



FACULTY OF ENGINEERING AND SUSTAINABLE DEVELOPMENT  
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# Peeling Back Biases:

## Exploring Consumer Perceptions of 'Ugly' Foods

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## **Abstract**

This thesis explores consumer perceptions of aesthetically imperfect, or 'ugly,' foods and investigates the willingness to purchase and consume these products as a strategy to reduce food waste. The study delves into cognitive biases that lead to the rejection of nutritionally sound yet visually unappealing foods, significantly contributing to food wastage. Through a comprehensive food perception survey, this research examines the impact of visual appeal, expected taste, price, and bundling strategies on consumer choices, particularly focusing on the enhancement of the attractiveness of 'ugly' foods when paired with aesthetically pleasing ones.

Key findings highlight that while consumer biases heavily influence the initial rejection of 'ugly' foods based on appearance, innovative marketing strategies like bundling can shift perceptions and increase consumer willingness to purchase. Crucially, the thesis identifies post-purchase ownership perception as a significant factor in influencing future consumer behavior. Ownership of 'ugly' foods, even in a hypothetical sense, positively affects consumers' perceptions and behaviors, increasing their likelihood to repurchase and recommend these products, thus indicating a sustainable shift in consumption patterns.

This research provides actionable insights for stakeholders in the food industry to mitigate consumer biases against 'ugly' foods, thereby enhancing sustainability and ethical consumption practices. The broader implications of these findings suggest that addressing post-purchase perceptions can effectively contribute to reducing global food wastage and fostering more environmentally responsible food consumption.

**Keywords:** Sub-optimal foods, food waste, consumer behavior, cognitive biases, environmental sustainability.

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# 1 Introduction

The contemporary consumer landscape grapples with a significant paradox: a substantial portion of food wastage stems not from inedibility but rather from aesthetic imperfections, predominantly observed in misshapen yet nutritionally sound produce. This phenomenon poses a critical challenge to sustainability and resource management, as perfectly edible 'ugly' foods are routinely discarded. The economic cost of food product loss and waste equates to 1 trillion USD globally, accounting for 8% of total global greenhouse emissions, highlighting the scale and impact of this issue (Young et al., 2024).

The crux of the issue lies in the cognitive biases shaping consumer behavior, leading to the irrational rejection of these foods based solely on their appearance (Aschmann-Witzel et al., 2017; Hezarkhani et al., 2023). Understanding and mitigating these biases are imperative for several reasons. Firstly, it directly influences efforts to reduce food wastage, a pivotal aspect of global initiatives towards environmental sustainability. Secondly, it profoundly impacts consumer behavior, thereby shaping demand and supply dynamics within the food industry (Xu et al., 2021). Lastly, addressing these biases contributes to ethical considerations surrounding food distribution and the paradox of food waste amidst global hunger (Cao & Miao, 2021; Dibets et al., 2021).

This quantitative research endeavors to provide comprehensive insights into the psychological factors driving food wastage. It investigates how visual appeal, expected taste, willingness to eat, and willingness to pay impact consumer decisions regarding aesthetic, ugly, and combined food bundles through a food perception survey. Moreover, it seeks to assess whether bundling 'ugly' foods with visually appealing ones enhances the overall attractiveness or perception of the former, and to understand consumers' inclination to purchase 'ugly' foods to mitigate waste despite considerations of visual appeal. Ultimately, by gaining insights into and mitigating these biases, the study aims to provide actionable recommendations aimed at fostering more ethically and environmentally responsible approaches to food consumption, potentially influencing stakeholders across the food supply chain.

## **1.1 Research Questions**

Outlined below are the research questions (RQ) this paper aims to address:

**RQ1:** What is the level of consumer willingness to purchase and consume 'ugly' foods as a means of reducing food waste?

**RQ2:** How does the practice of bundling 'ugly' foods with visually appealing ones affect consumer behavior and perceptions, potentially enhancing the marketability of 'ugly' foods?

**RQ3:** Does purchasing 'ugly' foods improve consumer perception and behavior, specifically in terms of post-purchase ownership perception, and do they express future willingness to seek, purchase, and recommend them?

## **1.2 Delimitations**

The research concentrates on exploring cognitive biases within consumer behavior towards 'ugly' foods, particularly concerning aesthetic imperfections. It does not delve extensively into broader systemic issues within the food supply chain or the regulatory landscape influencing consumer preferences.

## 2 Theoretical Framework

The theoretical underpinning of this research lies in the domain of cognitive psychology, specifically focusing on heuristics that influence consumer behavior. This framework is crucial in understanding why consumers, often subconsciously, choose to reject foods based purely on aesthetic criteria.

Theoretical Concepts:

The representativeness heuristic is a cognitive bias that leads consumers to judge the quality of food based on its appearance. Aesthetic imperfections are frequently equated with reduced freshness or nutritional value, causing this heuristic to override rational assessments of food quality (Cao & Miao, 2021; Makhal et al., 2020). As a result, perfectly edible but 'ugly' foods are often rejected.

Similarly, the affect heuristic plays a pivotal role in shaping food choices through emotional responses. The immediate reaction of disgust or aversion towards 'ugly' foods is a result of psychological conditioning that equates visual appeal with safety and quality (de Hooge et al., 2017).

The availability heuristic, influenced by media and cultural narratives, further skews consumer perception by associating food imperfections with health risks. The amplification of isolated incidents involving food recalls by the media reinforces this bias (Tsalis, 2020).

Another relevant concept is the naturalness bias, which describes a preference for products perceived as natural over synthetic alternatives, even if the latter have similar or superior qualities. This bias, as described by Gagliardi (2024), is particularly evident in food choices, where consumers favor natural-looking foods and often equate their irregular and 'ugly' appearances with authenticity and minimal processing (Gagliardi, 2024).

The licensing effect, detailed by Khan and Dhar (2006), posits that individuals who commit to a virtuous action, such as choosing an eco-friendly product, may feel justified in subsequently making more self-indulgent decisions. The initial virtuous choice enhances their self-concept, alleviating guilt associated with indulgent purchases. However, this effect diminishes when the virtuous act is attributed to external pressures rather than personal choice, underscoring the role of self-perception in driving behavior. This dynamic helps explain how consumers rationalize their choices between necessities and luxuries, influencing subsequent purchasing decisions (Khan & Dhar, 2006).

Bolton and Alba (2012) elucidate a phenomenon where consumers exhibit a forward-looking aversion to unused utility, particularly in the context of purchase decisions. This aversion is not merely about the waste of monetary resources but is intricately linked to the distaste for not utilizing the full potential of a product or service. This insight is pivotal for understanding consumer behavior towards 'ugly' foods. The aversion to unused utility could extend to the perception of 'ugly' foods, where the aesthetic imperfection might be misconstrued as an indicator of lesser utility or value, prompting consumers to opt for aesthetically pleasing alternatives despite the inherent wastefulness of such choices (Bolton & Alba, 2012). This behavior resembles loss aversion, where consumers prefer avoiding losses over acquiring equivalent gains (Tversky & Kahneman, 1991). In this context, aesthetic imperfections can be perceived as a loss of utility, leading to the rejection of 'ugly' foods.

The negative footprint illusion provides further insight into how bundling can affect perceptions of 'ugly' foods. The negative footprint illusion refers to the tendency to estimate a lower carbon footprint of a combined group of environmentally certified "green" buildings and ordinary conventional buildings than the carbon footprint of the conventional buildings alone (Sörqvist et al., 2022). This phenomenon, along with the averaging bias, can distort perceptions of environmental impact, leading to inaccurate estimates. Holmgren, Andersson, and Sörqvist (2018) demonstrated that individuals often average the perceived carbon footprint of "green" and conventional buildings, rather than summing them, leading to an underestimation of the total environmental impact (Holmgren et al., 2018).

The research by Popkowski Leszczyc and Häubl (2010) highlights the complexity and profitability of bundling strategies in auction markets. Their findings suggest that bundles are more profitable when items are complementary, even if only moderately so. This complements the investigation into whether bundling 'ugly' foods with visually appealing ones can enhance their attractiveness and marketability. The concept of complementarity in bundling suggests that the perceived value of 'ugly' foods could be significantly improved when paired with items that accentuate their utility, potentially mitigating biases against them due to aesthetic imperfections (Leszczyc & Häubl, 2010).

Cognitive biases are crucial in influencing consumer behavior, and marketing strategies targeting food wastage are key. Grasping the subtleties of aversion to waste and the implications of bundling can empower marketers to craft strategies that not only align with consumers' utility-maximizing desires but also confront and diminish irrational biases towards 'ugly' food.

## 2.1 Research Gap

While there is increasing recognition of the environmental and economic costs associated with food waste, and a burgeoning interest in consumer behaviors towards sustainability (Aschemann-Witzel et al., 2017; de Hooge et al., 2017; Hezarkhani et al., 2023), the literature reveals a lacuna in our comprehension of the complex mechanisms through which cognitive biases directly influence consumer attitudes and decisions regarding 'ugly' foods. Prior investigations have delved into the realms of food wastage, consumer aesthetics, and sustainability; however, they have not fully unraveled the intricate relationship between deeply ingrained cognitive biases—such as the representativeness, affect, and availability heuristics—and the systematic rejection of foods with aesthetic imperfections. Furthermore, the potential of marketing strategies, particularly the bundling of 'ugly' with visually appealing foods to counteract these biases and enhance the attractiveness of 'ugly' foods, remains underexplored. This research seeks to bridge this gap by offering a comprehensive examination of consumer perceptions of 'ugly' foods within the framework of cognitive psychology and marketing strategies.

This study aims to extend the existing body of knowledge by not only identifying and analyzing the cognitive biases at play but also by assessing the effectiveness of innovative marketing strategies—like bundling—in altering consumer perceptions and behaviors towards 'ugly' foods. It endeavors to contribute to the discourse on sustainable consumption patterns, ethical food choices, and the rational utilization of food resources, thereby resonating with contemporary scholarly discussions focused on sustainability, environmental ethics, and the promotion of more conscious and rational consumerism (Hezarkhani et al., 2023; Jang & Cho, 2022). By dissecting the psychological foundations underpinning consumer reluctance towards 'ugly' foods and evaluating practical interventions, this study not only fills a critical research void but also aligns with the broader objectives of promoting environmental sustainability and reducing food waste through informed consumer choices.

## **3 Methods**

A "Food Perception Survey" (see in Appendix A) is the primary means of data collection for this study. It aims to capture a wide range of insights into how demographic and psychographic factors influence food selection preferences and behaviors regarding 'ugly' foods.

This section details the study's sample size, material, design and procedure, data analysis techniques, and research ethics.

### **3.1 Sample**

The sample size for this study was guided by the approach used in Holmgren, Andersson, and Sörqvist (2018). In their research, which also focused on biases influencing perceptions and behaviors related to environmental impact, they used a sample of 90 participants. This number was sufficient to identify trends concerning the negative footprint illusion and the averaging bias.

Therefore, a sample size of 90 respondents ( $N = 90$ ) is considered appropriate for this study as well offering a wide representation of demographic and psychographic profiles. Section 3.1.1 below gives more information on who the participants were in general.

#### **3.1.1 Demographic breakdown of the survey participants**

**Age Distribution:** The respondents varied widely in age and followed a normal distribution, with ages ranging from 24 to 77 years, reflecting a broad spectrum of the consumer population. The mean and the median age of participants was 46 years.

**Gender Identity:** Of the total respondents, 81.1% identified as female, 15.6% as male, and 3.3% preferred not to say or identified as non-binary, demonstrating a female-leaning gender distribution.

**Education Level:** The educational attainment of participants showed a high level of diversity, with 33.3% holding a bachelor's degree, 30% having achieved a Graduate degree or higher, and the remaining 36.7% distributed among some college, high school, and other forms of educational qualifications.

**Income Range:** Household annual gross income varied, with 14.4% of respondents earning less than \$30,000, 28.9% earning between \$30,000 and \$70,000, 18.9% between \$70,000 and \$100,000, and 26.7% earning over \$100,000, indicating a wide economic range among the participants. 11.1% preferred not to say.

**Occupation and residency:** The survey participants represented a diverse array of professions and were predominantly from North America and Europe.

Dietary preferences: It varied with 75.6% identifying as omnivores, 10% as flexitarians, 8.9% as vegetarians, 4.4% as pescatarians, and 1.1% as vegans.

Table 1 below presents the psychographic data collected from the survey, displayed as median and mean scores. The responses were rated on a Likert scale from 1 to 9, where 9 indicates the highest level of agreement or frequency.

*Table 1 Psychographic information scores.*

Psychographic Information Scores		Median	Mean
To what extent do you prioritize sustainability and environmental conservation in your personal values?	7.00	6.90	
How concerned are you about the issue of food waste on a global and local level?	7.50	7.06	
How often do you shop for food products that are organic, locally sourced, or sustainable?	7.00	6.31	
How much does the visual appearance of food influence your decision to buy it?	6.00	6.13	
To what extent do you prioritize appearance over reducing food waste (buying misshapen fruits and vegetables can reduce food waste).	7.00	6.36	
How often do you cook meals from scratch?	8.00	7.20	
How important is it for you to know the origin of your food products?	7.00	6.84	
How do your ethical beliefs influence your food purchasing decisions? (e.g., animal welfare, fair trade, and labor practices.)	7.00	6.31	
To what extent do recommendations from friends or family impact your decision to try new food products?	6.00	5.76	

The data indicates a generally high prioritization of sustainability, environmental, and ethical considerations in food purchasing decisions. The median scores consistently meet or exceed 7 suggesting that those values are deeply integrated into the respondents' lifestyle choices.

### **3.2 Materials**

The survey was administered using Google Forms, an online survey tool, to facilitate easy distribution, participation, and data collection.

Participants were invited online through social media public posts on platforms like Facebook to reach a diverse audience.

The data collected from the survey was analyzed using the statistical software JASP.

### **3.3 Design and Procedure**

The survey was methodically divided into two parts after initial questions on demographic and psychographic information to capture comprehensive consumer perceptions. The first part focused on the general perception of food by evaluating visual

appeal, taste expectations, willingness to eat, willingness to pay, and the price willing to pay. This initial phase included an educational segment where participants were informed about the environmental impact versus the visual appeal of different food bundles. This education was crucial for setting the context on how aesthetic and environmental considerations might influence consumer choices.

The second part of the survey delved into post-purchase ownership perceptions after a hypothetical utilization of the foods. Following the educational insights provided in the first part, participants were asked to make an informed decision on which of the three bundles they would prefer to purchase: an aesthetic bundle of carrots, an ugly bundle, or a combined one. This decision-making process was designed to reflect how prior knowledge of environmental impact and product visual appeal could influence consumer purchasing behavior or their perception of ugly food.

The survey structure was integral to exploring the shifts in perceptions from an initial superficial assessment to an informed decision-making process based on a deeper understanding of the products' attributes.

The survey included a mix of closed-ended and Likert scale questions, allowing for quantitative analysis of consumer perceptions and behaviors. In order to reduce self-reporting bias, participants were also given the opportunity to answer open-ended questions and give feedback at the end of the survey sharing their opinions, thoughts, and experiences. These comments were invaluable to help validate data and offer deeper insights into the reasons behind choices made.

During the second part of the survey, out of 90 respondents, 30 opted to hypothetically buy the ugly carrot bundle, 41 for the combined bundle, and 29 for the aesthetic bundle. Initially, a technical glitch in the survey's routing led approximately 7 participants to respond as though they had selected all three bundles. However, this issue is not expected to significantly affect the overall results.

### **3.4 Data Analysis**

The data collected from the survey is analyzed using the statistical software JASP, with descriptive statistics serving as the primary analytical approach. The following analyses are carried out:

- **Descriptive Statistics:** Employed to summarize various aspects of the dataset, including measures of central tendency (such as mean and median) to understand the typical values for the demographic and psychographic variables. This is utilized to characterize the profiles of the respondents and mostly displayed using tables.

- Inferential statistics: T-tests are used to determine whether notable discrepancies exist in food perceptions among the three bundles, and additionally, to evaluate these perceptions against anticipated values.
- Frequency Distributions and Percentages: Used to quantify the proportion of respondents falling into specific categories, facilitating a clear understanding of the distributional patterns across various segments.
- Graphical Representations: Graphs such as interval plots, pie charts, and bar plots, are utilized to visually depict the data and findings derived from the descriptive analyses. These visualizations provide intuitive insights into the distributional patterns and relationships present within the data, enhancing the communicative efficacy of the results.

### **3.5 Research Ethics**

Participants were informed about the study's purpose, their voluntary participation, confidentiality measures, and the right to withdraw at any time.

The study respected individuals' choices and avoided stigmatization or judgment by emphasizing anonymity.

## 4 Results

### 4.1 Consumer's General Perception of Food

In this section, the collected survey data on general consumer perceptions is analyzed and demonstrated using descriptive and inferential statistics.

Paired sample t-tests were conducted to compare the ratings of variables like visual appeal, taste expectation, willingness to pay, willingness to eat, and price willing to pay (USD), across the different types of carrot bundles. The objective was to determine whether there were statistically significant differences in consumer perceptions and behaviors between the aesthetic, ugly, and combined bundles. Each variable was tested by comparing aesthetic vs ugly, aesthetic vs combined, and combined vs ugly. The null hypothesis for each test posited that there is no difference between the bundles, while the alternative hypothesis posited that there are differences. These tests were conducted using a 95% confidence interval.

Figure 1 illustrates how participants rated the visual appeal in general of the three different carrot bundles, highlighting consumer aesthetic preferences. As expected, the aesthetic carrots were the most appealing, then the combined ones, and lastly the ugly ones. The interval plots used show the mean value from the Likert scale ratings gathered in the survey with error bars representing the 95% confidence interval.

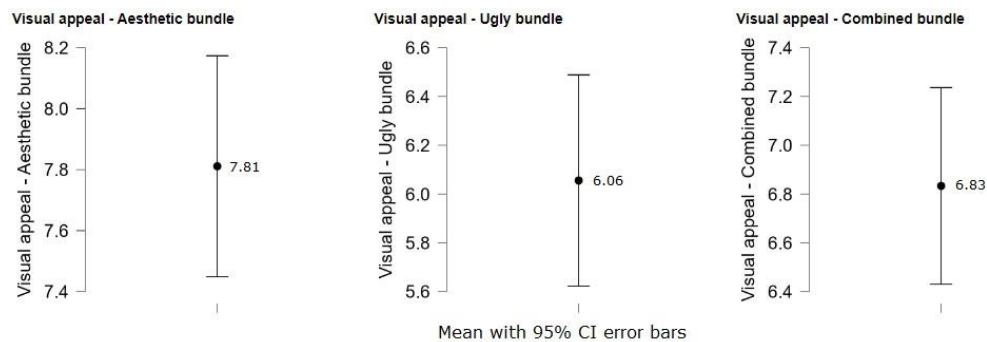


Figure 1 Interval plots of means for visual appeal ratings.

The paired sample t-tests for visual appeal expectedly revealed statistically significant differences in how participants perceived the aesthetics of each bundle. The tests comparing aesthetic vs ugly ( $p < .001$ ), aesthetic vs combined ( $p < .001$ ), and combined vs ugly ( $p < .001$ ) all resulted in p-values well below 0.05. These results demonstrate a clear preference for products perceived as more visually appealing.

In Figure 2, the expectations regarding the taste of the carrots from each bundle are captured. Sensory perceptions, like taste, can often influence purchase decisions. In this case each bundle was rated similarly.

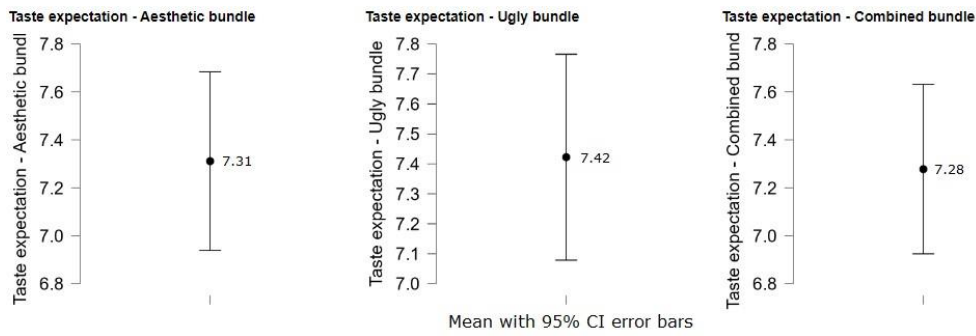


Figure 2 Interval plots of means for taste expectation ratings.

The paired sample t-tests for taste expectation showed that there is not enough evidence to reject the null hypothesis for any of the tests meaning that the participants rated the expected taste of the different bundles similarly. This conclusion is supported by p-values all exceeding 0.05.

The next plot (Figure 3) shows the participants' willingness to pay for each bundle, reflecting perceived value influenced by visual appeal and taste expectations. The results here were also similar for each type of bundle, meaning that people in general are willing to pay for even ugly carrots. This was not taking price into consideration yet.

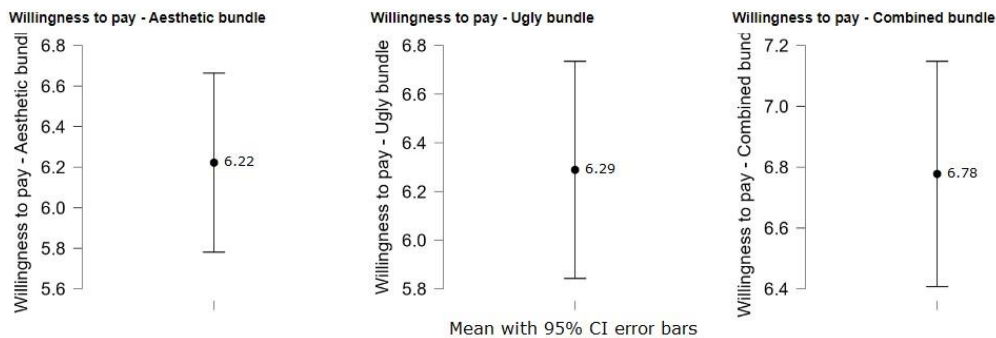


Figure 3 Interval plots of means for willingness to pay ratings.

Interesting results were derived from the paired sample t-tests conducted on the willingness to pay data. Specifically, the aesthetic bundle compared to the ugly one ( $p = 0.821$ ) did not show significant differences in willingness to pay, as the p-value is above 0.05. However, significant differences were observed when comparing the aesthetic bundle to the combined one ( $p = 0.025$ ) and the combined bundle against the ugly one ( $p < .001$ ). These results, shown by the bar plots in Figure 4, highlight a greater willingness to pay for the combined bundle over others.

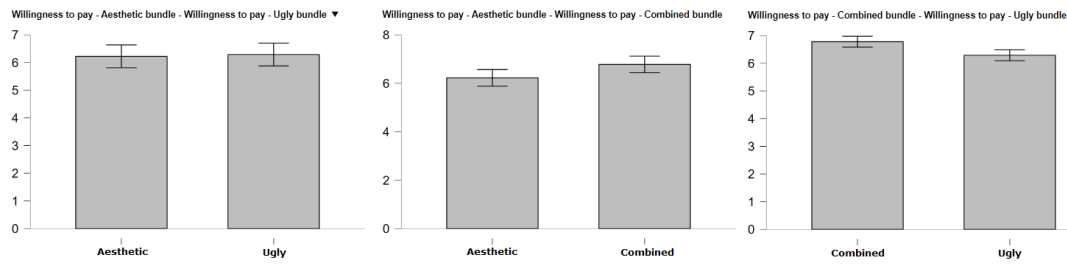


Figure 4 Bar plots of paired t-tests for willingness to pay.

The willingness to eat ratings, shown in Figure 5, indicate the likelihood of consumers actually consuming the products, which is crucial for assessing potential waste reduction. The results from this question were also favorable for each bundle type.

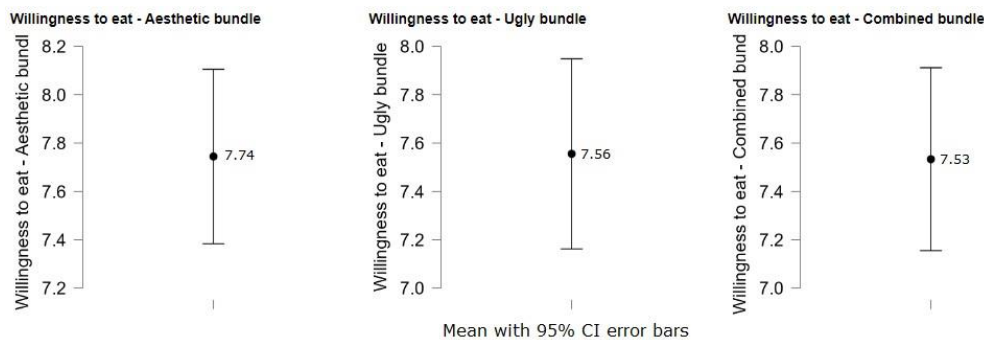


Figure 5 Interval plots of means for willingness to eat ratings.

The t-tests for willingness to eat yielded no significant differences among the bundles, with all p-values remaining above the 0.05 threshold, indicating that there was no substantial variation in participants' willingness to eat the different bundles.

The mean prices participants were willing to pay for the different types of bundles is compared and displayed in Figure 6 below using bar plots with 95% CI error bars from one sample T-tests compared to the expected price of \$4 (\$2/kg, taken from current Swedish grocery stores average price) that was explained to the participants during the survey. This provides a direct economic perspective on consumer choice.

The survey requested participants to price a 2kg bundle of carrots, reflecting the large quantities close to 2kg shown in the images. Figure 5 presents this data, but for ease of reading and comparing, the mean price for a 1kg bundle (price for 2kg divided by 2) was also added to the graphs.

The one sample T-tests were testing these hypotheses:

**Null hypothesis:** The mean price for a 2kg bundle of carrots given by the participants is the same as the expected price of \$4.

**Alternate Hypothesis:** The mean price for a 2kg bundle of carrots given by the participants is different from the expected price of \$4.

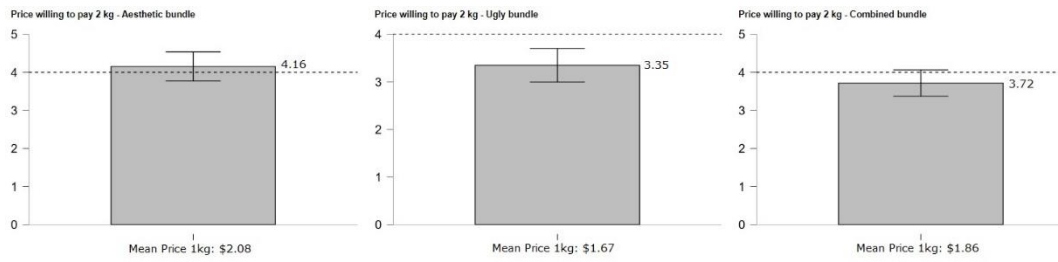


Figure 6 Bar plots of means for price willing to pay for a bundle of carrots.

Looking at the p-values, the T-test shows that the null hypothesis of both the aesthetic and the combined bundles with p-values of 0.422 and 0.111 respectively fails to be rejected. These p-values indicate that the difference between the given mean price and the expected price consumers are willing to pay is not statistically significant. So, there isn't enough evidence to suggest that the prices consumers are willing to pay for the aesthetic or combined bundles differs from the expected standard price.

For the ugly bundle though, the very low p-value of less than 0.001 shows that the null hypothesis can be rejected in favor of the alternate hypothesis. This suggests that the mean price consumers are willing to pay is significantly different from the standard. So, there is a significant negative perception in value for the ugly bundle, indicating a strong reluctance to pay standard price for it compared to the more visually appealing bundles.

The paired sample T-tests assessing this price variable reveal significant differences among the aesthetic, combined, and ugly product bundles. See the bar plot from Figure 7. The tests' results indicate a statistically significant higher price willing to be paid for the aesthetic bundle compared to the ugly one ( $p < .001$ ). Similarly, when comparing the aesthetic bundle to the combined one, the difference is significant ( $p = 0.005$ ), suggesting that consumers are willing to pay more for aesthetics. Additionally, the combined bundle also commanded a significantly higher price compared to the ugly one ( $p < .001$ ), showing that even when combined with less appealing products, the presence of aesthetics significantly enhances perceived value.

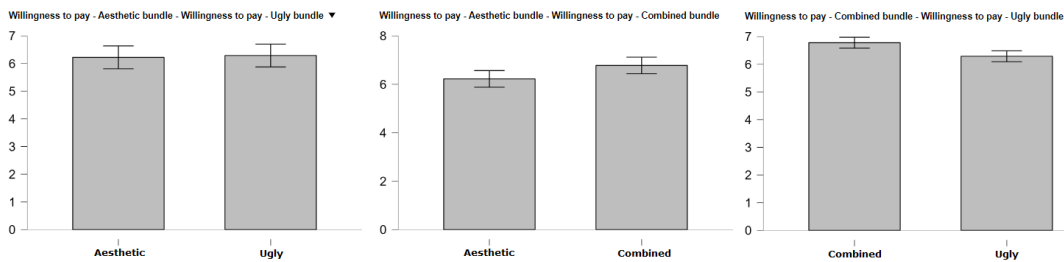


Figure 7 Bar plots of paired t-tests for price willing to pay.

Figure 8 presents three pie charts that depict the estimated amounts of anticipated food waste following the purchase of each carrot bundle, illustrating consumer expectations of waste associated with each option. This visualization helps gauge the perceived impact of each product type on food waste reduction.

### General Food Waste Expectations by Bundle Type

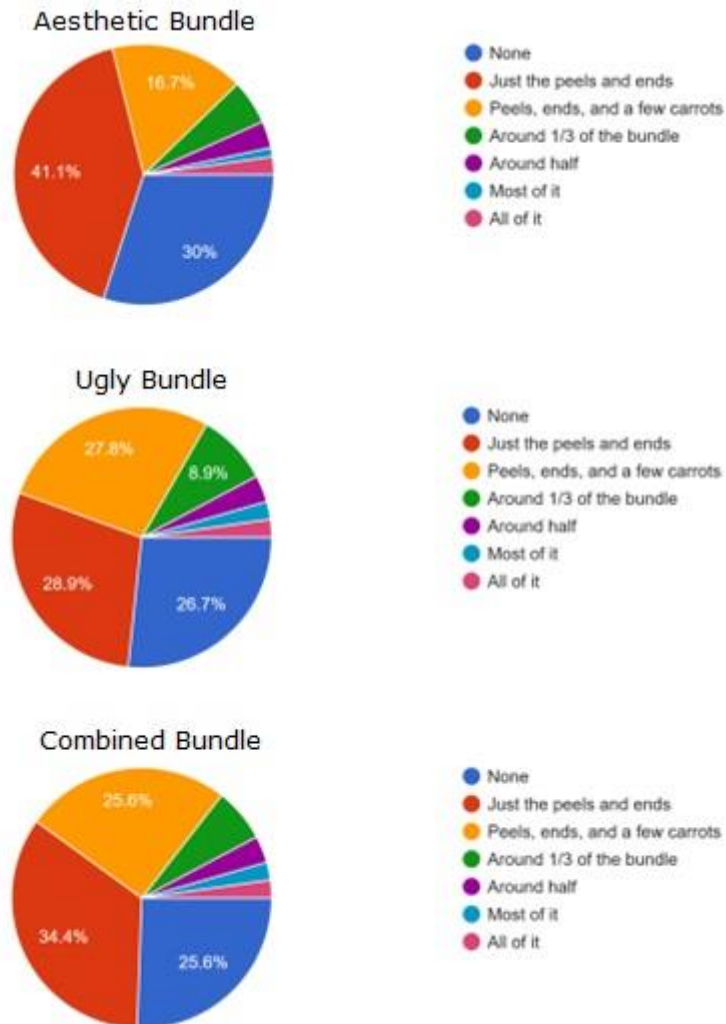


Figure 8 General consumer perception for food waste.

The interval plots in Figure 9 quantifies the likelihood that consumers would actively seek out and purchase the products featured in the survey. It reflects the potential market acceptance and consumer intent to buy based on their perceptions. Here, the combined carrot bundle was the most popular although by a small margin.

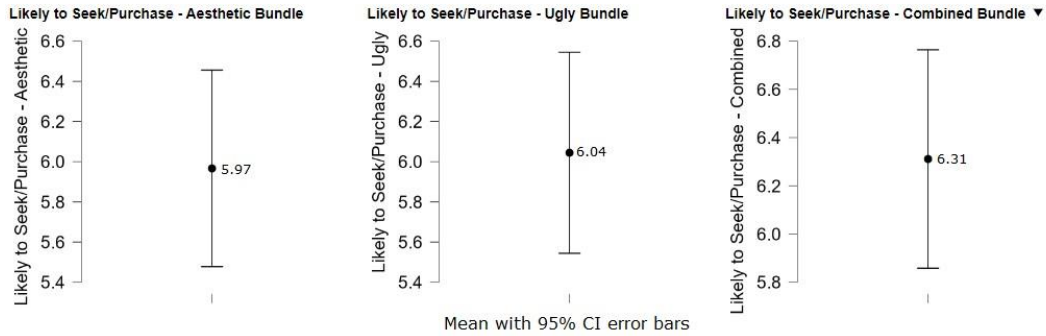


Figure 9 Interval plots of means for likeliness to seek and purchase ratings.

Figure 10 displays the likelihood that respondents would recommend each bundle to others. It measures the potential word-of-mouth impact, which is crucial for understanding the social influence on consumer decisions. The combined bundle was slightly more recommended.

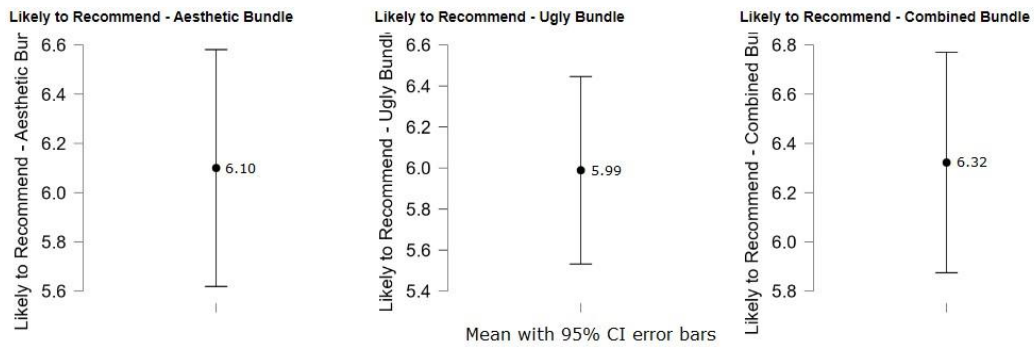


Figure 10 Interval plots of means for likeliness to recommend ratings.

## 4.2 Consumer's Ownership Perception of Food

This section presents the survey data on perceived ownership, where respondents were asked to select which carrot bundle they would hypothetically purchase and bring home for use. This imaginative exercise served as a virtual alternative to actual purchasing, aimed at eliciting a psychological response as if the consumer truly owned the product, providing deeper insights into consumer preferences without a real transaction. This shifts consumer perception from being purely objective to incorporating subjective elements in regard to the product.

Figure 11 features a pie chart detailing the distribution of respondents' preferences towards the different carrot bundles. It illustrates the percentage of participants who chose each type of bundle. The combined bundle was also the most attractive here.

Alternatives for Bundle Purchase

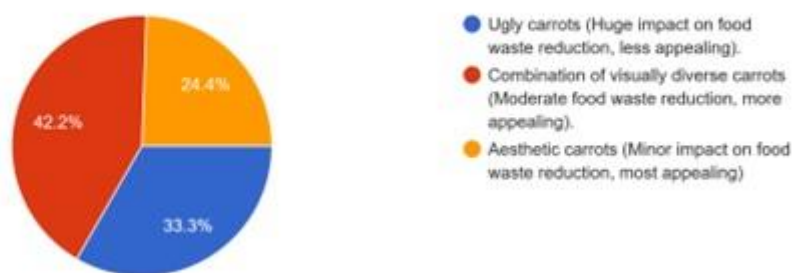


Figure 11 Alternatives for bundle purchase.

Figure 12 presents three pie charts showing the anticipated amounts of food waste after respondents "purchased" and "used" each type of carrot bundle at home. These charts provide a visual representation of expected waste levels, reflecting the psychological impact of ownership on consumer behavior towards food waste. Here something happened where the respondents who chose the ugly bundle ended up throwing away the least amount out of the bundle, a significant difference from the general perception chart. Overall, less food was wasted from each bundle after this exercise.

### Food Waste Expectations after Ownership Experience

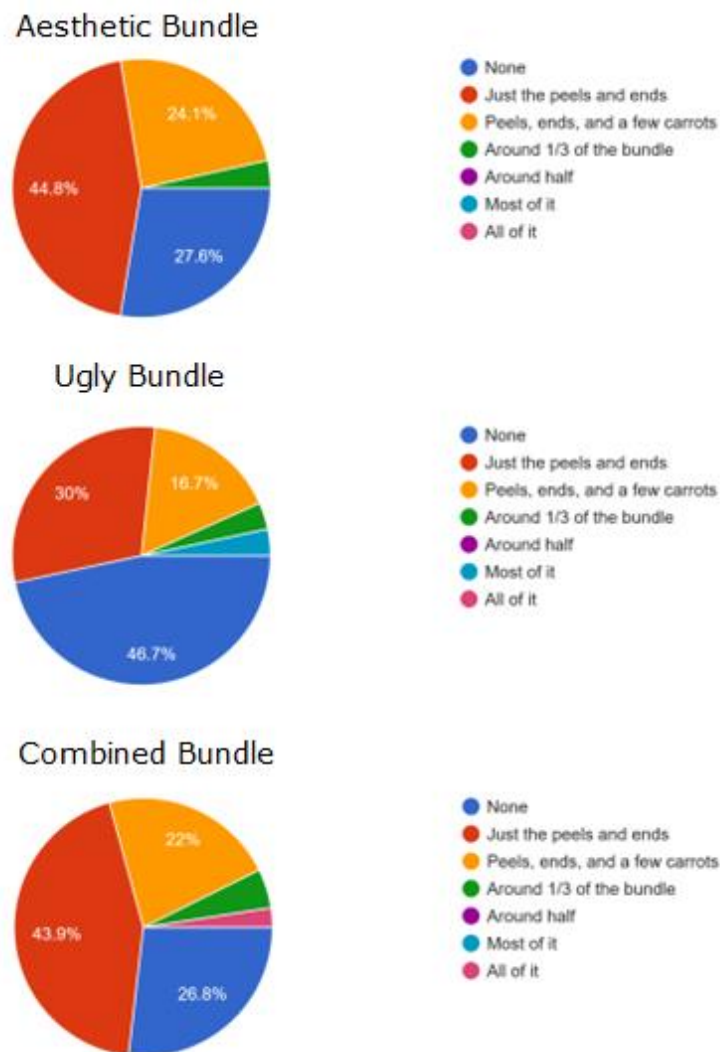


Figure 12 Ownership perception for food waste.

Figure 13 illustrates the future likelihood of respondents seeking or purchasing their chosen type of carrot bundle. For the ugly and combined bundles, respondents indicated that their likelihood of purchasing either stayed the same or increased. In contrast, the likelihood for the aesthetic bundle remained closer to the same. This reflects a positive trend towards accepting or integrating more ugly foods in consumer purchases.

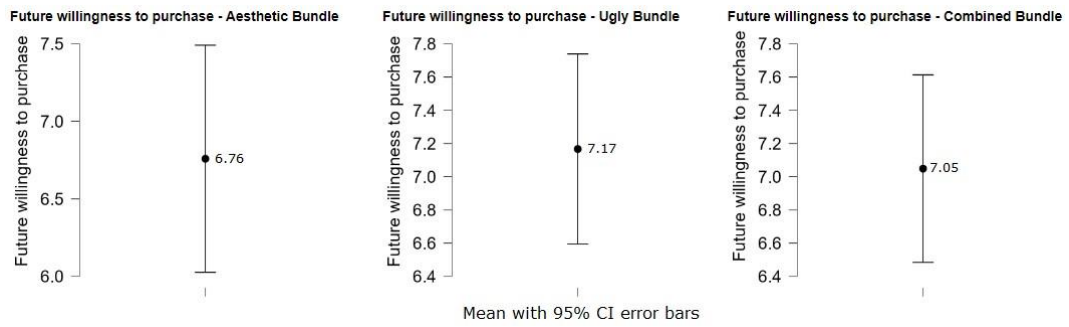


Figure 13 Future likeliness to seek/purchase.

Figure 14 displays three pie charts showing the likelihood of respondents recommending each type of carrot bundle following their hypothetical experience of purchasing and utilizing them. The charts reveal that the ugly and combined bundles were far more likely to be recommended by respondents compared to the aesthetic bundle, highlighting a significant preference for these options in terms of advocacy and potential influence on others' purchasing decisions.

### Future Likelihood to Recommend after Ownership Experience

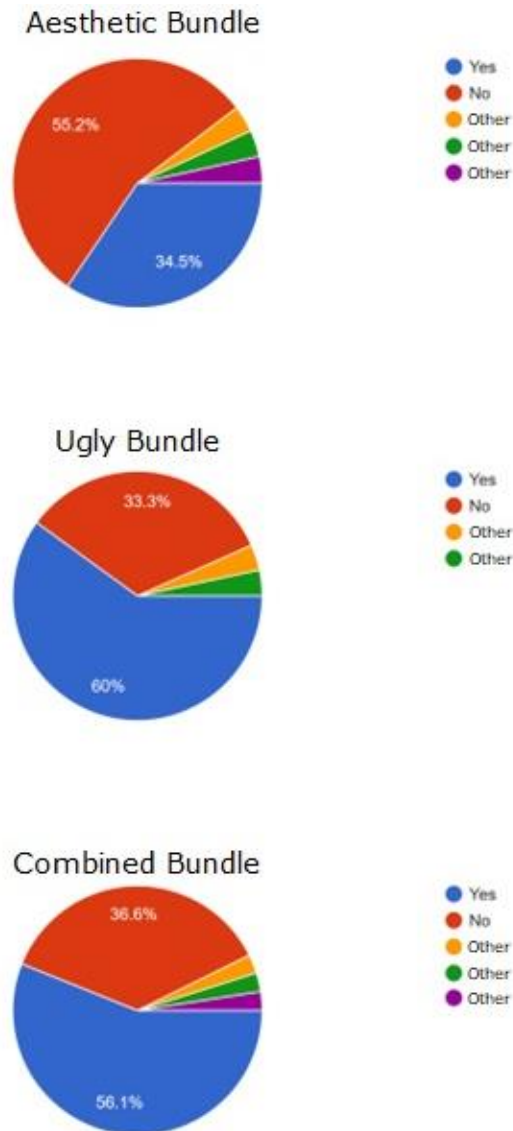


Figure 14 Future likelihood to recommend purchase.

The interval plots in Figure 15 illustrate how the perception of ugly food changed after respondents used their chosen bundle. Notably, perceptions shifted most positively for those who chose the ugly bundle, improved slightly for those with the combined bundle, and remained largely unchanged for those who selected the aesthetic bundle, demonstrating varying degrees of influence based on the type of carrots purchased.

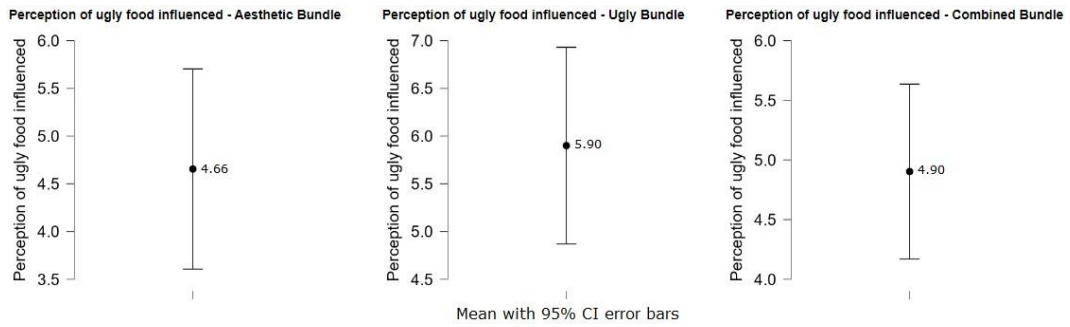


Figure 15 Has the purchased bundle influenced perception of ugly food.

## **5 Discussion**

### **5.1 Main Findings**

The research conducted sought to explore the influence of cognitive biases on consumer behavior regarding 'ugly' foods and identify strategies that could mitigate food wastage while promoting sustainable consumption patterns.

#### **5.1.1 Consumer Willingness to Engage with 'Ugly' Foods (RQ1)**

The results demonstrate a marked inclination among consumers to buy and consume 'ugly' foods, especially when they are educated about the environmental implications of food waste. This is consistent with existing studies indicating that environmental consciousness can favorably affect consumer behavior towards more sustainable practices (Buerke et al., 2017).

Previous research by Aschemann-Witzel et al. (2017) indicated that consumers often overlook 'ugly' foods due to ingrained aesthetic expectations. However, this study reveals that when consumers are made aware of the environmental consequences of food waste, their willingness to purchase 'ugly' foods increases. This suggests a shifting paradigm where environmental awareness can effectively counteract aesthetic biases, a point less emphasized in earlier studies (Aschemann-Witzel et al., 2017).

Unlike earlier studies that highlighted considerable resistance to 'ugly' foods based on aesthetic preferences, this study observed a higher willingness to engage with these foods. This discrepancy could be attributed to the increasing societal emphasis on sustainability and the educational efforts that were integrated into the study's methodology. Additionally, the heightened media focus on food waste and sustainability issues in recent years may have sensitized consumers to the implications of their food choices, thus influencing the study outcomes.

#### **5.1.2 Impact of Bundling on Consumer Perception (RQ2)**

The strategy of bundling 'ugly' foods with aesthetically pleasing ones effectively enhanced the attractiveness of these products. This finding supports the hypothesis that visual appeal can be leveraged, even when combined with less visually appealing items, to alter consumer perceptions and increase the acceptance of 'ugly' foods.

The effectiveness of bundling strategies aligns with findings by Popkowski Leszczyc and Häubl (2010), who highlighted the profitability of bundling in altering consumer perceptions (Leszczyc & Häubl, 2010). This study extends this notion to the context of 'ugly' foods, illustrating that bundling can be a viable marketing strategy not only

for enhancing profitability but also for promoting sustainability by reducing biases against aesthetically imperfect foods.

Previous research often considered bundling primarily as a commercial strategy aimed at enhancing sales without necessarily focusing on sustainability aspects. In contrast, this study explored bundling as a deliberate intervention to alter perceptions towards 'ugly' foods. The success of this approach in our study may be due to the explicit framing around environmental benefits, which is not commonly emphasized in traditional bundling strategies. This suggests that the context in which bundling is presented can significantly affect its effectiveness.

### **5.1.3 Changes in Consumer Behavior Post-Purchase (RQ3)**

The data revealed that ownership of 'ugly' foods led to a positive shift in consumer perceptions, with an increased likelihood of future purchases and recommendations. This suggests that personal experience with 'ugly' foods can challenge and possibly change long-standing biases, leading to more sustainable consumer behavior over time.

The positive shift in consumer perceptions post-purchase aligns with Festinger's theories of cognitive dissonance (1957), where consumers adjust their beliefs to align with their actions (Miller et al., 2015). This study contributes to the literature by demonstrating that actual engagement with 'ugly' foods can lead to a re-evaluation of preconceived notions about food quality and aesthetics, supporting a more sustainable consumption pattern.

Earlier research on consumer behavior post-purchase has frequently focused on satisfaction and regret. However, this study extends the discourse by examining changes in perception towards 'ugly' foods after purchase. The observed shift in attitudes may be linked to the experiential interaction with the product, which challenges and potentially alters pre-existing biases. This finding underscores the importance of direct experience in influencing consumer beliefs and behaviors, a factor that has been underexplored in the context of food aesthetics.

## 5.2 Alignment with SDG 12 Targets and Indicators

The findings of this study align with global sustainability efforts, particularly the Sustainable Development Goal 12 (*SDG 12 Hub*, 2021), which focuses on responsible consumption and production. Several connections emerge from the data. This underscores the relevance of consumer behavior studies in achieving international sustainability targets.

**Consumer Awareness and Behavioral Changes:** The enhanced consumer awareness and concern about food waste, as highlighted by survey responses, support Target 12.8 of SDG 12, which emphasizes the need for information and awareness for sustainable development and lifestyles. This increased awareness can catalyze shifts in consumer behavior that contribute to more sustainable consumption patterns, reflecting a critical advancement towards this target.

**Willingness to Purchase and Consume 'Ugly' Foods:** The willingness among consumers to purchase and consume 'ugly' foods aligns with Target 12.3, aimed at halving per capita global food waste at the retail and consumer levels. Promoting the acceptance of these foods is a practical approach to reducing waste, demonstrating how behavioral insights can facilitate progress toward reducing food waste globally.

**Economic Impact of Consumer Choices:** The findings on consumers' willingness to pay for different food bundles, including 'ugly' foods, tie into Indicator 12.c. This indicator focuses on rationalizing inefficient fossil-fuel subsidies that encourage wasteful consumption by using market-based tools. The economic behaviors observed suggest that modifying pricing strategies could serve as a powerful tool to promote sustainable consumption and reduce food waste.

**Reduction of Food Waste:** Data on the anticipated reduction in food waste related to different packaging options supports Target 12.5, which focuses on substantially reducing waste generation through prevention, reduction, recycling, and reuse. The study's insights into how product presentation and bundling can affect waste outcomes are invaluable for devising strategies that help minimize food waste.

## 5.3 Interpretation of the Findings

This research highlights the complex interplay between heuristics and biases, particularly focusing on how they influence consumer acceptance of "ugly" foods. Key findings suggest that the licensing effect and the naturalness bias interact with other cognitive heuristics to shape consumer behavior. Below is an analysis of these interactions:

**Interplay with Representativeness Heuristic:** The representativeness heuristic typically leads consumers to judge the quality of food based on appearance.

"Ugly" foods, which deviate from aesthetic norms, are often perceived as inferior in freshness and nutritional value. However, the licensing effect allows consumers to engage with these foods through the purchase of combined bundles. This approach lets consumers maintain their aesthetic preferences while still supporting environmental and ethical values. The presence of aesthetically pleasing foods in these bundles helps mitigate negative judgments associated with "ugly" foods. Concurrently, the naturalness bias shifts the perception of quality from mere looks to authenticity and minimal processing, challenging the traditional equating of beauty with quality. This perspective shift is especially pronounced among those who have grown their own food or have previous experience with 'ugly' foods. These individuals often report that 'ugly' foods are not only more flavorful but also offer health benefits, contrasting significantly with the less flavorful, aesthetically perfect produce commonly found in supermarkets.

**Interplay with Affect Heuristic:** Emotional responses significantly influence food choices, where the affect heuristic may lead to an instinctive rejection of "ugly" foods based on perceived quality or safety. Here, the licensing effect moderates this reaction by allowing consumers to feel good about selecting combined bundles, thereby providing a moral and environmental payoff. This positive reinforcement lessens the initial emotional aversion to "ugly" foods and fosters satisfaction, enhancing the likelihood of repeat purchases. Additionally, the naturalness bias can transform emotions from disgust to pride by emphasizing the ethical and health benefits of less processed foods, thus altering consumer perceptions positively.

**Interplay with Availability Heuristic:** The availability heuristic influences consumer perceptions based on prominent and memorable examples, often highlighting the negative aspects of "ugly" foods. Through the licensing effect, positive environmental impacts of choosing "ugly" foods are emphasized within combined bundles, introducing beneficial narratives to consumers' information pool. These narratives help counteract negative media portrayals and cultural biases, shifting focus from aesthetics to environmental and ethical benefits. Moreover, the naturalness bias provides a counter-narrative that champions "ugly" foods as preferable due to their minimal processing and reduced environmental impact, prompting consumers to reconsider their initial assumptions and appreciate the broader implications of their choices.

By strategically leveraging the licensing effect, marketers and policymakers can promote empowered and ethically satisfying consumer decisions that include "ugly" foods. This strategy not only challenges existing biases but also fosters a shift toward more sustainable and responsible consumption practices. Similarly, by championing

the naturalness bias, stakeholders can mitigate the detrimental impacts of these heuristics, encouraging a more informed and holistic approach to consumer decision-making regarding "ugly" foods, thus aligning consumer behaviors with sustainability goals.

## **5.4 Actionable Recommendations**

The key messages of this study can be utilized to suggest actionable strategies for stakeholders in the food industry and policymaking.

### **5.4.1 Awareness Campaigns to Educate Consumers**

The impact of environmental awareness on consumer willingness to purchase and consume 'ugly' foods underscores the importance of educational campaigns. Informing consumers about the environmental and social impacts of food waste can effectively alter perceptions and encourage more sustainable choices. These awareness campaigns can help challenge and reshape consumer biases, thus promoting a broader acceptance of aesthetically imperfect foods.

### **5.4.2 Strategic Marketing to Redefine Beauty Standards in Food**

Bundling strategies can help in enhancing the attractiveness of 'ugly' foods, demonstrating that marketing techniques can be powerful tools in redefining what is considered beautiful or acceptable in food aesthetics. By creatively presenting 'ugly' foods alongside aesthetically pleasing products, marketers can subtly shift consumer expectations and norms, contributing to a decrease in food wastage.

### **5.4.3 Direct Experience to Promote Sustainable Behavior**

The positive shifts in consumer behavior post-purchase indicate that direct experience with 'ugly' foods can mitigate initial biases and foster long-term changes in consumer behavior. This suggests that facilitating first-hand experiences with such foods, perhaps through taste tests or promotional events, could be an effective way to promote sustainable consumption practices.

### **5.4.4 Policy Interventions to Support Sustainability Initiatives**

Given the effectiveness of both educational and marketing strategies in influencing consumer behavior, there is a strong case for policy interventions that support these initiatives. Policies that encourage the labeling of 'ugly' foods as environmentally friendly or provide incentives for retailers to sell such products could enhance consumer uptake and support the development of a more sustainable food system.

## **5.5 Methods Discussion**

The methods employed in this study were chosen to gain a comprehensive understanding of consumer perceptions regarding 'ugly' foods and their implications for reducing food waste. By utilizing an online publicly distributed survey, the research tapped into a wide audience, ensuring that the findings reflected a broad spectrum of consumer attitudes and behaviors. The use of Likert scale questions and descriptive statistics played a crucial role in quantifying these insights, revealing information on food selection processes, and aiding in the development of targeted strategies to promote the acceptance of 'ugly' foods. One significant advantage of the quantitative nature of descriptive statistics was in helping identify patterns and trends within the population.

However, surveys often contend with the risk of self-reporting bias, where participants do not always provide accurate responses, potentially influenced by a desire to conform to perceived social norms. Moreover, they can also lack the depth that qualitative methods like interviews offer, potentially oversimplifying complex consumer behaviors and motivations.

## **5.6 Limitations of the study and directions for the future**

The study primarily focuses on consumer perceptions rather than actual behavior. While the survey provides valuable insights into attitudes and willingness to purchase 'ugly' foods, there is a gap between stated intentions and real-world purchasing decisions. This discrepancy is crucial because actual consumer behavior may be influenced by situational factors such as product availability, pricing, and social norms, which were not directly examined in this research.

Therefore, the study's scope is limited to understanding and addressing cognitive biases to mitigate food waste and promote more sustainable consumption practices. Future research could complement these findings with experimental or observational studies to capture the complex dynamics of actual purchasing behavior.

Even though a high proportion of the respondents were females and problems regarding gender imbalances could arise, the survey still reached a diverse international. Feedback from the study also indicated a noticeable shift in perception amongst the majority of participants towards better acceptance of 'ugly' foods, even among those who were not initially sustainably oriented.

To ensure that these shifts in perception translate into lasting changes in consumer behavior, it is crucial to assess the long-term effectiveness of the proposed marketing strategies and educational initiatives. Additionally, incorporating qualitative research methods, such as interviews with industry experts and stakeholders in the food sector, could provide a more in-depth understanding of the issue.

## 6 Sustainability Considerations

The study is in alignment with the following UN Sustainable Development Goals (*THE 17 GOALS | Sustainable Development*, n.d.):

**Goal 12:** Responsible Consumption and Production: This study emphasizes the need for sustainable consumption patterns and reduction of waste. By addressing the rejection of 'ugly' foods due to aesthetic biases, this study contributes to several of the 11 targets and 14 indicators under SDG 12. Additionally, by proposing interventions that encourage the acceptance and purchase of aesthetically imperfect foods, this research supports efforts to optimize resource use and decrease food wastage, aligning with the overarching aim of ensuring sustainable consumption and production patterns.

**Goal 13:** Climate Action: While the study does not directly focus on climate change, reducing food wastage has indirect benefits for climate action. Less food wastage means fewer resources expended in food production, and reduced greenhouse gas emissions from decomposing food waste, contributing to broader climate change mitigation efforts.

**Goal 2:** Zero Hunger: By promoting the utilization of all edible foods, including those that are aesthetically imperfect, the study indirectly supports efforts to combat global hunger. Reducing food wastage can contribute to more efficient food distribution and availability, aligning with the goal of achieving zero hunger.

This research provides valuable insights into how changing consumer perceptions and behaviors can lead to more sustainable food systems. While the primary focus is on consumer biases and food wastage, the implications of this study resonate with several aspects of sustainable development, especially in promoting responsible consumption, reducing waste, and indirectly supporting climate action and food security goals.

## **7 Conclusion**

This thesis has thoroughly examined consumer perceptions toward 'ugly' foods, investigating how strategic marketing and increased awareness can mitigate biases and promote acceptance to reduce food waste. Guided by focused research questions, the study delved into consumer willingness to engage with 'ugly' foods, the efficacy of bundling these foods with visually appealing counterparts, and the transformation in consumer behavior following purchase. The findings illuminate the critical role of psychological biases, specifically the licensing effect and naturalness bias, in shaping consumer decisions.

### **RQ1: Consumer Willingness to Purchase and Consume 'Ugly' Foods**

The results affirm a substantial willingness among consumers to purchase and consume 'ugly' foods, especially when their environmental benefits are highlighted. This willingness is partly influenced by the licensing effect, where consumers feel morally licensed to make environmentally friendly choices after being informed about the positive impacts of reducing food waste. This suggests that increasing consumer awareness through educational initiatives can significantly enhance the acceptance of 'ugly' foods.

### **RQ2: Impact of Bundling on Consumer Perception**

Bundling 'ugly' foods with aesthetically pleasing ones not only improves their attractiveness but also leverages the naturalness bias, where consumers perceive these combinations as more authentic and less processed. This strategy effectively shifts consumer perceptions, making 'ugly' foods more desirable and marketable. Thus, creative bundling emerges as a potent tool in redefining beauty standards in food and encouraging sustainable purchasing behaviors.

### **RQ3: Changes in Consumer Behavior Post-Purchase**

The study demonstrates that ownership of 'ugly' foods, even when hypothetical, significantly enhances consumer perceptions, leading to increased likelihood of future purchases and recommendations. This change is indicative of the licensing effect in action, where initial positive actions (choosing 'ugly' foods) empower consumers to continue making environmentally beneficial choices, reinforcing a cycle of sustainable behavior.

The findings highlight how cognitive biases like the licensing effect and naturalness bias can be strategically harnessed to promote 'ugly' foods. By understanding and leveraging these biases, marketers can design interventions that not only challenge but also change consumer attitudes towards these foods. This approach aligns with

Sustainable Development Goal 12 by promoting responsible consumption and significantly reducing food waste through behavioral change, in addition to other aforementioned SDGs.

## References

- Aschemann-Witzel, J., Jensen, J. H., Jensen, M. H., & Kulikovskaja, V. (2017). Consumer behaviour towards price-reduced suboptimal foods in the supermarket and the relation to food waste in households. *Appetite, 116*, 246–258. <https://doi.org/10.1016/j.appet.2017.05.013>
- Bolton, L. E., & Alba, J. W. (2012). When less is more: Consumer aversion to unused utility. *Journal of Consumer Psychology, 22*(3), 369–383. <https://doi.org/10.1016/j.jcps.2011.09.002>
- Buerke, A., Straatmann, T., Lin-Hi, N., & Müller, K. (2017). Consumer awareness and sustainability-focused value orientation as motivating factors of responsible consumer behavior. *Review of Managerial Science, 11*(4), 959–991. <https://doi.org/10.1007/s11846-016-0211-2>
- Cao, Y., & Miao, L. (2021). Consumer responses to suboptimal food products. *Appetite, 163*, 105205. <https://doi.org/10.1016/j.appet.2021.105205>
- de Hooge, I. E., Oostindjer, M., Aschemann-Witzel, J., Normann, A., Loose, S. M., & Almlí, V. L. (2017). This apple is too ugly for me!: Consumer preferences for suboptimal food products in the supermarket and at home. *Food Quality and Preference, 56*, 80–92. <https://doi.org/10.1016/j.foodqual.2016.09.012>
- Dibbets, P., Borger, L., & Nederkoorn, C. (2021). Filthy fruit! Confirmation bias and novel food. *Appetite, 167*, 105607. <https://doi.org/10.1016/j.appet.2021.105607>

- Gagliardi, L. (2024). *Naturalness Seeking Minds: The Cognitive Foundations of Naturalness Bias in Consumer Food Choice* (SSRN Scholarly Paper 4761160).  
<https://doi.org/10.2139/ssrn.4761160>
- Hezarkhani, B., Demirel, G., Bouchery, Y., & Dora, M. (2023). Can “ugly veg” supply chains reduce food loss? *European Journal of Operational Research*, 309(1), 117–132. <https://doi.org/10.1016/j.ejor.2023.01.033>
- Holmgren, M., Andersson, H., & Sörqvist, P. (2018). Averaging bias in environmental impact estimates: Evidence from the negative footprint illusion. *Journal of Environmental Psychology*, 55, 48–52.  
<https://doi.org/10.1016/j.jenvp.2017.12.005>
- Jang, H.-W., & Cho, M. (2022). The relationship between ugly food value and consumers’ behavioral intentions: Application of the Theory of Reasoned Action. *Journal of Hospitality and Tourism Management*, 50, 259–266.  
<https://doi.org/10.1016/j.jhtm.2022.02.009>
- Khan, U., & Dhar, R. (2006). Licensing Effect in Consumer Choice. *Journal of Marketing Research*, 43(2), 259–266. <https://doi.org/10.1509/jmkr.43.2.259>
- Leszczyc, P. T. L. P., & Häubl, G. (2010). To Bundle or Not to Bundle: Determinants of the Profitability of Multi-Item Auctions. *Journal of Marketing*, 74(4), 110–124. JSTOR.
- Makhal, A., Thyne, M., Robertson, K., & Miroso, M. (2020). “I don’t like wonky carrots”- an exploration of children’s perceptions of suboptimal fruits and vegetables. *Journal of Retailing and Consumer Services*, 54, 101945.  
<https://doi.org/10.1016/j.jretconser.2019.101945>

- Miller, M. K., Clark, J. D., & Jehle, A. (2015). Cognitive Dissonance Theory (Festinger). In G. Ritzer (Ed.), *The Blackwell Encyclopedia of Sociology* (1st ed.). Wiley. <https://doi.org/10.1002/9781405165518.wbeosc058.pub2>
- SDG 12 Hub. (2021, May 8). SDG 12 Hub. <https://sdg12hub.org/sdg-12-hub>
- Sörqvist, P., Volna, I., Zhao, J., & Marsh, J. (2022). Irregular stimulus distribution increases the negative footprint illusion. *Scandinavian Journal of Psychology*, 63. <https://doi.org/10.1111/sjop.12829>
- THE 17 GOALS | Sustainable Development. (n.d.). Retrieved December 11, 2023, from <https://sdgs.un.org/goals>
- Tsalis, G. (2020). What's the deal? Consumer price involvement and the intention to purchase suboptimal foods. A cross-national study. *Food Quality and Preference*, 79, 103747. <https://doi.org/10.1016/j.foodqual.2019.103747>
- Tversky, A., & Kahneman, D. (1991). Loss Aversion in Riskless Choice: A Reference-Dependent Model. *The Quarterly Journal of Economics*, 106(4), 1039–1061. <https://doi.org/10.2307/2937956>
- Xu, Y., Jeong, E., Jang, S. (Shawn), & Shao, X. (2021). Would you bring home ugly produce? Motivators and demotivators for ugly food consumption. *Journal of Retailing and Consumer Services*, 59, 102376. <https://doi.org/10.1016/j.jretconser.2020.102376>
- Young, A., Sima, H., Luo, N., Wu, S., Gong, Y., & Qian, X. (2024). Ugly produce and food waste management: An analysis based on a social cognitive perspective. *Journal of Retailing and Consumer Services*, 79, 103829. <https://doi.org/10.1016/j.jretconser.2024.103829>

## **Appendix A**

### **Food Perception Survey**

Welcome! Your insight into our food selection process is invaluable. This survey seeks to grasp the broad influences and preferences shaping our food choices, with an eye towards reducing waste. We appreciate your honest input. Thank you for contributing to this exploration. Let's begin!

This study is done by:

Natalie Hörnfeldt

ndloubier@gmail.com

\* Indicates required question

#### **INFORMED CONSENT**

Your participation in this study is entirely voluntary.

All data collected will be handled with strict confidentiality.

You have the right to withdraw from the study at any time without needing to provide a reason, simply by closing your browser.

1. Do you wish to participate? \* Mark only one oval.

Yes Skip to question 2

No Skip to section 2 (Declined Participation)

Declined Participation

You have declined to participate in the survey. You may close the browser or click submit below.

#### **Part 1: Demographic Information**

2. Age \*

3. Gender identity \* Mark only one oval.

Female

Male

Prefer not to say

Other:

4. Education level \* Mark only one oval.

Some high school

High school graduate

Some college

Bachelor's degree

Graduate degree

More than one Graduate degree or Ph.D.

Other:

5. Household annual gross income range \* Mark only one oval.

Less than \$30,000 (300,000 SEK)

\$30,000 - \$70,000 (300,000 - 700,000 SEK)

\$70,000 - \$100,000 (700,000 - 1,000,000 SEK)

\$100,000+ (1,000,000+ SEK)

Prefer not to say

6. What is your occupation or job title? \*

7. Current region/country of residence \*

### **Psychographic Information**

8. To what extent do you prioritize sustainability and environmental conservation in your personal values? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all Strongly prioritize

9. How concerned are you about the issue of food waste on a global and local level? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not concerned at all Extremely concerned

10. How often do you shop for food products that are organic, locally sourced, or sustainable? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Never Always

11. How much does the visual appearance of food influence your decision to buy it? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all Completely

12. To what extent do you prioritize appearance over reducing food waste (buying misshapen fruits and vegetables can reduce food waste). \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Appearance over reducing waste. Reducing waste over appearance.

13. Which of the following best describes your dietary lifestyle choices? \* Mark only one oval.

Omnivore: A balanced diet that includes both plant-based and animal-based foods.

Vegetarian: No meat or fish, but may consume other animal products like dairy and eggs.

Vegan: No animal products, including meat, fish, dairy, eggs, and maybe not honey.

Pescatarian: No meat but eat fish along with other animal products like dairy and eggs.

Flexitarian: Primarily a vegetarian diet but occasionally eat meat or fish.

Other:

14. How often do you cook meals from scratch? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Never Daily

15. How important is it for you to know the origin of your food products? \*  
Mark only one oval.

1 2 3 4 5 6 7 8 9 Not important Extremely important

16. How do your ethical beliefs influence your food purchasing decisions? (e.g., animal welfare, fair trade, and labor practices.) \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not important Extremely important

17. To what extent do recommendations from friends or family impact your decision to try new food products? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 No impact Extreme impact

## Part 2: General Perception

Please answer the following questions based on your consumer preferences without overthinking.

### Aesthetic carrots

This bundle of straight, spotless carrots may not translate to a significant reduction in food waste upon purchase.



Questions

18. How visually appealing do you find these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all appealing Extremely appealing

19. Rate your expectation of the taste of these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Expecting poor taste Expecting excellent taste

20. How willing are you to pay for these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not willing to pay at all Extremely willing to pay

21. How much would you be willing to pay for this 2 kg (4 lbs.) bundle of carrots, assuming that a standard price for carrots is 20SEK (\$2) per kilogram in Sweden? \*

22. How willing are you to eat these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not willing to eat at all Extremely willing to eat

23. After buying the carrots in the above picture, how much do you expect will go to waste? \* Mark only one oval.

None

Just the peels and ends

Peels, ends, and a few carrots

Around 1/3 of the bundle

Around half

Most of it

All of it

24. How likely are you to recommend these carrots to a friend or family member? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Very unlikely Very likely

25. How likely are you to seek out and purchase this type of food bundle in the future? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Very unlikely Very likely

## Part 2: General Perception

Please answer the following questions based on your consumer preferences without overthinking.

Ugly food (carrots)

This bundle of wonky, spotted carrots might offer a unique opportunity to considerably reduce food waste upon purchase.



Questions

26. How visually appealing do you find these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all appealing Extremely appealing

27. Rate your expectation of the taste of these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Expecting poor taste Expecting excellent taste

28. How willing are you to pay for these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not willing to pay at all Extremely willing to pay

29. How much would you be willing to pay for this 2 kg (4 lbs.) bundle of carrots, assuming that a standard price for carrots is 20SEK (\$2) per kilogram in Sweden? \*

30. How willing are you to eat these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not willing to eat at all Extremely willing to eat

31. After buying the carrots in the above picture, how much do you expect will go to waste? \* Mark only one oval.

None

Just the peels and ends

Peels, ends, and a few carrots

Around 1/3 of the bundle

Around half

Most of it

All of it

32. How likely are you to recommend these carrots to a friend or family member? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Very unlikely Very likely

33. How likely are you to seek out and purchase this type of food bundle in the future? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Very unlikely Very likely

## **Part 2: General Perception**

Please answer the following questions based on your consumer preferences without overthinking.

### Combined carrots

This combined bundle features a blend of aesthetic and ugly carrots and possesses great potential to reduce food waste upon purchase.



### Questions

34. How visually appealing do you find these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all appealing Extremely appealing

35. Rate your expectation of the taste of these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Expecting poor taste Expecting excellent taste

36. How willing are you to pay for these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not willing to pay at all Extremely willing to pay

37. How much would you be willing to pay for this 2 kg (4 lbs.) bundle of carrots, assuming that a standard price for carrots is 20SEK (\$2) per kilogram in Sweden? \*

38. How willing are you to eat these carrots? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not willing to eat at all Extremely willing to eat

39. After buying the carrots in the above picture, how much do you expect will go to waste? \* Mark only one oval.

None

Just the peels and ends

Peels, ends, and a few carrots

Around 1/3 of the bundle

Around half

Most of it

All of it

40. How likely are you to recommend these carrots to a friend or family member? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Very unlikely Very likely

41. How likely are you to seek out and purchase this type of food bundle in the future? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Very unlikely Very likely

### **Part 3: Ownership Perception**

Imagine making a hypothetical purchase based on your consumer preferences. Once you've selected your item, envision bringing it home and using it. Afterwards, reflect on your decision and respond to a few questions regarding your choice.

42. Choose one of these bundles of carrots. \* Mark only one oval.



Ugly carrots (Huge impact on food waste reduction, less appealing). Skip to question 43

Combination of visually diverse carrots (Moderate food waste reduction, more appealing). Skip to question 54



Aesthetic carrots (Minor impact on food waste reduction, most appealing) Skip to question 65

**Part 3: Ugly carrots (Huge impact on food waste reduction, less appealing).**

Now that you've chosen to "purchase" carrots with a huge impact on food waste reduction, please tell us about your initial perceptions.



With some peeling, trimming, and some coring, surely most of these carrots are good to go!

43. Please indicate your level of satisfaction with your selection of carrot bundle.

\* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all satisfied Extremely satisfied

44. Please indicate the level of perceived quality of your selection of carrot bundle. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Extremely low quality Extremely high quality

45. Please predict how much you will enjoy experiencing your selected carrot bundle overall. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Will not enjoy it at all Will enjoy it extremely

### **Post-consumption**

After utilizing your environmentally-conscious carrots, take a moment to reflect and then share your envisioned experience with us.

46. What type of recipe(s) did you "try" for the carrots? \*

47. Did you "share" your food with others? If so, who? \* Check all that apply.

No

Yes, friends

Yes, family

Other:

48. How much of your carrots actually "went to waste"? \* Mark only one oval.

None

Just the peels and ends

Peels, ends, and a few carrots

Around 1/3 of the bundle

Around half

Most of it

All of it

49. Please rate how well your chosen carrot bundle experience met your expectations. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Expectations not met at all Expectations met completely

50. Please indicate your future willingness to purchase food items similar to the carrot bundle you selected, having increased, decreased, or remained the same. (5 = same) \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Willingness has decreased Willingness has increased

51. Please share how your perception of 'ugly' food has been influenced by your experience with the carrot bundle you selected. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not influenced at all Extremely influenced

52. How important was the reduction of food waste in influencing your decision to choose the carrot bundle you utilized? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not important at all Extremely important

53. Have you shared your experience about your ugly carrot bundle with friends or family? Or recommended that they purchase such a food item? \*Mark only one oval.

Yes

No

Other:

Skip to question 76

**Part 3: Combination of visually diverse carrots (Moderate food waste reduction, more appealing).**

Now that you've chosen to "purchase" carrots with a moderate impact on food waste reduction, please tell us about your initial perceptions.



With some peeling and some minor trimming, these carrots are good to go!

54. Please indicate your level of satisfaction with your selection of carrot bundle.  
\* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all satisfied Extremely satisfied

55. Please indicate the level of perceived quality of your selection of carrot bundle. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Extremely low quality Extremely high quality

56. Please predict how much you will enjoy experiencing your selected carrot bundle overall. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Will not enjoy it at all Will enjoy it extremely

### **Post-consumption**

After utilizing your environmentally-conscious carrots, take a moment to reflect and then share your envisioned experience with us.

57. What type of recipe(s) did you "try" for the carrots? \*

58. Did you "share" your food with others? If so, who? \* Check all that apply.

No

Yes, friends

Yes, family

Other:

59. How much of your carrots actually "went to waste"? \* Mark only one oval.

None

Just the peels and ends

Peels, ends, and a few carrots

Around 1/3 of the bundle

Around half

Most of it

All of it

60. Please rate how well your chosen carrot bundle experience met your expectations. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Expectations not met at all Expectations met completely

61. Please indicate your future willingness to purchase food items similar to the carrot bundle you selected, having increased, decreased, or remained the same. (5 = same) \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Willingness has decreased Willingness has increased

62. Please share how your perception of 'ugly' food has been influenced by you experience with the carrot bundle you selected. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not influenced at all Extremely influenced

63. How important was the reduction of food waste in influencing your decision to choose the carrot bundle you utilized? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not important at all Extremely important

64. Have you shared your experience about your combined carrot bundle with friends or family? Or recommended that they purchase such a food item? \*Mark only one oval.

Yes

No

Other:

Skip to question 76

**Part 3: Aesthetic carrots (Minor impact on food waste reduction, most appealing).**

Now that you've chosen to "purchase" carrots with a minor impact on food waste reduction, please tell us about your initial perceptions.



With some peeling, these carrots are good to go!

65. Please indicate your level of satisfaction with your selection of carrot bundle.  
\* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not at all satisfied Extremely satisfied

66. Please indicate the level of perceived quality of your selection of carrot bundle. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Extremely low quality Extremely high quality

67. Please predict how much you will enjoy experiencing your selected carrot bundle overall. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Will not enjoy it at all Will enjoy it extremely

### **Post-consumption**

After utilizing your environmentally-conscious carrots, take a moment to reflect and then share your envisioned experience with us.

68. What type of recipe(s) did you "try" for the carrots? \*

69. Did you "share" your food with others? If so, who? \* Check all that apply.

No

Yes, friends

Yes, family

Other:

70. How much of your carrots actually "went to waste"? \* Mark only one oval.

None

Just the peels and ends

Peels, ends, and a few carrots

Around 1/3 of the bundle

Around half

Most of it

All of it

71. Please rate how well your chosen carrot bundle experience met your expectations. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Expectations not met at all Expectations met completely

72. Please indicate your future willingness to purchase food items similar to the carrot bundle you selected, having increased, decreased, or remained the same. (5 = same) \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Willingness has decreased Willingness has increased

73. Please share how your perception of 'ugly' food has been influenced by your experience with the carrot bundle you selected. \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not influenced at all Extremely influenced

74. How important was the reduction of food waste in influencing your decision to choose the carrot bundle you utilized? \* Mark only one oval.

1 2 3 4 5 6 7 8 9 Not important at all Extremely important

75. Have you shared your experience about your aesthetic carrot bundle with friends or family? Or recommended that they purchase such a food item? \* Mark only one oval.

Yes

No

Other:

Skip to question 76

### **Survey Submission**

If you decided to decline to participate, please close the browser window now.

If you are still willing, then click the submit button below.

76. Do you have any additional comments or opinions about your experience that you would like to share?