

From Waste to Taste: How “Ugly” Labels Can Increase Purchase of Unattractive Produce

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Abstract

Food producers and retailers throw away large amounts of perfectly edible produce that fails to meet appearance standards, contributing to the environmental issue of food waste. The authors examine why consumers discard aesthetically unattractive produce, and they test a low-cost, easy-to-implement solution: emphasizing the produce’s aesthetic flaw through “ugly” labeling (e.g., labeling cucumbers with cosmetic defects “Ugly Cucumbers” on store displays or advertising). Seven experiments, including two conducted in the field, demonstrate that “ugly” labeling corrects for consumers’ biased expectations regarding key attributes of unattractive produce—particularly tastiness—and thus increases purchase likelihood. “Ugly” labeling is most effective when associated with moderate (rather than steep) price discounts. Against managers’ intuition, it is also more effective than alternative labeling that does not exclusively point out the aesthetic flaw, such as “imperfect” labeling. This research provides clear managerial recommendations on the labeling and the pricing of unattractive produce while addressing the issue of food waste.

Keywords

aesthetics, debiasing, food waste, labeling, sustainability, ugliness penalty

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Consumers today expect the fruits and vegetables they purchase to “look good” all year round (Walmsley 2017), a demand that farmers and retailers meet by discarding large amounts of produce that fails to meet aesthetic standards. A lot of produce fails these standards, not because of disease or damage that may negatively affect taste or nutritional quality, but simply because of inherent variation in natural growth. In fact, U.S. retailers throw away \$15.4 billion of edible produce each year (Buzby, Farah-Wells, and Hyman 2014), and farmers discard up to 30% of their crops because of cosmetic imperfections (Berkenkamp and Meehan 2016). Food waste also has damaging consequences for the environment: 96% of wasted food is left to decompose in landfills, resulting in the release of methane, a greenhouse gas that traps solar radiation and contributes to climate change (Environmental Protection Agency 2017). In addition, food waste leads to a waste of other valuable resources: 1.4 billion hectares of land and 25% of the world’s fresh water are used to grow produce that will be later thrown away (Hall et al. 2009; Owen 2005).

Recent research has started to identify factors that might increase consumers’ acceptance of unattractive produce, including marketing message framing (Grewal et al. 2019; Shao et al. 2020; Van Giesen and De Hooze 2019), reduced

pricing (Aschemann-Witzel, Giménez, and Ares 2018), and individual differences in environmental awareness (De Hooze et al. 2017; Makhmal et al. 2020; Xu et al. 2021). Most relevant to the present investigation, Grewal et al. (2019) proposed that consumers devalue unattractive produce, in part because imagining eating it negatively affects how they view themselves. Thus, a marketing message boosting consumers’ self-esteem, “You Are Fantastic! Pick Ugly Produce!,” increases purchase compared with a message simply stating, “Pick Ugly Produce.” While this research identifies a straightforward managerial intervention, both the intervention and the comparison messages labeled unattractive produce “ugly,” so the effect of “ugly” labeling in isolation is unclear.

We build on this prior work by investigating the effect of labeling unattractive produce as “ugly” (what we call “ugly”

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labeling) and comparing it with several alternative labels. We believe that further investigation is warranted because most retailers do not label unattractive produce in any specific way, and when they do, there is great variation in how unattractive produce is labeled. Indeed, although “ugly” labeling was employed by French retailer Intermarché in 2014, subsequent campaigns by other retailers have used more understated labels to promote unattractive produce, such as “imperfect” or labels that aim to positively frame visual atypicality, such as produce “with personality.” To assess managers’ beliefs regarding the use of “ugly” labeling, we interviewed 52 grocery store managers across North America with an average of 12 years of experience, and asked them to indicate which of four labeling options (“ugly,” “imperfect,” “with personality,” or no specific label) they would use to promote unattractive produce sold at a discounted price. Of the 52 respondents, 46% stated that they would not use any label and that just the discount was enough, followed by 33% preferring “imperfect” labeling, 17% preferring “with personality” labeling, and only 4% preferring “ugly” labeling. We also asked them to select the worst option, and 75% mentioned “ugly” labeling.

Although managers do not see merit in “ugly” labeling, our research proposes that labeling unattractive produce as “ugly” can increase purchase, not only compared with no specific labeling, but also compared with more understated—and more popular—labeling such as “imperfect.” We demonstrate the effectiveness of “ugly” labeling through a combination of field and online experiments, and elucidate the underlying mechanism. We show that consumers saddle unattractive produce with an “ugliness penalty” (Hamermesh and Biddle 1994, p.1181) that negatively affects expectations of the produce’s key attributes—particularly tastiness—and thus affects purchase intentions. “Ugly” labeling corrects for these biased, negative expectations because it directly points out the aesthetic flaw as their source, in line with research that has shown a corrective effect when drawing observers’ attention toward the source of a biased judgment (Strack and Hannover 1996; Townsend and Shu 2010). Further, while price discounts can motivate consumers to purchase unattractive produce (Aschemann-Witzel, Giménez, and Ares 2018), we show that “ugly” labeling is most effective when associated with a moderate price discount, because large discounts in conjunction with the “ugly” label send conflicting signals regarding the quality of the produce.

Our work makes several contributions. While prior research on two-sided persuasion (Ein-Gar, Shiv, and Tormala 2011; Pechmann 1992) has shown that weak negative information added to a positive description can improve product evaluation, our research demonstrates that emphasizing negative information can have positive effects in the absence of any accompanying positive information. We also contribute to research that has investigated how awareness of influence has a corrective effect on biased judgment (Strack and Hannover 1996), extending prior findings to a consumption context.

Our research also provides guidance to managers on how to label and price unattractive produce. While retailers believe

“imperfect” labeling or no specific labeling to be more effective than “ugly” labeling, we demonstrate that the opposite is the case. Our research may therefore partly explain the unsuccessful attempts by Whole Foods and Walmart to sell unattractive produce by labeling it “imperfect” (Choi and McFetridge 2019). Our hope is that our research can assist managers in designing campaigns that can benefit their organizations and reduce food waste.

Theoretical Background

Why Consumers Reject Unattractive Produce: The “Ugliness Penalty” Effect

Unattractive produce is that which has a significant natural aesthetic deviation in shape and/or color from prototypical produce, but has no damage or disease that could affect safety, taste, or nutrition (De Hooge et al. 2017; Grewal et al. 2019). Grewal et al. (2019) suggest that consumers reject unattractive produce because imagining eating such produce makes consumers view themselves as less attractive, less moral, less healthy, and so on. We propose that produce unattractiveness also influences how consumers view the produce itself. Extant research in social and consumer psychology shows that people stereotypically attribute a “beauty premium” to attractive individuals and objects, and, conversely, they saddle unattractive individuals and objects with an “ugliness penalty” that negatively affects perceptions beyond aesthetics. Indeed, physically unattractive individuals are perceived as less intelligent and less sociable than attractive individuals (Griffin and Langlois 2006), and unattractive products are perceived as lower in quality and usability (Hoegg, Alba, and Dahl 2010; Villegas, Carbonell, and Costell 2008).

Regarding potential “ugliness penalty” effects in the realm of produce, we consider three categories of attributes: tastiness, healthiness, and naturalness. Tastiness refers to produce’s hedonic, multisensory qualities: not only its flavor, but also its juiciness or crispiness (Auvray and Spence 2008). Healthiness refers to nutritional value. Naturalness refers to the absence of chemicals (e.g., pesticides, preservatives), which is characteristic of organic produce (Verhoog et al. 2007). In addition to these categories, there can be additional safety concerns in the case of moldy, rotten, or damaged produce. However, our definition of unattractive produce explicitly excludes these concerns as retailers have strict regulations preventing the sale of unsafe produce.

Tastiness. There is clear evidence in the literature of a positive association between aesthetic appeal and tastiness—thus, consumers should expect unattractive produce to be less tasty than attractive produce. Visual appearance, including color and shape, has a strong impact on inferences about a food’s sensory quality (De Hooge et al. 2017; Hutchings 1994). In the domain of produce, multiple studies have shown that a wide range of fruits and vegetables with atypical (vs. typical) colors were expected to be less tasty, although the actual taste was equivalent

(Leksrisompong et al. 2012; Schifferstein, Wehrle, and Carbon 2019; Symmank, Zahn, and Rohm 2018).

Healthiness. Research also points to a positive association between aesthetic appeal and healthiness. In the domain of produce (as opposed to many processed foods), consumers largely expect tasty foods to be healthier (Haasova and Florack 2019), so if unattractiveness negatively affects tastiness expectations, it should also negatively affect healthiness expectations. In line with this proposition, two studies have found that carrots with atypical (vs. typical) colors and bell peppers with uneven (vs. even) shape were expected to be not only less tasty, but also less healthy (Hagen 2021; Schifferstein, Wehrle, and Carbon 2019).

Naturalness. The association between attractiveness and naturalness is less straightforward. On the one hand, classic aesthetic patterns that are considered beautiful (e.g., the golden ratio, Fibonacci proportions) stem from the natural world (Palmer, Schloss, and Sammartino 2013; Raghubir and Greenleaf 2006), hinting at a possible positive correlation between perceived attractiveness and naturalness—as Hagen (2021) found in the domain of food presentation. On the other hand, within the domain of fresh produce, cosmetic imperfections generally stem from nature (Grewal et al. 2019); thus, there may rather be a *negative* correlation between attractiveness and naturalness expectations. In line with this perspective, several studies suggest that consumers expect natural, organic, and/or pesticide-free produce to be *less* attractive (Bunn et al. 1990; Govindasamy, Italia, and Liptak 1997; Tsakiridou et al. 2008; Yuan et al. 2019), especially eco-conscious consumers (Loebnitz, Schuitema, and Grunert 2015). Importantly, the expectation that unattractive produce is more natural is not biased, but due to the fact that the absence of chemicals (pesticides, preservatives) results in cosmetic imperfections (Bunn et al. 1990).

The Corrective Effect of “Ugly” Labeling

As detailed previously, prior literature suggests that consumers expect unattractive produce to be less tasty and less healthy. Expectations regarding naturalness are less clear but tend toward a reverse effect given that natural/organic produce is more likely to be visually imperfect. Note that there is no factual reason to expect unattractive produce to be less tasty or less healthy; in fact, assuming that unattractive produce is more natural/organic, it should also be more tasty and more healthy, as suggested by a meta-analysis of 343 publications that concluded that organic foods present both gustatory and nutritive benefits (Barański et al. 2014). Thus, negative expectations regarding the tastiness and healthiness of unattractive produce are biased judgments, based on stereotypes such as those uncovered in research on the “ugliness penalty.”

We posit that “ugly” labeling—that is, labeling unattractive produce “ugly”—will *correct* for negative, biased expectations

that consumers may have about the tastiness or healthiness of unattractive produce. We propose that deliberately emphasizing the unattractiveness of the produce via “ugly” labeling acts as a signal that there is nothing “wrong” with the produce other than its appearance. Further, “ugly” labeling may make consumers reevaluate the diagnosticity of visual appearance for assessing tastiness and healthiness; that is, it will make them aware of the limited nature of their spontaneous objection to unattractive produce. This proposition is in line with research that has shown that “awareness of influence” triggers validity-driven corrections of attitudes (Strack and Hannover 1996). For instance, in the domain of aesthetics, Townsend and Shu (2010) found that the aesthetic design of financial documents influenced participants’ investment decisions, unless their attention was drawn to the design.

In summary, our central hypotheses are that “ugly” labeling will increase purchase of unattractive produce versus when no specific label is present and that this will occur by improving attribute expectations, in particular tastiness and healthiness. We do not expect naturalness expectations to be affected by “ugly” labeling, insofar as consumer beliefs about unattractive produce being more natural are not instances of biased judgment and as such do not need correction. Formally,

H₁: “Ugly” labeling (vs. no specific label) increases the likelihood that consumers purchase unattractive produce.

H₂: The effect of “ugly” labeling on the purchase of unattractive produce is mediated by improved attribute expectations, particularly tastiness and healthiness.

“Ugly” Labels Versus Common Marketplace Interventions

It is important to consider how “ugly” labeling compares or interacts with other interventions investigated by past research and/or employed in the field. First, research has shown that price discounts can motivate consumers to purchase unattractive produce (Aschemann-Witzel, Giménez, and Ares 2018; De Hooge et al. 2017); indeed, it is common practice to sell unattractive produce at a discount of up to 50% (Grewal et al. 2019). However, we propose that the depth of the discount moderates the effectiveness of “ugly” labeling. Although consumers value the economic benefit of acquiring produce for a low price, a large discount may signal low quality (Grunert 2007), thereby hindering the corrective effect of “ugly” labeling. From a managerial perspective, this suggests that “ugly” labeling along with a moderate discount may be as effective as a steeper discount in motivating purchase.

H₃: The effect of “ugly” labeling on purchase is moderated by the depth of price discount, such that “ugly” labeling is most effective when associated with a moderate (vs. steep) discount.

Second, while “ugly” labeling has generated a lot of media attention, there is great variation in the marketplace on the

labeling of unattractive produce. In fact, major brick-and-mortar retailers such as Whole Foods, Loblaws (in Canada), and Tesco (in England), as well as online retailers Imperfect Foods (imperfectfoods.com) and Perfectly Imperfect Produce (perfectlyimperfectproduce.com), have preferred to use a more understated label: “imperfect.” Retailers have also utilized labels that attempt to positively frame visual atypicality, such as “produce with personality” (Giant Eagle), “misfit” (Hy-Vee), or “pickuliar” (Koger). Web Appendix W1 provides a nonexhaustive list of labels used by retailers all over the world.

We have argued that “ugly” labeling unambiguously points out the aesthetic flaw in the produce, making it clear that there are no deficiencies other than unattractiveness. For this reason, alternative labels that do not point to the aesthetic flaw should not improve attribute expectations as much as “ugly” labeling does, and should therefore be less effective at motivating purchase. We compare “ugly” labeling with “imperfect” labeling (because it is the most popular label and does not point directly to aesthetics) and “with personality” labeling (as an example of a label that positively frames visual atypicality).

H₄: “Ugly” labeling is more effective than alternative labeling that does not explicitly point out the aesthetic flaw.

Overview of Studies

We first test the effectiveness of “ugly” labeling in the field at a farmers’ market (Study 1) and online, with incentive-compatible choices (Study 2). We then test our proposed mechanism—an increase in tastiness and healthiness expectations—through mediation (Study 3) and moderation (Study 4). We further test whether the effectiveness of “ugly” labeling is moderated by price discounts (Study 5). Finally, we compare the effectiveness of “ugly,” “imperfect,” and “with personality” labeling in an online study (Study 6a) and in a field study measuring online advertising click-throughs (Study 6b).

Study 1: Field Experiment at a Farmers’ Market

In Study 1, we tested the effect of “ugly” labeling at a farmers’ market. We ran a stand selling attractive and unattractive vegetables, and manipulated the way the unattractive produce was labeled (either “ugly” or not) by changing signage every hour. This study was preregistered (<http://aspredicted.org/blind.php?x=zg7hi5>).

Pretest

We obtained visually attractive and unattractive carrots, potatoes, and tomatoes from a local supplier. The unattractive vegetables were crooked or oddly shaped, but were not bruised or rotten. Fifty participants recruited on Amazon Mechanical Turk

(MTurk)¹ rated photos of these vegetables from $-3 =$ “Much less beautiful than normal” to $+3 =$ “Much more beautiful than normal,” with a midpoint of $0 =$ “Normal-looking.” Participants judged the unattractive vegetables as less beautiful than the attractive vegetables (carrots: $M = -1.20$, $SD = 1.46$ vs. $M = .34$, $SD = 1.17$; $p < .001$; tomatoes: $M = -.66$, $SD = 2.05$ vs. $M = 1.34$, $SD = 1.21$; $p < .001$; potatoes: $M = -.36$, $SD = .94$ vs. $M = .86$, $SD = 1.31$; $p < .001$).

Method

We conducted the study at a farmers’ market in a major city in Canada over four consecutive Saturdays in September 2020. We ran a stall from 10:00 A.M. to 2:00 P.M. each day, for a total of 16 hours. The stall consisted of a tent and a table, to which was attached a poster stating the name of the stand (“Sam’s Produce”) and, per a request by the Association of Farmers’ Markets, indicating that the stand is a student project selling certified organic produce grown by local farmers (see Web Appendix W2).

On top of the table were four baskets (see Figure 1): two contained unattractive produce, and two contained attractive versions of the same produce. We used potatoes and carrots on the first day, and potatoes and tomatoes on the other three days because carrots were no longer available from our supplier. The baskets had labels attached to them. We manipulated the labels associated with the unattractive produce, such that it was explicitly called “ugly” in the “ugly” label condition (“Ugly Potatoes,” “Ugly Carrots,” “Ugly Tomatoes”) and not in the control condition (“Potatoes,” “Carrots,” “Tomatoes”). Across both conditions, the attractive produce was always labeled “Potatoes,” “Carrots,” and “Tomatoes.” We changed the labels used for the unattractive produce every hour. On the first and third days, we displayed the “ugly” label first (from 10:00 to 11:00 A.M.), while on the second and fourth days, we displayed the control label first.

Our pricing was consistent across conditions. Following prior research (Grewal et al. 2019) and within the range of industry practice, the unattractive produce was sold at a discount of 25%. The attractive potatoes, carrots, and tomatoes were respectively priced at CAD \$2.50, \$2.50, and \$3.00 per pound, while the unattractive potatoes, carrots, and tomatoes were respectively priced at CAD \$1.88, \$1.88, and \$2.25 per pound.

The stall was managed by two research assistants blind to the hypotheses. The first research assistant was in charge of switching the labels and acted as the seller, handling transactions and communicating with shoppers following a script prepared in advance and kept constant across conditions. To maximize control, the research assistant was instructed to evade the issue if shoppers asked about the labels. A second research assistant recorded the transactions and also recorded the number of individuals per hour who stopped at the stand and engaged with the seller.

¹ For all MTurk studies herein, we used the Cloud Research platform, which filters suspicious participants (e.g., bots) based on IP address and allows for the exclusion of people who participated in our other studies.



Figure 1. Stimuli.
 Notes: For Studies 2–4, we only show stimuli in the “ugly” label condition. Stimuli in the control condition were identical, but without the label “ugly.” All stimuli can be found in Web Appendix W5.

Results

Across the four days, 938 individuals (in 573 groups) stopped at the stand, and 259 individuals (in 169 groups) engaged with the seller. Two-sided binomial tests indicated no significant differences in the number of individuals stopping or engaging with the seller across labeling conditions (all *ps* > .21). There

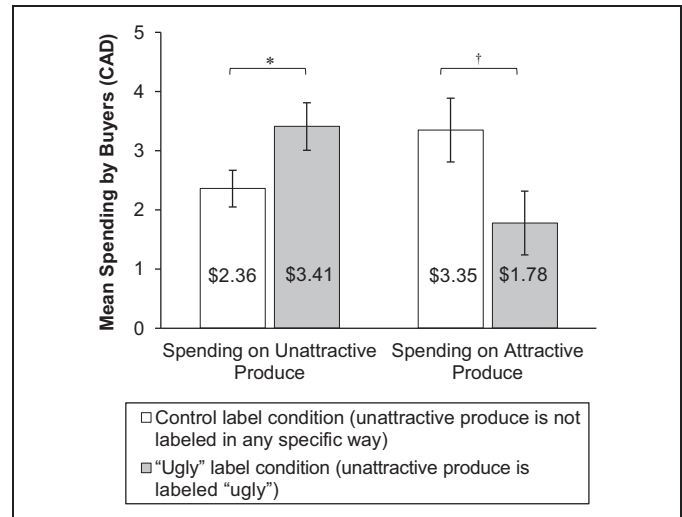


Figure 2. Spending by label conditions and visual appearance of produce (Study 1).
 † *p* < .1.
 * *p* < .05
 Notes: Error bars: ± 1 SE.

were 113 buyers (defined as the individuals who handled money to purchase produce), but again, there was no significant difference in the number of buyers across labeling conditions (*p* = .38), although labeling affected what produce was bought, as shown in the following analyses.

It was unknown whether the buyers purchased produce for themselves or also for the individuals that accompanied them, or whether the buyers used their own money or the group’s pooled money. Therefore, as indicated in the preregistration, all analyses controlled for the size of the group (if a buyer was alone, group size was 1; mean group size was 1.56). The analyses also controlled for the day of the study, given that we replaced carrots with tomatoes after the first day. All effects remained significant without these covariates (see Web Appendix W3).

In the control condition, 62.5% of buyers purchased unattractive produce and 56% purchased attractive produce (these proportions do not total 100% because some buyers purchased both types of produce). In the “ugly” label condition, 81.6% bought unattractive produce and 26.5% bought attractive produce. Two logistic regressions showed that labeling unattractive produce “ugly” (vs. control) significantly increased buyers’ likelihood to purchase unattractive produce (*z* = 2.28, *p* = .02) and decreased their likelihood to purchase attractive produce (*z* = −3.06, *p* = .002).

We found converging results using spending as the dependent variable (see Figure 2). On average, in the control condition, buyers purchased \$2.36 (SD = 2.49) of unattractive produce and \$3.35 (SD = 4.34) of attractive produce. In the “ugly” label condition they purchased \$3.41 (SD = 2.83) of unattractive produce and \$1.78 (SD = 3.76) of attractive produce. A mixed regression of total spending, with label (“ugly” vs. control) as a between-subjects factor and appearance (attractive vs.

unattractive) as a within-subject factor, found no significant main effects (all $ps > .49$) but a significant interaction effect ($z = 2.83, p = .005$). To interpret this interaction effect, we ran a multivariate regression with spending on unattractive produce and spending on attractive produce as dependent variables. Labeling unattractive produce “ugly” (vs. control) significantly increased spending on unattractive produce ($t(107) = 2.16, p = .03$) and marginally decreased spending on attractive produce ($t(107) = -1.79, p = .08$).

Discussion

Employing a field study setting at a farmers’ market, we found that buyers were more likely to purchase unattractive produce (sold at a discounted price) over attractive produce when the unattractive produce was labeled “ugly,” compared with a control condition in which unattractive produce was not labeled in any specific way. “Ugly” labeling also increased average spending on unattractive produce. These results verify H_1 and go against managers’ intuition that merely discounting unattractive produce, without using any specific label, should be more effective than using an “ugly” label.

In absolute terms, since the “ugly” label increased purchase of cheaper (unattractive) over more expensive (attractive) produce, less total revenue was generated in the “ugly” label condition (\$254.50) than in the control condition (\$364.90). However, given that attractive produce is more costly (not to mention its environmental cost), after including the cost at which we purchased the produce from the suppliers, gross profit margins were higher in the “ugly” label condition (\$39.30) than in the control condition (\$26.00).

Study 2: Incentive Compatibility and Option to Defer Purchase

In Study 2, we further test the effectiveness of “ugly” labeling in the context of produce boxes purchased online. Participants decided whether to buy a box of unattractive produce or a box of attractive produce (or nothing at all), and we manipulated the label for the unattractive produce (either “ugly” or not). We used an incentive-compatible design, and this study was preregistered (<https://aspredicted.org/blind.php?x=hd3iu5>). All questions for this and all subsequent studies appear in Web Appendix W4.

Pretest

Our stimuli consisted of a photo of attractive oranges, apples, cucumbers, and carrots, and a photo of the same items but visually unattractive (see Figure 1). Fifty MTurk participants judged the unattractive produce less beautiful than the attractive produce ($M = -1.90, SD = 1.39$ vs. $M = 1.20, SD = 1.12$; $p < .001$).

Method

Because this study involved incentive-compatible choices and to increase the power of the study (Meyvis and Van Osselaer 2017), we only recruited participants who would potentially be interested in purchasing produce online. We posted an ad on Facebook (shown in Web Appendix W5) targeted at people living in the United States, between 18 and 64 years of age, with an interest (determined by the Facebook pages they “like”) in “Online grocer,” “FreshDirect,” and “AmazonFresh.” The ad indicated that our research team was looking for participants, and in exchange for completing a survey, they would enter a lottery to win \$30 or produce boxes. The ad never mentioned “ugly” produce to avoid recruiting participants with a specific interest in such produce. We advertised the study until 303 participants completed it ($M_{\text{age}} = 45.20$ years, $SD = 12.83$ years; 93% female). The high proportion of female participants is likely due to Facebook ad targeting. Participants were randomly assigned to one of two conditions: either “ugly” labeling or control.

The ad led to a study hosted on Qualtrics. In the consent form, we indicated that the chance of winning the lottery was about 15%. Then, as a cover story, participants answered 25 questions with two possible answers, reportedly designed to measure personality (e.g., “Would you rather go to a movie or to dinner alone?”). In the 25 questions, we embedded two attention checks that automatically excluded participants who failed, before they could participate in the actual study (see Web Appendix W4).

Next, participants read, “You will now enter a lottery to win \$30. The prize will be paid via PayPal, Amazon eGift card or other online means of payment of your choice. If you win, you can decide to keep the \$30, or to use some of this money to purchase a box of fruits & veggies delivered to your doorstep by one of our trusted partners. Produce sold by our partners meets USDA [U.S. Department of Agriculture] safety standards. We managed to get special deals on two boxes of fruits & veggies.” We provided illustrations and information about these two boxes. Box 1 featured attractive oranges, apples, carrots, and cucumbers and indicated “SPECIAL PRICE: \$20 (regular price: \$35),” and Box 2 featured the same produce but aesthetically unattractive and indicated “SPECIAL PRICE: \$15 (regular price: \$25).” The label used for the attractive produce was always “Fruits and Veggies.” We manipulated between subjects the label used for the unattractive produce: either “Ugly Fruits and Veggies” in the “ugly” label condition or “Fruits and Veggies” in the control condition. We show the stimulus used in the “ugly” label condition in Figure 1, and all stimuli in Web Appendix W5.

Participants were asked to indicate in advance what they would do if they won the lottery: “I want the full \$30 cash prize without buying anything,” or “I want Box 1 at a special price of \$20 delivery included, and I get the remainder of \$10 cash,” or “I want Box 2 at a special price of \$15 delivery included, and I get the remainder of \$15 cash.”

We programmed the survey such that 15% of the participants won the lottery. The winners provided their email address, and we followed up by sending them online cash payments and/or online coupons of produce box delivery companies (Farmbox

Direct, Farm Fresh to You, Hungry Harvest, and Perfectly Imperfect Produce), depending on what prize they selected. If none of the companies could deliver to their address, we sent them online cash payments.

Results

In the “ugly” label (vs. control) condition, 41.1% of participants (vs. 26.3%) decided to purchase the box of unattractive produce, 7.9% (vs. 23.0%) decided to purchase the box of attractive produce, and 51.0% (vs. 50.7%) preferred to keep the cash (see Web Appendix W6). A logistic regression showed that the likelihood of purchasing a box over keeping the cash was not different across conditions ($p = .95$). However, the “ugly” label (vs. control) significantly increased the likelihood of purchasing the box of unattractive produce over the box of attractive produce ($z = 3.86, p < .001$).

Discussion

In an online study with an incentive-compatible measurement of choice and where participants had the option not to purchase any produce, we found that “ugly” labeling made consumers purchase unattractive, rather than attractive produce, in line with H_1 . As in Study 1, “ugly” labeling influenced produce choice, but not overall produce purchase.

Study 3: Mediation by Tastiness and Healthiness Expectations

In Study 3, we test our proposed mechanism: we posit that consumers have negative expectations regarding the tastiness and healthiness (but not the naturalness) of unattractive produce, and that “ugly” labeling improves these expectations. The study also addresses several alternative explanations for the positive effect of “ugly” labeling on choice. For example, it is possible that “ugly” labeling is perceived as original, surprising, or amusing (Eisend 2009). Likewise, “ugly” labeling may anthropomorphize unattractive produce, increasing sympathy (Koo, Oh, and Patrick 2019; Shao et al. 2020). “Ugly” labeling might also enhance the perceived credibility of the seller by conveying honest information about the produce. Finally, “ugly” labeling might affect self-perceptions (Grewal et al. 2019). We thus measure each of these constructs to test their potential role. The study was preregistered (<http://aspredicted.org/blind.php?x=ah63mh>).

Pretest

We used photos of attractive and unattractive cucumbers. Fifty MTurk participants judged the unattractive cucumbers less beautiful than the attractive ones ($M = -.84, SD = 1.54$ vs. $M = 1.26, SD = 1.24; p < .001$).

Method

We assigned 320 MTurk participants ($M_{\text{age}} = 36.21$ years, $SD = 11.94$ years; 53% female) to one of two between-

subjects conditions: “ugly” label versus control. Participants were shown photos of baskets of attractive and unattractive cucumbers ostensibly sold by the same vendor and meeting USDA safety standards. Across conditions the attractive cucumbers were called “Type A” and priced at \$1.26 per pound, and the unattractive cucumbers were called “Type B” and priced at \$.95 per pound. We manipulated the label attached to the basket of unattractive cucumbers: “Ugly Cucumbers” in the “ugly” label condition versus “Cucumbers” in the control condition. The attractive cucumbers were always labeled “Cucumbers.” The stimuli for the “ugly” label condition appear in Figure 1, and all stimuli in Web Appendix W5.

Participants indicated which produce they would purchase on a five-point scale ranging from 1 = “Definitely Cucumbers A” to 5 = “Definitely Cucumbers B,” with a midpoint of 3 = “I would be indifferent.”

We then measured produce attribute expectations (Hussin, Yee, and Bojei 2010) with a scale composed of four taste-related items (tasty, flavorful, juicy, crisp), three health-related items (healthy, nutritional, full of vitamins), four nature-related items (natural, free of pesticides, free of preservatives, organic), and three other items (ripe, fresh, clean). For each item, we asked participants to rate their expectations of Cucumbers B relative to Cucumbers A on a seven-point scale ranging from -3 = “Much more negative than Cucumbers A” to 3 = “Much more positive than Cucumbers A,” with a midpoint of 0 = “Not different from Cucumbers A.”

The next measurements were used to test alternative explanations. We distributed the negative self-perception scale developed by Grewal et al. (2019): participants imagined eating Cucumbers B (i.e., the unattractive ones) and rated whether they felt 16 self-perceptions (e.g., worthless, immoral) on a seven-point scale (1 = “Not at all,” 7 = “Very much”). Credibility was assessed with four items (e.g., “I think the seller of this vegetable is trustworthy”) adapted from Kirmani (1997) and evaluated on a seven-point scale (1 = “Strongly disagree,” 7 = “Strongly agree”). We measured anthropomorphic perceptions by asking participants to rate whether Cucumbers B reminded them of humanlike features (Koo, Oh, and Patrick 2019) on a five-point scale (1 = “Not at all,” 5 = “To a great extent”). We also asked participants whether they “feel sorry,” “feel compassion,” and “feel sympathy” for Cucumbers B on the same five-point scale. We measured whether participants perceived the image of cucumbers B to be original, surprising, and funny (with two items: funny and amusing) on a five-point scale (1 = “Not at all,” 5 = “To a great extent”). Each construct was presented on a separate, randomized page with reminders of the stimuli.

At the end of the study, as an attention check, we asked participants to recall the prices of Cucumbers A and B. There were five possible answers and only one correct answer; those who answered incorrectly were excluded from analysis. We used the same preregistered attention check and exclusion rule across all MTurk studies (Studies 3–6a). In Web Appendix W7, we report results with and without data exclusion; the results are consistent.

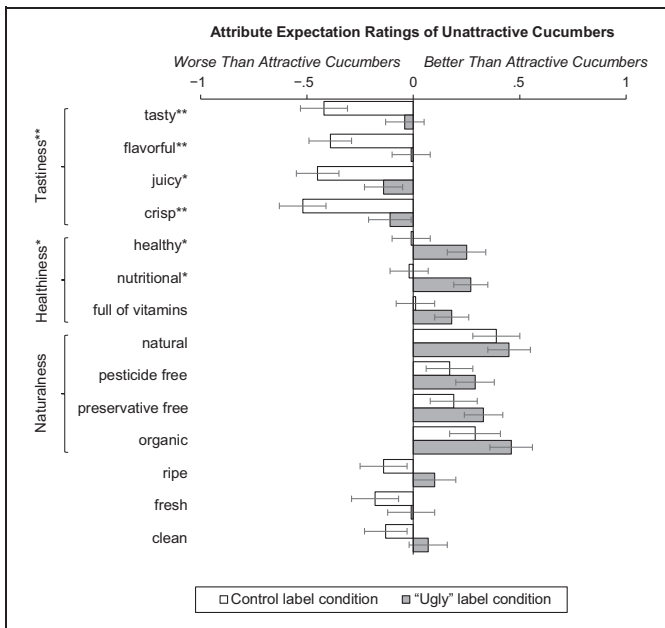


Figure 3. Attribute expectations of visually unattractive produce by label conditions (Study 3).

* $p < .05$.

** $p < .01$.

Notes: Error bars: ± 1 SE. "Tastiness," "healthiness," and "naturalness" are indices composed of the items in the brackets.

Results

Twenty-eight participants (8.8%) failed the attention check and were excluded from analysis.

Choice likelihood. An analysis of variance (ANOVA) of choice likelihood indicated that "ugly" labeling (vs. control) increased the likelihood of choosing the unattractive produce over the attractive produce ($M = 3.01$, $SD = 1.44$ vs. $M = 2.54$, $SD = 1.42$; $F(1, 290) = 7.90$, $p = .005$).

Attribute expectations. Figure 3 displays expectations about each attribute across conditions. We created indices of tastiness expectations ($\alpha = .92$), healthiness expectations ($\alpha = .92$), and naturalness expectations ($\alpha = .91$) and performed the analyses using these indices. Although "ripe," "fresh," and "clean" contribute to taste and nutritive quality, they are conceptually distinct from the tastiness and healthiness constructs (Hornick 1992; Péneau et al. 2006), so we did not include these items in the indices; note that "ugly" labeling did not significantly improve "ripe," "fresh," and "clean" expectations (all $ps > .10$).

The tastiness index was well below zero in the control condition ($p < .001$), indicative of an "ugliness" penalty effect on taste expectations of unattractive produce. The "ugly" label (vs. control) improved the tastiness index ($M = -.08$, $SD = 1.06$ vs. $M = -.45$, $SD = 1.12$; $F(1, 290) = 8.45$, $p = .004$). Healthiness expectations in the control condition were not significantly different from zero ($p = .93$). Still, the "ugly" label (vs. control)

significantly increased the healthiness index ($M = .23$, $SD = .94$ vs. $M = -.01$, $SD = .97$; $F(1, 290) = 4.59$, $p = .03$), although to a smaller extent than the tastiness index. We found an "ugliness premium" for naturalness, with expectations above zero in the control condition ($p = .01$), and the "ugly" label did not further increase the naturalness index ($M = .38$, $SD = 1.03$ vs. $M = .26$, $SD = 1.20$; $p = .34$).

We conducted a mediation analysis (Hayes 2012, Model 4) with the tastiness, healthiness, and naturalness indices as parallel mediators, choice likelihood as the dependent variable, and the label manipulation as the independent variable. As shown in Figure 4, tastiness had the strongest mediating effect ($b = .17$, $SE = .07$, 95% confidence interval [CI] = [.055, .343]), healthiness had a weaker, although significant, mediating effect ($b = .08$, $SE = .05$, 95% CI = [.008, .226]), and naturalness did not have a mediating effect (95% CI = [-.029, .137]). We conducted the same analyses for comparable conditions in Studies 4, 5, and 6a and present them in Figure 4.

Alternative explanations. We found that "ugly" labeling (vs. control) did not significantly affect self-perceptions ($M = 3.17$, $SD = .76$ vs. $M = 3.31$, $SD = .85$; $F(1, 290) = 2.13$, $p = .15$) or any of the measures of anthropomorphic perceptions or sympathy (all $ps > .3$).

"Ugly" labeling (vs. control) marginally improved credibility ($\alpha = .78$; $M = 5.40$, $SD = .93$ vs. $M = 5.18$, $SD = 1.01$; $F(1, 290) = 3.61$, $p = .06$), but credibility did not mediate the effect of labeling on choice based on a 95% confidence interval ($b = .09$, $SE = .05$, 95% CI = [-.004, .188]).

Images with "ugly" (vs. control) labels were judged funnier ($r = .90$; $M = 2.41$, $SD = 1.05$ vs. $M = 2.02$, $SD = .99$; $F(1, 290) = 10.54$, $p = .001$) and more original ($M = 2.65$, $SD = 1.05$ vs. $M = 2.41$, $SD = 1.04$; $F(1, 290) = 4.25$, $p = .04$), but not more surprising ($p = .24$). However, the effect of "ugly" labeling on produce choice was not mediated by humor (95% CI = [-.110, .039]) or by originality (95% CI = [-.046, .053]).

Discussion

Study 3 demonstrated that "ugly" labeling increases the choice likelihood of unattractive produce (H_1) and that this effect is mediated by an increase in tastiness expectations and, to a somewhat smaller extent, healthiness expectations (H_2). Unattractive produce without any specific label was judged less tasty than attractive produce, in line with past research, although unattractive produce was judged just as healthy. We return to this point in the "General Discussion" section. As a preview, we find across Studies 3 through 6a that people judge unattractive produce less tasty than attractive produce, but not necessarily less healthy; thus, the effect of "ugly" labeling on choice is mediated to a larger extent by tastiness expectations than by healthiness expectations.

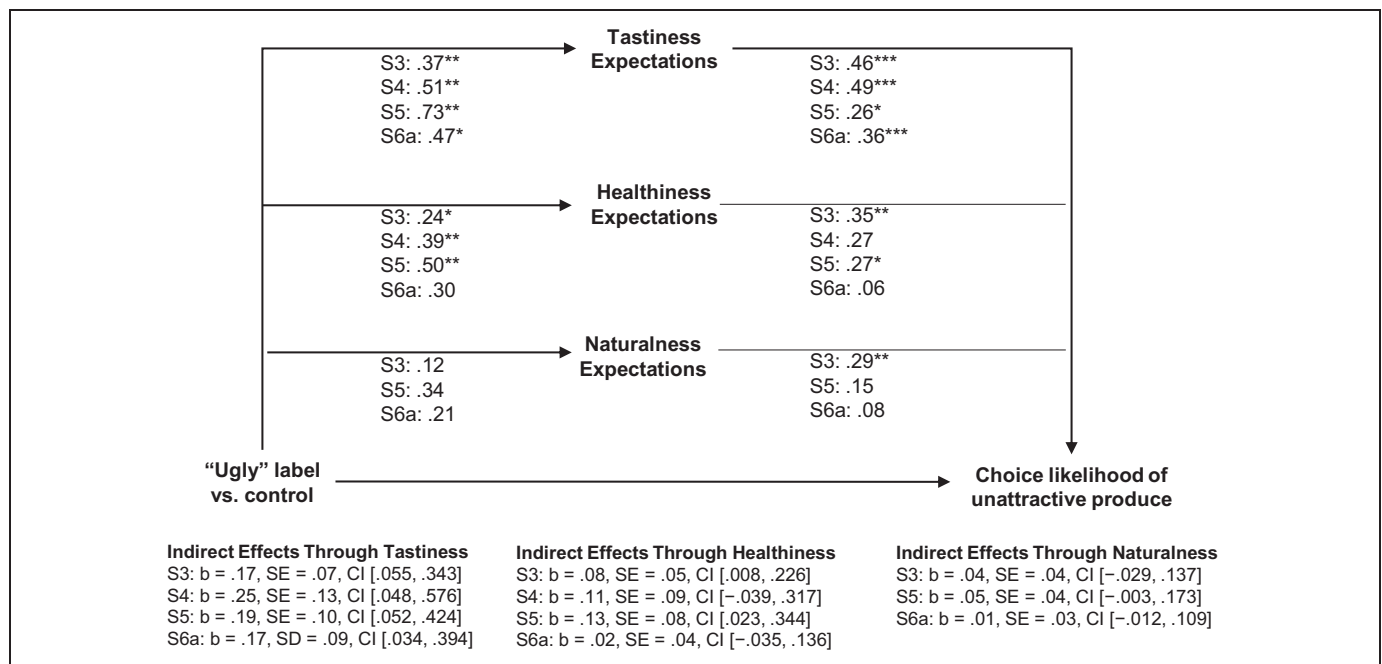


Figure 4. Mediation by tastiness, healthiness, and naturalness expectations (Studies 3 to 6a).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Notes: Parallel mediation models (Hayes 2012, Model 4) were used for Studies 3, 4, 5, and 6a. We only consider comparable “ugly” label and control label conditions: for Study 4, we exclude the condition in which participants received the corrective message; for Study 5, we exclude the two larger discount (40% and 60%) conditions; for Study 6a, we exclude the “imperfect” and “with personality” label conditions. The statistics inside the figure are unstandardized regression coefficients. The 95% confidence intervals of the indirect effects below the figure are estimated with 5,000 bootstrapped samples.

Naturalness expectations, credibility, self-perceptions, originality, surprise, humor, and anthropomorphic perceptions did not explain the effectiveness of “ugly” labeling.

Study 4: Manipulating the Mediator

To confirm the causality chain tested via mediation in Study 3 (“ugly” labeling → taste expectations; healthiness expectations → choice), Study 4 manipulated the mediator (Pirlott and MacKinnon 2016). We informed half the participants that aesthetic differences across produce do not pertain to differences in taste or healthiness. If the effectiveness of “ugly” labeling is due to improved taste or healthiness expectations, explicitly addressing those expectations should have the same effect as the “ugly” label. The study was preregistered (<http://aspredicted.org/blind.php?x=br2xi3>).

Method

A total of 423 MTurk participants ($M_{\text{age}} = 36.04$ years, $SD = 12.11$ years; 54% female) were assigned to a 2 (label: ugly vs. control/no descriptor) \times 2 (message: “no other difference than visual” vs. control/no message) between-subjects design.

Participants had to choose between purchasing attractive or unattractive cucumbers. The scenario, stimuli, manipulation of “ugly” labeling, prices, and measurement of choice likelihood

were identical to those in Study 3. In addition to the labeling manipulation, we manipulated a message such that half the participants read the following text before seeing the stimuli: “Please be aware that although the two types of cucumbers that you will see look different, these differences in visual appearance do not pertain to any differences other than visual: for instance, they have similar gustatory or nutritive qualities.”

Then, participants completed a shorter version of the attribute expectations scale: they evaluated the expected taste (tasty, flavorful, juicy, crisp) and healthiness (healthy, nutritional, full of vitamins) of the unattractive produce, relative to the attractive produce.

Results

Twenty-two participants (5.1%) failed the attention check and were excluded.

Choice likelihood. An ANOVA of choice likelihood revealed a main effect of the message manipulation ($F(1,397) = 9.50$, $p = .002$) and a significant message \times label interaction ($F(1,397) = 4.54$, $p = .03$). The main effect of label was not significant ($p = .12$). When there was no message, in line with Study 3, the “ugly” label (vs. control label) significantly increased choice likelihood of unattractive cucumbers ($M = 3.29$, $SD = 1.42$ vs. $M = 2.77$, $SD = 1.36$; $t(397) = 2.64$, $p = .009$).

However, when participants were exposed to the “no other difference than visual” message, the “ugly” label (vs. control label) no longer had a significant impact ($M = 3.43$, $SD = 1.47$ vs. $M = 3.51$, $SD = 1.40$; $p = .70$). In addition, comparing choice likelihood across the “ugly” label/no message condition and either of the two conditions in which participants received the “no other difference than visual” message, we found no significant differences (all $ps > .30$). In other words, merely labeling unattractive produce “ugly” had a similar effect as informing consumers that visual differences do not pertain to other attribute differences.

Attribute expectations. We created healthiness ($\alpha = .93$) and tastiness ($\alpha = .93$) indices and tested a moderated mediation model (Hayes 2012, Model 7) with the label manipulation as the independent variable, choice likelihood as the dependent variable, healthiness and tastiness expectations as parallel mediators, and the message moderating the link between the independent variable and the mediators. The indices of moderated mediation were significant for both tastiness (95% CI = [.10, .46]) and healthiness (95% CI = [.02, .25]). The results, reported in detail in Web Appendix W8, replicated those of Study 3: among participants who did *not* receive the additional message (but not among those who did), the effect of “ugly” labeling on choice was mediated by tastiness, and to a smaller extent (and marginally significantly) by healthiness, as shown in Figure 4.

Discussion

Merely labeling unattractive produce “ugly” had a similar effect to informing consumers that visual differences do not pertain to healthiness or tastiness differences. This provides support for our argument that “ugly” labeling increases choice of unattractive produce because it improves expectations about tastiness and healthiness of unattractive produce (H_2).

Study 5: The Moderating Effect of Price Discounts

Across all studies presented herein, unattractive produce is sold at a 25% to 33% discount compared with attractive produce. Given the industrywide practice of discounting unattractive produce (Aschemann-Witzel, Giménez, and Ares 2018), Study 5 tests whether the depth of discount moderates the effectiveness of “ugly” labeling. We propose that “ugly” labels are more effective for moderate discounts because a large discount may signal low quality, thereby hindering the positive effect that “ugly” labels have on taste and healthiness expectations and thus on purchase (H_3). The study was preregistered (<https://aspredicted.org/blind.php?x=nc67z7>).

Method

A total of 709 MTurk participants ($M_{\text{age}} = 35.38$ years, $SD = 11.37$ years; 47% female) were assigned to a 3 (discount:

20% vs. 40% vs. 60%) \times 2 (label: ugly vs. control) between-subjects design.

All participants saw an ad for two produce boxes, described as customizable boxes of fruits and vegetables that meet USDA safety standards. The ad (shown in Web Appendix W5) depicted examples of produce contained in each of the two boxes, one featuring attractive oranges, apples, carrots, and cucumbers and the other featuring the same produce but aesthetically unattractive (we used the same photos as in Study 2). The label used for the attractive produce was always “Fruits and Vegetables.” We manipulated the label used for the unattractive produce: either “Ugly Fruits and Vegetables” (“ugly” label condition) or “Fruits and Vegetables” (control condition). The box with attractive produce was always priced at \$20 for 5 pounds of produce. We manipulated the price of the box with unattractive produce: \$16 with a “20% OFF” tag, \$12 with a “40% OFF” tag, or \$8 with a “60% OFF” tag. To facilitate measurement, the boxes were called “Box 1” (at the top of the ad) and “Box 2” (at the bottom); the position of the unattractive and attractive boxes was counterbalanced across participants.

Participants indicated which produce box they would rather purchase on a five-point scale ranging from 1 = “Definitely Box 1” to 5 = “Definitely Box 2,” with a midpoint of 3 = “I would be indifferent.” Because of the counterbalance, we reverse-coded the answers for half the participants, such that a higher number on the scale would always indicate preference for the box of unattractive produce. Then, they completed the full attribute expectations scale for the unattractive produce, relative to the attractive produce. Unlike Studies 3 and 4, this scale also included the item “sweet (fruits only),” which was also used to create the tastiness index.²

Results

One hundred nineteen participants (16.8%) failed the attention check and were excluded.³

Choice likelihood. An ANOVA of choice likelihood with label, discount, counterbalance, and their interactions as independent variables showed that counterbalancing interacted with none of the manipulated factors (all $ps > .57$). We thus collapsed the results across counterbalance conditions and repeated the ANOVA, which revealed significant main effects of label ($F(1,586) = 4.24$, $p = .04$) and price discount ($F(1,586) = 12.27$, $p < .001$), and a significant label \times discount interaction effect ($F(1,586) = 8.54$, $p = .004$).

² The results were similar when the item “sweet” was excluded from the scale.

³ Study 5 was the last MTurk study that we ran (May 2020). Because we noticed a sharp increase in low-quality responses and as indicated in the preregistration, in addition to the end-of-questionnaire attention check, we added another attention check at the beginning that automatically excluded participants who failed. We also increased the sample size in order to reach approximately 100 participants per condition, as indicated in the preregistration. As indicated earlier, we report in Web Appendix W7 all MTurk results on choice likelihood with and without data exclusion.

As shown in Figure 5, contrast analyses revealed that the “ugly” label (vs. control) significantly increased the choice likelihood of unattractive produce when the price discount was 20% ($M = 2.56$, $SD = 1.37$ vs. $M = 1.94$, $SD = 1.21$; $t(584) = 3.13$, $p = .002$). When the discount was 40%, the “ugly” label (vs. control) had a directionally positive but non-significant impact on choice ($M = 2.66$, $SD = 1.42$ vs. $M = 2.36$, $SD = 1.44$; $t(584) = 1.49$, $p = .13$). When the discount was 60%, the “ugly” label (vs. control) had a non-significant impact ($p = .31$). Also note that “ugly” labeling coupled with a low discount (20%) was just as effective as providing a steep price discount (60%) with or without the “ugly” label (all $ps > .16$).

Attribute expectations. We created tastiness ($\alpha = .95$), healthiness ($\alpha = .91$), and naturalness ($\alpha = .92$) expectations indices and tested a moderated mediation model (Hayes 2012, Model 7) with the label manipulation as the independent variable; choice likelihood as the dependent variable; tastiness, healthiness, and naturalness expectations as parallel mediators; and discount moderating the link between the independent variable and the three mediators. Discount was treated as a continuous variable, given that the discounts increased linearly across conditions. There were significant main effects of “ugly” labeling on tastiness ($t(586) = 3.34$, $p < .001$) and healthiness ($t(586) = 2.64$, $p = .009$), and marginally significant label \times discount interaction effects on tastiness ($t(586) = -1.91$, $p = .056$) and healthiness ($t(586) = -1.95$, $p = .052$); the other effects (including those on naturalness) were nonsignificant (all $ps > .10$). The indices of moderated mediation were significant for both tastiness (95% CI = [.003, .097]) and healthiness (95% CI = [.002, .080]), but not for naturalness (95% CI = [-.002, .037]). We thus do not discuss naturalness further.

When the discount was 20%, the results mirrored what we found in Studies 3 and 4: the “ugly” label (vs. control) improved tastiness expectations ($M = .36$, $SD = 1.34$ vs. $M = -.36$, $SD = 1.77$; $t(584) = 3.32$, $p = .001$) and healthiness expectations ($M = .66$, $SD = 1.15$ vs. $M = .16$, $SD = 1.48$; $t(584) = 2.64$, $p = .008$), and, as shown in Figure 4, the effect of “ugly” labeling on choice was mediated by tastiness ($b = .19$, $SE = .10$, 95% CI = [.052, .424]) and healthiness ($b = .13$, $SE = .08$, 95% CI = [.023, .344]). When the discount was 40%, the effects were weaker: the “ugly” label (vs. control) marginally improved tastiness expectations ($M = .10$, $SD = 1.43$ vs. $M = -.32$, $SD = 1.64$; $t(584) = 1.90$, $p = .06$) and healthiness expectations ($M = .43$, $SD = 1.22$ vs. $M = .02$, $SD = 1.53$; $t(584) = 2.11$, $p = .04$); the effect of “ugly” labeling on choice was mediated by tastiness ($b = .14$, $SE = .09$, 95% CI = [.007, .386]) but not significantly by healthiness ($b = .04$, $SE = .08$, 95% CI = [-.071, .249]). When the discount was 60%, none of these effects were significant (all $ps > .54$; 95% CIs include zero).

Discussion

In Study 5, “ugly” labeling was found to be most effective when associated with a moderate (vs. steeper) discount, in line

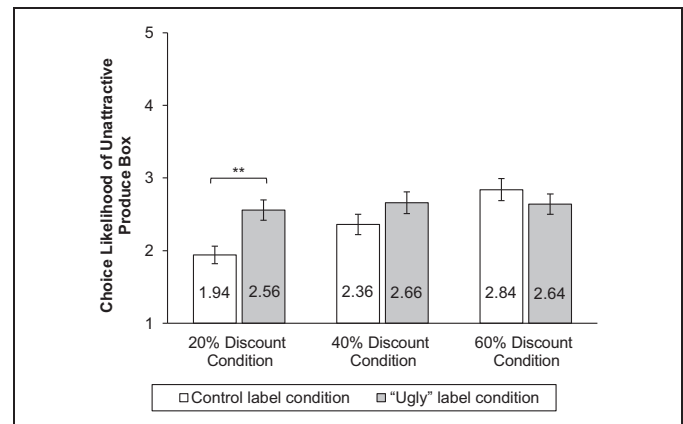


Figure 5. Choice likelihood of unattractive produce box by label and price discount conditions (Study 5).

** $p < .01$.

Notes: Error bars: ± 1 SE.

with H_3 . Indeed, “Ugly” labeling (vs. control) increased choice likelihood of unattractive produce via improved health and taste expectations when the price discount was 20%, but not when the price discount was 60%.

“Ugly” labeling allows retailers to avoid excessively discounting the price of unattractive produce: participants were just as likely to choose unattractive produce when it was labeled “ugly” and had a 20% discount as when it had a 60% discount (with or without “ugly” labeling). Indeed, while a steeper price discount naturally increases choice likelihood (as in the control condition), this was not the case in the “ugly” label condition. Although more affordable, produce with a 60% discount and an “ugly” label was expected to be less tasty and less healthy than produce with a 20% discount and an “ugly” label (tastiness: $M = -.20$, $SD = 1.51$ vs. $M = .36$, $SD = 1.34$, $t(584) = 2.54$, $p = .01$; healthiness: $M = .27$, $SD = 1.35$ vs. $M = .66$, $SD = 1.15$, $t(584) = 2.06$, $p = .04$). This is in line with our contention that steep discounts send a signal conflicting with the “ugly” label regarding produce quality.

Study 6a: “Ugly,” “Imperfect,” and “With Personality” Labels (MTurk)

In Study 6a we compare the effectiveness of “ugly” labeling with two other labels: “with personality” and “imperfect.” “Imperfect” is used by numerous retailers and was the most popular label choice (beside no specific label) in our interview with grocery store managers. While this study has important practical implications, it also allows a further test of our theory that “ugly” labeling is most effective because it points out that the flaw in the produce is aesthetic, compared with “imperfect” and “with personality” labeling (H_4). This study was preregistered (<http://aspredicted.org/blind.php?x=zx2ppq2>).

Method

A total of 440 MTurk participants ($M_{\text{age}} = 34.78$ years, $SD = 11.73$ years; 49% female) were assigned to one of four label conditions: “ugly,” “imperfect,” “with personality,” or control.

The scenario, the stimuli (shown in Web Appendix W5), and the questions were similar to Study 5. However, unlike Study 5, the prices of the boxes were fixed at \$18 for the box of attractive produce and \$12 for the box of unattractive produce, and there was no discount tag. There were four labeling conditions for the box of unattractive produce: “Ugly Fruits and Vegetables,” “Imperfect Fruits and Vegetables,” “Fruits and Vegetables with Personality,” or just “Fruits and Vegetables” (control).

Results

Forty-nine participants (11.1%) failed the attention check and were excluded.

Choice likelihood. An ANOVA of choice likelihood revealed a significant effect of labeling ($F(3, 387) = 4.40, p = .005$). As shown in Web Appendix W9, the “ugly” label increased choice of unattractive produce ($M = 2.82, SD = 1.49$) significantly compared with the control label ($M = 2.08, SD = 1.37; F(1, 387) = 12.98, p < .001$), marginally significantly compared with the “imperfect” label ($M = 2.42, SD = 1.36; F(1, 387) = 3.62, p = .058$), and directionally compared with the “with personality” label ($M = 2.51, SD = 1.50; F(1, 387) = 2.26, p = .13$).

Although “imperfect” and “with personality” were less effective than “ugly,” they still increased choice of unattractive produce compared with the control label. The “imperfect” versus control contrast was marginally significant ($F(1, 387) = 2.94, p = .09$), and the “with personality” versus control contrast was significant ($F(1, 387) = 4.43, p = .04$).

Attributes expectations. We created tastiness ($\alpha = .96$), healthiness ($\alpha = .93$), and naturalness ($\alpha = .93$) expectation indices and tested parallel mediations (Hayes 2012, Model 4). The effects of the “ugly” label (vs. control) were in line with Studies 2–4: a significant improvement in tastiness ($M = -.50, SD = 1.44$ vs. $M = -.97, SD = 1.36; t(387) = 2.53, p = .01$), a marginally significant improvement in healthiness ($\alpha = .93, M = -.09, SD = 1.26$ vs. $M = -.39, SD = 1.13; t(387) = 1.83, p = .07$), and a nonsignificant change in naturalness ($p = .23$). As shown in Figure 4, tastiness mediated the effect of “ugly” labeling on choice ($b = .17, SE = .09, 95\% CI = [.034, .394]$); however, neither healthiness nor naturalness were significant mediators ($95\% CI = [-.035, .136], 95\% CI = [-.012, .109]$, respectively).

“Imperfect” labeling (vs. control) did not have any significant impact on tastiness, healthiness, and naturalness expectations (all $ps > .12$), and none of these categories of expectations were significant mediators ($95\% CIs$ include zero).

“With personality” labeling (vs. control) positively affected tastiness ($M = -.60, SD = 1.22$ vs. $M = -.97, SD = 1.36; t(387) = 2.05, p = .04$), and tastiness mediated the effect of “with personality” labeling on choice ($b = .20, SE = .11, 95\% CI = [.013, .429]$). However, “with personality” labeling did not significantly influence healthiness ($p = .10$) or naturalness ($p = .70$), and these categories were not significant mediators. We discuss these effects after Study 6b.

Study 6b: “Ugly,” “Imperfect,” and “With Personality” Labels (Facebook)

Study 6b compares the effectiveness of the three labeling interventions in the field through ads posted on social media platforms. We used Facebook Ads Manager’s Split Test (also called “A/B Test”) to compare the effectiveness of different versions of an ad on click-through rates, holding all other factors constant (Castelo, Bos, and Lehmann 2019; Hardisty and Weber 2020; Kupor and Laurin 2020).

As we were measuring click-throughs in advertising, rather than relative choice, we focused solely on ads with unattractive produce, and we only included ads with specific labels, namely “ugly,” “imperfect,” and “with personality” (i.e., there was no condition without a specific label). This study was preregistered (<https://aspredicted.org/blind.php?x=rr88f8>).

Method

We created an ad for a “produce box” of unattractive produce using the same photos of unattractive produce in Studies 2 and 6a). The three versions of the ad each had a different label written on the box: “Ugly Fruits and Veggies,” “Imperfect Fruits and Veggies,” or “Fruits and Veggies with Personality” (as shown in Figure 1). We added text at the top of the ad that reinforced the label manipulation; for instance, in the “ugly” label condition, the text was “Ugly fruits and vegetables delivered to your door, in a customizable box. Get 30% off your first order today.” The call to action for the ad was a button labeled “Get Offer.”

Facebook Ads Manager enabled us to determine the audience for the ad: people living in the United States, between 18 and 64 years of age, with an interest in “Online grocer,” “FreshDirect,” and “AmazonFresh.” The ad was placed on social media platforms Facebook and Instagram, and users were randomly assigned to see one of the three versions of the ad. We programmed the campaign such that the ad would be delivered for four days, for a total cost of \$600 (\$200 per version). This amount was determined based on an estimated test power of 80%. Additional technical specifications appear in Web Appendix W10.

Results

Our ads were viewed a total of 42,463 times: 14,269 in the “ugly” condition; 14,199 in the “imperfect” condition; and 13,995 in the “with personality” condition. Thus, there was no imbalance in number of views across conditions (all $ps > .17$).

There were 438 clicks in the “ugly” condition, 373 in the “imperfect” condition, and 404 in the “with personality” condition. We computed the click-through rate (CTR), defined as the number of clicks divided by the number of impressions (Kupor and Laurin 2020), for each condition and analyzed the differences in CTR across conditions. As shown in Web Appendix W9, the “ugly” ad generated the highest CTR (3.07%) and the lowest cost per click (\$.46). In line with Study 6a, the “imperfect” ad was the least effective (CTR = 2.62%; cost per click = \$.54) and the “with personality” ad was in between (CTR = 2.89%; cost per click = \$.50). The difference in CTR between the “ugly” ad and the “imperfect” ad was significant ($\chi^2 = 5.04, p = .02$). The differences between the “ugly” and the “with personality” ad, and between the “imperfect” and the “with personality” ad were not significant ($\chi^2 = .82, p = .37$; $\chi^2 = 1.78, p = .18$, respectively).

Discussion

Studies 6a and 6b provide consistent results across very different study designs. In partial support of H₄, the studies showed that “ugly” labeling was more effective than “imperfect” labeling in terms of hypothetical choice between unattractive and attractive produce ($p = .058$), and was also more effective at generating clicks with social media advertising in a field setting ($p = .02$). This is remarkable, given that the more than 50 grocery store managers that we interviewed overwhelmingly preferred “imperfect” labeling over “ugly” labeling.

The “ugly” label was directionally more effective than the “with personality” label, but the differences did not approach significance (all $ps > .13$), failing to support H₄. In addition, “with personality” labeling (vs. control) significantly increased choice of unattractive produce, and “ugly” labeling mediated by tastiness expectations. In retrospect, this finding may not be inconsistent with our theorizing. The label “with personality” is a playful reference to language that suggests someone is not attractive; thus, the label may in fact point out the aesthetic flaw, albeit in a less explicit manner. To further examine this possibility, in Web Appendix W11 we report an additional study that compares the “ugly” label with yet other labels: “misshapen,” “inferior,” and “second-rate.” We found that “ugly” was more effective than “inferior” and “second-rate,” although “misshapen” was as effective as “ugly,” and its effect on purchase likelihood was mediated by attribute expectations. Overall, this suggests that any label that explicitly (“ugly,” “misshapen”) or implicitly (“with personality”) points out an aesthetic flaw may correct biased attribute expectations and increase purchase of unattractive produce.

General Discussion

Up to 30% of edible produce is discarded by farmers and retailers every year because of cosmetic imperfections, contributing to the environmental cost of food waste (Berkenkamp and Meehan 2016). Our work offers a simple marketing communications strategy that can be easily implemented to increase the

appeal of unattractive produce. Specifically, across seven experiments we show that emphasizing the aesthetic flaw of unattractive produce via “ugly” labeling increases purchase, choice, and click-throughs.

Study 1 was conducted at a farmers’ market and demonstrated that “ugly” labeling (vs. no specific label) increased purchase of unattractive, rather than attractive, produce. Study 2 used an incentive-compatible design and showed that “ugly” labeling significantly increased the likelihood that consumers use their lottery earnings to purchase a box of unattractive, rather than attractive, produce. Studies 3 and 4 showed through mediation and moderation that “ugly” labeling increases the choice of unattractive over attractive produce because it improves tastiness expectations and, to a smaller extent, healthiness expectations. Study 5 demonstrated that price discounts moderate the effectiveness of “ugly” labeling, and that “ugly” labeling associated with a mere 20% discount is as effective as a steep 60% discount. Studies 6a and 6b showed that “ugly” labeling is more effective than “imperfect” labeling at increasing the choice of unattractive produce and at increasing clicks on online ads. However, “ugly” labeling was not significantly more effective than “with personality” labeling (we return to this point under “Limitations”).

We theorized that “ugly” labeling increases acceptance of unattractive produce because it corrects for consumers’ biased, negative expectations about unattractive produce. We hypothesized that this should be the case for tastiness and healthiness expectations, but not for naturalness expectations. The results on tastiness supported our theorizing: without any specific label, unattractive produce suffered from *negative* tastiness expectations; “ugly” labeling systematically corrected for these negative expectations, which mediated the effect of “ugly” labeling on choice. The results on naturalness also supported our theorizing. Without any specific label, unattractive produce enjoyed *positive* naturalness expectations. As these positive expectations are in line with fact (the absence of pesticides, preservatives, or wax coatings necessarily yields cosmetic imperfections), they did not need to be corrected, and the mediations by naturalness were never significant. The results on healthiness were more muddled, but still consistent with our theorizing. Although healthiness expectations for unattractive produce in the absence of the “ugly” label were never significantly negative, we nonetheless found positive effects of “ugly” labeling and some mediating effects, although these effects were systematically weaker than for tastiness and not always significant (see Figure 4 for all mediation analyses; see Web Appendix W12 for all means and additional analyses).

Theoretical Contributions

Our research examines the effectiveness of “ugly” labeling, which was held constant in prior research examining how unattractive produce can negatively affect self-perceptions (Grewal et al. 2019). In doing so, our research builds on this previous work by identifying another reason consumers reject unattractive produce: negative inferences about produce attributes. Our

work also adds to research examining how food unattractiveness affects attribute expectations (Hagen 2021).

We also extend the literature on “awareness of influence” (Strack and Hannover 1996) to the domain of consumption. In line with this literature, we show that explicitly pointing out the source of biased attitudes—in this case, produce unattractiveness—motivates validity-driven corrections of attitudes.

Additionally, we contribute to research on persuasion. In the context that we study, simply adding one piece of negative information improves product evaluation. This contrasts with the literature on two-sided arguments (Pechmann 1992) that has shown that weak negative information improves product evaluation, provided it is combined with positive information. However, the effects operate through different mechanisms. While two-sided arguments preempt counterarguments by explicitly addressing favorable and opposing views (Kamins and Marks 1987; Rucker, Petty, and Briñol 2008), “ugly” labeling draws consumers’ attention to a nondiagnostic cue that was biasing their judgment.

Limitations and Future Research

While we have demonstrated the efficacy of “ugly” labeling, it is likely that any label pointing out the aesthetic flaw should increase purchase of unattractive produce. Studies 6a and 6b suggested that the “with personality” label, which hints at unattractiveness in a subtle way, was nearly as effective as the “ugly” label. Our study reported in Web Appendix W11 showed that the “misshapen” label, which clearly points out the aesthetic flaw, works as well as “ugly” to drive choice of unattractive produce, and both labels are driven by the same mechanism. Given our findings, it would be interesting to examine the extent to which other labels (e.g., “misfit,” “pickuliar”) are perceived as pointing to aesthetics as the source of imperfection, and whether they can also motivate purchase of unattractive produce.

Future research should also investigate heterogeneity in attractive–healthy associations and attractive–natural associations. While we found that people do not necessarily expect unattractive produce to be unhealthy, two studies found such associations (Hagen 2021; Schifferstein, Wehrle, and Carbon 2019). Looking at the stimuli used in these two studies, we suggest the possibility that when unattractiveness is operationalized with strong deformity or very unusual colors, it leads to unhealthiness inferences. Likewise, while we found that people expect unattractive produce to be *more* natural, research by Hagen (2021) showed the opposite. This may be because Hagen’s research focused on prepared and processed foods, for which cosmetic imperfections are unlikely to stem from nature. This discrepancy may also be related to measurement. Indeed, we measured naturalness with such items as “free of pesticides” and “free of preservatives,” which may activate the knowledge that a more natural mode of production results in cosmetic imperfection, while Hagen measured naturalness with such items as “pure” and “unprocessed,” which are more likely to activate notions of classic beauty.

Managerial Implications

Our work offers significant managerial contributions: it gives clear guidance to managers on whether and how to label unattractive produce, and which price discount will maximize sales. Specifically, we show that “ugly” labeling is more effective than “imperfect” labeling and works best with moderate price discounts. Importantly, these findings largely contrast with managers’ beliefs. Indeed, several large brick-and-mortar and online retailers have relied on “imperfect” labeling (Web Appendix W1), and the more than 50 grocery store managers we spoke to largely preferred “imperfect” labeling, or no specific labeling, over “ugly” labeling.

“Ugly” labeling can also be a support for other better-world interventions, as shown by Grewal et al. (2019) in the case of a self-esteem boost intervention. Although this has not been tested, “ugly” labeling may also further increase the effectiveness of more labor-intensive and costly interventions that rely on educating consumers about the environmental consequences of food waste (Aschemann-Witzel et al. 2015; Bunn et al. 1990; Van Giesen and De Hooge 2019).

Online retailers who exclusively sell unattractive produce have been recently criticized for occasionally sourcing produce from industrial-scale producers, driving small-scale farmers out of business (Mull 2019). While being cognizant of this issue, we believe that increasing consumers’ interest in unattractive produce remains crucial: “ugly” labeling can be applied by smaller actors, particularly farmers, whose limited resources render them unable to meet the aesthetic demands and quotas required by retailers. “Ugly” labeling may also overcome retailers’ reluctance to sell unattractive produce, whether it is because they fear a lack of consumer interest or they are concerned that steep price discounts would hurt their bottom line. Given retailers’ participation in the U.S. Food Loss and Waste 2030 Champions initiative, with its objective of cutting food waste in half by 2030, our research helps reduce the uncertainty and reluctance regarding promotion of unattractive produce. In alignment with the National Academies of Science, Engineering, and Medicine (2020), which recently released a report focused on strategies to reduce food waste, our work shows how marketing can be used to shape a “better world” by providing a win-win solution to several stakeholders—from farmers and retailers to consumers and society at large.

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