

“Ugly Bundling” Increase Purchase of Unattractive Produce

Short Abstract:

Every day, food producers and retailers discard a significant amount of perfectly edible fruits and vegetables that do not meet appearance standards within the food supply chain, contributing to food waste. We examine an easy-to-implement solution to this type of retail food waste: an "ugly" bundling, where multiple types of unattractive produce are sold in a single package rather than individually. Across two online experimental studies, we demonstrate that "ugly" bundling increases the purchase likelihood of unattractive produce. We also show that consumers do not expect discounts for ugly bundling, offering additional commercial incentives. This research provides a clear managerial recommendation on the product packaging format for unattractive produce while addressing the issue of food waste within the food distribution system.

Keywords: Food waste, Product packaging, Ugly food

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Introduction and Theoretical Background

One estimate suggests that U.S. retailers discard more than \$15 billion of edible produce each year (Buzby, Farah-Wells, and Hyman 2014), and 30% of food discarded by food producers is attributed to not meeting cosmetic standards (Berkenkamp and Meehan 2016). Not only does this cause significant economic losses, but it also generates additional environmental impacts.

To address this type of food loss, the literature suggests factors that can increase acceptance of cosmetically imperfect produce by consumers. This includes anthropomorphizing imperfect produce (Cooremans and Geuens 2019; Shao et al. 2020), marketing message framing (Grewal et al. 2019; Mookerjee et al. 2021), reduced pricing (Aschemann-Witzel et al. 2017), and presentation of the product (Chung and Li 2013; Qi et al. 2022). Most relevant to the present research is the presentation of the products, i.e., where and how unattractive produce is presented to consumers (Wolf, Spittler, and Ahern 2005). Some researchers suggest that displaying unattractive produce alongside "normal" looking alternatives increases consumption of unattractive produce (Chung and Li 2013), while others suggest that separate presentation leads to greater consumption of unattractive produce (Jaeger et al. 2018). More recently, Qi et al. (2022) proposed that mixing ugly produce with standard produce in a single package can encourage consumption of unattractive produce by reducing perceived ugliness of the target produce.

This research proposes an alternative packaging solution to retail food loss by investigating the effect of mixing multiple unattractive produce in a single package (what we call "ugly bundling") in increasing consumption of unattractive produce. This investigation offers implications on whether unattractive produce should be sold separately or mixed with other unattractive produce in a bundle format.

Study 1

Study 1 tests the effect of "ugly" bundling in increasing the choice likelihood of unattractive produce relative to an attractive alternative. Our stimuli include photos of attractive and unattractive carrots and potatoes. Fifty CloudResearch participants rated the unattractive carrots ($M_{\text{attractive}} = 6.10$, $SD = .84$ vs. $M_{\text{unattractive}} = 2.74$, $SD = 1.34$; $p < .001$) and potatoes ($M_{\text{attractive}} = 4.58$, $SD = 1.16$ vs. $M_{\text{unattractive}} = 2.22$, $SD = 1.11$; $p < .001$) as less beautiful than the attractive ones.

Method: The participants ($n = 301$) were randomly assigned to one of three between-subjects conditions: produce A (carrots) only, produce B (potatoes) only, or produce A+B bundle. First, participants were shown photos of packaged products of attractive and unattractive produce. Across conditions, the attractive product was called "Type A" and priced at \$1.49 per pound, and the unattractive product was called "Type B" and priced at \$1.12 per pound. Our manipulation was single-item versus multi-item bundle packaging. Participants evaluated the products and indicated which produce they would choose to purchase on a binary choice measure (0 = Type A, 1 = Type B). Next, participants completed demographic questions and attention check questions.

Results: We removed responses that failed attention check questions ($n = 17$), which resulted in a final sample of 284 participants (48.4% female; $M_{\text{age}} = 36.68$, $SD = 12.42$).

Choice likelihood. To examine the effect of multi-item bundle (vs. single-item) packaging of unattractive produce, we recoded the condition variable into binary categories (0 = single-item package, 1 = multi-item bundle package), which resulted in an imbalanced sample size across the two conditions. Therefore, we conducted weighted binary logistic regression. The results

indicated that the multi-item bundle (vs. merged single-item) packaging leads to a higher likelihood of choosing unattractive produce over the attractive alternative (bundle package = 28.9% vs. single-item package = 19.7%, $B = .51$, $p = .07$).

Study 2

Study 2 aims to replicate the findings of Study 1 using a different produce category and examines a potential underlying mechanism (i.e., enhanced product appearance) of the “ugly” bundling effect. Given the industry-wide practice of selling bundled products at a discounted price (Mookerjee et al. 2021; Janiszewski and Cunha 2004), we also tested whether consumers expect a deeper discount of unattractive produce when they are offered in a bundled format than in the non-bundled (single-item) format. To this aim, we measured participants' expected discount rate for the unattractive product (i.e., “How much of a price discount (%) would you expect for this product relative to the same product in normal-looking condition?”). We expect no difference in participants' expectation of a price discount across the two conditions. This is because bundling unattractive produce may increase the attractiveness of the product, thus mitigating the normative perception of the bundle-price relationship.

Method: The participants ($n = 150$; 51.0% female; $M_{\text{age}} = 38.17$, $SD = 10.52$) were randomly assigned to one of the three between-subjects conditions: produce A (apple) only, produce B (pear) only, or produce A+B bundle. First, participants were shown photos of packaged products of unattractive produce. Participants then indicated their intentions to purchase (i.e., likely to purchase, willingness to purchase; $r = .96$) the product and how much of a price discount (%) they expect for the product. Next, participants rated the appearance of the product (i.e., attractive, appeal, likable, bad/good; $\alpha = .96$) on a seven-point scale. Lastly, participants completed demographic questions and attention check questions.

Results:

Purchase intentions. As in Study 1, we recoded the condition variable into binary categories (0 = single-item package, 1 = multi-item bundle package). We conducted independent samples t-test using the weighted data. The results show that participants in the multi-item bundle condition indicated significantly higher purchase intention as compared to the merged single-item condition ($M_{\text{multi-item bundle}} = 4.85$, $SD = 1.79$ vs. $M_{\text{single-item}} = 4.20$, $SD = 2.08$; $t(144.72) = 2.07$, $p = .040$).

Expected price discount (%). As expected, the expected price discount was not differ between bundled and single-item package conditions ($M_{\text{multi-item bundle}} = 25.90$, $SD = 15.91$ vs. $M_{\text{single-item}} = 27.92$, $SD = 16.41$; $t(148) = -.77$, $p = .445$).

Product appearance. The product appearance evaluation was not differ between the two conditions ($M_{\text{multi-item bundle}} = 4.05$, $SD = 1.47$ vs. $M_{\text{single-item}} = 3.72$, $SD = 1.66$; $t(148) = 1.30$, $p = .195$).

Implications for Theory and Practice

Our findings demonstrate the effectiveness of “ugly” bundling across different categories of unattractive produce. Building on prior work on how the presentation of unattractive produce influences their acceptance, our research offers an alternative easy-to-implement packaging solution to retail food waste. Our work also adds to research examining how visible aesthetics can be influenced by the presentation of unattractive products (e.g., Qi et al., 2022). In terms of managerial implications, our findings provide clear guidance to retailers on how to present unattractive produce using a packaging design.

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