternatives (Rosenfeld, 2018). However, in cultures where animal-derived products are prevalent, as is the case in the majority of Western countries, opting for vegan foods may clash with cultural values, triggering negative emotions like shame (Ruby & Heine, 2011; Sahakian et al., 2020). Similarly, choosing upcycled foods may also be categorized as prosocial behavior due to combating food waste and reducing the environmental impact of food production (Aschemann-Witzel et al., 2023), potentially eliciting positive emotions. However, consuming foods made with previously discarded ingredients can also be perceived as unnatural, wrong, or disgusting, evoking negative emotions (Spielmann et al., 2023). Given the influence of emotions on behavior, it is important to understand how vegan and upcycled foods are perceived in this regard.

In addition to emotional considerations, food choices are influenced by cognitive factors such as perceived health benefits or superior taste. Foods associated with sustainability are
commonly viewed as healthy, based on the reasoning that food that is good for the environment should also be good for oneself (Berry & Romero, 2021). This type of association has been observed for many foods related to sustainability. For example, describing a food as “natural” increases its perceived nutritional value, regardless of whether this is true or not (Berry et al., 2017). Similarly, “vegan” or “organic” foods are perceived as healthy even when the product category is unhealthy, as evidenced by studies on ice cream (Bullock et al., 2020) and cookies (Schuldt & Schwarz, 2010). Sustainable foods tend also to be perceived differently in terms of expected taste. For instance, fair trade and local foods are perceived as tasting better than their conventional counterparts (Lotz et al., 2013; Schott et al., 2022). However, highlighting the sustainability characteristic of a food may backfire if consumers associate this characteristic with diminished product quality. For example, informing consumers that crops were produced with reclaimed water led to the consumption of these crops being perceived as a health risk (Savchenko et al., 2019), and informing that a product is vegan reduces consumers’ expected to taste towards it (Stremmel et al., 2022). While the cognitive pathways for consumer behavior regarding vegan foods have already been described, it is essential to understand how upcycled foods are cognitively perceived.

1.3 Research Gaps and Overview of the Papers

The previous sections have demonstrated the significance of vegan and upcycled foods as strategies to reduce GHG emissions from food systems. However, the success of these strategies depends on consumer purchases. Both affective and cognitive components influence consumer behavior. Yet, how consumers perceive vegan and upcycled foods in terms of affect and cognition remains underresearched. This dissertation is a compilation of three papers analyzing how informing consumers about the vegan or upcycled characteristics impacts their purchase intentions. While the common thread among these papers is their focus on sustainable foods, each adopts a unique perspective to illuminate the nuanced and underexplored influences
on consumer behavior. Furthermore, they seek to unravel how the interaction of vegan or upcycled information with other product elements shapes consumers' feelings, cognition, and preferences.

The first two papers take an affective perspective, examining the effect of informing consumers that food is vegan (Paper 1) or upcycled (Paper 2) on their emotions. Paper 3 adopts a cognitive perspective, investigating how informing consumers that food is upcycled affects their evaluation of it. Figure 1 provides an overview of the dissertation framework. The following paragraphs describe relevant gaps in the literature to date and the main content of each paper to address these gaps.

As discussed in the previous section, existing research has focused on how vegans and vegan products are perceived in society (Markowski & Roxburgh, 2019; Stremmel et al., 2022) and how vegans perceive themselves (e.g., Rosenfeld et al., 2020). However, little is known about how individuals' feelings might affect the purchase of vegan products. Paper 1 reveals that informing consumers about the vegan characteristics of food through a vegan label increases consumers' warm glow, leading to a higher purchase intention for these products. This effect is moderated by packaging color and the consumer’s biological sex. Applying a feminine packaging color (i.e., pink) to vegan food reduces the warm glow male individuals perceive. By revealing these mechanisms, Paper 1 makes a meaningful contribution to the factors that affect the acceptance of vegan food, providing marketers with a leverage point for interventions to increase their consumption.

Moving away from vegan food, Papers 2 and 3 focus on upcycled food. Recent research reveals a paradox wherein individuals, despite expressing aversion to food waste, exhibit lower purchase intention for upcycled foods compared to their conventional counterparts (Grasso et al., 2023). This phenomenon might be attributed to the perception of discarded food as impure and potentially considered immoral (Spielmann et al., 2023). The literature supports that merely acknowledging sustainability problems may not suffice if the solution to these problems is not
perceived as the right thing to be done. In this context, Paper 2 investigates how informing consumers about the upcycled characteristic affects their purchase intention through the lens of moral emotions. Positive moral emotions, which arise from doing what consumers perceive as the right thing to be done, are essential to understanding decision-making processes and why individuals choose to address specific issues (Graham et al., 2013). These emotions have been demonstrated to facilitate the adoption of sustainable behaviors, such as recycling (Davies et al., 2002). Conversely, negative emotions can impede acceptance, as evidenced in the case of misshapen fruits and vegetables (Spielmann et al., 2023). Emotions are also influenced by an individual’s familiarity with a particular product. Familiarity strengthens positive feelings, such as calmness and certainty, and minimizes negative feelings, such as uncertainty (Aldridge et al., 2009). Paper 2 investigates the effect of the upcycled information on consumers’ emotions and purchase intention for both familiar and unfamiliar rescued ingredients. The paper reveals that upcycled information positively influences consumers’ emotional responses to a product, which in turn enhances their purchase intention. Notably, the emotions elicited are stronger when the rescued ingredient is already familiar to the consumer.

Cognition also plays a role in consumers’ choices, functioning through rational and analytical information processing, independent of affective processing (Epstein, 2012). Consequently, an understanding of the affective pathways does not necessarily lead to an enhanced comprehension of the cognitive pathways. Building on this foundation, Paper 3 investigates how informing consumers about a product’s upcycled characteristics affects its evaluation, specifically its perceived sustainability, healthfulness, and expected taste. The extant literature suggests that information about a specific product characteristic has the potential to shape consumers’ expectations beyond the explicit content of the information itself (Jahn et al., 2023). The third paper shows that the upcycled information positively affects a product’s perceived sustainability and healthfulness, which is also reflected in the purchase intention, with no effect on expected taste. Furthermore, the effects are accentuated when the
rescued ingredients are familiar to consumers. In light of the many discussions surrounding the regulation of terms related to sustainability attributes in marketing (European Commission, 2023), this paper contributes weight to the argument for the implementation of regulatory measures to avoid consumer deception.

Overall, this dissertation reveals biases generated by two sustainability information sources: the vegan label and the “rescued” claim. Drawing upon a diverse set of theoretical frameworks, the results contribute to the literature and the praxis in several ways. First, it shows that the vegan and the upcycled information positively influence consumer purchase intention, which can be explained by an enhancement of consumers’ feelings and cognition. Second, it adds to a better understanding of how the combination of this information with other product elements might foster sustainable food choices. Third, it emphasizes the need for clear guidelines on displaying sustainability information to prevent consumers from being misled in their evaluations and choices.

Table 1 summarizes each paper’s major findings and contributions, while Table 2 offers a methodological overview of the studies conducted in the papers. All articles use primary data gathered through online surveys.
Figure 1

Dissertation Framework

<table>
<thead>
<tr>
<th>Sustainability label</th>
<th>Moderator(s)</th>
<th>Mediator(s)</th>
<th>Consumer behavior</th>
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<tr>
<td>Vegan label</td>
<td>Biological sex</td>
<td>Warm glow</td>
<td>Purchase intention</td>
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<th>Familiarity</th>
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<th>Product evaluation</th>
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<td>Paper</td>
<td>Research Goal</td>
<td>Key Findings</td>
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| Paper 1: Choosing vegan feels good, doesn’t it? Effects of congruent cues on vegan-labeled products | Understand the influence of congruent packaging colors on warm glow and consumer behavior in vegan products. | • Vegan label increases consumers’ warm glow, increasing purchase intention.  
• Congruent packaging color will strengthen the label effect for women but not for men. | • Vegan products are perceived in a positive light.  
• The presence of the vegan label leads consumers to perceive a heightened sense of societal acknowledgment and value as individuals.  
• For men, these feelings might be neutralized if the label is displayed in a congruent packaging color. |
| Paper 2: Rescue-based foods: The role of moral and ingredient familiarity | Understand the influence of the “rescued” claim and ingredient familiarity on moral attitude and consumer behavior. | • The “rescued” claim increases consumers’ purchase intention.  
• An elevated moral attitude explains the purchase intention.  
• The moral attitude is lower for unfamiliar rescued ingredients. | • Provides empirical evidence of the impact of the “rescued” claim on consumers’ moral emotions.  
• Reveal the importance of familiarity with the rescued ingredient on moral attitude. |
| Paper 3: Rescue us all! The effects of the “rescued” claim for familiar and unfamiliar food ingredients | Understand the influence of the “rescued” claim and ingredient familiarity on product evaluation and consumer behavior. | • The “rescued” claim increases a product’s perceived sustainability and healthiness, positively influencing consumers’ purchase intention. The effects are more pronounced when consumers are familiar with the rescued ingredient.  
• No significant effect of the claim on expected taste was observed. | • Demonstrate that the claim generates biased product expectations.  
• Provides empirical evidence of the impact of ingredient familiarity on product evaluation. |
### Table 2

**Methodological Summary of Papers 1, 2, and 3**

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<thead>
<tr>
<th>Paper 1: Choosing vegan feels good, doesn’t it? Effects of congruent cues on vegan-labeled products</th>
<th>Pre-Study</th>
<th>One-factorial design</th>
<th>Survey Circle</th>
<th>N = 42</th>
<th>Label</th>
<th>T-Test</th>
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<tr>
<td>Main Study</td>
<td>2 (label: control vs. vegan) x 2 (packaging color: congruent vs incongruent) x 2 (Biological sex: female vs. male) between-subjects design</td>
<td>Survey Circle</td>
<td>N = 268</td>
<td>Chocolate bar</td>
<td>ANOVA, Mediation analysis, and Moderated moderated mediation analysis (using PROCESS Model 4 and 12 with 5,000 bootstrap samples; Hayes, 2022)</td>
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<th>Paper 2: Rescue-based foods: The role of moral and ingredient familiarity</th>
<th>Study 1</th>
<th>One-factorial design</th>
<th>Prolific</th>
<th>N = 40</th>
<th>-</th>
<th>Content-analysis procedures (Krippendorff, 2004).</th>
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<tr>
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<td>2 (claim: control vs. “rescued”) x 2 (rescued ingredient: familiar vs. unfamiliar) between-subjects design</td>
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<td>N = 200</td>
<td>Banana cake</td>
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<th>Paper 3: Rescue us all! The effects of the “rescued” claim for familiar and unfamiliar food ingredients</th>
<th>Pre-Study</th>
<th>One-factorial design</th>
<th>Prolific</th>
<th>N = 45</th>
<th>List with 11 food items</th>
<th>T-Test</th>
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</thead>
<tbody>
<tr>
<td>Main Study</td>
<td>2 (claim: no claim vs. “rescued”) x 2 (familiarity: familiar vs. unfamiliar) between-subjects design</td>
<td>Prolific</td>
<td>N = 236</td>
<td>Ice cream</td>
<td>ANOVA, Mediation analysis, and Moderated parallel mediation analysis (using PROCESS Model 4 and 8 with 5,000 bootstrap samples; Hayes, 2022)</td>
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1.4 Abstracts

1.4.1 Paper 1

The availability of vegan products is on the rise, yet veganism remains associated with femininity. Some companies are modifying their product packaging to align with this gender schema. However, the impact of incorporating congruent packaging elements on consumer behavior regarding vegan products is currently unknown. This study addressed this gap through the lens of congruency and warm glow. It investigates how the presence of the vegan label and its interaction with packaging color influence consumer feelings and purchase intention. The findings reveal that the consumer’s biological sex moderates the interaction between the vegan label and packaging color. For women, the presence of the vegan label is found to enhance warm glow and purchase intention, regardless of packaging color congruency. Conversely, for men, the warm glow increases only when the packaging color is incongruent with the feminine schema (i.e., brown). These results are crucial for food marketers and policymakers seeking to promote sustainable eating habits across the general population.

1.4.2 Paper 2

Approximately 931 million tonnes of food safe for human consumption are wasted yearly due to oversupply, suboptimality (e.g., aesthetic flaws), or undervaluation as a nutritious food source. The United Nations set the reduction of food waste as one of the primary goals to be achieved by countries by 2030. Meanwhile, some companies are rescuing these foods from being wasted and using them as ingredients. This practice is not new, but by highlighting this attribute and calling these foods “upcycled” or “rescued,” companies created a new category: rescue-based food (RBFs). Using a mixed-methods design, we demonstrate that RBFs evoke different associations in consumers' minds and that their purchase intention is driven by morality. Our findings also reveal that familiarity with the rescued ingredient plays an
important role, with products made with familiar rescued ingredients evoking stronger moral emotions than those with unfamiliar ingredients. Our findings contribute to a better understanding of how the “rescued” claim influences consumer behavior and provide valuable insights for marketers in developing their strategies to promote this product category.

1.4.3 Paper 3

The United Nations has committed to halving food waste by 2030. In line with this goal, companies started rescuing some foods that would otherwise be discarded and communicating it to their customers. These foods are repurposed as ingredients and marketed as upcycled or “rescued.” Notably, upcycled products (e.g., ice cream) can be made with rescued ingredients that are familiar (e.g., chocolate) or unfamiliar (e.g., malted milk) to consumers, which might affect how they are perceived. This research aims to investigate the impact of informing consumers about the “rescued” nature of ingredients. It also assesses how consumers’ familiarity with these rescued ingredients moderates the effect on product perception and consumer behavior. We find that highlighting the rescued aspect enhances a product’s perceived sustainability and healthiness, positively influencing consumers’ purchase intention. No significant effect of the claim on expected taste was observed. The effects of the claim on perceived sustainability and healthiness are more pronounced when consumers are already familiar with the rescued ingredient. Our findings suggest that informing about rescued ingredients increases purchase intention.
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2 Paper 1: Choosing vegan feels good, doesn’t it? Effects of gender-congruent cues on vegan-labeled products
(co-authored by Yasemin Boztuğ)

A prior version of this paper was presented as:


Keywords: vegan label, congruency, warm glow.

____________________________

1 Authors contribution: Fernanda Carneiro-Otto: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing – original draft, Writing review & editing, Visualization. Yasemin Boztug: Resources, Validation, Writing – review & editing, Supervision.
2.1 Introduction

Vegan food sales grew three times faster than overall food sales in 2021 alone in the U.S. (GFI, 2022). This rapid growth is largely attributed to increasing consumer awareness about global warming and climate change (Jürkenbeck et al., 2021). To align with this trend, food marketers are expanding their vegan product offerings and prominently promoting this information by adding a vegan label to their packaging.

Sustainability cues are known to evoke a positive emotional response in consumers, often referred to as “warm glow” (Trudel et al., 2020). This emotional state has both short- and long-term effects. In the short term, warm glow increases product purchase intention (Hartmann et al., 2017). In the long term, it generates spillovers to other sustainable behaviors (Juhl et al., 2017) and mitigates compensatory effects, preventing the reduction of sustainable behaviors after one has already been performed (Chatelain et al., 2018). Consequently, sustainability cues play a crucial role in encouraging more sustainable behavior patterns over time.

However, vegan labels are typically displayed on product packaging, which incorporates multiple design elements. Congruency between a product’s elements enhances consumers’ affective state, positively influencing the purchase intention of the products where these elements appear (Magnier & Schoormans, 2015). For example, the presence of sustainability cues on products perceived as natural (e.g., water or tea) has been found to lead to higher product evaluation and choice likelihood than when the same cues are displayed on processed products (e.g., cola or energy drink) (Herédia-Colaço & Coelho do Vale, 2018).

Veganism is associated with sustainability (Stremmel et al., 2022) as well as with femininity (Thomas, 2016). While the vegan label is commonly combined with sustainability-related design elements, such as the green color, it is also combined with feminine elements. For instance, the packaging of the vegan chocolates from the brand Alpia features much more
feminine design elements, such as a pink color and heart drawings, compared to their regular chocolate packaging (Hajok, 2024). Given that there is a gender-based difference in the consumption of vegan products, with twice as many women as men consuming vegan products (Euronews, 2021). It is important to understand how the vegan label and its interaction with packaging color affects consumers. Based on that, this study explores how combining the vegan label and packaging color affects consumers’ warm glow feelings and purchase intention and whether consumers’ biological sex moderates this interaction.

Our study contribution is threefold. First, we investigate how the vegan label affects consumers' feelings. Second, we analyze how gendered packaging color interacts with the label. Third, we show how consumers’ biological sex influences this interaction. In doing so, we contribute to the literature investigating the effect of sustainability cues on consumers’ feelings and the research on the effect of congruent packaging cues. The findings aim to assist policymakers and food marketers in understanding how cues can be strategically combined to promote sustainable consumption.

The rest of this article is structured as follows: Initially, we review the literature on warm glow and the congruency theory within the context of foods. Building on this review, we formulate our conceptual model. Subsequently, we introduce the stimuli employed in our main study and conduct a pretest to assess their appropriateness. Additionally, we detail the methodology of our main study. Finally, we delve into the study’s results and implications.

2.2 Theoretical Background

Sustainability labels aim to enhance transparency throughout the food chain and inform consumers in a way that encourages sustainable consumption (Grunert et al., 2014). For example, an organic label signals consumers that a product’s ingredients were cultivated without the use of chemical fertilizers or pesticides (Council of the European Union, 2007),
while a Fairtrade label indicates that the farmers received fair wages (Berry & Romero, 2021) with both labels found to increase product preference compared with when no label is displayed (Bissinger & Leufkens, 2017; Janssen & Hamm, 2012).

A vegan label communicates that a product is free from animal-derived ingredients (Stremmel et al., 2022). Foods containing animal-derived ingredients can have an environmental impact up to 14 times higher compared to their vegan counterparts (Takacs et al., 2022), and studies indicate that a vegan diet can adequately meet human nutritional requirements (Medawar et al., 2019). These factors have sparked discussions on the ethics of animal consumption, positioning a vegan diet as a positive lifestyle choice for many individuals (Judge et al., 2022).

However, animal-derived products are deeply embedded in various cultures and are integral to daily practices (Benningstad & Kunst, 2020). The complete rejection of animal-derived products is often perceived as a denial of traditional values, contributing to consumers’ resistance to a vegan diet (Rosenfeld & Tomiyama, 2021). Despite this, a shift towards food habits that include a higher percentage of vegan dishes is being observed (Martinelli & De Canio, 2022), with more individuals consciously reducing the amount of animal products in their diets (Rosenfeld et al., 2020).

Nonetheless, research on the impact of vegan labels on food products presents contradictory findings. Some studies have found that adding a vegan label reduces consumers’ intention to purchase those products (Berke & Larson, 2023; Hielkema & Lund, 2022). In contrast, other studies have found that a label increases purchase intention (Rosenfeld et al., 2022; Stremmel et al., 2022). A possible explanation for this discrepancy might be due to differences in the context analyzed. Studies finding negative results investigate the effect of labels in an out-of-home (OOH) context, where hedonic values such as taste and treating oneself usually play a more significant role (Claessens et al., 2023). However, OOH meals
represent, on average, only a small amount of the food consumed. Therefore, we will focus on the supermarket context where utilitarian values such as buying health products are more critical. Since vegan foods are commonly perceived as healthy (Bullock et al., 2020), we believe adding a vegan label will increase product preference.

Thus, we expect to replicate the findings from previous studies showing that the presence of a vegan label leads to positive purchase intention. Accordingly, we hypothesize our H1 as follows:

H1: A vegan label (vs. no label) increases purchase intention.

2.2.1 Anticipated Warm Glow Feeling

Sustainability attributes can evoke emotions and feelings that positively influence consumers. Consuming products perceived as having others-benefiting characteristics signals prosocial behavior, enhancing the consumer’s emotional state (Lotz et al., 2013). Specifically, using products with sustainability attributes increases consumers’ positive feelings, contributing to a better consumer experience and, consequently, a higher purchase intention (Tezer & Bodur, 2020). In the literature, this improved emotional state is called a “warm glow.” The feeling of warm glow is an important behavior driver (Andrews et al., 2014), and the research has shown that sustainability attributes can activate this feeling in various contexts. For instance, participants listening to music with headphones made from recycled material experience feelings of warm glow and report a more enjoyable experience compared to participants who used regular headphones (Tezer & Bodur, 2020). This improved emotional state towards sustainable products persists even when the product is described as lower quality (Bezençon et al., 2020).

The feeling of warm glow has also been observed in the context of food consumption. Studies have shown that consumers report an improved emotional state after consuming foods
bearing a sustainability label, such as the Fairtrade and organic labels (Apaolaza et al., 2018; Lotz et al., 2013). Informing participants about the sustainable characteristics of chocolate increased how good they expected themselves to feel upon consuming it, resulting in a higher preference for fair trade chocolate, even when objectively superior alternatives (e.g., a bigger chocolate bar) were available (Trudel et al., 2020). Similarly, positive emotional feelings have been identified as a key driver of consumer preference for organic foods (Watanabe et al., 2020).

In contrast to the well-known sustainability attributes, the perception of veganism is ambiguous. On the one hand, veganism is positively viewed due to its commitment to higher ethical standards (De Groeve & Rosenfeld, 2022). On the other hand, individuals who declare themselves to be vegan still experience stigma (Bresnahan et al., 2016), being targeted as arrogant and overcommitted, which leads people to avoid being associated with this group (Markowski & Roxburgh, 2019). It is, therefore, unclear whether the mere presence of a vegan label will elicit positive feelings that arise from doing something good or whether it will instead engender fear of being associated with a stigmatized group.

Despite vegans still evoking negative associations, this is primarily the case for those who publicly advocate this lifestyle (De Groeve & Rosenfeld, 2022). Recent research shows that the moral commitment of vegans actually evokes admiration (Judge & Wilson, 2019), with people who declare reducing their meat consumption being more positively perceived (Patel & Buckland, 2021). Acting according to high moral standards increases how someone is perceived by society, as well as how someone feels about themselves (De Groeve et al., 2021), which is pointed as a reason for omnivores to adopt vegan behavior (De Groeve & Rosenfeld, 2022). Based on this, we posit that a vegan label will lead to a feeling of warm glow, which will drive the purchase intention of these products. According, we hypothesize that:

H2: A vegan label (vs. no label) increases consumers' anticipated warm glow, leading to higher purchase intentions.
2.2.2 Packaging Color and Consumer Biological Sex

Labels are typically displayed on a product’s packaging, which contains various design elements. Among these elements, packaging color is crucial in capturing consumers’ attention and is arguably considered the most important (Spence & Velasco, 2018). It influences consumers’ feelings and behavioral responses in different ways (Faralla et al., 2023). For example, a product in green packaging can make individuals feel more virtuous upon choosing it (Spielmann, 2021), while white (vs. black) packaging can make individuals feel purer (Semin & Palma, 2014).

Combining different design elements may strengthen or weaken each element’s intended message, enhancing or diminishing their impact on the product’s evaluation and how individuals feel about consuming it (Brought et al., 2016). According to the schema-congruency theory, consumers evaluate products based on the extent to which the product’s characteristics align with the activated category schema (Aggarwal & McGill, 2007). For example, a hygiene product with an eco-label is expected to be more efficient when the label is displayed on a package with a color congruent with the sustainability information (i.e., green). In contrast, the expected efficacy decreases when the same label is on a package with an incongruent color (e.g., blue). This higher rating positively impacts individuals’ purchase intention (Pance et al., 2017). Likewise, the preference for plant-based meat alternatives (PBMA) labeled as "plant-based" and presented in green packaging is higher compared to when the same product is presented in red packaging. However, if the same PBMA is labeled as a "meat alternative," red packaging leads to a higher preference than green. This happens because, in the first scenario, the plant schema is activated, making the color green be perceived as more congruent. In the second scenario, the meat schema is activated, leading the color red to be perceived as more congruent. These findings reveal that the associations activated by the
label are essential in determining which combination of design elements leads to positive behavioral intentions (Sucapane et al., 2021).

The congruency theory extends to other combinations. For example, feminine (masculine) brands with feminine (masculine) packaging are preferred over feminine (masculine) brands with masculine (feminine) packaging (Pang & Ding, 2021). Also, products displaying feminine (masculine) logos paired with feminine (masculine) colors are better liked than when the same product displays feminine (masculine) logos paired with masculine (feminine) colors (van Tilburg et al., 2015). Since sustainability is also associated with femininity (Brough et al., 2016), displaying a sustainability label on a packaging with feminine design elements would lead to a more positive attitude than when the same label is displayed on a packaging with masculine design elements. However, the congruency effect might be affected by consumers’ biological sex.

Brough et al. (2016) show that financial support to a proenvironmental organization branded with feminine (i.e., congruent) vs. masculine (i.e., incongruent) design elements (i.e., via colors, fonts, words, and symbols) is moderated by participants’ male sex. The authors reveal that male participants are more willing to donate to a pro-environmental organization that is schema-incongruently (i.e., masculine) than schema-congruently branded (i.e., feminine). One possible explanation might be that since the masculine identity is so fragile and constantly under-proof (Rosenfeld & Tomiyama, 2021), combining two feminine elements might threaten the masculine identity, reducing the positive feelings elicited by the sustainability attribute. For women, the effect remained ambiguous. While the evaluation of a congruently branded sustainable product was significantly higher than when the same product was incongruently branded, the financial support to a congruently branded proenvironmental organization did not significantly differ from the financial support offered to an incongruently branded organization. This could indicate that congruency loses its importance for women in
situations with an exclusive others-benefiting character, such as the charity donation. However, congruency still plays a role when it comes to product evaluation. Nonetheless, Brough et al. (2016) focused on pro-environmental organizations and non-food products. Moreover, the authors manipulated multiple cues simultaneously, making it challenging to associate the congruency effect with a specific product element. Therefore, more research is needed to understand how congruency might affect consumers' feelings. Applying the previous research to vegan-labeled food, we hypothesize that:

H3a: For women, the effect of a vegan label on consumers’ anticipated warm glow will be more pronounced for congruent (vs. incongruent) packaging color.

H3b: For men, the effect of a vegan label on consumers’ anticipated warm glow will be more pronounced for incongruent (vs. congruent) packaging color.

Figure 1

Conceptual Model
2.3 Methods

Before testing our hypothesis, we carried out a pre-study (Section 3.1) to establish the stimuli for our main study. The procedural details for the main study are outlined in Section 3.2. Both studies were approved by the independent ethical review board at the authors’ university.

2.3.1 Pre-study

We first wanted to ensure that the vegan label was perceived as feminine. We employed a between-subject design and recruited 42 participants through SurveyCircle. SurveyCircle is a crowdsourcing platform based on mutual support. By fulfilling surveys, participants earn points that can be used to acquire participants for their survey. We excluded those participants who took the survey more than once (based on participation with identical IP Addresses); 38 valid responses remained for analysis (76.3% women, \( M_{\text{age}} = 24.76, \text{SD} = 4.76 \)).

After agreeing to participate in the survey, participants were shown the V-label and asked to rate how they perceived a product containing such a label (“A product with this label is advertised…”, 1 = exclusively for women to 7 = exclusively for men). The V-Label was selected as the vegan label because it is the most frequently found on food packaging in Europe. We compared the rating using the scale midpoint of 4 as the cutoff value for categorization. Participants classified products containing the vegan label as being advertised more for women than men (\( M = 3.76, \text{SD} = .49, t = -2.98, p = .003 \)). Based on this result, we can affirm that the vegan label makes a product more associated with women than men.

2.3.2 Main Study

The main study was designed as a 2 (vegan label: absent vs. present) x 2 (packaging color: congruent vs. incongruent) x 2 (consumers’ biological sex: female vs. male) between-
subject design (see Fig.1 for a visualization of our conceptual model). Packaging color was chosen according to previous research that suggested pink to be a feminine color, thus representing the congruent option, and maroon, a masculine color, thus representing the incongruent option (van Tilburg et al., 2015). We selected a chocolate bar as a stimulus because it is commonly consumed by both genders and displayed in different packaging colors.

A sample of 268 participants living in Germany was recruited via SurveyCircle. We excluded those participants who did not pass the attention check (N = 36, the attention check consisted of asking participants to click the number seven), who took the survey more than once (N = 23, based on participation with identical IP Addresses), and who declared to follow a vegan diet (N = 6), to avoid biased answers. A total of 203 valid responses were retained and utilized for data analysis. The average age of the sample was 27.60 years (SD = 7.40, min = 20, max = 70), with 62.6% women and 76.4% having at least a bachelor’s degree.

After agreeing to participate in the survey, participants were randomly assigned to one of four conditions. Participants saw a chocolate bar either in pink or maroon packaging, with or without a vegan label, and were asked to state their anticipated warm glow from consuming the chocolate (“Compared to other chocolates, the consumption of the chocolate pictured above would…” with the endpoints 1 = “give me a bad feeling” and 7 = “give me a good feeling,” adapted from Andrews et al., 2014), as well as their intention to purchase it (“Compared to other chocolates, I… the chocolate pictured above” with the endpoints 1 = “would not buy” and 7 = “preferably buy”).

2.3.2.1 Results

ANOVA results (see Table 1 for summary statistics) indicate a positively significant direct effect of the vegan label on purchase intention \( M_{\text{control}} = 3.63, \ SD = 1.22, \ N = 98 \) vs. \( M_{\text{vegan}} = 4.14, \ SD = 1.17, \ N = 105, \ F(1, 195) = 10.989, \ p = .001 \). This indicates that the presence
of the vegan label increases the purchase intention of a product compared to when the label is not presented. The positive direct effect of the vegan label on purchase intention is in accordance with previous literature (Stremmel et al., 2022) and allows us to confirm H1.

We also found a positively significant effect of the vegan label on the anticipated warm glow ($M_{\text{control}} = 3.66$, $SD = 1.18$, $N = 98$ vs. $M_{\text{vegan}} = 4.42$, $SD = 1.10$, $N = 105$; $F(1, 195) = 22.970$, $p < .001$). Furthermore, we could observe a significant three-way interaction for anticipated warm glow ($F(1, 195) = 5.651$, $p = .018$) (see Figure 2), which indicates that the effect of the vegan label on anticipated warm glow significantly differs depending on packaging color and consumer’s biological sex. All other effects were not significant; $p$’s > .10.
<table>
<thead>
<tr>
<th></th>
<th>No label</th>
<th>Vegan label</th>
<th>No label</th>
<th>Vegan label</th>
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<tr>
<td></td>
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<tr>
<td><strong>Packaging color</strong></td>
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<td></td>
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</tr>
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<td></td>
</tr>
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<tr>
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<td>4.27</td>
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<tr>
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<td>1.22</td>
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<td>1.25</td>
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</table>
To test the indirect effect of the vegan label on purchase intention via anticipated warm glow, we used the PROCESS macro for SPSS (model 4; Hayes 2022) with 5,000 bootstrap samples. The effect of the vegan label on purchase intention was completely mediated via anticipated warm glow (EST = 0.444, SE = 0.108, 95% CI = 0.245 to 0.671), thus supporting H2.

Next, we tested our conceptual model using a moderated-moderated mediation analysis with 5000 bootstrap samples (model 12; Hayes 2022) (for details on the results, see Fig. 4).
For women, the presence of the vegan label increased the anticipated warm glow, leading to higher purchase intentions. This effect was more pronounced for congruent (EST = .611, SE = .210, 95% CI = .215 to 1.032) than incongruent (EST = .332, SE = .157, 95% CI = .036 to .658) packaging color. For men, vegan labeling increased consumers’ anticipated warm glow, leading to higher purchase intentions when the packaging color was incongruent (EST = .762, SE = .264, 95% CI = .251 to 1.289). In contrast, when the packaging color was congruent, we found no significant indirect effect (EST = .131, SE = .162, 95% CI = -.184 to .450). The index of moderated moderated mediation is significant (EST = .910, SE = .410, 95% CI = .119 to 1.729), meaning that the indirect effect of the vegan label on purchase intention for different packaging colors depends on consumers’ biological sex. Therefore, H3a and H3b are supported.

Figure 4

Parameters Estimates

(***p < .01, **p < .05, *p < 0.1)
2.4 Discussion

The number of products labeled as vegan is growing, and some companies are adjusting the packaging of their vegan-labeled products to maintain a congruent product image (e.g., Hajok, 2024). Sustainability cues are often observed to positively affect consumers' emotions (Lotz et al., 2013), promoting short- and long-term behavioral responses (Hartmann et al., 2017; Juhl et al., 2017). However, vegans are still stigmatized (Markowski & Roxburgh, 2019), and vegan alternatives to conventional products often face more negatively associated than their counterparts (Michel et al., 2021). Therefore, it is important to understand how the vegan label affects consumers’ emotions. Since the combination of packaging elements might influence consumers' attitudes and behavior (Faralla et al., 2023), it is also relevant to understand how the vegan label works within a more integrated context.

Our results show that displaying the vegan label might positively affect purchase intention. This occurs because the vegan label leads consumers to expect themselves to feel better about consuming a product with the label. However, this effect is moderated by the product’s packaging color and consumers’ biological sex. In the following, we will initially elucidate our findings regarding the effect of the vegan label on the anticipated warm glow feeling. We will then expound upon the effect of packaging color and the consumer’s biological sex. Subsequently, we will draw on their implications and future research.

In our study, we show that the presence of the vegan label on a product packaging increases its purchase intention. Although this result contradicts previous research showing that the vegan label negatively affects consumers' preferences (Berke & Larson, 2023; Hielkema & Lund, 2022), it aligns with our expectations and previous literature indicating that the vegan label has a positive effect on consumer behavioral intention (Stremmel et al., 2022). A possible explanation for this divergence might be the increasing public discourse highlighting the relevance of reducing the consumption of animal-derived products, which may be shifting
people's attitudes towards vegan food (Tagesspiegel, 2023). Moreover, the differences in the contexts should also be considered. Berke and Larson (2023) and Hielkema and Lund (2022) investigated an OOH context, where behaviors are usually more driven by taste, while Stremmel et al. (2022) and our findings focus on packaged products typically found in supermarkets, where health goals play a more significant role. Future research should consider context when investigating the acceptance of the vegan label. Marketers aiming to increase transparency about the ingredients utilized in their products should not observe any disadvantage when adding vegan labels to their packaged products.

Consumers' anticipated warm glow fully mediates the positive effect of the vegan label on purchase intention. This result aligns with our prediction and research showing that sustainability cues elevate consumers’ feelings (Trudel et al., 2020; Tezer & Bodur, 2020). Similar effects have been found in the food context for other labels, such as the Fairtrade (Lotz et al., 2013) and the organic label (Apaolaza et al., 2018). Since warm glow is highlighted in the literature as generating spillovers to other sustainable behaviors (Juhl et al., 2017), our findings indicate a similar potential for the vegan label.

However, when considering the combination of the label with other variables, namely packaging color and consumer’s biological sex, we observe that the positive effect of the vegan label on warm glow is not without restriction. Products with a vegan label are perceived as more feminine and less masculine, aligning with the literature pointing out that sustainability is associated with femininity (Brough et al., 2016). In line with the congruency theory, which states that congruent elements lead to higher product evaluation (Pang & Ding, 2021; van Tilburg et al., 2015), we observed that the vegan label increased anticipated warm glow for both packaging colors, with the effect being stronger for the congruent color. However, these results hold only for the female group, while for the male group, the positive effect of the label is only observed for the incongruent packaging color. The male preference for the incongruent
combination aligns with the literature showing that men prefer sustainable products when these products have a masculine design (Brough et al., 2016). Since the masculine identity is fragile, combining the vegan label with another feminine cue, in this case, the pink packaging color, might threaten the identity of male consumers, reducing the positive effect of the label. These results reinforce the idea that the congruency between packaging design elements and consumers’ biological sex is more important than the congruency between packaging elements themselves, at least for male consumers (Neale et al., 2015). Nonetheless, food marketers aiming to promote the vegan aspect of their products should be aware that combining the label with incongruent packaging color might lead to overall higher purchases, as the lower purchases from females might be compensated by higher purchases from male consumers. Future research should investigate ways to detach veganism and sustainability from this gendered association.

Our findings are not without limitation. We tested the effect of the vegan label on a hedonic food. Despite the indication that the effect of vegan labels is independent of whether the product category is hedonic or utilitarian (Stremmel et al., 2022), previous research has shown that individuals usually need a justification to consume hedonic products (Okada, 2005). Therefore, the vegan label could be used as an “excuse” to consume a hedonic product, similar to what is found for other sustainability labels, like the organic label (Schuldt & Schwarz, 2010). Moreover, we assessed the impact of the vegan label on a product where the vegan characteristic might not be a central attribute in the decision process (Parker et al., 2020). In order to test the generalizability of this effect, future research should evaluate a more extensive variety of food exemplars.

From a theoretical perspective, our results reinforce that the vegan label increases the product’s purchase intention (Rosenfeld et al., 2022; Stremmel et al., 2022), extending the findings to a new product category, namely chocolate. Moreover, we contribute
to the literature by revealing the psychological reasoning behind the label effect: consumers’ anticipated warm glow. Additionally, we also contribute to the congruency theory by showing that gendered cues may still be relevant, especially for male customers.

From a practical perspective, our results give food marketers a greater understanding of the impact of vegan labels and their interaction with packaging color on consumers’ attitudes toward vegan products. Previous studies obtained different results regarding the use of congruent cues (Lieven et al., 2015). Our results demonstrate that, in order to promote vegan-labeled products, combining the vegan label with an incongruent packaging color may lead to an overall higher level of customers’ anticipated warm glow and purchase intention.

Policymakers should also be aware of the impact of congruent cues on male consumers. Our results indicate that strategies to detach the association of sustainability with a specific gender might promote more sustainable eating habits in the population.
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3 Paper 2: Rescue-based foods: The role of moral and ingredient familiarity
(co-authored by Yasemin Boztuğ)²

A prior version of this paper was under first-round review in Food Quality and Preference.

This paper is submitted to Appetite.

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Keywords: Upcycled foods, moral emotions, sustainability claim

² Authors contribution: Fernanda Carneiro-Otto: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing – original draft, Writing review & editing, Visualization. Yasemin Boztug: Resources, Validation, Writing – review & editing, Supervision.
3.1 Introduction

Approximately 30% of the food produced worldwide is wasted yearly (UNEP, 2024). Food still suitable for human consumption is often wasted along the supply chain due to oversupply, suboptimality (e.g., aesthetic flaws), or underestimated potential for human consumption (Priefer et al., 2016). This market failure has an estimated value of up to US$1 trillion (World Bank, 2020) and is responsible for 8 – 10% of global greenhouse gas emissions, significantly contributing to climate change (UNEP, 2024). In a world where almost one-third of the population suffers from food insecurity, food waste is also a social issue (UNEP, 2024). The negative implications of food waste reinforce why this issue has become part of the Sustainable Development Goals, with countries committing to halve food waste by 2030 (UN, 2015). Food industry actors have also recognized the importance of addressing this issue and have been attempting to implement viable solutions to decrease food waste at various points in the food supply chain (Wakeman et al., 2022).

Some companies are striving to reduce food waste by rescuing foods that would be discarded and reintroducing them into the food chain as ingredients in their products. For example, Motatos (www.motatos.de) uses potatoes deemed too “ugly” to be sold in grocery stores as an ingredient in their sauce; Regrained (www.regrained.com) uses brewers’ spent grains, a by-product of beer production, in its flour substitute products; while InStock (www.instock.nl) incorporates these grains into its granola. This practice of reintroducing food into the supply chain is not new. Many traditional dishes in diverse cuisines (e.g., Cassoulet in France and American chop suey in the US) were originally a way of utilizing leftovers. However, these foods are now being marketed as “upcycled” or “rescued” in many countries (Lu et al., 2024).

Marketers are not obliged to disclose that information. However, as environmental concerns among consumers grow (Euromonitor, 2022), many consumers consider the
sustainability aspects of the products they choose (Grunert et al., 2014). Therefore, some marketers emphasize their products' sustainable qualities to differentiate themselves in the market (de Visser-Amundson et al., 2021). The main strategy used to highlight the rescued characteristic of a product is by adding a claim on its packaging stating that the food contains ingredients that were rescued from being wasted. However, not all sustainability characteristics are perceived positively, and scholars have identified several unintended negative side-effects that can arise from marketing the sustainable attributes of products (Aschemann-Witzel et al., 2020; Spielmann et al., 2023).

In 2011, only 11 companies in the USA market highlighted the rescued characteristic of their products (Dewey, 2017). By 2023, that number had increased to 109 companies (ReFED, 2023). Despite the growing number of rescue-based foods (RBFs) (MarketWatch, 2023), there is limited available literature on this topic (Aschemann-Witzel & Stangherlin, 2021). Furthermore, no consensus exists on how marketing the rescued characteristic of an ingredient impacts consumer attitude and behavior. Some authors find that RBFs are not perceived more favorably than conventional products (i.e., products without this characteristic highlighted), and consumers are unwilling to pay more for them (Bhatt et al., 2020). Additionally, informing consumers about the rescued characteristic alongside environmental benefit appeals can evoke images of waste and spoilage in their minds, attenuating consumer preference (Acuti et al., 2022). Conversely, some authors suggest that RBFs reduce guilt and improve self-perception, positively affecting the demand for those products (Aschemann-Witzel & Stangherlin, 2021). Given that food waste occurs for various reasons, contradictory findings may arise due to differences within the RBF category.

Past studies on products made from discarded items (e.g., a necklace made of soda can pieces) suggest that highlighting the previous identity of the rescued component increases the demand for the resulting product (Caprioli et al., 2023; Kamleitner et al., 2019). Nonetheless,
the extent to which emphasizing the previous identity of the rescued component affects the perception of products in the food category remains unclear. RBF can be made with familiar or unfamiliar rescued components. However, unfamiliarity in the food context has been linked to decreased attitude and behavioral intention (Aschemann-Witzel & Peschel, 2019; Hellali & Korai, 2023). Based on that, it is plausible that unfamiliarity with the rescued food ingredient could also impact consumers’ attitudes toward the RBF. This is concerning because, besides the environmental benefits of reducing food waste, numerous unfamiliar ingredients, such as food industry by-products, are often considered low-cost ingredients abundant in antioxidants, dietary fibers, minerals, and essential fatty acids (Grasso, 2020).

We employed a mixed-methods design to determine how informing consumers that food was made with rescued ingredients influences their preferences and behavior, and how the level of familiarity with the rescued ingredient interacts with it. Firstly, we conducted a qualitative study to identify the main associations that emerged when consumers imagined a product made with RBF. Subsequently, we conducted a quantitative experiment to validate the initial study's findings and investigate how familiarity with the rescued ingredient influenced consumers’ perceptions.

Our research contributes to the literature on food waste in two ways. First, we extend the understanding of the psychological underpinnings of food waste by highlighting how the “rescued” claim positively influences consumers’ moral attitudes and how it reflects in their behavioral intentions. Second, we demonstrate that not all RBFs are perceived equally and that it is crucial to differentiate between RBFs made with familiar and unfamiliar ingredients when analyzing this food category. While consumers do not necessarily react negatively to RBFs made with unfamiliar ingredients, communicating that the unfamiliar ingredient was rescued does not positively impact consumer behavior either. Based on these findings, we derived
managerial implications and identified the research’s limitations, as well as opportunities for future research.

3.2 Theoretical Background

3.2.1 “Rescued” Claim and Consumer Behavior

Utilizing food that would otherwise be discarded as an ingredient to produce other foods is not a new concept. Many traditional dishes were created as a way to use leftovers. For example, Arancini Balls, an Italian specialty, are fried rice balls originally made with day-old risotto and cheese. Chilaquiles, a Mexican dish, are fried stale tortillas mixed with salsa. The food industry has also long been creating new products from by-products. Whey, the by-product of milk in cheese production, has high availability (80-90 % of the milk amount) and nutritional value, which has encouraged companies to incorporate this by-product into their recipes and even launch a new product category with high market value, namely whey protein (Aschemann-Witzel et al., 2023). However, marketing the fact that the food used as an ingredient would otherwise be wasted is still relatively new.

This phenomenon can be explained by the fact that as environmental concern grows, many consumers are becoming aware of the consequences of their behavior on the planet, developing a positive attitude toward sustainable products and increasing their preference for them compared to conventional ones (White et al., 2019). Previous studies show that organic foods are preferred to conventional ones (Yeh et al., 2021). Similar observations are made for other sustainability attributes such as local (Feldmann & Hamm, 2015) or fair trade (Berry & Romero, 2021). The growing relevance of sustainability in consumers’ decision-making is prompting companies to invest in making their products more sustainable and communicate it to consumers. However, informing about sustainability attributes can also backfire for different reasons. For example, consumers might feel overwhelmed by the high effort associated with
processing sustainability-related product information, the sustainability information might reduce quality perception, or it can elicit negative emotions in consumers, negatively affecting their attitudes attitude towards a product (for a review, Acuti et al., 2022).

One of the main reasons for foods to end up being discarded is oversupply and aesthetic flaws, as well as the underutilization of those foods as a whole, that is, of its side-streams (e.g., fruit peels) or by-products (e.g., bagasse) (Aschemann-Witzel et al., 2021). Products with aesthetic flaws or made with by-products or side-streams are typically perceived as having lower quality (Aschemann-Witzel et al., 2019) and are commonly associated with waste (Aschemann-Witzel & Stangherlin, 2021). Despite this, some studies indicate that consumers are willing to buy RBFs (Coderoni & Perito, 2020; McCarthy et al., 2020), which can be partially explained by the fact that solely communicating that a food product is rescued does not necessarily lead to negative associations (de Visser-Amundson et al., 2021). Moreover, some consumers perceive RBFs as helpful for the environment and an effective tool for minimizing food waste (Bhatt et al., 2018), which might positively affect the acceptance of such products. Since RBFs do not necessarily have visible flaws or are made with side-streams, which are the main reasons for the lower acceptance of those products, we postulate the following hypothesis:

H1: The presence of a “rescued” claim (vs. no claim) will positively influence consumers’ purchase intention.

3.2.2 The Role of Moral

Environmentally conscious behaviors, such as purchasing a sustainable product, are commonly considered to fall within the realm of morality (Thøgersen & Ölander, 2006). This implies that individuals form attitudes towards environmentally conscious behaviors based on their moral convictions, reflecting their perceptions of right and wrong rather than a
comprehensive assessment of the costs and benefits involved (Schwartz, 1977). This morality-based attitude then serves as a foundation for individuals to decide how to act (Thøgersen & Ölander, 2006).

The concept of morality is essential for understanding why certain individuals choose to address certain issues while others do not (Graham et al., 2013). Specifically, individuals may acknowledge sustainability problems but lack the motivation to address them if they do not perceive them as moral dilemmas. Scholars have examined various sustainable behaviors through the lens of moral theory. For instance, Davies et al. (2002) found that individuals’ perception of recycling as an appropriate (moral) behavior was a stronger predictor of their attitude towards a recycling program than their perception of recycling as having low adherence costs, leading to higher recycling rates. Similarly, Rees et al. (2015) show that the more morally wrong individuals perceived human-caused environmental damages to be, the more willing they were to take action against it. These findings can be explained by the fact that acting according to one’s norms and values leads to a positive self-rewarding feeling, which individuals strongly consider when deciding how to act (Arvola et al., 2008). Therefore, this psychological aspect is a key component enabling individuals to recognize a problem and coordinate its solution effectively.

In the context of food, moral convictions are also one of the main reasons why consumers act more sustainably. Sustainability cues, such as labels or claims, can evoke moral associations that ultimately shape consumers’ preferences. For example, consumers demonstrate a positive moral attitude towards foods labeled as organic (Yeh et al., 2021) or Fairtrade (Trudel et al., 2020), which explains their preference for such foods over conventional ones. Similarly, consumers perceive locally produced foods as the morally right choice, increasing their preference for these foods compared to imported ones (Thøgersen, 2023). However, moral considerations can sometimes backfire and hinder the acceptance of
sustainable foods, as is evident with vegan foods. In some countries, due to cultural considerations, vegan foods are not always perceived as an appropriate choice, resulting in their consumption being deemed wrong and, therefore, immoral (Ruby & Heine, 2011).

Food waste is regarded as a global moral issue due to unequal access to food (Aschemann-Witzel et al., 2017), and wasting food is generally perceived as immoral (Visschers et al., 2016). However, some scholars have expressed concern that RBFs might be associated with waste, evoking feelings of disgust and making their consumption perceived as wrong (Spielmann et al., 2023).

An individual’s ability to perceive a product as being ethical determines their behavior towards it. However, the impact of the “rescued” claim on moral attitude remains under-researched. Based on the fact that most sustainability cues are positively perceived in moral terms, we postulate the following hypothesis:

H2: The presence of a “rescued” claim (vs. no claim) will positively influence moral attitude, subsequently enhancing consumers’ purchase intention.

3.2.3 Familiarity with the Rescued Ingredient

Consumers often hesitate to support what they are unfamiliar with (Hartmann & Siegrist, 2016). Familiarity has been shown to mitigate fear and distrust (Aldridge et al., 2009) and influences various sustainable behaviors, such as investing in sustainable companies (Tenner & Hörisch, 2021) and purchasing sustainable housing (Judge et al., 2019). Generally, attitudes are stronger predictors of behavior when consumers are already familiar with the product (Verbeke, 2015). Furthermore, familiarity influences moral perception, predicting food acceptance and preference. For example, moral attitude was a better predictor of the intention to choose organic red wine among consumers who were already familiar with it (Thøgersen, 2002). Additionally, individuals familiar with consuming insects or vegan foods are more
inclined to perceive them as a morally appropriate food source (Adise et al., 2015; Verbeke, 2015).

RBFs can be made from parts of foods that consumers are familiar with as an ingredient (e.g., banana pulp) or unfamiliar with (e.g., banana peel). Based on the line of reasoning that familiarity strengthens the idea of morality, we postulate the following hypotheses:

H3: The effect of the “rescued” claim on moral attitude and consumer purchase intention will be more pronounced for familiar (vs. unfamiliar) rescued ingredients.

3.3 Methods

We utilized a mixed-methods design to address our research questions, combining qualitative and quantitative approaches. In the first study, we employed an open-ended questioning methodology to explore the associations that consumers form about RBFs. Additionally, we investigate the potential factors influencing consumers’ consideration of purchasing these products. Open-ended questions facilitate the identification of unexpected associations and offer valuable insights into consumers’ perspectives, which is recommended in under-researched areas (Aschemann-Witzel et al., 2020). In the second study, we run an experiment to quantitatively analyze the “rescued” claim’s impact on moral attitude and purchase intention, along with the moderating influence of familiarity with the rescued ingredient. Ethical approval for both studies was obtained from the authors’ university’s review board.

3.3.1 Study 1

Forty participants from Germany (47.5% women, 2.5% divers, M_{age} = 27.47, SD = 6.72) were recruited for the study through Prolific in exchange for a small cash incentive — the study comprised two parts. In the first part, participants were presented with the definition
of RBF (“Rescue-based foods are those produced with ingredients that would otherwise be wasted. This often happens due to aesthetic flaws, oversupply, or underestimated use potential.” adapted from de Visser-Amundson et al., 2021), a common practice given the innovative nature of this food category (e.g., Grasso et al., 2023). After reading the definition of RBFs, participants reported whether they had previously consumed RBFs, specifying the particular food if affirmative.

The second part of the study involved a word association task, beginning with two warm-up questions to familiarize participants with the activity. In these warm-up questions, participants were prompted to list the first five words or thoughts that came to mind upon seeing the word “sky.” The same procedure was repeated for the word “telephone.” The order in which the two words were presented was randomized. Subsequently, participants were instructed to: “Imagine you are in a supermarket and see a food product made with a rescued ingredient. Please write the first five words or thoughts that would come to mind.” They were then asked to report their intention to purchase a RBF and explain their reasoning. Socio-demographic information was collected before finishing the survey.

3.3.1.1 Results and Discussion

The responses were analyzed using content-analysis procedures (Krippendorff, 2004). Two independent coders cross-validated the answers. Out of the participants, ten reported having consumed foods with rescued ingredients. The responses that emerged were categorized into two main dimensions: associations related to the product itself and those related to the participants. Table 1 presents the dimensions, categories, example quotes, and the percentage of respondents corresponding to each category or dimension. Depending on the depth of the answer, a single respondent may be represented in more than one category. As shown, 65% of the responses were coded into the ‘product characteristics,’ while 35% were coded as
‘personal/self-related characteristics.’ In the ‘product characteristics’ dimension, sustainability was the most frequently mentioned category participants associated with RBF (29%). In the ‘personal/self-related dimension,’ words associated with moral aspects were the most commonly mentioned (21%).

When asked about their intention to purchase RBFs, all participants who had already tried RBFs (N = 10) expressed their willingness to continue purchasing them. Among the participants who had not tried RBFs before (N = 30), 80% expressed interest in purchasing them, 16.7% stated that they would not buy such products, and 3.3% were unsure. Considering both groups, participants who stated having tried RBF before and those who stated that they had not, the most frequently mentioned reasons to purchase RBFs were price (e.g., ‘if it is cheaper than conventional products’) and moral aspects (e.g., ‘to do something good,’ ‘to contribute to the environment’), representing 37.5% for each of these reasons. Followed by quality (e.g., ‘if it is tasty,’ ‘if it is like normal food’) (20%) and health aspects (e.g., ‘if the food is healthy’) (5%).

These findings provide initial insights into how RBFs are perceived and highlight the importance of moral aspects in the purchase intention of these products. Next, we conducted a quantitative study to enhance the generalizability of our results and analyze the impact of ingredient familiarity on the perception of moral and purchase intention within the context of RBF.
Table 1

Consumers' Associations with RBFs

<table>
<thead>
<tr>
<th>Dimensions and categories</th>
<th>Example quotes</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainability</td>
<td>'food is not wasted,' 'environmentally friendly,' 'sustainable'</td>
<td>65%</td>
</tr>
<tr>
<td>Quality</td>
<td>'old,' 'tasty,' 'ripe'</td>
<td>29%</td>
</tr>
<tr>
<td>Price</td>
<td>'cheap,' 'low price'</td>
<td>18%</td>
</tr>
<tr>
<td>Waste</td>
<td>'discarded,' 'waste,' 'mold'</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Personal/self-related characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moral</td>
<td>'good,' 'meaningful,' 'valuable'</td>
<td>35%</td>
</tr>
<tr>
<td>Curiosity</td>
<td>'interesting,' 'new,' 'would like to learn more'</td>
<td>21%</td>
</tr>
<tr>
<td>Health</td>
<td>'healthy,' 'nutritious,' 'harmful'</td>
<td>12%</td>
</tr>
</tbody>
</table>

Note: N = 40. Statements were coded into one or more categories. Question: “Imagine you are in a supermarket and see a food product made with rescued ingredients. Please write down the first five words or thoughts that would come to mind.”

3.3.2 Study 2

While selecting the stimuli for this study, we opted for banana cake because it is widely known and can be easily made either with familiar or unfamiliar parts of the same ingredient, bananas - banana pieces or banana peels. A pre-study involving 93 participants (48.4% women, 3.2% divers, M_age = 28.75, SD = 8.73, Prolific) revealed that banana pieces are perceived as a familiar food ingredient (1 = ‘not familiar at all’ to 7 = ‘very familiar’) compared to banana peels (M_pieces = 5.94 vs. M_peels = 2.11, t(91) = 12.29, p < .001).

For study two, 200 participants (49.2% women, 1.6% divers, M_age = 28.47, SD = 7.12, with 43.9% holding a bachelor’s degree or higher) were recruited from the same online platform as in the previous studies. They were randomly assigned to one of four conditions in a 2 (“rescued” claim: control vs. with the claim) x 2 (rescued ingredient: familiar vs. unfamiliar) between-subjects design (see Fig. 1 for a visualization of our conceptual model). Participants
in the claim condition first read the definition of RBF, while those in the control condition proceeded directly to the questionnaire. The definition was the same as that used in study one. Next, participants viewed a picture of a banana cake made either with banana pieces (representing the familiar ingredient condition) or banana peels (representing the unfamiliar ingredient condition).

After viewing the stimuli, participants were asked about their moral attitude towards the product and their intention to buy the cake. The moral attitude was measured using three items adapted from Arvola et al. (2008): “Buying the cake pictured above instead of other cakes would” (1) “feel like making a personal contribution to something better,” (2) “feel like the morally right thing,” and (3) “make me feel like a better person.” Responses were provided on a 7-point scale ranging from ‘strongly disagree’ to ‘strongly agree.’ Purchase intention was assessed with one single item: “Compared with other cakes, would you not buy (=1) … preferably buy (=7) the cake pictured above.” Before finishing, participants provided their socio-demographic information.

Figure 1

Conceptual Model
3.3.2.1 Results and Discussion

We excluded nine participants for failing the attention check, which consisted of clicking the option “I disagree.” Additionally, four participants were excluded because they took the survey multiple times, based on participation with identical IP addresses. A manipulation check confirmed that the cake with the “rescued” claim was perceived as contributing to food waste reduction compared to the cake without a claim (M_{control} = 4.17 vs. M_{claim} = 5.62, F(1, 183) = 45.22, p < .001, n^2_p = .198).

A two-way ANOVA was performed to test for the effect of the “rescued” claim on consumers’ purchase intention. Participants exposed to the cake with the “rescued” claim reported significantly higher purchase intention (M_{claim} = 4.25) compared to those who viewed the cake without a claim (M_{control} = 3.36, F(1, 183) = 13.82, p < .001, n^2_p = .070), thus supporting H1. Further analysis of the mean differences between the control group’s purchase intention and the group exposed to the “rescued” claim revealed more pronounced differences when the cake was made with banana pieces rather than banana peels (no claim: M_{unfamiliar} = 3.11 vs. M_{familiar} = 3.59; with claim: M_{unfamiliar} = 3.52 vs. M_{unfamiliar} = 4.98). This yielded a significant interaction effect between the claim and ingredient familiarity for purchase intention (F(1, 183) = 4.04, p = .046, n^2_p = .022).

To test the indirect effect of the “rescued” claim on purchase intention via moral attitude, we used a mediation analysis with 5,000 bootstrap samples (model 4; Hayes 2022). The indirect effect was positive and significant (EST = 1.038, SE = 0.187, 95% CI = 0.677 to 1.422). Supporting H2, the results demonstrated that the effect of the “rescued” claim on purchase intention is entirely mediated by moral attitude.

We then tested our conceptual model using a mediated moderation analysis with 5,000 bootstrap samples (model 8; Hayes 2022) (for parameter estimates, see Fig. 2). The index of mediated moderation demonstrates a significant difference between the group with the
unfamiliar rescued ingredient compared to the familiar rescued ingredient conditions (IE = 1.005, Boot SE = .333, 95% CI = .351 to 1.669). The mediation effect through moral attitude was significant for both conditions but stronger for the familiar one (unfamiliar rescued ingredient: IE = .519, Boot SE = .249, 95% CI = .049 to 1.027; familiar rescued ingredient: IE = 1.524, Boot SE = .252, 95% CI = 1.606 to 2.049), leading us to accept H3.

Therefore, we can conclude that a “rescued” claim on a product’s packaging increases consumers’ purchase intention. The higher purchase intention is explained by the fact that the “rescued” claim leads consumers to perceive product consumption as the right thing to do. This effect will hold for both unfamiliar and familiar ingredients to the consumers, but the moral attitude will be significantly higher for ingredients consumers are familiar with.

### Figure 2

**Parameter Estimates**

![Diagram](image)

### 3.4 General Discussion

Consumers play an important role in reducing food waste. By adopting food options that utilize rescued ingredients, consumers can contribute to avoiding wastage and supporting more efficient utilization of natural resources. Firms are employing various strategies to promote RBFs, including highlighting the rescued characteristics of their products. However,
consumer perception of RBFs is still under-researched, particularly regarding differentiation within this “new” food category. Based on this background, we first quantitatively investigated consumers’ associations with the concept of RBFs and their willingness to purchase such products. Subsequently, we quantitatively examined how adding a “rescued” claim to a product influences consumer purchase intention through moral attitude and how familiarity with the rescued ingredient impacts this relation.

Our findings demonstrate that individuals intend to purchase RBFs, indicating a potential market for companies to invest in and reinforcing previous research (e.g., Grasso et al., 2023). However, companies should recognize that not all types of RBFs are equally perceived. Promoting RBFs made with familiar ingredients generates synergy effects, increasing consumers’ purchase intention. However, this synergy effect is diminished for RBFs made with unfamiliar ingredients. This does not imply that companies should not invest in RBFs with unfamiliar ingredients. Instead, consumers may require time to develop new shopping habits (Keller et al., 2018). Moreover, in the long run, exposure to unfamiliar ingredients can be expected to increase the likelihood that these ingredients will be perceived as familiar in the future (Aschemann-Witzel & Stangherlin, 2021).

3.4.1 The Mechanism Behind the Intention to Purchase RBFs

The present findings make a valuable contribution to the research on RBFs. By utilizing a mixed-methods design and investigating the mediating role of moral attitude in the effect of the “rescued” claim on purchase intention, we respond to the call for more qualitative studies and studies to understand the reasoning behind the intention to purchase RBFs (Aschemann-Witzel & Stangherlin, 2021).

Our first study reveals that RBFs generally evoke positive associations in consumers’ minds and that consumers tend to have an intention to purchase these foods. Previous studies
have suggested that RBFs might be perceived as lower quality (Aschemann-Witzel et al., 2019) or associated with spoilage (Aschemann-Witzel & Stangherlin, 2021). Although we did not specifically test these associations, and our goal is not to dismiss them, our qualitative study suggests that such associations are not necessarily at the forefront of consumers’ minds, aligning with previous findings (Visser-Amundson et al., 2021).

Our second study further elucidates that the intention to purchase RBFs can be explained by the fact that RBFs activate consumers’ moral feelings. Therefore, seeing a product with a “rescued” claim leads consumers to perceive its purchase as “the right thing to do,” fostering a positive moral attitude toward the product and, consequently, boosting consumers’ purchase intention. Given that the purchase intention of RBFs is rooted in moral attitudes, marketers might benefit from emphasizing moral aspects when promoting these products.

Our findings align with our prediction and are consistent with previous research demonstrating that sustainability cues enhance positive moral attitudes, increasing purchase intention (Arvola et al., 2008). Our results contribute to the literature on RBF by reinforcing that there is market potential for these products. Moreover, our findings suggest that this potential extends beyond environmentally concerned groups, indicating a larger market than previously suggested by other scholars (McCarthy et al., 2020; Zhang et al., 2020). Furthermore, by highlighting the role of moral attitude on purchase intention, we extend the existing literature on consumer variables that influence behavior (Aschemann-Witzel & Stangherlin, 2021).

3.4.2 The Role of Familiarity with the Rescued Ingredient

Familiarity has been observed to positively influence how consumers morally judge a product (Verbeke, 2015). Although the purchase intention of RBFs is higher when the rescued
ingredient is familiar to consumers, our study demonstrates that the positive effect of the “rescued” claim will hold for unfamiliar rescued ingredients, albeit to a lesser extent.

Contrary to previous research that observed a low attitude towards RBFs made with unfamiliar ingredients (Aschemann-Witzel & Peschel, 2019), we show that the attitude towards RBF remains positive even for unfamiliar ingredients. One potential explanation may lie in the expected taste of the rescued ingredient. At the same time, previous research analyzed RBFs made with ingredients that have uncommon flavors for the tested product category (i.e., a cocoa drink made with grass/potato protein). In our case, the expected taste of the rescued ingredient is familiar (i.e., banana is a familiar cake flavor). Differences in the results may also arise from variations in the categories examined. While previous research focused on virtue products (i.e., milk substitutes), we focused on a vice product (i.e., cake). Regarding RBFs, acceptance has been observed to be higher for vice categories (Peschel & Aschemann-Witzel, 2020). Future studies should investigate the differences within the unfamiliar ingredients group and the possible interaction with the virtue and vice product categories.

The generally positive attitude towards RBFs made with unfamiliar ingredients indicates an amplified potential for this category, as it increases the amount of food that can be rescued from being wasted. This is not only positive from an environmental perspective but also reveals a great opportunity for the industry and policymakers, as using underused fruits can contribute to improving local employment, among other benefits (Aschemann-Witzel et al., 2021). By analyzing how a RBF without visible flaws influences moral evaluation, our results respond to calls for marketing research on different types of RBFs (Spielmann et al., 2023) and support the notion that consumers do have an interest in RBFs when the rescued ingredient is less visually discernible (de Visser-Amundson et al., 2023).
3.4.3 Limitations and Future Research

Our findings are not without limitations. Our study focused on the effect of the “rescued” claim on one product, namely cake. Additionally, testing our hypotheses on a packaged product may have influenced participants’ perceptions of characteristics that affect purchase intention, such as food safety. Consumers in developed countries usually assume that packaged foods meet a minimum quality standard and are safe to consume, influencing food acceptance (Lease et al., 2014). Future research could examine the generalizability of our results by extending the analysis to unpacked foods. Including different products would also enable better control for consumer heterogeneity in taste preferences (Tan et al., 2016). Furthermore, both studies in our research were conducted in Germany, where consumers have a high level of trust in the quality of products (Macready et al., 2020) and a high awareness of environmental issues (Grunert et al., 2014). Future research should investigate whether the findings can be reproduced in other countries.

3.5 Conclusion

Food waste presents a significant environmental, social, and economic challenge. The United Nations has set a 50% reduction in it as a Sustainable Development Goal to be achieved by 2030. Food companies and consumers are also increasingly aware of the importance of addressing this issue. While avoiding waste by utilizing leftover foods is not new, marketing this aspect is a relatively recent development. However, the impact of informing consumers about this characteristic on their intention to purchase a product is still not fully understood, especially when possible differences within the RBF category are considered.

Our studies show that RBFs evoke positive (moral) feelings in consumers, leading RBFs to be perceived as the right thing to consume. This reasoning is responsible for a higher purchase intention compared with when the RBF characteristic is not informed. The positive
moral attitude holds for RBF made with familiar and unfamiliar rescued ingredients. This study is the first to explore the role of ingredient familiarity within the RBF context. While recent research has shown that consumers are receptive to RBFs, our study highlights the importance of familiarity with the rescued ingredient as a moderator. While combining the promotion of the rescued characteristic with the introduction of new ingredients does not result in unintended negative consequences, the positive effect of the “rescued” claim on moral attitude will be stronger for ingredients that the consumer is familiar with. Companies aiming to reduce food waste should balance promoting their products’ rescued characteristics and introducing new food ingredients to consumers.
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4 Paper 3: Rescue us all! The effects of the “rescued” claim for familiar and unfamiliar food ingredients

(co-authored by Steffen Jahn, Jessica Aschemann-Witzel and Yasemin Boztuğ)\(^3\)

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4.1 Introduction

The global food system accounts for 34% of total greenhouse gas emissions (Crippa et al., 2021), and around 30% of all food produced ends up wasted (UNEP, 2021). Overproduction, aesthetic flaws, and underuse of potential are among the main reasons why this occurs. Confronting these facts, the United Nations has committed to halving food waste by 2030 (United Nations, 2015). Many companies have acknowledged this issue and started utilizing those foods that would otherwise be discarded as an ingredient in their products. From 2016 to 2021, the number of foods and beverages launched with rescued ingredients increased by 122% (Innova Trends Survey, 2021).

While the disclosure of whether an ingredient has been rescued from waste is not mandatory, some companies have begun to do so, aiming to draw attention to the food waste problem and signal social responsibility. For example, the Nestle (2023) brand Maggi launched a new line of soups (“Krumm Glücklich”) with the claim “rescue vegetables.” Online grocery Motatos has a line of products that the company claims to be “made with saved ingredients” (Motatos, 2023). In the literature, these products are referred to as upcycled, waste-to-value, value-added surplus, or rescue-based food (Aschemann-Witzel et al., 2022; Bhatt et al., 2017; de Visser-Amundson et al., 2021), with the first term being the most commonly used (Aschemann-Witzel et al., 2023). However, even though consumers are concerned about food waste, the degree of consumer acceptance of upcycled foods is a subject of debate. Some studies report positive results (e.g., Zhang et al., 2020), suggesting that consumers have positive attitudes toward the upcycled food category in general, akin to their views on other forms of corporate social responsibility (CSR) and pro-environmental products (de Visser-Amundson et al., 2021). Yet studies have reported backfire effects as consumers may associate the rescued characteristic with spoiled food, which potentially increases perceived health risks (Hellali et al., 2023), reduces the product's expected taste (Aschemann-Witzel & Peschel, 2019), and can
decrease purchase intention (de Visser-Amundson et al., 2021). Notably, previous research has focused on the personal characteristics that lead to the acceptance of upcycled foods (Coderoni & Perito, 2021; Grasso & Asioli, 2020; Hellali & Koraï, 2023; McCarthy et al., 2020; Yilmaz & Kahveci, 2022), or on how different ways of communicating about the upcycled characteristic affects product acceptance (Asioli & Grasso, 2021; Bhatt et al., 2020; Hellali et al., 2023; Peschel & Aschemann-Witzel, 2020; Taufik et al., 2023), with a few investigating the mechanism underlying these effects (Aschemann-Witzel & Peschel, 2019; Bhatt et al., 2021; de Visser-Amundson et al., 2021). Therefore, our first research objective is to examine how the “rescued” claim affects product perceptions and, subsequently, consumer behavior¹.

Our second research objective is to investigate the role of familiarity with the rescued ingredient. If a soup is made with rescued vegetables, for example, these ingredients are familiar to most consumers. Some upcycled foods, however, are made with ingredients not commonly used, such as side streams (e.g., peels) or by-products (e.g., spent grain). Existing research on products made with items that would have otherwise been discarded (e.g., a vase made with an old light bulb) indicates that emphasizing the past identity of the rescued component can boost demand for the product containing it (Kamleitner et al., 2019). However, it is unknown to which extent emphasizing the past identity of the rescued component affects product perception in the food category. As unfamiliarity within the context of upcycled foods has been associated with lower attitude (Aschemann-Witzel & Peschel, 2019) and behavioral intention (Grasso & Asioli, 2020; Hellali et al., 2023; Peschel & Aschemann-Witzel, 2020), it may also affect the effectiveness of a “rescued” claim.

The contribution of the present research is twofold. First, we analyze the yet-under-researched “rescued” claim regarding its effects on product perceptions and purchase intention.

¹ Although a study found that consumers tend to prefer the more technical term “upcycled” (Bhatt et al., 2017), we use the term “rescued” to highlight the moral connotation of the claim. Moreover, data collection took place in Germany where the “rescued” claim is commonly used to advertise the use of upcycled ingredients.
Second, we investigate how familiarity with the rescued ingredient interacts with the “rescued” claim. In doing so, we contribute to the extant literature investigating the effect of claims on product perception. To the best of our knowledge, this study is the first to focus on the “rescued” claim in this regard. As the reduction of food waste gains relevance, it is crucial for stakeholders in the food sector, as well as policymakers, to acquire a thorough understanding of this practice. Our research adds to the literature on ethical claims and contributes to better informing marketers on how they should communicate about the use of rescued ingredients in their foods and which potential benefits are best suited to be portrayed as unique selling points.

The remainder of this article is organized as follows: We first review the determinants of purchase intention that may be pertinent in the context of upcycled foods. Based on this review, we derive our conceptual model. Then, we introduce the stimuli used in our main study and present a pretest to assess their appropriateness. Additionally, we describe the methodology of our main study. Finally, we elaborate on the study’s results and implications.

4.2 Theoretical Background

The reasons for food waste are multifaceted, including overproduction, aesthetic flaws, and underused potential. “Rescued” claims inform consumers about the origin of ingredients used in the production process, which offers marketers an opportunity for product differentiation (Thøgersen, 2023). In the past years, there has been a growing demand for transparency along the food supply chain (Astill et al., 2019), with one of the arguments behind this demand being to enable consumers to make more conscious choices. Consequently, providing a “rescued” claim would enable consumers to choose products that contribute to the reduction of food waste.

However, the literature exploring the acceptance of upcycled food presents varying perspectives on whether providing information about the upcycled characteristics enhances
food acceptance (for a review, see Lu et al., 2024). Studies investigating consumers’ reactions to the concept of upcycled food reveal that the concept is generally perceived in a positive light, with the majority of consumers expressing interest in purchasing such products. For example, Nitzko and Spiller (2019) found that upcycled foods made from fruits and vegetables with aesthetic flaws are usually perceived as being of rather high quality, harmless for health, and appetizing, with slightly less favorable evaluations for upcycled foods containing side streams. Similarly, Zhang et al. (2020), focusing on the acceptance of upcycled foods across different generations, also observe that these foods are generally perceived as being of high quality, with participants indicating a positive intention to purchase them. Coderoni and Perito (2021) corroborate these findings, adding that food enriched with rescued ingredients is perceived as having environmental benefits.

In spite of a general willingness to buy upcycled foods, a majority of consumers seem more likely to select a conventional product when given a choice between conventional and upcycled food (Grasso et al., 2023). Likewise, when consumers learn the price of a conventional food product, they tend to adjust their willingness to pay for an upcycled alternative below that reference (Hellali et al., 2023; Stelick et al., 2021). The outcomes align with findings from studies explicitly contrasting conventional foods with their upcycled counterparts, which have reported either equal (de Visser-Amundson et al., 2021) or lower (Bhatt et al., 2020; Grasso & Asioli, 2020; Peschel & Aschemann-Witzel, 2020) behavioral intentions toward upcycled products (see Table 1). Upcycled products are preferred, however, when nutritional benefits are provided (Asioli & Grasso, 2021) or when consumers are reminded about the effects of food waste (Bhatt et al., 2020; Stelick et al., 2021).

The previous discussion indicates that a claim communicating the moral benefit of an upcycled food that uses rescued ingredients can potentially improve behavioral intentions (Bhatt et al., 2021; de Visser-Amundson et al., 2023). It is unclear, however, if products
featuring a “rescued” claim would stimulate favorable or unfavorable inferences, as well as what the underlying reasons are. We know that claims may lead consumers to develop expectations about a product that goes beyond the claim itself. Using one attribute to make inferences about the entire product is known as the halo effect (Burton et al., 2015; Jahn et al., 2023). For instance, consumers might see the “rescued” claim and erroneously infer that the upcycled product is healthier overall. At the same time, inferences can work in the opposite direction. For example, genetically modified food is often perceived as unhealthy, even if science disagrees (Wunderlich & Gatto, 2015). In the following sections, we discuss the likely inference mechanisms resulting from the “rescued” claim for three important drivers of food purchase intentions, namely perceived sustainability, healthiness, and taste.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Dependent Variable(s)</th>
<th>Moderator(s)</th>
<th>Mediator(s)</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhatt et al. (2020, Study 2)</td>
<td>Willingness to pay (WTP)</td>
<td>Rational vs emotional messaging</td>
<td>—</td>
<td>WTP for upcycled foods is lower than for conventional alternatives. Participants who watched an emotional video indicated a higher WTP for conventional products, whereas participants who watched a rational video indicated a higher WTP for upcycled foods.</td>
</tr>
<tr>
<td>Peschel &amp; Aschemann-Witzel (2020, Study 2)</td>
<td>Choice; fair price perception</td>
<td>Product category: virtue vs. vice</td>
<td>—</td>
<td>Equal choice likelihood for both conventional and upcycled plant-based products, with an overall preference for virtue products across all conditions. Fair price perception was the lowest in the upcycled condition, and upcycled vice foods displayed the lowest fair price perception overall.</td>
</tr>
<tr>
<td>Grasso &amp; Asioli (2020)</td>
<td>Preference, WTP</td>
<td>—</td>
<td>—</td>
<td>Food with conventional ingredients is preferred over the same food with upcycled ingredients. WTP for upcycled food is negative.</td>
</tr>
<tr>
<td>Asioli &amp; Grasso (2021)</td>
<td>WTP</td>
<td>Benefit provision</td>
<td>—</td>
<td>When nutritional benefit information is provided, WTP for upcycled food becomes positive.</td>
</tr>
<tr>
<td>Authors</td>
<td>Dependent Variable(s)</td>
<td>Moderator(s)</td>
<td>Mediator(s)</td>
<td>Key Findings</td>
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<tr>
<td>de Visser-Amundson et al. (2021, Study 1b)</td>
<td>Purchase intention</td>
<td>Physical waste association</td>
<td>—</td>
<td>Purchase intentions are similar between upcycled foods with no waste association and conventional foods, whereas attitudes are more positive for the former. When waste associations are present, purchase intention, but not attitude, decreases.</td>
</tr>
<tr>
<td>Stelick et al. (2021)</td>
<td>Purchase intention; WTP</td>
<td>—</td>
<td>—</td>
<td>Purchase intention was higher when participants were informed that the product was made with a rescued ingredient than when no information was provided. WTP for upcycled food was lower than for the conventional option.</td>
</tr>
<tr>
<td>de Visser-Amundson et al. (2023, Study 2)</td>
<td>Purchase intention; taste perception</td>
<td>Transformation level</td>
<td>—</td>
<td>For food with low ingredient transformation, purchase intentions, and taste perceptions are similar between upcycled and conventional food. For food with high ingredient transformation, purchase intention, but not taste perception, is higher for upcycled than conventional food.</td>
</tr>
<tr>
<td>Grasso et al. (2023)</td>
<td>Attraction; purchase intention</td>
<td>—</td>
<td>—</td>
<td>Most participants considered upcycled and conventional foods as equally attractive, indicating similar purchase intentions for both.</td>
</tr>
<tr>
<td>This study</td>
<td>Purchase intention</td>
<td>Ingredient familiarity</td>
<td>Sustainability, health, and taste perceptions</td>
<td>Through sustainability and health perceptions, a “rescued” claim increases purchase intention, especially when the rescued ingredient is familiar.</td>
</tr>
</tbody>
</table>
4.2.1 Perceived Sustainability

The significance of sustainability attributes in food choices has increased in the last few years (Smeding et al., 2023). For example, information on low carbon emissions or local production has been shown to increase consumers’ preference for it (Aprile & Punzo, 2022; Holenweger et al., 2023). Similarly, stating that during the production process, the company actively avoided overproduction positively affects purchase intention (Lucas et al., 2021).

From the literature, we know that consumer beliefs about the sustainability of products with claims such as “local” and “organic” are often based on expectations of lower carbon emissions in production processes and transportation (Feldmann & Hamm, 2015). However, studies have pointed out that these beliefs may be incorrect, as frequently, the carbon footprint of conventional and organic food production is essentially equivalent (Treu et al., 2017). Similar holds for local products, as not only the proximity to the consumption place is relevant to determining how much greenhouse gases are emitted along the production chain, but also the season in which a crop is grown plays an important role (Theurl et al., 2014).

In the context of upcycled foods, previous research has revealed consumer interest in purchasing foods made with ingredients that would otherwise be discarded (Zhang et al., 2020), with environmental reasons being mentioned as a motivation for their acceptance (Coderoni & Perito, 2021; Moshtaghian et al., 2024; Nitzko & Spiller, 2019). Ensuring that food produced for human consumption fulfills its purpose is considered as sustainable by consumers (Grasso et al., 2023). Previous research has shown that consumers can perceive the use of ingredients that would otherwise go to waste as environmentally friendly (Bhatt et al., 2017; Coderoni & Perito, 2021; Grasso et al., 2023). However, some people may not perceive upcycled foods as sustainable (Zhang et al., 2020). This could potentially be due to concerns about where the ingredients came from, once long transportation distances would mean higher greenhouse emissions, or maybe due to the belief that the food should have been donated to charity.
institutions instead of being further processed into upcycled food. Based on past research, it remains unclear whether informing individuals that food is upcycled will have an impact on its perceived sustainability.

Shopping for food is often a low-involvement situation where consumers rely on cues to evaluate products and make decisions (Neumayr & Moosauer, 2021). Therefore, it is unlikely that the presence of the “rescued” claim will prompt consumers to reflect deeply on various sustainability aspects of the product. Instead, it is more probable that consumers will use the “rescued” claim as a cue to evaluate a product as more sustainable, as sustainability attributes positively influence consumers’ preferences and behavior intentions (Smeding et al., 2023), we hypothesize that:

H1: The “rescued” claim (vs. no claim) increases sustainability perception.

4.2.2 Perceived Health

Health is another crucial factor guiding food decisions, and research has shown that claims can also affect consumers’ perceptions of food healthiness. For example, claims like “natural” or “organic” have been found to increase perceived healthiness compared to when no claim is displayed (Berry et al., 2017; Nadricka et al., 2020). Similar results have been observed for various claims, such as “high fiber” and “wholesome,” despite not being a predictor of the food’s nutritional quality (for further details, see André et al., 2019). Also, ethical-related claims have been observed to affect inferences about the healthiness of a product. Consumers often associate what is beneficial for the environment and society as also advantageous to themselves, which explains why foods labeled as “fair trade” (Schuldt et al., 2012) or “local” (Megicks et al., 2012) are rated as healthier. Since upcycled foods are perceived as being helpful for the environment (Bhatt et al., 2017; Coderoni & Perito, 2021; Grasso et al., 2023), a “rescued” claim might also lead to perceptions of increased healthiness.
Yet food waste is not typically associated with a nutritional source (Pereira et al., 2022), and consumers sometimes perceive upcycled food as less fresh (de Visser-Amundson et al., 2021), which might be one of the reasons why they do not associate upcycled foods with health benefits (Coderoni & Perito, 2021). Even though rescued ingredients may have the same nutritional value as regular ones (e.g. Chang et al., 2023; Sanz et al., 2021), and may serve as sources of fiber and proteins (Nyhan et al., 2023) as well as vitamins and antioxidants (Abbasi et al., 2016), consumers might believe that the reutilization process has reduced its nutritional value (Prada et al., 2016), potentially lowering the perceived healthiness of foods with the “rescued” claim. Although in nature, nothing is truly created but rather transformed (de Lavoisier, 2019), research has shown that consumer awareness about the fact that a product is being reused can lead to the perception that it may be contaminated. Magnier et al. (2019), for example, demonstrate that products made with recycled materials have been perceived as having a higher risk of contamination, negatively influencing purchase intention. Given the strong correlation between contamination and health (White et al., 2016), the increased contamination risk could lower the perceived healthiness of foods made with ingredients that were going to have another destination. Corroborating this finding, research has shown that food produced with recycled water was perceived as representing a higher health risk than foods produced in a conventional way (Savchenko et al., 2019).

Accordingly, we formulate H2 as follows:

H2: The “rescued” claim (vs. no claim) decreases health perception.

4.2.3 Expected Taste

Taste is a crucial characteristic consumers evaluate when considering a food product (Smeding et al., 2023). Numerous studies have demonstrated that different labels and claims can influence a product's expected taste, subsequently impacting consumer behavior. Claims
highlighting sensory aspects of the food, such as the type of sugar used (Prada et al., 2021) or information about the quality of those ingredients, such as their freshness (Piqueras-Fiszman & Spence, 2015), have been found to positively affect expected taste and, consequently, consumer preference. Claims related to ethical aspects, such as “organic” or “local,” are also found to improve the taste perceptions of food, resulting in a higher willingness to consume those products (Bernard & Liu, 2017; Nadricka et al., 2020; Schott et al., 2022). Likewise, similar findings were observed for the fair trade label, wherein its presence on food packaging enhanced consumers' taste experience (Lotz et al., 2013). The explanation behind this phenomenon is that products considered better for the environment or society are associated with higher quality, which in turn would contribute to a higher expected taste (Thøgersen, 2023).

A “halo” can turn into a “horn,” however, especially when consumers believe that the advertised attributes diminish product quality (Luchs et al., 2010). For instance, products with a vegan label may be perceived as tasting worse than those made with animal-derived ingredients (Stremmel et al., 2022), possibly due to consumers associating vegan products with a different sensory experience than the one appreciated by those consumers (e.g., not being as creamy as a product containing milk). This can even lead to reduced taste expectations among naturally vegan products in case a “vegan” label is provided (Stremmel et al., 2022).

Upcycled foods are made with ingredients that were previously discarded, potentially prompting consumers to associate these foods with old products or waste (de Visser-Amundson et al., 2021). Highlighting this characteristic might result in consumers perceiving the food as having lower value (Aschemann-Witzel & Stangherlin, 2021), thus negatively affecting the taste expectation of upcycled products. Initial evidence in this regard is provided by studies showing that food rejected due to aesthetic reasons scored lower in expected taste (de Hooge et al., 2017) and that consumers perceive food made with ingredients previously wasted to be
less tasty than those made with conventional products (Aschemann-Witzel and Peschel, 2019). Qualitative interviews have also indicated concerns from consumers regarding the taste of upcycled foods in general (de Visser-Amundson et al., 2021). Consequently, we argue that the presence of a “rescued” claim will reduce a food's expected taste. Accordingly, we formulate our hypothesis H3 as follows:

H3: The “rescued” claim (vs. no claim) decreases the expected taste.

Food labeling research has repeatedly shown that perceived sustainability, healthiness, and taste influence purchase intention (Grasso et al., 2023; Grunert et al., 2012; Zhang et al., 2020). Consequently, we expect these variables to mediate the effects of the “rescued” claim on purchase intention.

H4: The “rescued” claim (vs. no claim) influences purchase intention via (a) perceived sustainability, (b) perceived healthiness, and (c) perceived taste.

4.2.4 The Moderating Role of Familiarity

The degree of familiarity is a factor often considered in the evaluation of food products, as consumers frequently exhibit reluctance to support what they are unfamiliar with (Hartmann & Siegrist, 2016). Attitudes are stronger predictors of behavior when consumers are already familiar with the product (Verbeke, 2015). Familiarity has been demonstrated to mitigate fear and distrust (Aldridge et al., 2009) and has an impact on various sustainable behaviors, such as investing in sustainable companies (Tenner & Hörisch, 2021) and purchasing sustainable housing (Judge et al., 2019).

Familiarity has been found to influence product perception, serving as a predictor of food acceptance and preference (Giacalone & Jaeger, 2023). Studies have shown that many consumers may be skeptical or even have a strong aversion to foods perceived as new, evaluating them more negatively than familiar ones. For example, consumers often prefer
traditional beef burgers to plant-based burgers, although the latter generate lower CO2 emissions in their production and are perceived as healthier than the meat burger (Michel et al., 2021). Additionally, consumers usually expect new versions of traditional recipes to score worse (Goulart et al., 2020). Even when the taste is identical, and consumers are aware of the environmental benefits, as is the case for cultured meat, consumers might hesitate to choose the new product (Mancini & Antonioli, 2019).

Upcycled foods can be made with ingredients that consumers are familiar with (e.g., chocolate) but also from those they are unfamiliar with (e.g., malted milk). Previous research has shown that upcycled foods made with a familiar ingredient were rated more favorably than those made with an unfamiliar one (Aschemann-Witzel et al., 2022; Aschemann-Witzel & Peschel, 2019; Grasso & Asioli, 2020). We, therefore, argue that informing consumers about a rescued ingredient will amplify the positive effect of the “rescued” claim on perceived sustainability, and it will attenuate the negative effect on perceived healthiness and taste if the rescued ingredient is familiar. Accordingly, we hypothesize that:

H5a: The positive effect of a “rescued” claim (vs. no claim) on purchase intention via perceived sustainability is more pronounced for foods with familiar (vs. unfamiliar) rescued ingredients.

H5b: The negative effect of a “rescued” claim (vs. no claim) on purchase intention via perceived healthiness is attenuated for foods with familiar (vs. unfamiliar) rescued ingredients.

H5c: The negative effect of a “rescued” claim (vs. no claim) on purchase intention via expected taste is attenuated for foods with familiar (vs. unfamiliar) rescued ingredients.
4.3 Methodology

Before testing our hypotheses, we conducted a pre-study to select stimuli for the main investigation (see Section 3.1). Details of the methodology used in our main research are provided in Section 3.2. Both studies received ethical approval from the university's independent review board.

4.3.1 Pre-Study

In selecting our stimuli, we aimed to choose commonly known food products that could be made with both familiar (e.g., carrot) and unfamiliar (e.g., aquafaba) ingredients. The objective of varying only the rescued ingredient was to ensure that any observed effects were due to the ingredient’s familiarity rather than the familiarity with the product per se. For the pre-study, we employed a within-subject design and recruited 45 participants through Prolific. Prolific is an online research platform that has been found effective in recruiting a sufficiently diverse sample (see, e.g., Caprioli et al., 2023; Russell & Knott, 2021). We excluded those...
participants who failed the attention check (the attention check was asking participants not to check any option in a list of four possible hobbies, explicitly informed that the question was an attention check); 40 valid responses remained for analysis (55.0% women, M<sub>age</sub> = 29.75, SD = 8.16; 52.5% with at least a bachelor’s degree).

After agreeing to participate in the survey, participants were shown a list of eleven food ingredients and asked to rate their familiarity with each ingredient on the list (“How familiar are you with [ingredient name] as an ingredient?" 1 = not familiar at all to 7 = very familiar). We compared the mean values of familiarity with the food ingredients using a scale midpoint of 4 as the cutoff value for categorization (see Table 2). Participants rated chocolate (M = 6.28, SD = 1.38, t(39) = 10.45, p < .001, d = 1.38 ) and banana (M = 6.23, SD = 1.25, t(39) = 11.25, p < .001, d = 1.25) as the most familiar ingredients, while oat pomace (M = 1.80, SD = 1.49, t(39) = -9.35, p < .001, d = 1.49) and malted milk (M = 1.90, SD = 1.55, t(39) = -8.57, p < .001, d = 1.55) were rated as the least familiar ones. We selected the pair chocolate and malted milk for the main study because both are processed and found as ingredients in a common product, namely ice cream.

**Table 2**

*Results of the Familiarity with Food Ingredients*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>T (39)</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquafaba</td>
<td>3.18</td>
<td>2.10</td>
<td>-2.49</td>
<td>0.17</td>
<td>-.39</td>
</tr>
<tr>
<td>Bananas</td>
<td>6.23</td>
<td>1.25</td>
<td>11.25</td>
<td>&lt;.001</td>
<td>1.78</td>
</tr>
<tr>
<td>Banana peel</td>
<td>2.10</td>
<td>1.43</td>
<td>-8.41</td>
<td>&lt;.001</td>
<td>-1.33</td>
</tr>
<tr>
<td>Berries</td>
<td>5.90</td>
<td>1.43</td>
<td>8.41</td>
<td>&lt;.001</td>
<td>1.33</td>
</tr>
<tr>
<td>Bread</td>
<td>6.20</td>
<td>1.16</td>
<td>12.00</td>
<td>&lt;.001</td>
<td>1.90</td>
</tr>
<tr>
<td>Brewer’s spent grains</td>
<td>1.55</td>
<td>1.11</td>
<td>-13.98</td>
<td>&lt;.001</td>
<td>-2.21</td>
</tr>
<tr>
<td>Chocolate</td>
<td>6.28</td>
<td>1.38</td>
<td>10.45</td>
<td>&lt;.001</td>
<td>1.65</td>
</tr>
<tr>
<td>Ingredient</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----</td>
<td>----</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Malted milk</td>
<td>1.90</td>
<td>1.55</td>
<td>-8.57</td>
<td>&lt;.001</td>
<td>-1.36</td>
</tr>
<tr>
<td>Oat pomace</td>
<td>1.80</td>
<td>1.49</td>
<td>-9.35</td>
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<td>-1.48</td>
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<tr>
<td>Potatoes</td>
<td>6.75</td>
<td>0.87</td>
<td>20.00</td>
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<td>3.16</td>
</tr>
<tr>
<td>Whey</td>
<td>3.83</td>
<td>2.18</td>
<td>-0.51</td>
<td>0.62</td>
<td>-.80</td>
</tr>
</tbody>
</table>

### 4.3.2 Main Study

We used a 2 (claim: no claim vs. “rescued” claim) x 2 (familiarity: unfamiliar vs. familiar) between-subjects design to test our hypotheses (see Fig. 1 for a visualization of our conceptual model). Two hundred and thirty-six participants in Germany who were fluent in German were recruited via Prolific. We excluded responses from participants who took the survey more than once (N = 6) (participation with identical IP Address) or failed the attention check (N = 15) (the attention check was the same as in the pre-study). Due to our ice cream stimuli, we also excluded participants who declared not consuming dairy products (N = 12) to avoid biased answers. We had 203 valid responses that remained and were used for data analysis. The average age of the sample was 29.06 years (SD = 8.58, min = 18, max = 65), with 48.3% women and 1% non-binary/preferred not to answer; 51.3% had at least a bachelor’s degree.

After giving informed consent to take part in the study, the participants were randomly assigned to one of four experimental conditions. Those assigned to the “rescued” claim condition first read a short description of upcycled foods (“Rescue-based foods are made from ingredients that would otherwise go to waste. This often happens due to aesthetic flaws, oversupply, or underestimated potential uses.”) before being asked to rate the displayed product. Participants in the “no claim” condition skipped this part. This procedure follows previous literature (de Visser-Amundson et al., 2021; Zhang et al., 2020), and it is relevant since the “rescued” claim is relatively new in the market and unfamiliar to most people.
Participants were then asked to evaluate the product presented (“Compared to other ice creams, I think the ice cream pictured above is…” in terms of perceived sustainability (1 = not sustainable at all, 7 = very sustainable), perceived healthiness (1 = not healthy at all, 7 = very healthy), expected taste (1 = not tasty at all, 7 = very tasty) and state their intention to purchase the ice cream (“Compared to other ice creams, I would … 1 = definitely not buy, 7 = definitely buy… the ice cream pictured above).

4.3.2.1 Results

ANOVA results (see Table 3 for summary statistics) indicate that perceived sustainability was higher for products with the “rescued” claim (M_{no claim} = 3.58 vs. M_{claim} = 5.66, F(1, 199) = 169.56, p < .001), as was perceived healthiness (M_{no claim} = 3.26 vs. M_{claim} = 3.95, F(1, 199) = 18.71, p < .001). While the increased sustainability perception supports H1, the claim did not reduce perceived healthiness, leading to the rejection of H2. The “rescued” claim did not affect expected taste (M_{no claim} = 3.77 vs. M_{claim} = 3.79, F (1, 199) = 0.02, p = .881), consequently leading us to reject H3.

Table 3

*Means (M) and Standard Deviations (SD) by Experimental Condition*

<table>
<thead>
<tr>
<th></th>
<th>Unfamiliar ingredient</th>
<th>Familiar ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No claim (N = 101)</td>
<td>“Rescued” claim (N = 102)</td>
</tr>
<tr>
<td>Perceived sustainability</td>
<td>M = 3.58 SD = 1.16</td>
<td>M = 5.66 SD = 1.15</td>
</tr>
<tr>
<td>Perceived healthiness</td>
<td>M = 3.26 SD = 1.20</td>
<td>M = 3.95 SD = 1.10</td>
</tr>
<tr>
<td>Expected taste</td>
<td>M = 3.77 SD = 1.40</td>
<td>M = 3.79 SD = 1.24</td>
</tr>
</tbody>
</table>
To test the indirect effect of the “rescued” claim on purchase intention via (a) perceived sustainability, (b) healthiness, and (c) taste, we used the PROCESS macro for SPSS (model 4; Hayes 2022) with 5,000 bootstrap samples. The indirect effect via perceived sustainability was positive and significant (EST = 0.560, SE = 0.157, 95% CI = 0.286 to 0.897), thus providing support for H4a. While the indirect effect via perceived healthiness is significant as well (EST = 0.108, SE = 0.059, 95% CI = 0.000 to 0.227), its direction is opposite to the prediction stated by H4b. We found no significant indirect effect of the “rescued” claim on purchase intention via expected taste (EST = 0.013, SE = 0.112, 95% CI = -0.219 to 0.223). Therefore, H4c is also rejected.

To test our proposed moderated parallel mediation model, we used the PROCESS model 8 (Hayes 2022) with 5,000 bootstrap samples (for details on the results, see Fig. 2 and Table 4). The indirect effect of the “rescued” claim on purchase intention via perceived sustainability was significant across both levels of familiarity (upcycled food with unfamiliar rescued ingredient [malted milk ice cream]: EST = 0.393, SE = 0.146, 95% CI = 0.148 to 0.716; upcycled food with familiar rescued ingredient [chocolate ice cream]: EST = 0.594, SE = 0.191, 95% CI = 0.246 to 0.990). In line with H5a, the indirect effect was larger when the rescued ingredient was familiar, as indicated by a significant index of moderated mediation (IoMM) (EST = 0.201, SE = 0.094, 95% CI = 0.047 to 0.412).

The “rescued” claim did not affect purchase intention via perceived healthiness for the product with the familiar rescued ingredient (chocolate ice cream: EST = 0.090, SE = 0.060, 95% CI = -0.005 to 0.226), but we did find a significant indirect effect for the product with the unfamiliar rescued ingredient (malted milk ice cream: EST = 0.136, SE = 0.074, 95% CI = 0.002 to 0.288). The difference between both indirect effects, however, is not statistically

<table>
<thead>
<tr>
<th>Purchase intention</th>
<th>M = 3.22</th>
<th>M = 4.22</th>
<th>M = 3.22</th>
<th>M = 3.86</th>
<th>M = 3.22</th>
<th>M = 4.57</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD</td>
<td>1.47</td>
<td>1.44</td>
<td>1.39</td>
<td>1.60</td>
<td>1.57</td>
<td>1.17</td>
</tr>
</tbody>
</table>
significant (IoMM: EST = -0.047, SE = 0.060, 95% CI = -0.181 to 0.060). Moreover, we predicted a negative effect of the “rescued” claim on perceived healthiness but found a positive one (see H2). Combined, these findings suggest the rejection of H5b.

The effect of the “rescued” claim on purchase intention was not significantly mediated via expected taste, independent of the familiarity of the rescued ingredient (IoMM: EST = -0.008, SE = 0.221, 95% CI = -0.436 to 0.435). Hence, H5c is rejected.

Regarding the direct effect of the “rescued” claim on purchase intention, it was significant for the familiar rescued ingredient (chocolate ice cream: EST = 0.657, SE = 0.273, 95% CI = 0.118 to 1.196), while no significant effect was observed for the unfamiliar ingredient (malted milk ice cream: EST = 0.093, SE = 0.244, 95% CI = -0.389 to 0.574). This indicates that the effect of the “rescued” claim on purchase intention for upcycled food with unfamiliar ingredients is fully mediated by perceived healthiness and perceived sustainability. For a familiar ingredient, the effect of the “rescued” claim on purchase intention is partially mediated by perceived sustainability.
Figure 2

Parameter Estimates

Familiarity
(unfamiliar vs. familiar)

-0.896***

Perceived sustainability

1.65**

-0.203ns

“Rescued” claim
(control vs. with claim)

0.836***

Perceived healthiness

0.033ns

Expected taste

Purchase intention

0.238***

0.163**

0.629***

(***p < .01, **p < .05, *p < 0.1)
<table>
<thead>
<tr>
<th></th>
<th>Purchase intention</th>
<th>Perceived sustainability</th>
<th>Perceived healthiness</th>
<th>Expected taste</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EST</td>
<td>SE</td>
<td>CI lower</td>
<td>CI upper</td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>.093</td>
<td>.244</td>
<td>-.389</td>
<td>.574</td>
</tr>
<tr>
<td>Familiar</td>
<td>.657</td>
<td>.273</td>
<td>.118</td>
<td>1.196</td>
</tr>
<tr>
<td>Index of moderate mediation</td>
<td>.201</td>
<td>.094</td>
<td>.047</td>
<td>.412</td>
</tr>
</tbody>
</table>
4.4 Discussion

Our results show that displaying the “rescued” claim has a positive impact on purchase intention. For products with familiar rescued ingredients, this effect can be attributed to an increased perception of sustainability. In the case of products with unfamiliar rescued ingredients, we additionally observe an improved health perception. In the following, we will initially elucidate our findings regarding the effect of the “rescued” claim on perceived sustainability. We will then expound upon their implications and future research. Subsequently, we will adopt a similar structure to discuss the effects of the claim on perceived healthiness and expected taste.

The presence of the “rescued” claim significantly increased the perceived sustainability of products with both unfamiliar and familiar rescued ingredients, subsequently raising purchase intentions. These results are consistent with previous research demonstrating that food claims can influence the perceived sustainability of products (Feldmann & Hamm, 2015). Additionally, they are consistent with studies suggesting that foods enriched with rescued ingredients are perceived as environmentally beneficial (Bhatt et al., 2017; Coderoni & Perito, 2021; Grasso et al., 2023). Furthermore, the effect of the “rescued” claim on perceived sustainability was significantly higher for familiar rescued ingredients compared to unfamiliar ones. This result aligns with our prediction and is also consistent with previous research suggesting that unfamiliarity may reduce a product’s perceived usefulness for the environment (Hellali & Korai, 2023).

The “rescued” claim also significantly affected inferences about perceived healthiness, albeit only for products with unfamiliar rescued ingredients. Contrary to our expectations, however, the claim did not decrease perceived healthiness but increased it instead. One possible explanation for this result could be that our study was conducted in Germany, where trust in the safety of food is generally high (Larson, 2023). Consequently, consumers might have believed that products offered for consumption are not harmful to one’s health (Nitzko & Spiller, 2019).
Moreover, the association of the “rescued” claim with sustainability traits might have spilled over to inferences about the perceived healthiness of upcycled food compared to conventional products. This is consistent with previous literature that has found positive effects of environmental-related claims, such as the natural claim (Berry et al., 2017) and the local claim (Feldmann & Hamm, 2015), on the perceived healthiness of a product, as well as with previous literature, showing that perceived healthiness is one of the reasons why people are willing to try new foods (Giacalone & Jaeger, 2023; Vural et al., 2023). At least in the context examined in this research, the positive inferences were greater than any negative inferences about the health risks associated with upcycled food. Thus, our findings challenge the notion proposed by Savchenko et al. (2019) that the reutilization of natural resources on the food chain will be negatively perceived. This contributes to the literature by demonstrating that informing consumers about the “rescued” characteristic does not impact the perceived health risk associated with the food.

This bias holds implications for policymakers. It could potentially affect the consumption volume of these products, thereby posing risks to consumers’ health. Future research should investigate whether the increase in perceived healthiness has an impact on other relevant consumer behaviors, as well as how the “rescued” claim affects a product’s perceived healthiness in countries where trust in institutions and product quality is relatively low. Additionally, future research should explore how the “rescued” claim affects consumer behavior through perceived healthiness for other food categories, such as virtuous products, where healthiness is typically the primary driver of food choice.

We did not find evidence that the “rescued” claim leads to biased consumer inferences regarding the expected taste for either product made with the unfamiliar or familiar rescued ingredient. However, the food made with the familiar rescued ingredient scored significantly higher in expected taste than the one with the unfamiliar ingredient. This means that participants expected the chocolate ice cream to taste better than the malted milk ice cream, independent of
the “rescued” claim. Therefore, we can conclude that the expected taste is primarily influenced by the rescued ingredient itself rather than its status as an upcycled food. While this result contradicts the notion that consumers generally perceive previously discarded food to be less tasty (de Hooge et al., 2017), it is consistent with other studies that revealed no significant effect of ethical claims on taste rating after participants tried the food (Lee et al., 2013; Piqueras-Fiszman & Spence, 2015). Our results also align with those of Nitzko and Spiller (2019), who found that the expected taste varies depending on the origin of the rescued ingredient.

From a managerial perspective, this finding is relevant, as it suggests that adding a claim to these products will not negatively impact this hedonic variable. However, our results should be interpreted with caution. We investigated the effect of the claim for highly processed rescued ingredients (chocolate and malted milk). Compared with fresh rescued ingredients, like fruits or vegetables, it is probably less likely for consumers to associate processed ingredients with characteristics that could have negatively affected taste, such as being old or rotten, which might have mitigated the prospective negative effect of the “rescued” claim (Aschemann-Witzel et al., 2019; de Visser-Amundson et al., 2023; Suher et al., 2021). Future research should investigate how consumers expect the upcycled food product to taste when the rescued ingredient is originally unprocessed, such as when potatoes are upcycled into potato chips.

As indicated by our results, companies utilizing rescued ingredients may benefit from clearly communicating this through a claim on their product packaging. The positive effect is strengthened by highlighting the rescued ingredient. Our findings indicate that the “rescued” claim positively influenced a product's perceived sustainability, enhancing overall purchase intention. This holds for both familiar and unfamiliar products, with the effects being milder for the latter. Moreover, the “rescued” claim positively influenced the product's perceived healthiness, leading to increased purchase intention for unfamiliar but not familiar food. Additionally, we found no negative effect of the “rescued” claim on expected taste.
Hence, we aim to draw attention to the potential misuse of the “rescued” claim. Given its lack of regulation, companies may opportunistically begin to add this claim to their products, aiming to enhance their perceived sustainability. This might be an issue if the products do not genuinely contribute to food waste reduction, such as utilizing ingredients that were not actually previously wasted. Moreover, although food waste reduction is a sustainability goal, policymakers must ensure that the usage of these rescued ingredients for human consumption does not conflict with other sustainability goals, such as curbing greenhouse gas emissions. This poses a considerable challenge, particularly concerning emissions attributed to transporting these rescued ingredients.

As a limitation, it should be noted that consumer associations with upcycled food may differ for different countries. German respondents are known to be generally receptive to suboptimal products (Aschemann-Witzel et al., 2019), which can be partially explained by a high environmental concern, as well as general trust in the quality of products, which could explain why no health risk perception was found. Future studies should investigate how the “rescued” claim affects product perception and purchase intention in countries with low environmental concern and trust. Furthermore, we focused on indulgent products, which are known to be strongly affected by ethical claims (Ellison et al., 2016; Peschel & Aschemann-Witzel, 2020). Future studies should investigate whether the effects of the “rescued” claim can be applied to virtuous foods.

4.5 Conclusion

Our study is the first one to investigate how the “rescued” claim affects product perception and purchase intention for food products made with unfamiliar and familiar rescued ingredients. The findings enhance our understanding of how consumers perceive upcycled foods, offering valuable insight for the food sector stakeholders and policymakers striving to reduce food waste by repurposing those foods as an ingredient in their products.
Among the multiple findings, two conclusions deserve particular emphasis. First, we conclude that the “rescued” claim positively affects the purchase intention of products made with both unfamiliar and familiar rescued ingredients. For foods made with the familiar rescued ingredient, this effect is explained by a higher perceived sustainability of products carrying this claim. For foods made with the unfamiliar rescued ingredient, the effect of the claim on purchase intention is additionally explained by an increase in the product’s perceived healthiness. Second, we conclude that the “rescued” claim does not alter a food’s expected taste. Our results offer valuable insights into consumer behavioral psychology that may guide companies in their decisions to invest in this area. This, in turn, highlights the need for policymakers to regulate the use of this claim to prevent its misuse and to ensure that the utilization of rescued ingredients benefits the environment.
5 General Discussion

In the face of global warming and its consequences on all living beings, shifting our diet towards a more sustainable one is increasingly urgent (White et al., 2019). The IPCC (2022) highlights two strategies that have a high potential to reduce GHG emissions from food systems: reducing the consumption of animal-derived products and minimizing food waste. In recent years, companies have continuously expanded their offerings of food products aligned with these strategies, specifically vegan and upcycled foods (EMR, 2023; Innova Trends Survey, 2021).

Although it is not mandatory to inform consumers about a product’s sustainability attributes, companies are doing so for several reasons. These include signaling social responsibility, differentiating their products from competitors, and enabling consumers to make sustainable choices (Hermundsdottir & Aspelund, 2021).

For a shift towards more sustainable diets to succeed, companies and governments must understand how consumers perceive these sustainable foods. This understanding is crucial for encouraging a preference for these products while avoiding deceptions and backfire effects. Previous research has shown that, despite consumers generally expressing favorability towards products with a low environmental impact, some sustainability attributes might lead to a lower purchase intention if these attributes negatively affect how individuals feel about consuming a product (Brough et al., 2016) or how they evaluate it (Luchs et al., 2010).

This dissertation analyzes two distinct food categories that contribute to a sustainable food system, namely vegan and upcycled foods, investigating possible challenges that may arise in their promotion. Specifically, it reveals the causal paths by which the information about these sustainability attributes affects consumers’ purchase intention and demonstrates the variables that strengthen or weaken these paths. The results provide new insights into consumer reactions towards these foods. The following sections summarize the theoretical and practical implications of these findings.
5.1 Theoretical Implications

This dissertation examines how vegan and upcycled foods are emotionally and cognitively perceived and how these perceptions impact consumers’ purchase intentions. By assessing two different categories of sustainable food consumption (i.e., vegan and upcycled foods), the papers contribute to different streams of literature.

In examining how consumers emotionally perceive sustainable foods, we found that positive emotions play a major role in promoting vegan and upcycled foods. Despite indications that vegan and upcycled foods might be stigmatized (Markowski & Roxburgh, 2019; Spielmann et al., 2023), our findings show that individuals do not perceive them as such. This perception leads to an increased preference for these products, similar to what is observed for products with non-stigmatized sustainability attributes (e.g., organic) (Van Bussel et al., 2022). However, other product elements may weaken consumers' positive emotions, particularly if they represent a risk to consumers, such as elements that conflict with their self-perception or are unfamiliar.

In the first case (i.e., elements that conflict with consumers' self-perception), our study revealed that when a sustainable attribute is combined with another attribute that is congruent but threatens individuals’ self-identity (i.e., pink packaging in the case of male consumers), the positive emotions evoked by the sustainable attribute are lower than when combined with an incongruent attribute (i.e., maroon packaging). This contradicts previous research showing that consumers prefer congruent elements (van Tilburg et al., 2015; Wen & Lurie, 2018). Our findings contribute to the congruency theory by identifying a new scenario where combining congruent elements may backfire.

In the second case (i.e., elements unfamiliar to consumers), our findings show that unfamiliarity with ingredients leads to lower levels of positive feelings upon consuming sustainable foods. This aligns with previous research showing that familiarity positively affects
consumers’ feelings (Aldridge et al., 2009). Therefore, we extend the literature on consumer emotions by providing evidence of their impact in the vegan and upcycled domains.

In examining the effect of sustainability information on consumers’ cognition, we demonstrate that informing individuals about the upcycled characteristic of a food biases their evaluation of it. This aligns with prior research on biased inferences from sustainability labels (Stremmel et al., 2022). Our findings indicate that the “rescued” claim can evoke positive effects, but not negative ones, increasing sustainability and health perceptions for products featuring such a claim. Moreover, the effect of sustainability information on consumers’ cognition is more pronounced when the rescued ingredient is familiar to them. This is consistent with existing literature indicating familiarity positively affects product evaluation (Giacalone & Jaeger, 2023). Our study contributes to the extant literature on biased inferences and food labeling by delving into the “rescued” claim, a trend gaining popularity as evidenced by its increasing prevalence in the marketplace.

5.2 Managerial Implications

The findings of this dissertation offer valuable insights for marketers aiming to promote vegan and upcycled food consumption. In essence, informing consumers about the sustainability attributes of food (i.e., that the food is vegan or upcycled) fosters a positive attitude towards it, which positively impacts purchase intention. Consequently, marketers can display this product information to evoke more positive reactions compared to conventional products.

Regarding the promotion of vegan foods, we showed that informing consumers about this attribute positively affects consumers’ feelings. However, we also reveal that this elevated emotional state is influenced by combining the vegan label with other product elements, namely packaging color. Pairing the vegan label with feminine packaging colors strengthens the positive effect of the label on the feelings of female consumers but neutralizes the positive effect
for male consumers. Conversely, pairing the vegan label with masculine packaging color strengthens the positive effect of the vegan label on the feelings of both genders. Marketers targeting both demographic groups should promote their vegan products in masculine packaging colors.

For promoting upcycled foods, despite concerns about potential adverse effects due to waste association (de Visser-Amundson et al., 2021), we reveal that the “rescued” claim positively influences the evaluation of products carrying it, enhancing their purchase intention. While familiar rescued ingredients show a stronger positive effect on product evaluation, unfamiliar ingredients are also positively perceived. Moreover, unfamiliar ingredients may gain familiarity through frequent marketing. Therefore, marketers should not hesitate to incorporate unfamiliar ingredients. However, due to the observed biased health perception of upcycled foods, which could negatively affect public health, marketers should combine the claim with other communication strategies to avoid misleading customers. Given the absence of an official definition for upcycled food, policymakers should be vigilant about potential misuses, ensuring that this praxis aligns with broader sustainability goals and does not compete with them.

In conclusion, the findings presented in this dissertation assert that, despite potential negative associations, both the vegan and the “rescued” claim serve as effective means to promote sustainable food consumption behavior.
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6 Appendices

Appendix A. Paper 1 – Main Study: Example congruent packaging color with the vegan label

Example incongruent packaging color without a label
Appendix B. Paper 2 – Main Study: Example stimuli with familiar ingredient and no claim

Example stimuli with unfamiliar ingredient and “rescued” claim
Appendix C. Paper 3 – Main Study: Example stimuli with familiar ingredient and “rescued” claim

Example stimuli with unfamiliar ingredient and no claim
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Statement of Contribution to Each Paper of this Cumulative Dissertation

My contribution to the three papers of this cumulative dissertation is as follows:

- **Paper 1:** “Choosing vegan feels good, doesn’t it? Effects of gender-congruent cues on vegan-labeled products” co-authored by Yasemin Boztug:
  I conceptualized the study, collected data, conducted the formal analyses, created visualizations, wrote the original draft, and edited the manuscript. My co-author reviewed the draft.

- **Paper 2:** “Rescue-based foods: The role of moral and ingredient familiarity” co-authored by Yasemin Boztug:
  I conceptualized the study, collected data, conducted the formal analyses, created visualizations, wrote the original draft, and edited the manuscript. My co-author reviewed the draft.

- **Paper 3:** “Rescue us all! The effects of the “rescued” claim for familiar and unfamiliar food ingredients” co-authored by Steffen Jahn, Jessica Aschemann-Witzel, and Yasemin Boztug:
  I conceptualized the study, collected data, conducted the formal analyses, created visualizations (80%), wrote the original draft (90%), and edited the manuscript (80%). Stefen Jahn wrote the original draft (10%), created visualizations (20%), and edited the manuscript (20%). All the co-authors reviewed the draft.

____________________________________

Fernanda Carneiro-Otto, Göttingen, 21.05.2024