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Ugly Food, Negative Feelings: Why Consumers Won't Pay More for Unattractive Produce

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Report Summary

Retailers regularly trash fresh, edible fruits and vegetables, generating millions of pounds of waste and billions of lost revenue dollars annually. In response to growing public awareness of the environmental, social, and financial issues surrounding food waste, some retailers have started selling aesthetically imperfect produce. Campaigns include Intermarché's "Inglorious Fruits and Vegetables," Asada's "Wonky Produce," Whole Foods' "Imperfect Produce," and Giant Eagle's "Produce with Personality." In each case, retailers promoted "ugly produce" by discounting prices and encouraging more positive perceptions of appearance atypicality. It is questionable, however, whether these strategies will be effective or sustainable in the long term.

In this report, Lauren Grewal, Jillian Hmurovic, Cait Lamberton, and Rebecca Walker Reczek propose that there are more sustainable and cost-effective ways to market unattractive produce. By examining the underlying psychological process at the point of consumer produce acquisition, they investigate how the aesthetic premium placed on produce contributes to consumers' rejection of safe, edible, yet aesthetically unattractive produce, and suggest how such devaluation can be reduced.

In four experiments they demonstrate that consumers systematically devalue unattractive produce because of altered self-perceptions: merely imagining the consumption of unattractive produce negatively impacts the way consumers view themselves, eliciting lower product valuations for less attractive produce, driving diminished choice, purchase, and willingness to pay. In demonstrating the self-perception mechanism driving consumers' depreciation of unattractive produce, these results also reveal strategies for mitigating consumers' devaluation response.

The authors test two managerially relevant methods for effectively counteracting the adverse impact of unattractive produce on negative self-perceptions: (1) reducing the diagnostic value of the self-signal of consumer choices and (2) preserving self-perceptions by boosting consumers' self-esteem. An intervention strategy aimed at boosting self-esteem, for example, increased willingness to pay for unattractive produce by 22.4% (effectively equalizing consumers' valuation of unattractive and attractive produce). Additionally, in an experiment in the field, simple in-store messaging boosting self-esteem increased grocery shoppers' positive self-perceptions and, subsequently, willingness to choose unattractive produce. Back-of-the-envelope revenue calculations suggest such intervention strategies would generate 6.5% - 19.4% more revenue than employing a discounting strategy.

Retailers can use these low-cost, easily-implementable interventions to market unattractive produce without offering steep discounts, thus mitigating food waste while protecting their bottom lines. More broadly, these findings indicate that any retailer interventions encouraging consumer purchase and choice of unattractive produce incorporate elements to offset the adverse effects of the negative inferences shoppers make about the self when considering unattractive produce.

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In 2015, consumers spent over $58 billion on produce in grocery stores, making up nearly 12% of all supermarket sales (Food Marketing Institute 2016). Although consumers increased their produce spending by 26.5% from five years earlier (Food Marketing Institute 2016), not all produce has generated profit. During production, farmers discard up to 30% of produce simply because it is not considered "pretty enough" for retail sale (Berkenkamp and Nennich 2015), refusing to pick unattractive produce in the field, removing cosmetically compromised products prior to packaging, and leaving entire crop fields unharvested (Gunders and Bloom 2017). In stores, consumers reject unattractive produce, resulting in unsold product that generates billions of pounds of waste. According to the USDA, retailers trash $15.4 billion of edible fruits and vegetables annually (Buzby, Wells, and Hyman 2014). Not only does this waste harm retailers' bottom lines, it can also damage their image, as food waste is increasingly viewed as socially irresponsible (Aubrey 2016; Kor, Prabhu, and Esposito 2017; Qi and Roe 2016).

To address this problem, some retailers have promoted this "ugly food," primarily using one of two approaches: positively framing its atypical appearance and/or substantially reducing the selling price. For example, French retailer Intermarché launched an "Inglorious Fruits and Vegetables" campaign that celebrated the absurd aesthetic imperfections of produce (e.g., "the failed lemon;" Godoy 2015). Similar campaigns include Asada's "Wonky Produce," Whole Foods' "Imperfect Produce," and Giant Eagle's "Produce with Personality" (Aubrey 2016; Smithers 2016). In each case, retailers combined sizable price discounts (generally between 30-50%; Aubrey 2015; Godoy 2015) with marketing focused on changing consumer perceptions of appearance atypicality to be more positive (Zamon 2015).

It is questionable, however, whether these strategies will be effective or sustainable in the long-term. In fact, retailers themselves question the efficacy of such strategies. We surveyed

grocery store owners (n = 44, M_{age} = 32 years, 32% female, M_{own} = 5.6 years; see Table 1 for all items and summary statistics, following references) to directly assess perceptions of and strategies for managing unattractive produce. Each store, although part of a large retail grocery chain in Sweden, is independently owned and operated, meaning individual owners fully dictate store actions.

First, we note that store owners report observing customers expressly avoiding unattractive produce (M = 4.34, which is significantly above the midpoint of the scale where 1 = not at all and 6 = all of the time; $t(43) = 5.40$, $p < .001$). Second, managers believe that this tendency to avoid unattractive produce results in both (1) increased food waste generated by the store (M = 3.90; significantly above the midpoint on the same six-point scale used above, $t(43) = 2.16$, $p = .036$) and (2) lost sales (M = 2.86; significantly above scale midpoint of a five-point scale where 1 = not at all and 5 = a great deal, $t(43) = 2.59$, $p = .013$).

Third, when asked about the strategies they use when faced with unattractive produce as part of their inventory, the most commonly reported strategies the store owners report using are simply throwing it out (34%) and offering steep price discounting (34%). In fact, store owners indicated needing to offer unattractive produce at essentially half price (on average, providing a 46% discount) in order to sell it. Other common strategies include attempting to blend unattractive produce in with other produce (22%) and repurposing the produce for other uses in the store so that it is not sold whole (11%). Interestingly, despite the increasing popularity of campaigns designed to make ugly produce seem more attractive, none of the store owners in our sample reported using advertising or digital displays to encourage the purchase of unattractive produce. However, these store owners acknowledged not being confident that their solutions

were best (M = 1.93; significantly below the midpoint of the scale where 1 = not at all confident and 5 = a great deal confident; t (43) = -3.07, p = .004).

Considering these findings, we suggest that there are more sustainable and cost-effective ways to market unattractive produce than offering deep discounts or trying to change feelings about appearance typicality. We ground our arguments in a social-cognitive understanding of *why* consumers reject "ugly" produce. Drawing on self-perception theory (Bem 1972) and self-signaling theory (Bodner and Prelec 2003), we demonstrate that consumers devalue unattractive produce because of *altered self-perceptions*: merely imagining the consumption of unattractive produce acts as a self-diagnostic signal that negatively impacts how consumers view themselves, consequently lowering willingness to pay for unattractive produce relative to equally safe, but more attractive, alternatives. We show that this can be offset by altering the diagnostic value of the self-signal or reducing consumers' negative self-perceptions by boosting self-esteem.

In presenting these findings, we offer a number of theoretical and practical contributions. First, we identify altered self-perceptions as a novel psychological explanation for consumers' rejection of unattractive produce. Second, we find that mere imagined consumption, both when explicitly prompted and implicitly stimulated by the consumer context, can lower consumers' valuation of unattractive produce. For retailers, the fact that this devaluation can occur merely with imagined consumption intensifies the need to address this problem: the number of shoppers potentially devaluing unattractive produce is substantially greater than if this response was contingent on actual product trial and consumption. In offering theoretically-grounded interventions to reduce the rejection of unattractive produce, we contribute to both the literature on food waste (Block et al. 2017; Porpino 2016; Williamson, Block, and Keller 2016) and self-perceptions (Dhar and Wertenbroch 2012; Savary, Goldsmith, and Dhar 2015; Summers, Smith,

and Reczek 2016). Additionally, our work has clear practical implications for retailers wishing to sell unattractive produce without offering steep discounts by suggesting a low-cost, easily implementable intervention.

Theoretical Background

Research on interpersonal perception has established the existence of the "what is beautiful is good" stereotype, showing that attractive individuals are evaluated as more intelligent, socially-skilled, ethical, and occupationally competent (Dion, Berscheid, and Walster 1972; Eagly et al. 1991; Langlois et al. 2000). This aesthetic premium observed in person-to-person interactions extends to the perception of consumer products (Bloch 1995; Liu, Li, Chen, and Balachander 2017; Raghubir and Greenleaf 2006; Townsend and Shu 2010; Wu et al. 2017). For example, aesthetically-pleasing packaged goods generate higher purchase intentions and control a greater average market share than less aesthetically-pleasing competitors (Raghubir and Greenleaf 2006).

It follows that the aesthetic premium would extend to the domain of consumer food products and, specifically, produce. Unsurprisingly, sensory attributes contribute to consumers' food acceptance or rejection (Cardello 1994), with prior research demonstrating that visual appearance is a key determinant of consumer liking (Hurling and Shepherd 2003). While some research has begun to explore the impact of "ugly" food on purchase intentions (Loebnitz, Schuitema, and Grunert 2015), to our knowledge no research has examined the price levels commanded by aesthetically atypical produce. We anticipate that consumers will exhibit an aesthetic premium for produce, valuing aesthetically attractive produce to a greater degree than

aesthetically unattractive produce, resulting in lower willingness to pay for unattractive produce. However, the more interesting and practically relevant question is *why* this happens, and (with that understanding) what can be done about it.

Produce Attractiveness

We characterize produce attractiveness in terms of atypical physical appearance (e.g., shape, color). Consistent with research showing that individuals respond more favorably to products that are more similar to prototypical product category exemplars (Barsalou 1985; Landwehr, Labroo, and Herrmann 2011; Loken and Ward 1990; Veryzer and Hutchinson 1998), we conceptualize produce attractiveness as the degree of natural aesthetic deviation from the prototypical category exemplar of physical appearance. Thus, we limit our focus to the natural variation in physical appearance that arises during a product's growth (e.g., an apple's odd shape while growing on a tree). This excludes deviations in appearance due to damage, disease, or other sources of external aesthetic divergence that may raise safety or health concerns (e.g., due to pests or consumer mishandling; White et al. 2016). As such, unattractive produce is defined as having significant natural variation from prototypicality, whereas more attractive produce is defined as having limited (if any) variation from prototypicality.

Altered Self-Perceptions

What is it about aesthetically atypical produce that decreases consumers' valuations? We propose that consumers' devaluation results from altered self-perceptions: beliefs about the self, derived from their own thoughts or behavior (Bem 1972). Both self-perception theory (Bem 1972) and self-signaling theory (Bodner and Prelec 2003) suggest that people make inferences about themselves based on observing their own behavior, which are taken to reveal diagnostic information about the self. For example, people perceive themselves to be more prosocial after

performing charitable acts that are more personally costly (Gneezy et al. 2012a). Further, a broad and robust literature in psychology and marketing demonstrates that individuals use their own behavior (including product and brand choice) to strategically and actively self-signal desirable personal attributes and identities. In other words, consumers have a desire to view themselves positively and use the signaling value of products to preserve a positive self-view. In our context, we propose that choosing or consuming unattractive produce is a diagnostic, negative signal to the self that is integrated into self-perception inferences, subsequently decreasing product valuation. To avoid this negative self-signal, consumers will avoid choosing unattractive produce, even if it is objectively as safe and healthy as a more attractive item.

This may suggest that only consumers who actually purchase unattractive produce are at risk. However, we submit that the risks of considering unattractive produce may extend beyond this subset of consumers. Rather, the mere imagination of consumption or simulation of behavioral action is sufficient for signaling information that can negatively impact consumer self-perceptions. Prior literature supports this position. For example, merely choosing a volunteer activity, even without actual participation, is a positive self-signal that alters people's self-concept (Khan and Dhar 2006). In addition, simply receiving a behaviorally-targeted ad can serve as a self-signal, such that consumers who receive an ad for an environmentally-friendly product report having higher green consumption values, despite having engaged in no actual additional green behavior (Summers, Smith, and Reczek 2016).

As these examples illustrate, non-participatory consumption behavior (e.g., selecting or imagining an action, but not engaging in the action) prompts consumers to make self-perception inferences. Consequently, we propose that imagined consumption of unattractive produce generates self-signaling effects, prompting consumers to perceive themselves more negatively. In

turn, we predict that these negative self-perceptions explain the low product valuations that consumers place on less aesthetically attractive produce, driving consumers' diminished choice, purchase, and willingness to pay.

How can devaluation of ugly produce be mitigated?

Based on our self-perceptions account, we identify two means by which the devaluation of unattractive produce can be mitigated. First, self-signals should not impact valuation when they are not considered diagnostic. That is, reducing the diagnostic value of the self-related signal should reduce the tendency for imagined consumption of unattractive produce to negatively impact self-perceptions and, thus, willingness to pay. Prior research has identified several factors that can influence the diagnostic value of initial behavioral self-signals and subsequent consumer behavior, including the assortment of behavioral options available (Dhar and Wertenbroch 2012), social observability of action (Gneezy et al. 2012b; Kristofferson, White, and Peloza 2014), and costliness of behavior (Gneezy et al. 2012a). In some cases, simply knowing that one's product preferences do not reflect who they are as a person should reduce the diagnosticity of a product-related signal (Summers, Smith, and Reczek 2016). In our context, interventions that erode the self-diagnostic value of consumers' behavior should weaken the intensity or relevance of the information cued by imagined consumption of unattractive produce, consequently reducing consumers' devaluation response.

Additionally, because negative self-perceptions are driving consumers' depreciation of unattractive produce, a second means of mitigating consumers' devaluation response involves bolstering consumers' self-perceptions when encountering these products. In our theorizing, we purposefully focus on self-perceptions as our primary process mechanism: self-perceptions are beliefs individuals hold about themselves, inferred from their own behaviors (Bem 1972). In our

context, an individual who considers buying or imagines consuming unattractive produce – because of the ubiquity of the "what beautiful is good" belief (described above) – will infer such behavior to signal that they, like the unattractive produce, are less "good."

We propose that boosting self-esteem, one's global assessment regarding their value as a person (Rosenberg 1979; Rosenberg et al. 1995), will protect against the negative beliefs about the self that may be cued by real or imagined consumption of ugly products. Past research shows that when information relevant to a given topic is provided, individuals reduce their reliance on inference making when forming evaluative judgments (Luchs et al. 2010; Naylor, Lamberton, and Norton 2011). As such, a highly salient message that directly boosts self-esteem will reduce reliance on information inferred about the self as a result of considering consuming ugly produce protecting the consumer from both negative self-perception effects and the unattractive produce from devaluation. Thus, we propose that marketing interventions that directly strengthen self-esteem may be a practical method to diminish the negative self-perceptions and subsequent devaluation cued by imagined consumption of unattractive produce because such messaging provides a highly proximate source of data regarding the self, reducing the tendency to rely on inference making as a source of information. We test this prediction using two different methods to directly raise self-esteem: first, we prime positive self-esteem using a writing task in a lab experiment; second, we boost self-esteem in the field using in-store messaging that retail managers can easily implement at the point of purchase.

Overview of Studies

We present four experiments that test our conceptual framework (see Figure 1, following references). Study 1 provides an initial test of our proposed theoretical account explaining consumers' devaluation of unattractive produce. In Study 2, we demonstrate that reducing the self-

diagnostic value of consumers' behavior eliminates consumers' devaluation of unattractive produce. Using an incentive-compatible experimental design, Study 3 then shows that externally boosting consumers' self-esteem raises real willingness to pay for unattractive produce to levels that equal those of attractive produce. Lastly, Study 4, an experiment in-the-field, shows that in-store advertising messages that boost shopper self-esteem effectively increase shoppers' choice of unattractive produce. We show that our effect extends across different produce types, variations in study design, using hypothetical and consequential dependent variables, and looking at singular pictures of produce and produce assortments (see Figure 2, following references).

Study 1: Mediation Through Altered Self-Perceptions

Study 1 tests our proposed self-perceptions mechanism as the driver of the aesthetic premium for produce. Notably, our experimental manipulation of unattractive produce is comparable to that which a consumer is most likely encounter in a retail context; rather than testing excessive deviations from typicality, we manipulate unattractive (and attractive) produce using examples that meet USDA official grades and standards.

Method

Amazon Mechanical Turk workers (n = 304, M_{age} = 37, 48% female) completed this survey for nominal payment. Participants were randomly assigned in a 2 (produce attractiveness: unattractive, attractive) x 2 (produce type: strawberry, potato) between-subjects design. Participants imagined shopping at a grocery store for produce that meets USDA standards, meaning that it is not damaged, is free from decay, and is safe to eat. Participants imagined they found a package of fresh strawberries [potatoes] and viewed an attractive or unattractive strawberry [potato] contained in the package. Manipulation of the produce's attractiveness was

limited to the distortion of its natural variation from the USDA standards of "typical" produce, as presented on the USDA website (see Figure 2 for images of stimuli used in all studies).

Next, participants read that the average price for a one-pound package of strawberries [potatoes] is $3.50 and indicated their willingness to pay for a one-pound package of strawberries [potatoes] containing strawberries [potatoes] that look like the one pictured, using a sliding scale anchored at $0 and $10. Afterwards, participants reported their likelihood of purchasing a one-pound package of strawberries [potatoes] that has strawberries [potatoes] like the one they just saw (1 = very unlikely, 7 = very likely).

Following this evaluation task, participants completed a sixteen-item self-perceptions index, indicating how they perceived themselves on a series of traits after imagining consuming the strawberry [potato] (e.g., "good," "bad," "attractive;" 1 = strongly disagree, 7 = strongly agree $\alpha = .90$). Positive items were reverse-coded so that larger values indicate more negative self-perceptions. Participants additionally completed a manipulation check question regarding produce attractiveness (1 = strongly disagree, 7 = strongly agree), and demographic questions.

Results

Manipulation check. To test the effectiveness of our manipulation, we regressed perceived attractiveness ratings on attractiveness condition (unattractive = -1, attractive = 1), produce type (potato = -1, strawberry = 1), and their interaction. There was no main effect of produce type (b = .04, $t = .379$, $p = .705$), nor a significant interaction effect (b = -.09, $t = -.945$, $p = .345$). As predicted, we found a main effect of attractiveness condition (b =.74, $t = 7.49$, $p < .001$), such that participants perceived the attractive produce as significantly more attractive (M = 4.49, SD = 1.80) than the unattractive produce (M = 2.99, SD = 1.66).

There was no difference across the two produce types (strawberries and potatoes) and produce type did not interact with our attractiveness manipulation for any dependent measures; therefore, across all subsequent analyses, we include produce type as a covariate.

WTP. We regressed WTP on attractiveness condition, controlling for produce type and observed a main effect of attractiveness ($\beta = .33$, $t = 4.23$, $p < .001$). Participants were willing to pay significantly more for attractive (M = $3.17, SD = $1.21) than unattractive produce (M = $2.53, SD = $1.55), consistent with an aesthetic premium effect.

Purchase intentions. When estimating the same regression model as above, predicting purchase intensions, we once again found a main effect of attractiveness ($\beta = .84$, $t = 8.27$, $p < .001$). Participants were significantly more likely to purchase attractive (M = 5.20, SD = 1.64) compared to unattractive produce (M = 3.55, SD = 1.91).

Mediation. To test our proposed self-perception process, we conducted a mediation analysis (PROCESS Model 4; 10,000 bootstrapped samples; Hayes 2013) estimating the indirect effect of produce attractiveness on WTP, with participants' negative self-perceptions as the mediator and produce type as a covariate. Results revealed that produce attractiveness predicted self-perceptions (b = -.30; SE = .06, CI_{95}[-.42, -.18]), and self-perceptions predicted WTP (b = -.41; SE = .07; CI_{95}[-.55, -.27]). Supporting our predicted process, the indirect effect was statistically significant (b = .12; SE = .03, CI_{95}[.07, .21]). Additionally, this same pattern of results emerges when purchase intentions is the dependent variable (i.e., the indirect effect of self-perceptions was statistically significant; b = .28; SE = .05, CI_{95}[.18, .40]).

Discussion

Study 1 shows that merely imagining the consumption of unattractive produce negatively impacts self-perceptions and, consequently, lowers people's willingness to pay for unattractive

produce. In providing initial evidence of the self-perceptions process account, Study 1 reveals a specific mechanism that retail interventions can target to influence consumers' valuation of unattractive produce.

Study 2: The Diagnostic Value of Consumers' Behavior

Study 2 tests the first of our two intervention approaches: altering the diagnostic value of the self-signal. We believe that consumers use their own imagined consumption of produce as a source of information to make inferences about the self. Therefore, we expect that when consumers consider their behavior self-diagnostic, the mediating effects of self-perceptions on purchase intentions obtained in Study 1 should replicate. If, however, consumers do not consider their behavior self-diagnostic, the mediating negative influence of self-perceptions on produce devaluation should be attenuated.

Method

Undergraduates (n = 301, M_{age} = 21, 50% female) participated in this study in exchange for course credit. Participants were randomly assigned to one condition in a 2 (produce attractiveness: unattractive, attractive) x 2 (diagnostic value of choice: diagnostic, non-diagnostic) between-subjects design. Participants began the study by first completing a set of personality scales, framed as a "Who I Am" task purportedly part of a larger project related to market segmentation and consumer profiles. Afterwards, participants progressed to a shopping task, in which they viewed assortments of four products and were instructed to choose the one item that "best reflects who [they] are as a person." Participants chose one product from each of ten product categories, including water bottles, glass ornaments, and baked bread.

Once all produce choices had been made, participants waited while an algorithm ostensibly compared their product selections and response latencies to the results of their answers on the "Who I Am" personality test. Participants read that everyone would be provided with a summary of results from this algorithm's analysis. We manipulated the diagnostic value of choice in this summary. In the diagnostic value condition, participants were told they selected products that "strongly match who [they] are as a person," thereby suggesting that their product choices offer relevant self-signals. In the non-diagnostic value condition, participants were told that they "select products that don't strongly match who [they] are as a person," thereby suggesting that they should derive little self-signaling value from their product choices.[1]

After reviewing their results summary, participants began a seemingly separate product opinion survey. Participants viewed a picture of an unattractive or attractive strawberry (see Figure 2) and imagined that, from among several fresh fruit options guaranteed to be healthy and safe for consumption, they selected this strawberry to eat. Next, using the same measure as in Study 1, participants indicated their willingness to pay. Participants then answered the same self-perception items and manipulation check from Study 1 and standard demographic questions.

Results

Manipulation check. To test the effectiveness of our produce attractiveness manipulation, we regressed perceived attractiveness ratings on attractiveness (unattractive = -1, attractive = 1), diagnostic value (diagnostic = -1, non-diagnostic = 1), and their interaction. There was no main

[1] Amazon Mechanical Turk workers (n = 152, Mage = 34, 43% female) completed this survey for nominal payment. Participants were randomly assigned in a 3 (control, diagnostic, non-diagnostic) between-subjects design. Participants completed the "Who I Am" task from Study 2 in both the diagnostic and non-diagnostic conditions, but not in the control condition. Afterwards, participants answered a manipulation check regarding how diagnostic participants believed their choices to be (α = .82; four-item scale). We found that our diagnostic manipulation increased participant's belief that their choices were self-diagnostic (b =.40, t = 3.48, p < .001), while our non-diagnostic manipulation made participants believe their choices were significantly less diagnostic (b = -.46, t = -3.94, p < .001).

effect of diagnostic value (b = .16, t = 1.42, p = .156), nor a significant interaction effect (b = -.05, t = -.520, p = .603). As predicted, we found a main effect of attractiveness condition (b = .54, t = 5.11, p < .001), such that the unattractive strawberry was considered significantly less attractive (M = 3.74, SD = 1.77) than the attractive strawberry (M = 4.87, SD = 1.65), suggesting our manipulation was successful.

WTP. We predicted that WTP would be higher for attractive (vs. unattractive) produce when people believed that their product choices offered self-diagnostic value but that there would be no difference in WTP when people believed there was no diagnostic value to their choices. To test this, we regressed WTP on attractiveness, diagnostic value, and their interaction.

As expected, there was a significant interaction between produce attractiveness and diagnostic value on WTP (b = -.16, t = -1.98, p = .048). There was also a main effect of produce attractiveness (b = .32, t = 3.90, p < .001), and a main effect of diagnostic value (b = .27, t = 3.22, p = .001). The simple effect of produce attractiveness on WTP was positive and significant when participants believed their choices were self-diagnostic (b = .49, t = 4.87, p < .001), such that those who imagined choosing and consuming the attractive produce were willing to pay more (M = \$3.52, SD = \$1.26) than those who imagined choosing and consuming the unattractive produce (M = \$2.55, SD = \$1.19). The simple effect was not significant, however, when participants believed their choices were not self-diagnostic (b = .16, t = 1.17, p = .244; $M_{unattractive}$ = \$3.41, $SD_{unattractive}$ = \$1.72; $M_{attractive}$ = \$3.73, $SD_{attractive}$ = \$1.31).

Moderated mediation. We predicted that the detrimental effect of negative self-perceptions on consumers' willingness to pay for unattractive produce would be attenuated when the self-diagnostic value of imagined produce choice and consumption is weakened. We tested this prediction using PROCESS Model 8 (with 10,000 bootstrapped samples; Hayes 2013), with

produce attractiveness as the predictor, self-perceptions as the mediator, and diagnostic value of choice as the moderator.

The index of moderated mediation was significant (b = -.10, SE = .05, CI_{95} [-.22, -.02]). Importantly, a conditional indirect effects analysis demonstrated that when participants believed their behavior was self-diagnostic, the indirect effect of produce attractiveness of negative self-perceptions was significant (b = .15, SE = .05, CI_{95} [.07, .27]), replicating our prior devaluation findings. Conversely, when participants believed their behavior was not self-diagnostic, the indirect effect became non-significant (b = .02, SE = .03, CI_{95} [-.03, .09]; see Table 2, following references).

Discussion

In Study 2, when people believed their produce choice and imagined consumption were diagnostic self-signals, we replicate the devaluation effects seen in Study 1. However, when people believed their choices were not self-diagnostic, this devaluation of unattractive produce was mitigated.

These results also highlight one potential tactic retailers can employ to minimize consumers' devaluation of unattractive produce: reducing the self-diagnostic value of consumers' behavior. Although the experimental intervention in this study was implemented in a fairly strong form for the sake of theory testing, marketplace operationalizations could serve a similar purpose. For example, marketers can incorporate messaging that provides consumers with a convincing and acceptable external reason for their consumption behavior, such as attributing shoppers' selections to market forces, persuasion tactics, or social influence. Alternatively, managers could target customer segments in states of lower self-diagnostic

sensitivity, such as those making purchases for others. In the next two studies, we introduce another tactic to mitigate the devaluation of unattractive produce: boosting self-esteem

Study 3: How Boosting Self-Esteem Preserves Self-Perceptions

Study 3 tests our prediction that directly boosting consumers' self-esteem should reduce their reliance on inferences about the self that stem from imagined consumption of unattractive produce, thereby increasing consumers' WTP for unattractive produce. We do so using a self-esteem priming manipulation in an incentive compatible design with a new context (i.e., a produce box containing unattractive produce), with participants potentially receiving the opportunity to purchase the produce at their reservation price.

Method

Undergraduates (n = 191, M_{age} = 20 years, 50% women) participated in this study in exchange for course credit and $2.00. Participants were randomly assigned to one of four conditions in a 2 (produce attractiveness: unattractive, attractive) x 2 (self-esteem: high, control) between-subjects design. All participants received an envelope containing $2.00 (in dimes) for participating in the lab session. After handling the money and certifying its quantity, participants completed a "Life Events Survey" writing task that served as our self-esteem prime, adapted from Lee and Shrum (2012). In the high self-esteem condition, participants wrote about a time in the past few months "when you accomplished something that made you feel proud of yourself." In the control condition, participants wrote about "what a typical morning is like for you during the week (i.e., not the weekend)." Participants had to spend at least one-minute writing.

After the writing task, participants continued to a consumer product evaluation survey. Participants read about a monthly produce box delivery service and saw a corresponding image of an open box containing an assortment of seven different types of attractive [unattractive] produce (i.e., green peppers, apples, oranges, cucumbers, carrots, potatoes, and strawberries; see Figure 2). Included in the description of the "fruit and veggie box" were quality assurance statements pledging that the product is “100% guaranteed to be fresh and safe to eat” and the company has “strict quality-control measures in place to ensure that what ends up on your doorstep is fresh and nutritious.” Next, participants imagined consuming a piece of produce from the “fruit and veggie box” and completed the self-perceptions index used in the previous studies.

Afterwards, participants learned they may have the opportunity to purchase a “fruit and veggie sampler box” containing an assortment of produce that looked similar to that in the “fruit and veggie box” previously displayed. We assessed participants’ valuation of this attractive [unattractive] produce sampler box, which was said to retail for $5.00, using an adaption of the BDM method of price elicitation (Becker, DeGroot, and Marschak 1964), which incentivizes participants to provide accurate valuations. Participants were told that if they were chosen they would either pay the randomly assigned price (i.e., if they stated they would buy the box at the price given, for example $1.40) or they would not pay the experimenter, not receive the box, and keep their money if they had indicated that they did not want to pay for the box at the elicited price. Participants indicated their willingness to pay at alternating values of $.10 (e.g., WTP at $.10, then $2.00, then $.20, then $1.90) that was randomized to start at $2.00 or $.10.

Finally, participants completed the manipulation check used in prior studies and standard demographics items. At the end of each lab session, one participant was chosen to purchase the

sampler produce box and the purchase transaction was made (if the participant's decision was to buy at the randomly chosen price).

Results

Manipulation checks. We regressed produce attractiveness ratings on produce attractiveness condition (unattractive = -1, attractive = 1), self-esteem (control = -1, high = 1), and their interaction. There was no main effect of the self-esteem intervention (b = -.09, t = -.868, p = .387), nor a significant interaction effect (b = -.03, t = -.271, p = .787). As predicted, however, we did find a main effect of produce attractiveness condition (b = .27, t = 2.61, p = .010), where the attractive produce box selection was considered significantly more attractive (M= 5.67, SD = 1.28) than the unattractive produce box selection (M = 5.12, SD = 1.58).

WTP. We predicted that boosting self-esteem would disrupt consumers' devaluation response, thereby increasing WTP for the unattractive produce sampler box. To test this, we regressed WTP on attractiveness, self-esteem, and the interaction. There was a main effect of produce attractiveness on WTP (b = .09, t = 2.05, p = .042), but no main effect of self-esteem (b = .07, t = 1.47, p = .143). More importantly, there was a significant interaction between produce attractiveness and self-esteem on WTP (b = -.09, t = -2.08, p = .039). Replicating our prior findings, the simple effect of produce attractiveness on WTP was positive and significant in the control condition (b = .19, t = 2.72, p = .008), such that participants were WTP more for attractive produce (M = $1.81, SD = $.55) than unattractive produce (M = $1.43, SD = $.77). However, this devaluation of unattractive produce did not emerge among those exposed to the self-esteem intervention; there was no difference in WTP for the attractive (M = $1.75, SD = $.54) and unattractive produce boxes (M = $1.75, SD = $.60; b = -.002, t = -.026, p = .979).

Moderated mediation. We predicted that the negative self-perceptions that occur after imagining consuming unattractive produce would be mitigated by boosting consumers' self-esteem, subsequently increasing people's WTP for unattractive produce. We tested this prediction using PROCESS Model 8 (with 10,000 bootstrapped samples; Hayes 2013), with produce attractiveness as the predictor, self-perceptions as the mediator, and self-esteem intervention as the moderator.

The index of moderated mediation was significant (b = -.04, SE = .02, CI_{95} [-.10, -.03]). A conditional indirect effects analysis demonstrated that, in the absence of the self-esteem intervention, negative self-perceptions mediated the effect of produce attractiveness on WTP (b = .02, SE = .01, CI_{95} [.03, .09]), replicating our prior devaluation findings. Specifically, when consumer self-esteem was not boosted, imagined consumption of unattractive produce increased people's negative self-perceptions, which lowered their willingness to pay. When consumer self-esteem was externally boosted, however, the indirect effect of produce attractiveness on WTP through negative self-perceptions became non-significant (b = .002, SE = .01, CI_{95} [-.01, .03]; see Table 3, following references).

Discussion

Study 3 uses an incentive compatible design to demonstrate that boosting people's self-esteem effectively mitigated differences in real willingness to pay for unattractive and attractive produce. Momentarily raising an individual's self-esteem reduces the negative self-inferences made following the imagined consumption of unattractive produce, thereby disrupting the negative influence of produce attractiveness on self-perceptions and, as a result, increasing how much the consumer is willing to spend on unattractive produce.

This is particularly noteworthy for retailers, for whom this indicates a method to recapture formerly lost revenue. For example, in this study, boosting self-esteem effectively increased people's willingness to pay for the unattractive produce by 22.4%. In an industry that offers relatively slim profit margins, strategies with the potential to increase revenue by such a large amount represent lucrative opportunities. In our next study, we further examine the effectiveness of a managerial operationalization of the self-esteem boosting intervention in an experiment in-the-field.

Study 4: Experiment In-The-Field: Directly Boosting Self-Esteem

In this experiment in-the-field (Morales, Amir, and Lee 2017), we manipulated the messaging of two in-store advertisements (self-esteem boosting vs. control) posted above a display of apples and measured shoppers' subsequent choices of unattractive or attractive produce. In addition to examining the self-esteem intervention in an actual retail context, this study also examines whether this intervention could be plausibly weakened for some segments of consumers: those with higher food knowledge and those shopping exclusively for others. Consumers who are more knowledgeable about food may not interpret the consideration or choice of ugly foods as a negative self-signal (e.g., if they hold different beliefs about such produce, such as "ugly food is cool and unique"). Based on our theory, consumers who are shopping exclusively for someone else should not have lowered negative self-perceptions due to unattractive produce because the choice of the unattractive produce signals nothing about the self and, therefore, should not impact negative self-perceptions.

Method

We collaborated with the same Swedish grocery retailer from whom we collected the store manager data reported in Table 1. In this retail chain, individual grocery stores are independently owned, allowing each store to tailor advertisements, the products sold, and store-layouts to the local population. We ran our experiment in-the-field in one of the retailer's full-sized grocery stores, located in a municipality center in Stockholm that caters to consumers across a range of socioeconomic status.

Within this store, we manipulated two advertising displays for one week and measured shoppers' (n = 130; M_{age} = 52 years, 70% women) apple choices. Throughout the week of data collection, in-store advertisements were rotated hourly between two conditions (positive self-esteem condition vs. control) during regular store hours. Signage was displayed behind two unlabeled produce bins: one containing attractive apples and the other containing unattractive apples. Attractive and unattractive apples were determined using the same criteria as in previous experiments and the display was set up by the research assistants using these standards.

The ad messaging in the positive self-esteem condition focused on boosting shoppers' self-esteem while encouraging the choice of unattractive produce (i.e., "You are Fantastic! Pick Ugly Produce!"), whereas messaging in the control condition focused exclusively on encouraging the choice of the unattractive produce (i.e., "Pick Ugly Produce!").[2] Both signs also included an image of an unattractive tomato to highlight an example of unattractive produce

[2] Amazon Mechanical Turk workers (n = 99; M_{age} = 33 years, 41% women) completed this survey for nominal payment. Participants were randomly assigned in a 2 (control, positive self-esteem) between-subjects design. Participants either saw the self-esteem advertisement or the control advertisement that was shown in the experiment in-the-field (Study 4). Afterwards, participants answered the State Self-esteem Scale from Heatherton and Polivy (α = .89; 1991). This scale is comprised of three subscales of state self-esteem; appearance self-esteem (α = .94), social self-esteem (α = .82), and performance self-esteem (α = .78). Overall, our self-esteem manipulation increased participants' state self-esteem (b =.31, t = 2.24, p = .027). More specifically, our manipulation increased appearance-self-esteem (b =.38, t = 2.34, p = .021) and performance self-esteem (b =.29, t = 2.55, p = .012), but not social self-esteem (b =.24, t = 1.11, p = .27). These results have good face validity as there is no social aspect to the self-esteem manipulation we used.

without giving consumers a specific reference point for a "typical" unattractive apple. Thus, the advertisements were identical except for the self-esteem message (see Figure 2).

Three research assistants approached every third person who passed a predefined point in the produce section and asked if they could spare a couple of minutes for a short survey. If people agreed, they were told they would receive an apple as compensation. Some shoppers, before completing the survey, first indicated the bin from which they would like their apple (i.e., the bin of unattractive apples or attractive apples), after which they completed the survey, while this order was reversed for some shoppers (i.e., survey, then produce choice). We note that all participants saw the advertisement and displayed apples simultaneously before making a choice and completing the survey.

The brief paper survey (collected in Swedish) included a shortened five-item self-perceptions index where the positive items were reverse-coded so that larger values indicate greater negative self-perceptions ($\alpha = .90$), a three-item ad-hoc food knowledge measure ($\alpha = .78$), an item to assess who consumers were shopping for, possible control variables including liking of apples, purchase frequency of apples, liking of produce generally, frequency of shopping at the store, and standard demographics (see the Appendix for pictures of the in-store advertising set-up). After completing the survey, shoppers received their produce selection (i.e., a bag of two apples), which were not taken directly from the produce bins accompanying the in-store advertising in order to maintain the consistency of the produce display across all shoppers. The research assistants ensured that the number of apples in each bin was consistently equivalent and the bins stayed essentially identical throughout the week.

Results

Choice of produce. Estimating a binary logistic regression of produce choice (attractive = 0, unattractive = 1), we observed a main effect of advertisement condition (control = 0, positive = 1 self-esteem), such that shoppers exposed to the positive self-esteem ad were significantly more likely to choose unattractive apples than those exposed to the control ad (50% vs. 26%; β = 1.05, χ^2 = 7.62, p = .006, Exp(B) = 2.87). Looking specifically at the choice of unattractive or attractive apples within each advertising condition, we found that of shoppers exposed to the control ad message, 74% chose the attractive apples and 26% chose the unattractive apples. In contrast, in the positive self-esteem message condition, the choice of attractive and unattractive apples was split evenly at 50-50%. These findings were robust to the inclusion of control variables (β = .816, χ^2 = 3.98, p = .046, Exp(B) = 2.26), including when shoppers chose their apple (i.e., before or after answering the survey), liking of apples, purchase frequency of apples, liking of produce generally, how frequently they shop in the store, and basic demographics (i.e., age and gender). None of these items significantly impacted the likelihood of choosing an unattractive apple (all *p's* > .28).

Mediation. To test our predicted self-perception process, we conducted mediation (PROCESS Model 4; 10,000 bootstrapped samples; Hayes 2013), estimating the indirect effect of advertisement condition on produce choice, with shoppers' negative self-perceptions as the mediator and controlling for the order of the dependent variable and mediator being measured. Results revealed that the advertising message predicted negative self-perceptions (b = -.43; SE = .22, CI_{90}[-.80, -.06]), and negative self-perceptions predicted choice of unattractive produce (b = -.42; SE = .17; CI_{90}[-.70, -.15]). Supporting our predicted process, the indirect effect of negative

self-perceptions was significant (b = .18; SE = .13, CI_{90}[.03, .48]).[3, 4] The self-esteem boosting advertisement decreased shoppers' negative self-perceptions and, in response, increased their likelihood of choosing unattractive produce.

Possible moderators. To test whether shoppers' perceived food knowledge moderated the indirect effect of self-perceptions, we ran PROCESS Model 8 (with 10,000 bootstrapped samples; Hayes 2013), with advertisement condition as the predictor, negative self-perceptions as the mediator, food knowledge as the moderator (mean-centered), and produce choice as the dependent variable, controlling for the order of the dependent variable and mediator being measured. The index of moderated mediation was not significant (b = .16, SE = .14, CI_{90} [-.01, .43]), and food knowledge was not shown to influence perceived negative self-perceptions (p = .825) or produce choice (p = .795).

We also investigated whether who the consumer was shopping for moderated the indirect effect of self-perceptions. To test this, we ran the same analysis as above, with shopping recipient as the moderator (0 = shopping exclusively for someone else, 1 = not shopping exclusively for someone else).[5] The index of moderated mediation was significant (b = -.50, SE = .39, CI_{90} [-1.22, -.036]). A conditional indirect effects analysis demonstrated that negative self-perceptions mediated the effect of advertisement condition on produce choice when shoppers were not shopping exclusively for someone else (b = .59, SE = .39, CI_{90} [.078, 1.32]). Thus, replicating prior results, when consumers were also shopping for themselves (which should be self-diagnostic), the self-esteem boosting ad bolstered shoppers' negative self-perceptions and,

[3] The same analysis conducted without controlling for the order of measuring the dependent variable and the mediator yield the same pattern of results (b = .17; SE = .13, CI_{90}[.02, .49]).
[4] At CI_{95}, advertising did not predict negative self-perceptions (b =-.43; SE =.22, CI_{95}[-.87, .01]), however, negative self-perceptions predicted choice (b =-.42; SE =.17; CI_{95}[-.75, -.10]), and the indirect effect of negative self-perceptions was significant (b =.18; SE =.13, CI_{95}[.007, .57]).
[5] Although many shoppers were not shopping exclusively for others, a non-trivial portion (20%) of our sample stated that they were shopping exclusively for someone else.

consequently, increased their likelihood of choosing unattractive produce. However, when people were exclusively shopping for someone else (i.e., not shopping for themselves, which should not be self-diagnostic) shoppers' negative self-perceptions did not mediate the relationship between ad message and produce choice (b = .09, SE = .12, CI_{90} [-.04, .33]).

Discussion

In this experiment in-the-field, we found that advertising that directly strengthens consumers' self-esteem at the point of purchase effectively mitigated differences in the real choice of unattractive and attractive produce. Boosting shoppers' self-esteem reduced the negative self-inferences made following the consideration of unattractive produce, thereby disrupting the adverse influence of unattractive produce on self-perceptions and, consequently, increasing the likelihood of the shopper choosing unattractive produce. In fact, the self-esteem intervention shown using in-store messaging increased shoppers' choice share of unattractive apples by 93.3%, nearly doubling shoppers' retail selection of unattractive produce.

Moreover, as we observed shoppers' actual decisions, we conducted a series of back-of-the envelope calculations to estimate the potential profitability of our simple in-store messaging. We separately estimated the revenue generated by shoppers' observed choices when exposed to the control ad and when exposed to the self-esteem boosting ad. Each was calculated as the sum of revenue generated from the attractive produce and the unattractive produce:

$$Revenue_{control} = Revenue_{control,att} + Revenue_{control,unatt}$$

$$Revenue_{boost} = Revenue_{boost,att} + Revenue_{boost,unatt}$$

For each condition, the revenue for attractive produce was given by the equation:

$$Revenue_{condition,att} = (FullPricePerLB_{att} \times WeightLB_{att}) \times Quantity_{condition,att}$$

Because it is a relatively common strategy for retail managers to selectively discount unattractive produce (e.g., our store manager survey suggests discounts are often about 50%), the

equation to estimate revenue for unattractive produce for each condition additionally included a discount factor to account for retailers' promotional price reductions:

$$Revenue_{condition,unatt} = \left(FullPricePerLB_{unatt} \times WeightLB_{unatt} \times (1 - Discount_{unatt})\right) \times Quantity_{condition,unatt}$$

To isolate the potential revenue implications of the observed choice boost, all elements of the equations were held constant across both conditions, with the exception of quantity chosen.[6] In our estimates, the full price per pound of apples ($FullPricePerLB$) reflected the retailer's actual price ($2.53), and the weight per apple ($WeightLB$) was assumed to be .33 lbs.

Because each shopper's produce choice resulted in the receipt of two apples, each condition's calculation of quantity was computed as two times the number of shoppers selecting the respective produce type (attractive or unattractive):

$$Quantity_{condition,att} = 2 \times NShoppers_{condition,att}$$

$$Quantity_{condition,unatt} = 2 \times NShoppers_{condition,unatt}$$

After separately estimating the revenue generated by shoppers' observed choices when exposed to the control ad and when exposed to the self-esteem boosting ad, we compared these values to calculate the percent difference in revenue generated by the different ad messages:

$$\%\ \text{Difference in Revenue} = \left(\frac{Revenue_{boost} - Revenue_{control}}{Revenue_{boost}}\right) \times 100$$

We repeated this calculation, assuming different levels of discounting for unattractive produce, at a 50% and 30% discount, which is currently consistent with both retail manager norms and intuitions.

[6] Prior to analyses, we converted all pricing and weight measurements from the metric system to the imperial system (i.e., US dollars and pounds).

Our results show a consistent pattern of benefit for the retailer. The self-esteem boosting ad generated more revenue than the control ad (see Table 4, following references). Assuming this retailer was offering a 30% discount on unattractive produce, the revenue from the self-esteem boosting ad was 12.6% higher than that of the control ad, despite the discount. If the retailer offered a 50% discount on unattractive produce, the self-esteem boosting ad still generated 6.5% more revenue than the control ad. However, had the retailer offered no discount on unattractive produce, the self-esteem boosting ad messaging would have generated 19.4% more revenue than the control messaging. Thus, the estimated retail revenue generated by the self-esteem boosting in-store advertisement was higher than when displaying the control ad, regardless of whether the unattractive produce is half- or equivalently-priced to the attractive produce.

General Discussion

Retailers regularly trash over $15.4 billion of edible fresh fruits and vegetables each year (Buzby, Wells, and Hyman 2014), despite being spectacularly wasteful both financially and environmentally. To address this waste, some retailers have recently started selling aesthetically imperfect produce. Although retailers have primarily promoted these products by positively reframing atypicality and discounting prices, it is questionable whether these strategies will be effective or sustainable in the long-term. In this research, we suggest that there are better and more cost-effective ways to market these products. In fact, we identify interventions that may eliminate the need to discount unattractive foods. These interventions are based on a social-cognitive understanding of *why* consumers reject unattractive produce: altered self-perceptions.

Consistent with self-perception theory (Bem 1972) and self-signaling theory (Bodner and Prelec 2003), we propose that choosing or consuming unattractive produce (whether actual or imagined), acts as a self-diagnostic signal that negatively impacts how consumers view themselves, subsequently reducing their valuation of less aesthetically attractive produce. Thus, negative self-perceptions are predicted to explain the low product valuations that consumers place on less aesthetically attractive produce, driving consumers' diminished choice, purchase, and willingness to pay, because imagined consumption of unattractive produce leads consumers to make negative inferences about the self.

Supporting our predictions, results from four experiments demonstrate that consumers systematically devalue unattractive produce because of altered self-perceptions. We demonstrate the causal influence of negative self-perceptions in this process across several different produce types and stimuli using numerous variations in study design (e.g., hypothetical and consequential outcomes; lab, online, and retail contexts). Moreover, we show that consumers' devaluation of unattractive produce manifests in multiple types of managerially-relevant variables: WTP (Studies 1, 2, 3), purchase intentions (Study 1), and product choice (Study 4). We additionally identified two managerially-relevant methods for effectively counteracting the adverse impact of unattractive produce on negative self-perceptions: reducing the diagnostic value of the self-signal (Study 2) and preserving self-perceptions by boosting consumers' self-esteem (Studies 3 and 4).

Theoretical Implications

This research offers several theoretical contributions. Chiefly, we identify a novel psychological mechanism driving consumers' diminished willingness to pay for unattractive food—altered self-perceptions. Imagined consumption of unattractive produce conveys self-diagnostic information that negatively shapes consumers' self-perceptions, causing consumers to

devalue the produce compared to equally safe, but more attractive, alternatives. In identifying this novel process mechanism, we contribute to the growing literature in marketing examining the implications of self-perceptions and self-signaling (Dhar and Wertenbroch 2012; Savary, Goldsmith, and Dhar 2015; Summers, Smith, and Reczek 2016). Within the marketing field, substantially more work has examined the inferences others make about a person's behavior (i.e., social inferences) than the inferences a person makes about their own behavior (i.e., self-inferences). Thus, our treatment of imagined consumption of unattractive produce as a self-diagnostic cue adds to work demonstrating the powerful effects of self-signaling. While previous work has shown that choosing an activity can serve as a self-signal or receiving an ad (that is based on previous behavior) can serve as a self-signal, the current work contributes by demonstrating that just imagining consuming a product can also serve as a self-signal.

The current paper also contributes to the literature on food waste. As awareness and relevance of social and financial issues surrounding food waste has gained increasing public prominence, food waste is shifting from being a historically neglected research topic among marketing scholars to a contemporary concern. Indeed, there have been repeated, urgent calls for academic marketing research to address issues of food waste (Block et al. 2017; Porpino 2016). Although there is a burgeoning literature examining factors that contribute to individual consumer disposal behavior (Haws et al. 2012; Williamson et al. 2016; Winterich, Reczek, and Irwin 2017), there remains an extremely limited amount of research examining the psychological processes underlying consumer waste behavior, particularly at the retail point of sale and consumer acquisition stages (Block et al. 2017; see Sen and Block 2009 for a notable exception). Therefore, by focusing on the consumer psychological process at the point of consumer produce acquisition, our paper directly addresses this void in the literature.

Furthermore, we also contribute to literature on product aesthetic design, which has received limited academic attention and has overwhelmingly focused on non-ingestible products (Landwehr et al. 2011; Landwehr, Wentzel, and Herrmann 2013; Liu et al. 2017). Despite research suggesting the "aesthetic premium" likely extends to food products (Hurling and Shepherd 2003; Loebnitz, Schuitema, and Grunert 2015), work in the domain of product aesthetics and product design has mostly not expanded its concepts to ingestible products (Wu et al. 2017 is a notable exception) other than to explore food packaging (e.g., Deng and Srinivasan 2013). Our research is also the first to focus on food that is created through a natural growth process (that can occur without human or machine assistance). Thus, we contribute to research on aesthetic design by considering the implications for a new class of products.

Implications for Managers and Public Policy Makers

In addition to offering several theoretical contributions, this research also has many important practical marketing implications. Based on our findings, retailer interventions for encouraging consumer purchase and choice of unattractive produce should consider the influence on consumer self-perceptions and consider incorporating elements that can offset the adverse effects of the negative inferences shoppers make about the self when considering unattractive produce. Our findings suggest that retailers could display in-store advertising messages that raise consumers' self-esteem. Not only did a variant of this intervention increase real willingness to pay for unattractive produce (Study 3), in-store advertising with self-esteem-enhancing messaging increased real choice of unattractive produce among real shoppers in an experiment conducted in a retail field context (Study 4).

As an alternative approach, our findings also suggest that there is the potential for retailers to display in-store advertising designed to weaken the tendency for shoppers to make

inferences about the self from their behavior. For example, retailers' messaging can supply consumers with reasons to purchase unattractive produce that are not self-diagnostic; tactics that, although not directly tested, are theoretically supported by the results from Study 2. Thus, the deeper understanding of the produce devaluation process generated by our experimental studies has allowed us to generate managerial interventions that are relatively affordable and easy-to-implement at the point of retail purchase. Importantly for retailers, none of these interventions necessitate discounting unattractive produce, a commonly used approach at present.

Retailers can therefore use these strategies to protect their bottom lines when they have unattractive produce in their inventory. This is particularly evident for the intervention strategy aimed at boosting self-esteem. This strategy increased people's real willingness to pay for unattractive produce by 22.4% in Study 3, thereby effectively equalizing consumers' valuation of the unattractive and attractive produce (Study 3). Furthermore, revenue estimates derived from shoppers' produce decisions in our experiment in-the-field (Study 4) indicated greater revenue was generated when the intervention was implemented than when it was not – between 6.5% and 19.4% more, depending on the degree to which the retailer was previously discounting unattractive produce.

Additionally, this research may contribute to efforts aimed at reducing food waste. The negative self-perception process evidenced in this paper contributes to food waste by discouraging consumers' willingness to purchase unattractive (but edible) produce, which contributes to the likelihood that farmers or retailers dispose of this produce. We, however, identify ways to this process and increase consumers' willingness to pay for such foods. The potential to avoid revenue loss using such easy to implement, light-touch interventions may encourage additional retailers to (successfully) sell unattractive produce. Given that only a

limited number of retailers currently offer consumers unattractive foods, widespread adoption could have the potential to markedly reduce retailers' food waste. Public policy makers interested in reducing food waste may also consider the use of similar strategies to those we have identified in public service announcements either designed to encourage consumers to choose and consume unattractive produce or to encourage producers and retailers not to discard it.

Limitations and Future Research Directions

One question to consider moving forward is whether the presence of a discount interacts with produce appearance to influence consumer responses. While we limited our focus to non-discounted products, discounted produce that is also unattractive may send a doubly-negative signal to the self, as both the discount and the unattractive nature of the produce suggest low value. However, it is also possible that a discount, by providing an external justification for considering unattractive produce, reduces the diagnosticity of the unattractive produce's signal. If this is the case, then some level of discount could protect consumers from ugly food's negative self-perception effects.

More broadly, future research could also consider the other strategies that the store owners in our survey mentioned using to sell unattractive produce (e.g., repurposing produce to use in prepared foods; see Table 1) and foods with other types of deficiencies beyond physical imperfections. For example, future research could address when different strategies (e.g., discounting, product re-purposing, utilizing advertising) are best received by consumers across different product categories (e.g., produce, canned goods) and across different types of "problematic" food products (e.g., physical imperfections, brand scandals). Researchers could explore how different types of strategies are received by consumers depending on when the messaging is deployed (e.g., coupons, discounts, advertising received prior to shopping vs. when

entering the store prior to developing a consideration set vs. at point of purchase). Furthermore, future research could investigate the longevity and strength of different forms of messages that could influence consumer's behavior (e.g., self-esteem, informational, pro-social).

Finally, future research could explore whether the negative self-perception process we uncover generalizes to the devaluation of unattractive products in other product categories. To begin to examine the generalizability of our effect beyond the produce aisle and encourage future research in this space, we ran a small pilot study on Amazon Mechanical Turk (n = 135, M_{age} = 21 years, 53% women) testing whether the mediating effect of negative self-perceptions held for consumer-packaged goods. Results showed that participants who imagined consuming food from a slightly dented (vs. undented) can of chickpeas experienced more negative self-perceptions (*p* = .06), which subsequently lowered their product purchase intentions (CI_{95}[.05, 1.00]). These results support the possibility that self-perceptions may influence purchase behavior outside of the fresh produce domain.

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Table 1: Store Owner Survey Items, Scales, and Results

Survey Item	Scale/Answers	Mean (or % Responded)	St. Dev
Do you end up having to waste any of your produce because consumers will not purchase it due to it having an aesthetically unattractive appearance?	1 = Not at all – 6 = All the Time	3.91	1.25
Do you find customers avoiding aesthetically unattractive items from the produce section?	1 = Not at all – 6 = All the Time	4.34	1.03
How much does your store struggle with encouraging customers to purchase unattractive produce?	1 = Not at all – 5 = A Great Deal	3.45	1.21
How much do you think your store loses in sales avoiding aesthetically unattractive items from the produce section?	1 = Not at all – 5 = A Great Deal	2.86	.93
How confident are you that your approach is the best solution to handling the issue of getting customers to purchase aesthetically unattractive produce?	1 = Not at all – 5 = A Great Deal	1.93	1.19
If you find yourself with aesthetically unattractive produce that you need to sell, what do you end up doing with the produce? Choose all that apply. • We try to sell the ugly produce by mixing it in with the more attractive produce • We eventually throw out any produce that ends up not purchased • We re-purpose the produce into things like prepared foods and juices • We provide discounts to sell the produce (Please provide % discount you use) • We try to only purchase attractive produce to begin with from our suppliers so this is not an issue • We separate the ugly produce from the attractive produce and place in different sections of the store • We use advertising/digital displays to encourage purchase of ugly produce • Other (please explain) _____	1 = Checked 0 = Not Checked	11.4% 34.1% 20.5% 34.1% (45% discount) 43% 2.3% 0% Other: 11.4%	
If you were going to sell aesthetically unattractive produce at a discount, to what % do you believe the produce needs to be discounted (from 0% to 100%)?	_____%	44.55%	13.68%
If your customers are avoiding aesthetically unattractive produce, why do you think they are doing so? • Concerns about safety of the produce • Concerns about quality of the produce • The produce makes customers feel bad about themselves • Customers just prefer nicer looking produce • Other (Please write in why you think customers do not choose uglier produce)	1 = Strongly Disagree – 7 = Strongly Agree	3.48 5.53 3.00 6.61	1.99 1.78 2.01 .65
We are currently in the process of coming up with campaigns/advertisements to increase purchase of aesthetically unattractive produce in stores. Below please let us know how effective you believe each strategy would be in encouraging customers to purchase aesthetically unattractive produce. • An appeal based in morals • A pro-social/environment appeal • An appeal that makes people feel good about themselves • An appeal that reframes an aesthetically unattractive appearance to be seen as positive • An informational appeal about food waste • Other (please explain)	1 = Not at all effective – 5 = Extremely effective	3.40 3.71 3.73 3.29 3.57	.86 .81 .98 1.35 1.17

Table 2: Moderated Mediation (Diagnostic Value Moderator; Study 2)

	M (Neg Self-Perceptions)				Y (WTP)			
Antecedent	Coeff.	SE	*T*	*p*	Coeff.	SE	*t*	*p*
X (Produce Attractiveness)	-.2421	.0550	-4.3983	<.0001	.2400	.0936	2.5636	.0110
M (Neg Self-Perceptions)	---	---	---	---	-.3865	.1042	-3.7081	.0003
W (Diagnostic Value)	-.1193	.0550	-2.1666	.0312	.2218	.0910	2.7256	.0068
Produce Attractiveness* Diagnostic Value	.1226	.0550	2.2275	.0268	-.1437	.0911	-1.7628	.0790
Constant	1.5897	.0550	28.8816	<.0001	3.8581	.1886	20.4517	<.0001
Model Summary	R^2 = .0978 F(3, 297) = 8.9216, p < .0001				R^2 = .1131 F(4, 296) = 7.8412, p < .0001			

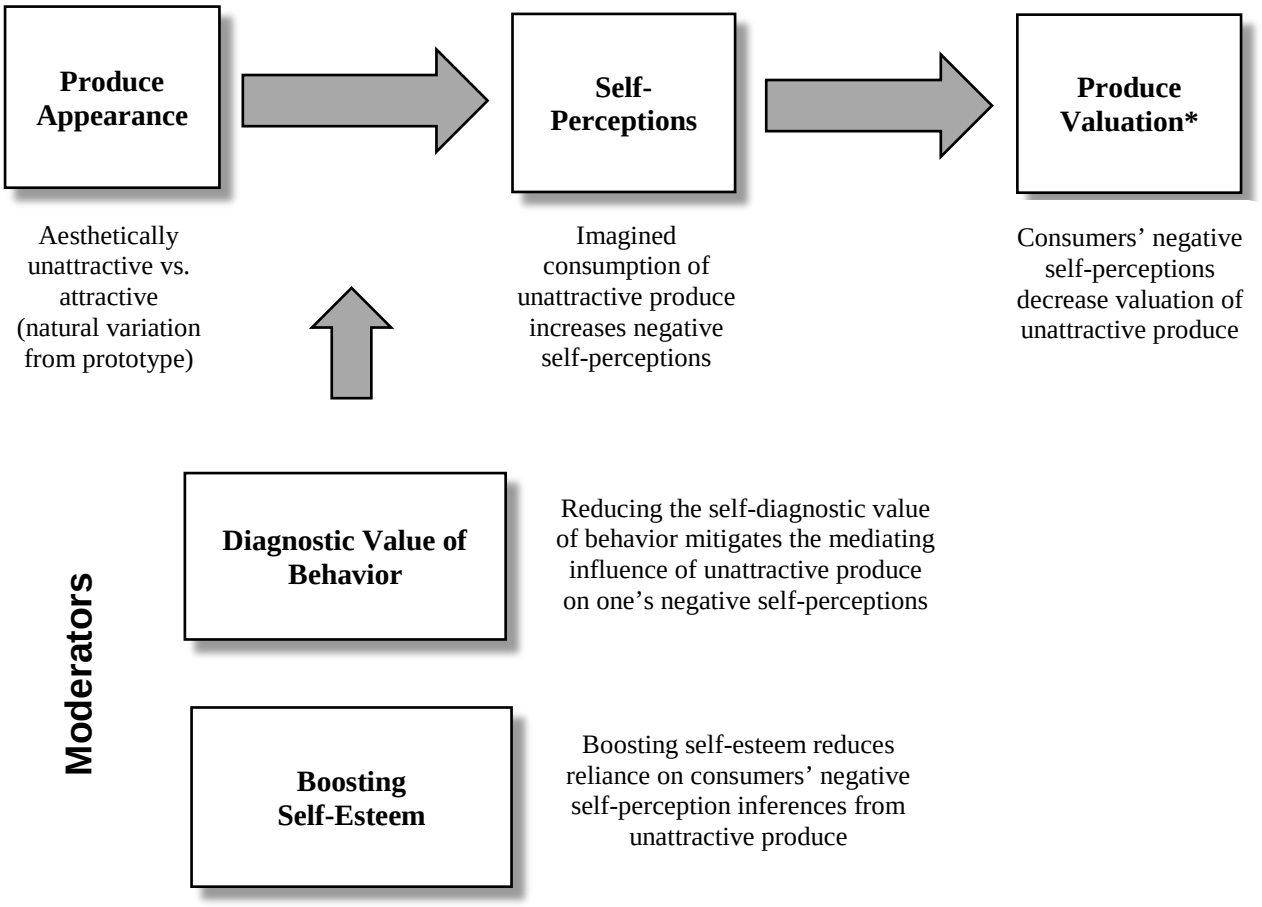
Table 3: Moderated Mediation (Self-Esteem Moderator; Study 3)

	M (Neg Self-Perceptions)				Y (WTP)			
Antecedent	Coeff.	SE	*t*	*p*	Coeff.	SE	*t*	*p*
X (Produce Attractiveness)	-.1204	.0506	-2.3807	.0183	.0700	.0653	1.0726	.2848
M (Neg Self-Perceptions)	---	---	---	---	-.1009	.0458	-2.2012	.0290
W (Self-Esteem)	-.0572	.0506	-1.1317	.2592	.0704	.0453	1.5543	.1218
Produce Attractiveness* Self-Esteem	.1029	.0506	2.0358	.0432	-.1012	.0457	-2.2172	.0278
Constant	2.6505	.0506	52.4198	<.0001	1.5006	.1789	8.3887	<.0001
Model Summary	R^2 = .0562 F(3, 187) = 3.7135, p = .0126				R^2 = .0601 F(4, 186) = 2.9717, p =.0207			

Table 4: Potential Revenue Implications (Study 4)

Retailer Promotion (on Unattractive Produce)	% Difference in Revenue (Boosting vs. Control)	Revenue Impact of Self-Esteem Boosting Ad:
No Discount	+ 19.44%	↑
30% Discount	+ 12.58%	↑
50% Discount	+ 6.48%	↑

Figure 1: Conceptual Framework



*Produce Valuation: Measured as willingness to pay (Studies 1, 2, 3, 4), purchase intentions (Study 1), and real choice (Study 4)

Figure 2: Stimuli Across Studies

Study	Attractive or Control Stimuli	Unattractive Stimuli
1	 	 
2		
3		
4 (Manipulation Stimuli)	 “Pick Ugly Produce”	 “You are Fantastic! Pick Ugly Produce”
4 Choice Stimuli (Prototype of Apples Seen)		

Appendix: Study In-store Set-up

Examples of in-store signage

Control Condition

Self-esteem Boosting Condition

Example of shoppers completing survey