Gerecht, Svenja; Eckmann, Lisa; Wentzel, Daniel; Landwehr, Jan R.

Anthropomorphic Sad Expressions Reduce Waste of "Single" Imperfect Food

Psychology & Marketing

Provided in Cooperation with:
John Wiley & Sons

Suggested Citation: Gerecht, Svenja; Eckmann, Lisa; Wentzel, Daniel; Landwehr, Jan R. (2024) : Anthropomorphic Sad Expressions Reduce Waste of "Single" Imperfect Food, Psychology & Marketing, ISSN 1520-6793, Wiley, Hoboken, NJ, Vol. 42, Iss. 3, pp. 669-683, https://doi.org/10.1002/mar.22145

Psychology & Marketing

WILEY

RESEARCH ARTICLE OPEN ACCESS

Anthropomorphic Sad Expressions Reduce Waste of "Single" Imperfect Food

Svenja Gerecht[1] | Lisa Eckmann[2] | Daniel Wentzel[1] | Jan R. Landwehr[2]

[1]School of Business and Economics, RWTH Aachen University, Aachen, Germany | [2]Faculty of Economics and Business, Goethe University Frankfurt, Frankfurt am Main, Germany

Correspondence: Lisa Eckmann (le508@bath.ac.uk)

Received: 6 February 2024 | **Revised:** 11 October 2024 | **Accepted:** 12 October 2024

Keywords: anthropomorphism | emotional expressions | food waste | imperfect food | point-of-sale communication

ABSTRACT

Point-of-sale anthropomorphism—attributing human characteristics to nonhuman entities—has been shown to increase evaluations of food that deviates in shape or form from consumer expectations ("imperfect food"). However, while previous research has included the use of primary emotions to manipulate anthropomorphism, it is unclear whether depicting imperfect produce with happy or sad emotional expressions is more effective in boosting choice of such produce. This research addresses this gap and additionally examines a novel type of imperfection: when produce is torn off the bunch it normally comes in. A field study conducted at a large food retailer in Germany revealed that sales of "single" bananas significantly increased when they were anthropomorphized with sad emotions compared to when they were anthropomorphized with happy emotions or not anthropomorphized. Across three preregistered online experiments, this research corroborates the effectiveness of sad emotional expressions in boosting purchase intentions, establishes compassion as the underlying process, generalizes this effect to other produce (i.e., tomatoes), and shows that a price discount eliminates this effect. The findings of this research are particularly relevant for food retailers aiming to increase purchases, and thus reduce waste, of fresh produce that has become a loose "single."

1 | Introduction

According to the UNEP Food Waste Index 2024, more than 1.05 billion tons of food are wasted globally (UN Environment Programme 2024)—by 2030, this number is projected to double to 2.1 billion tons (BCG 2024). Currently, 131 million tons occur in the retail sector alone (UN Environment Programme 2024). In industrialized nations, this waste mainly results from trade norms and picky consumer preferences concerning the flawless appearance of fresh produce (FAO 2019).

In light of these numbers, a substantial body of research has emerged that examines how to increase consumer acceptance of imperfect produce. The current literature conceptualizes imperfect food predominantly as fruits or vegetables that deviate in shape or color from prototypical produce yet are equally tasty, nutritious, and safe to consume (Grewal et al. 2019; Mookerjee, Cornil, and Hoegg 2021). Accordingly, previous studies have focused on objective esthetic flaws such as shape deformations or reduced freshness (e.g., misshaped potatoes, weathered cucumbers).

This research examines a novel type of imperfection that has so far been overlooked by the current literature: when the produce has been torn off the bunch it normally comes in (e.g., bunched bananas, tomatoes on the vine) and thus deviates from consumer expectations regarding the presentation of produce at the point of sale. For instance, single bananas have been shown to account for the highest amount both of climate impact and of

The first two authors contributed equally to this study.

food wasted at retailers (Mattsson, Williams, and Berghel 2018). Specifically, single bananas are much more likely to be discarded than their bunched counterparts if they are not sold by the end of the day such that current food waste avoidance practices explicitly list single bananas as a source of avoidable food waste (BCG 2024; EcoWorlder 2022; Rees 2023).

Independent of the produce in question, one stream of literature has focused on anthropomorphism—ascribing human characteristics to nonhuman agents—as a potential solution for mitigating consumer rejection of imperfect food. These studies found positive effects of various forms of anthropomorphism on the evaluation and choice of imperfect food, including adding facial elements (Shao et al. 2020, 2021; Walsh and Darriet 2020), reframing deformations as body parts (Cooremans and Geuens 2019), or mimicking human behavior (Koo, Oh, and Patrick 2019).

Most relevant to the present research is prior work that has examined emotional expressions as a form of anthropomorphism. Existing studies have focused on the effect of depicting happy (T. Chen et al. 2021; Cooremans and Geuens 2019) or sad (Mukherjee, Mukherjee, and Iyer 2021) emotional expressions on imperfect produce. While happiness and sadness induce different affective and behavioral responses and have been shown to differ in effectiveness when used in marketing messaging in other domains (Ketron and Naletelich 2019; Small and Verrochi 2009), the current imperfect food literature lacks a direct comparison of the effectiveness of these emotions. Yet, the attributed capacity to experience emotions is a powerful indicator of perceived humanness, which warrants further investigation into the differential effects of happiness and sadness as primary emotions in anthropomorphism research. This research seeks to fill this research gap by explicitly comparing the effectiveness of happy and sad emotional expressions on anthropomorphized single produce in boosting choice of such produce.

Our work has direct practical implications. Among different anthropomorphism forms, endowing imperfect produce with emotions via facial expressions is easily viable for many produce categories, making it an impactful yet cost-effective intervention. Hence, generating insights into which emotion is most effective in boosting choice of single produce is highly relevant from a managerial perspective. Importantly, our work also shows how anthropomorphizing such produce interacts with another strategy typically used to promote such produce—price discounts—thereby providing retailers with clear guidelines on how to effectively communicate at the point of sale.

2 | Theoretical Background

2.1 | Anthropomorphism in Imperfect Food

Anthropomorphism means imbuing "nonhuman agents with humanlike characteristics, motivations, intentions, or emotions" (Epley, Waytz, and Cacioppo 2007, p. 864), allowing individuals to draw on their knowledge regarding human agents to interpret and make sense of a nonhuman target (Epley, Waytz, and Cacioppo 2007). For instance, seeing a "face" in a nonhuman object allows individuals to evaluate it as if they would evaluate a human's face. Marketers intentionally incorporate anthropomorphism into their products to help consumers establish a humanlike connection with the product. While any type of anthropomorphism that involves some human component is conceivable, studied types include letting a product speak, letting a product engage in human behavior, or giving a product a facial expression, which have been found to positively influence product evaluations (Aggarwal and McGill 2007), brand liking (Delbaere, McQuarrie, and Phillips 2011), and product sales (Landwehr, McGill, and Herrmann 2011), respectively.

In the context of sustainability, anthropomorphism has not only been shown to positively influence environmental conservation behaviors such as resource use, product replacement, and recycling (Ahn, Kim, and Aggarwal 2014; Chandler and Schwarz 2010; Ketron and Naletelich 2019; Wu, Malter, and Johar 2023) but also to enhance evaluations and choice of imperfect produce—produce that deviates in appearance from what consumers consider typical. Similar to research on imperfect food in general (e.g., Grewal et al. 2019; Mookerjee, Cornil, and Hoegg 2021), existing studies in the domain of anthropomorphism have focused primarily on shape abnormalities or reduced freshness (see Table 1 for an overview) as manifestations of imperfections. In particular, these studies found positive effects on purchase intention, willingness-to-pay, and product evaluations of such produce from a range of different anthropomorphism forms, including presenting oddly shaped fruit and vegetables with a humanlike smile (T. Chen et al. 2021) or sad facial features (Mukherjee, Mukherjee, and Iyer 2021), framing shape abnormalities as body parts (Cooremans and Geuens 2019), arranging old produce to resemble a human face or imitating human behavior (Koo, Oh, and Patrick 2019), and adding eyes as human facial features (Shao et al. 2020, 2021; Walsh and Darriet 2020).

We aim to add to this body of literature by examining "singleness" as another, currently understudied manifestation of imperfect produce. Specifically, we call fresh produce "single" when it is torn off the bunch it originally comes in and is usually presented in (e.g., bunched bananas, tomatoes on the vine) and conceptualize it as imperfect as it deviates from consumer expectations regarding how it should be presented at the point of sale (i.e., in its original bunched state). Studying such single produce is particularly relevant in the context of anthropomorphism as separation from peers reflects a fundamental human concern (Baumeister and Leary 1995).

2.2 | Emotional Expressions

While the previously discussed body of research contributes to our understanding of the effectiveness of different forms of anthropomorphism, the impact of different emotions conveyed through anthropomorphism has received less attention. Signaling emotions and interpreting emotional expressions shape everyday social interactions. The face is considered the main nonverbal medium for communicating emotions and the

TABLE 1 | Overview of studies on anthropomorphism in selling imperfect produce (IP).

Research	Stimuli	Independent variable	Anthropomorphism through …	Dependent variable(s)	Process	Moderator	Study type	Key results
T. Chen et al. (2021)	Typical/ misshapen potatoes/ carrots/ apples	Anthropomorphism, type of anthropomorphism	Happy face, text	Purchase intention	Empathy	Product popularity	Online	Anthropomorphizing IP evokes consumer empathy due to rejection. Empathy increases acceptance and purchases of IP. Product popularity weakens the effect.
Cooremans and Geuens (2019)	Typical/ misshapen carrot/ tomato/ cucumber	Product type (typical/ imperfect), anthropomorphism	Happy face, adding "body parts"	Purchase intention, choice, willingness-to-pay	Positive affective reactions, taste perceptions	Environmental concern	Lab, online	Due to positive affective reactions that enhance taste perceptions, anthropomorphizing IP leads to higher purchase intentions and choice. This effect is weaker for consumers high on environmental concerns.
Koo, Oh, and Patrick (2019)	Fresh/ weathered/ spotted cucumber/ banana/zuc-chini	(Im)perfection, anthropomorphism	Arranging elements to resemble neutral human face, IP engaging in typical human behavior (sunbathing)	Produce evaluation	Feelings of warmth	Lay beliefs about aging	Lab, online	Anthropomorphizing old produce increases evaluation due to enhanced feelings of warmth, contingent on "old is gold" beliefs.
Mukherjee, Mukherjee, and Iyer (2021) (Study 2)	"An assortment of both fruits and vegetables"	(Im)perfection, anthropomorphism	"sad faces that mimic human facial features"	Purchase intention, retailer patronage intention	Feelings of embarrassment	—	Online	Anthropomorphism increases purchase intention and retailer patronage intention due to decreased feelings of embarrassment when purchasing IP.
Shao et al. (2020)	Misshaped potato	Anthropomorphism	Eyes, neutral beak, hat, text	Purchase intention	—	Temporal distance, message framing	Online	Anthropomorphism increases purchase intention towards IP. Gain-framed messages are more effective when set in the distant future,

(Continues)

TABLE 1 | (Continued)

Research	Stimuli	Independent variable	Anthropomorphism through …	Dependent variable(s)	Process	Moderator	Study type	Key results
								while loss-framed messages are more effective when described in the near future.
Shao, Jeong, and Jang (2021)	Misshaped potato	Anthropomorphism	Eyes, neutral beak, hat, text	Purchase intention	—	Gender, age	Online	In the younger age group, female consumers' purchase intention towards IP is positively influenced by anthropomorphism while men's is not. The positive effect applies to both genders in the older age group.
Walsh and Darriet (2020)	Misshaped lemon	Anthropomorphism	Googly eyes	Willingness-to-pay	—	—	Online	Participants were willing to pay more for oddly shaped lemons in the anthropomorphized/whimsical condition compared to those in the control condition.
This research	Single/bunched bananas/tomatoes	Anthropomorphized facial expression/emotion	Happy versus sad face, text	Choice	Compassion	Price discount, cognitive load	Field, online	Anthropomorphized sadness is more effective in driving consumers' choice of single IP than happiness or no anthropomorphism. The effect (sad vs. happy) is mediated by compassion and eliminated in the presence of a price discount (sad vs. control).

literature has particularly focused on studying primary emotions (e.g., happiness and sadness), which are universally conveyed through distinct facial expressions (Keltner et al. 2003). Importantly, previous work has found that the capacity to experience emotions (e.g., joy) has a stronger effect on people's perception of what it means to have a mind—and thus, be human—than the capacity to act (e.g., planning; Gray, Gray, and Wegner 2007). Hence, studying conveyed emotions (e.g., via "facial" expressions) is directly relevant in the context of anthropomorphism.

However, recent research on anthropomorphizing imperfect produce has either not used specific emotions (Koo, Oh, and Patrick 2019; Shao et al. 2020, 2021; Walsh and Darriet 2020), used happy expressions only (T. Chen et al. 2021; Cooremans and Geuens 2019), or used sad expressions only (Mukherjee, Mukherjee, and Iyer 2021). To our knowledge, no prior research has explicitly tested whether conveying happy or sad emotional expressions is more effective in increasing consumer choice of imperfect food. Yet, a direct comparison of the effect of happy and sad emotional expressions seems highly relevant in this context, as the primary emotions of happiness and sadness can be understood as opposites (Feldman Barrett and Russell 1998) and are thus likely to evoke different affective and behavioral responses.

Specifically, we propose that the extent to which anthropomorphism affects consumer preferences for single produce is stronger for sad than for happy emotions. Overall, previous research has demonstrated that conveying sad emotions is effective in increasing message compliance across various domains, including prosocial behavior (Bagozzi and Moore 1994), environmental conservation (Ahn, Kim, and Aggarwal 2014; Ketron and Naletelich 2019), and food choices (Choueiki, Geuens, and Vermeir 2021). More importantly, there is empirical evidence that conveying sadness is more effective in direct comparison with conveying happiness. For instance, Small and Verrochi (2009) showed that donation appeals were more effective when the victims portrayed in these appeals exhibited sad rather than happy emotions. Additionally, Ketron and Naletelich (2019) tested happy and sad anthropomorphic cues and, while finding no differences between the emotions themselves, uncovered that consumers are more likely to comply with environmental appeals when being exposed to sad versus no anthropomorphic cues in the decision context. Similarly, a product featuring a sad expression may instill an urge to save the product from its "misery," leading to a higher purchase likelihood. Conversely, a product with a happy expression may be perceived as being content in its context. As a result, consumers are less likely to experience a need for action and may thus be less inclined to buy that product. Hence,

H1. *Depicting a sad (vs. happy or no) emotional expression on single produce increases customer choice of that produce.*

2.3 | Mediation by Compassion

As theorized in the previous section, happy and sad emotional expressions on imperfect food should influence consumer behavior differently as they elicit different affective responses. For happy expressions, past research in the domain of imperfect food has shown that imbuing imperfect produce with a smiling "face" leads to higher feelings of warmth compared to when the produce is not anthropomorphized (T. Chen et al. 2021; Cooremans and Geuens 2019). Similarly, Koo, Oh, and Patrick (2019) argue that the effect of anthropomorphizing old produce stems from "sentimental feelings of warmth" (p. 348). Warmth perception is a primary determinant of person perception and evaluation and reflects how well-intentioned, friendly, and trustworthy a person appears (Fiske, Cuddy, and Glick 2007; Wojciszke 2005). Essentially, these studies argue that anthropomorphizing an imperfect product activates a positive human schema, which, in turn, elicits a positive affective reaction (see also Aggarwal and McGill 2007).

For sad expressions, anthropomorphism is likely to lead to feelings distinct from warmth. Witnessing sadness in others is likely to evoke compassionate responses, particularly in the context of social exclusion. The need to belong is one of the most basic human motivations (Baumeister and Leary 1995) such that people perceive being involuntarily separated from peers as aversive. We follow the compassion conceptualization by Goetz, Keltner, and Simon-Thomas (2010) who define compassion as "the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help" (p. 2) and who consider similar constructs such as sympathy, pity, and empathic concern as a family of compassion-related states that share the central desire to alleviate another's suffering. Indeed, prior research has demonstrated that such concern for others is associated with increased helping behavior (e.g., Dovidio, Allen, and Schroeder 1990). Accordingly, consumers exposed to a single produce conveying sadness are likely to experience compassion, which will translate into a desire to ameliorate the product's suffering. As the compassion evoked by sad expressions—in contrast to the warmth evoked by happy expressions—should thus trigger an immediate behavioral impulse to "help" (i.e., buy) the produce, the effect of anthropomorphizing single produce on consumer choice should be stronger for sad expressions than for happy expressions:

H2. *The effect of depicting sad emotional expressions of single produce on choice of such produce is mediated by compassion.*

2.4 | Cognitive Load and Price Discounts as Potential Moderators

Based on our proposed mechanism through compassion, we examined both a consumer-related and a context-related moderator with high practical relevance that might attenuate this process in a shopping context.

We focused on cognitive load as a consumer-related moderator as several studies have documented that the availability of cognitive resources impacts decision-making (e.g., Greene et al. 2008; Hinson, Jameson, and Whitney 2003). According to cognitive load theory (Sweller 2011), the working memory has limited capacity for processing information. When this capacity is exceeded, processing information can become impaired.

Accordingly, consumers' cognitive load might influence the effectiveness of anthropomorphizing imperfect produce at the point of sale.

On the one hand, experiencing compassion in response to a sad product may require sufficient cognitive resources (Goetz, Keltner, and Simon-Thomas 2010), such that the difference between happy and sad expressions may either disappear under high load or reverse given that happy anthropomorphism can be decoded under high cognitive load. On the other hand, consumers might experience a spontaneous, gut-level response (Rameson, Morelli, and Lieberman 2012) when exposed to an imperfect product expressing sadness, suggesting that the effect of sad expressions is robust across different levels of cognitive load. Hence, while we hypothesized that a sad emotion depicted on single produce would increase choice more than a happy emotion under low cognitive load, we did not hypothesize a specific direction of the effect for high cognitive load but specified different possible patterns of results as follows:

H3. *Depicting sad (vs. happy) emotions on anthropomorphized single produce is more effective in increasing customer choice of that produce under low cognitive load. Under high cognitive load, different patterns of effects are theoretically plausible (i.e., sad is more than, less than, or equally effective as happy).*

In addition to examining cognitive load, we focused on price discounts as an external, context-related moderator. Price discounts are the promotional tool most frequently used by marketers (Darke and Chung 2005) and the main strategy to boost sales of imperfect food (Grewal et al. 2019). Hence, it is important to understand how discounts interact with our proposed anthropomorphism intervention. Previous research has demonstrated that introducing price discounts can undermine other interventions targeted at promoting imperfect food by signaling its lower quality (Mookerjee, Cornil, and Hoegg 2021). More importantly, reminders of money have been shown to prime a self-sufficient orientation, making people dislike dependencies and thus less likely to help others (Vohs, Mead, and Goode 2006). Consequently, when the concept of money is activated by the presence of a price discount, consumers should be less susceptible to an emotionalized message asking the consumer to "help" (i.e., buy) an imperfect product. Accordingly, we argue that introducing price discounts should weaken the compassion evoked by sad emotional expressions on imperfect food, making the sad anthropomorphism intervention less effective:

H4. *Depicting sad emotions on anthropomorphized single produce increases customer choice of that produce when no price discount is present. In the presence of a price discount, the effect is mitigated.*

2.5 | Empirical Overview

We conducted four empirical studies (see Figure 1 for our conceptual model). We first test the real-life relevance of our key proposition in a field experiment, where we observe actual purchase behavior (Study 1). We then explore the underlying process via compassion (Study 2) and examine cognitive load and price discount as potential moderators (Studies 3 and 4) in the controlled environment of online experiments. All studies were preregistered and received ethical institutional peer approval. We report the study protocols for our experiments and additional analyses in Supporting Information S1: Appendices A and B, respectively. The data sets, statistical code, and stimuli of all studies are available on the Open Science Framework: https://osf.io/8k6pb/.

3 | Study 1: Field Experiment

Study 1 (preregistered: https://aspredicted.org/t98d-kr74.pdf and https://aspredicted.org/4ddx-rqz9.pdf)[1] was conducted in collaboration with a major German supermarket chain and tested the effect of different emotional expressions in a field setting by observing actual purchase behavior of single bananas.

3.1 | Method

The experiment was conducted on 8 days for 12 h each in two supermarkets of the same chain, yielding 192 h of data collection. In the supermarkets, single bananas are placed in a separate basket next to the bunch bananas. To test how consumers' choices differed across different types of anthropomorphizing,

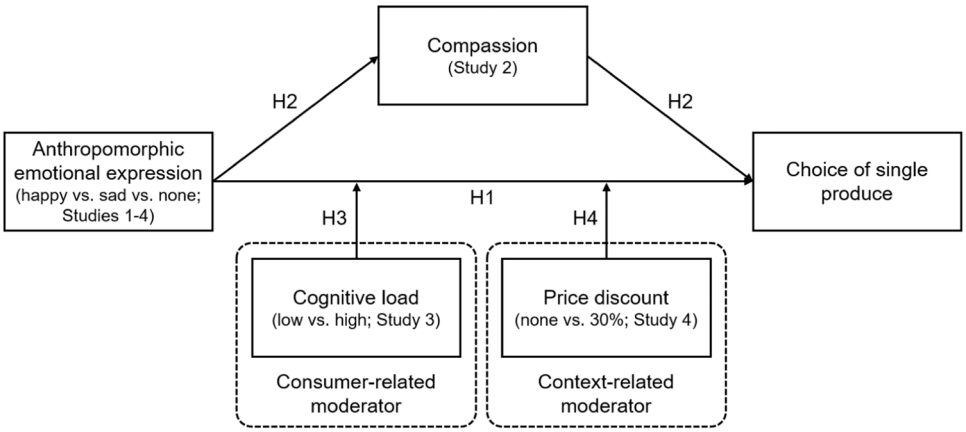

FIGURE 1 | Conceptual model.

we installed three different signs (control, happy, sad) next to these baskets. The two anthropomorphized conditions were based on existing research on facial expressions and emotions (e.g., Bassili 1979; Ekman 1993). In the happy (sad) condition, the sign featured a single banana with a smile (downward-sloped mouth) and the information "We are happy (sad) singles and want to be bought as well." In the control condition, the sign only displayed the non-emotionalized information "Here are single bananas that want to be bought as well." Following Mookerjee, Cornil, and Hoegg (2021), the signs were rotated every hour to minimize weekday and daytime interferences.

When changing the signs, we counted the overall number of single bananas taken (i.e., sold) in the last hour. To keep the number of bananas in the basket constant, the basket was refilled after each counting when required. Additionally, we watched the customers from a hidden spot in the store and recorded whether they chose the single or the bunch bananas and how many single bananas they chose. These three measures (number of single bananas sold in the last hour, binary choice of single bananas per customer, number of single bananas taken per customer) served as our key dependent variables. We also recorded the number of customers passing the banana shelves in each hour and whether other bananas were on sale as control variables. Importantly, the single bananas were not sold at a discount or as the cheapest option available, as this might have implied a lower product quality. Instead, they were sold at 1.99 €/kg (i.e., the same price as organic and branded bunches, and 0.84 €/kg more expensive than the chain's cheapest private label).

3.2 | Results and Discussion

Because the stimuli and rotation scheme were the same across both supermarkets, we pooled the data for analysis. Across the entire timeframe of the study (i.e., 192 1-h time slots), a total of 3,810 customers purchased bananas ($N_{control} = 1226$, $N_{happy} = 1283$, $N_{sad} = 1301$). We had to exclude one time slot (in which 16 customers bought bananas) because the number of purchased single bananas during this time slot was a severe outlier (i.e., five SDs above the mean). This spike was due to a shortage of bunch bananas in one of the branches, thereby driving sales of single bananas. Hence, we do not consider this time slot representative and focus on the remaining 191 time slots and 3794 customers for further analysis. Nevertheless, we also conducted the analysis without excluding this outlier as a robustness check (see Supporting Information S1: Appendix B).

3.2.1 | Number of Single Bananas Sold Per Time Slot

To test whether the number of single bananas sold per hour differed depending on the emotion displayed on the sign, we conducted a one-way ANOVA using the aggregated data on the level of the time slots. As expected, this analysis revealed a significant effect for the experimental manipulation ($F(2, 188) = 3.59$, $p = 0.030$, $\eta^2 = 0.037$). Subsequent planned contrasts revealed a significant difference in sales between the control ($M_{control} = 2.02$, $SD_{control} = 2.31$) and sad condition ($M_{sad} = 3.19$, $SD_{sad} = 3.24$; $p = 0.016$), while there was no significant difference between the control and the happy condition ($M_{happy} = 2.13$, $SD_{happy} = 2.55$; $p = 0.818$). Moreover, the difference between the happy and the sad condition was significant ($p = 0.030$). This pattern of results remains robust when including the number of customers passing the banana shelves, branch, weekday, timeslot, and whether other bananas were on sale as control variables (see Supporting Information S1: Appendix B).

3.2.2 | Choice of Single Bananas Per Customer

We used the disaggregated data, that is, the customers as the unit of analysis ($N = 3{,}794$), and observed whether each customer bought single bananas (= 1) or not (= 0). A χ^2 test indicated a significant difference in the proportion of customers purchasing single bananas across conditions (sad: 7%, happy: 5%, control: 4%; $\chi^2(2) = 10.33$, $p = 0.006$, $\varphi_c = 0.052$) and logistic regressions replicated the finding that the odds of buying single bananas are higher in the sad condition than in the happy condition ($b = 0.38$, $p = 0.025$) and the control condition ($b = 0.53$, $p = 0.003$).

3.2.3 | Number of Single Bananas Taken Per Customer

Again using the customers as the unit of analysis, we conducted a one-way ANOVA with the displayed emotion as the independent variable and the number of single bananas taken as the dependent variable. Again, a significant main effect of emotion is revealed ($F(2, 3791) = 3.28$, $p < 0.038$, $\eta^2 = 0.002$) and contrast analyses indicate significant differences between the sad and the happy conditions ($M_{sad} = 0.16$, $SD_{sad} = 0.66$; $M_{happy} = 0.11$, $SD_{happy} = 0.51$; $p = 0.027$) as well as between the sad and the control condition ($M_{control} = 0.11$, $SD_{control} = 0.57$; $p = 0.027$).

Taken together, we find evidence across all dependent variables that depicting sad emotional expressions on single bananas is more effective in increasing choice of such produce than depicting happy or no emotional expression (H1).

4 | Study 2: Mediation by Compassion

Study 2 (preregistered: https://aspredicted.org/5xqn-47x2.pdf)[2] was an online experiment to examine the process underlying choice of single produce. We hypothesized that the effect of sad anthropomorphism but not that of happy anthropomorphism would be mediated by compassion (H2). As in the field experiment, we used single (vs. bunched) bananas as our stimuli.

4.1 | Method

In total, 754 US CloudResearch participants (49.1% female, 49.9% male, 1.0% other; $M_{age} = 40.88$) completed a one-factorial (product anthropomorphism: control, happy, sad) between-subjects experiment. Participants were shown a picture of a supermarket shelf with single bananas on the left and banana

bunches on the right side (see Figure 2). Apart from being separated from the bunch, the single bananas were not abnormal in terms of shape, color, or size. The displayed signs were similar to those used in Study 1, except that we depicted a non-humanized banana in the control condition to make it more similar to the other conditions and added tears to the sad banana to make the emotion more salient (see Figure 2).

Participants were asked to imagine going to the supermarket intending to buy bananas and to indicate whether they would take bananas from the left (single) or right (bunch) side of the display (1 = definitely from the left side, 6 = definitely from the right side), which served as our dependent variable (reverse-scored such that higher numbers indicated a higher likelihood of choosing single bananas). Next, participants indicated their compassion for the single bananas ("I feel pity towards the bananas," "I feel concern for the bananas," "I feel sympathy towards the bananas"; 1 = not at all, 6 = very much, $\alpha = 0.96$; Jackson and LePine 2003) and responded to our anthropomorphism manipulation check ("How strongly do the bananas on the left side remind you of a human being?"; "How strongly do the bananas on the right side remind you of a human being?"; both ranging from 1 = not at all, 6 = very much). Although not central to our theorizing, participants also indicated to what extent they felt warmth towards the single bananas as initially preregistered (see Supporting Information S1: Appendix B). Participants then responded to an attention check ("What product was depicted in the shelf?," 1 = banana, 2 = cucumber, 3 = beef) and a set of control variables, including taste and freshness perceptions of the bananas, whether they had seen products as depicted on the left side of the shelf before, how important it is to them to consume fresh fruits and vegetables, how concerned they are with the environment, whether they rate the term "single" as rather positive or negative, and what their relationship status is (see Supporting Information S1: Appendix A).

4.2 | Results and Discussion

4.2.1 | Attention Check

All participants passed the attention check so that we retained all participants for analysis.

4.2.2 | Manipulation Check

As intended, the manipulation check for the perceived humanness of the single bananas was significant ($F(2, 751) = 13.82$, $p < 0.001$, $\eta^2 = 0.036$). The single bananas were perceived as significantly more human in the happy ($M_{happy} = 2.68$, $SD_{happy} = 1.70$; $p < 0.001$) and the sad conditions ($M_{sad} = 2.71$, $SD_{sad} = 1.72$; $p < 0.001$) relative to the control condition ($M_{control} = 2.03$, $SD_{control} = 1.51$). There was no difference across the two anthropomorphized conditions ($p = 0.872$). Furthermore, as expected, the perceived humanness of the bunch bananas did not differ across the conditions ($F(2, 751) = 1.05$, $p = 0.351$, $\eta^2 = 0.003$; $M_{control} = 1.88$, $SD_{control} = 1.49$; $M_{happy} = 1.95$, $SD_{happy} = 1.43$; $M_{sad} = 1.77$, $SD_{sad} = 1.23$).

4.2.3 | Choice

Figure 3 provides means for the dependent variable choice and the mediator variable compassion. An ANOVA revealed a significant main effect of the experimental manipulation on choice

FIGURE 2 | Experimental conditions and stimuli of Study 2.

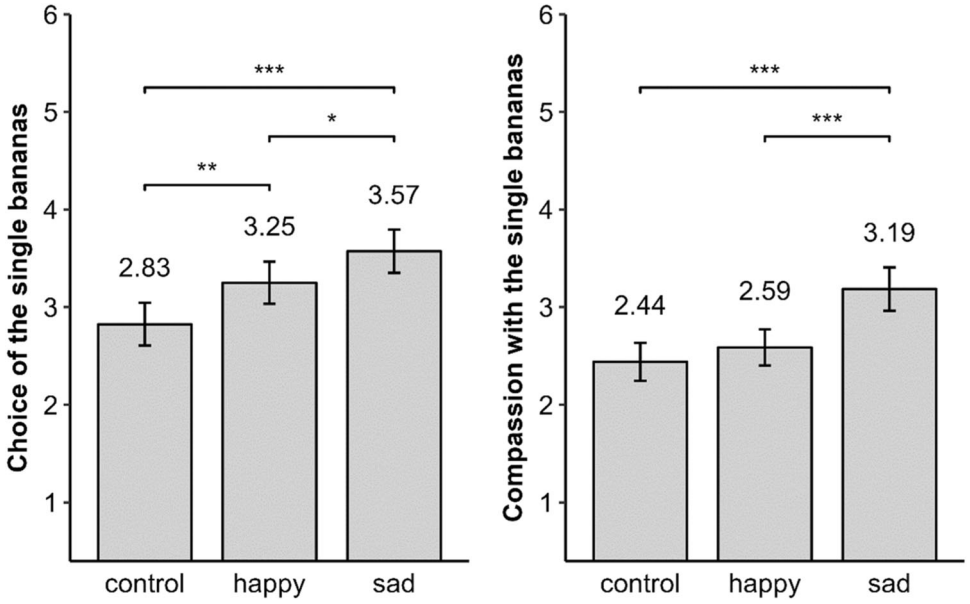

FIGURE 3 | Means for choice and compassion measured in Study 2. Error bars represent 95% confidence intervals.

($F(2, 751) = 11.43$, $p < 0.001$, $\eta^2 = 0.03$). Planned contrasts showed that participants exposed to the happy ($M_{happy} = 3.25$, $SD_{happy} = 1.73$; $p = 0.007$) or the sad single banana ($M_{sad} = 3.57$, $SD_{sad} = 1.78$; $p < 0.001$) were more likely to choose single bananas than participants in the control condition ($M_{control} = 2.83$, $SD_{control} = 1.76$). Moreover, participants in the sad condition were more likely to choose single bananas than those in the happy condition ($p = 0.040$). Importantly, these results remain robust when including our control variables (taste and freshness perceptions, familiarity with the product, product category relevance, environmentalism, rating of the term single, relationship status). These findings indicate that while both anthropomorphizing strategies were effective in increasing choice of the single bananas relative to a control condition, this effect was more pronounced when sad rather than happy emotions were conveyed, again supporting H1.

4.2.4 | Mediation Analysis

To examine the underlying process via compassion, we estimated a multicategorical mediation model with 5000 bootstrapped samples (PROCESS model 4; Hayes 2018; we also report simple mediation models including warmth as preregistered in Supporting Information S1: Appendix B) that coded our three experimental conditions into two dummy variables (happy expression: 1 = present and 0 otherwise; sad expression: 1 = present and 0 otherwise, making the non-anthropomorphized condition the reference against which the other conditions were compared). Figure 4 provides the unstandardized estimates of the mediation analysis. As expected, the analysis indicated a significant indirect effect on choice of single produce through compassion for the sad expression ($a_1b = 0.15$, SE = 0.04; $CI_{95\%}$: [0.07, 0.25]) and an insignificant indirect effect for the happy expression ($a_2b = 0.03$, SE = 0.03; $CI_{95\%}$: [−0.03, 0.09]). Hence, although both anthropomorphism conditions increased choice relative to the control condition, the analysis indicates that only the sad expression induced compassion with the single produce consistent with H2, which accounts for its greater effectiveness.

5 | Study 3: Generalization and Effect of Cognitive Load

Study 3 (preregistered: https://aspredicted.org/cs4f-bt3x.pdf) serves to generalize our findings to a different product category and to examine cognitive load as a moderator (H3). We used tomatoes and manipulated whether they were presented alone or on a vine. Additionally, we focused on the critical comparison between the happy and the sad condition and omitted the control condition to simplify our experimental design. An a priori power analysis based on Study 2 indicated that a sample size of 930 would be required to detect an effect with 80% power and 5% type-I error probability. Because we considered a null effect of the moderator variable possible, we roughly doubled the intended sample size to test the moderating effect with sufficient power.

5.1 | Method

In total, 1990 US Prolific participants completed a 2 (product emotion: happy, sad) by 2 (cognitive load: low, high) between-subjects experiment. Participants imagined going to a supermarket to buy a few items. In the low (high) cognitive load condition, participants were presented with 2 (8) items on a shopping list that included tomatoes and were asked to memorize these items (following often-used load manipulations involving memorizing a sequence, e.g., Shiv and Fedorikhin 1999). They were then shown single tomatoes next to bunched tomatoes (see Figure 5) and asked the same choice item as in Study 2. Additionally, participants responded to a three-item anthropomorphism manipulation check ("Regarding the tomatoes on the left side of the display:"; "To what extent do you see humanlike features in the tomatoes?," "To what extent do the tomatoes remind you of humanlike features?,"

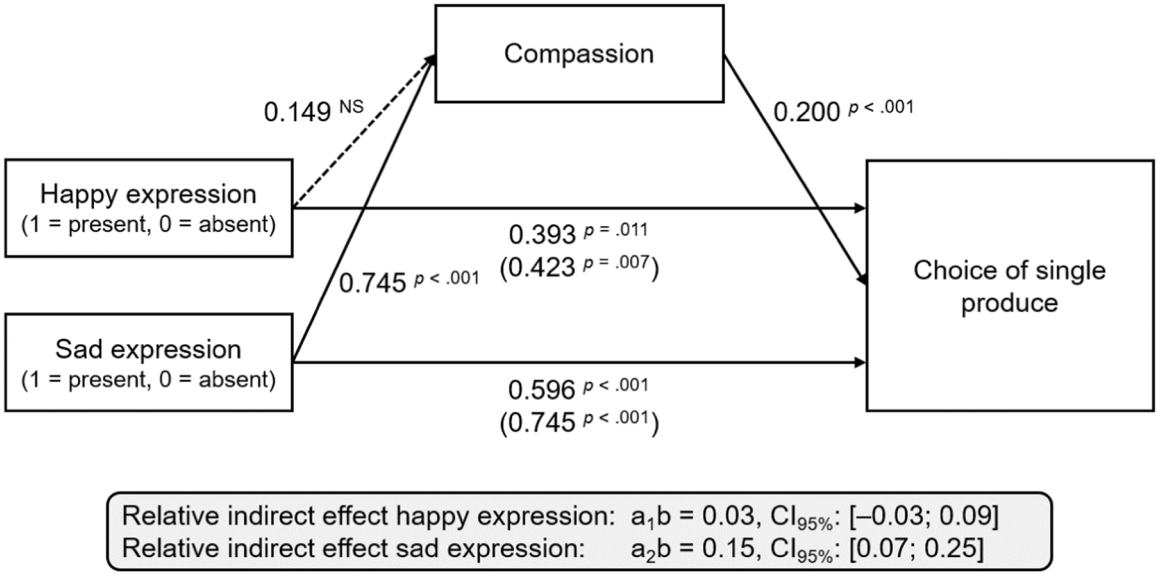

FIGURE 4 | Mediation model of Study 2.

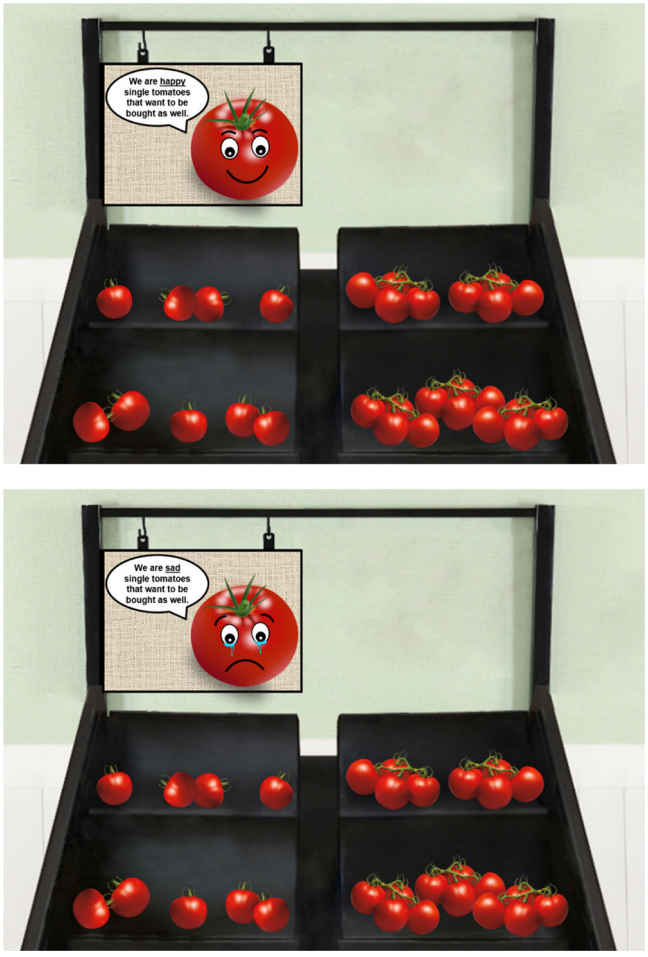

FIGURE 5 | Stimuli Used for Study 3. *Source:* Tomato on the sign: Wikimedia Commons (https://en.wikipedia.org/wiki/File:Tomato.png). CC0 1.0 Universal. Tomatoes on the vine: *Tomato Png Image* [PNG image], by Hannah Hill 2016, http://freepngimg.com (https://freepngimg.com/png/17363-tomato-png-image). CC BY-NC 4.0.

"To what extent do the tomatoes come to life as a person?," 1 = not at all, 6 = very much; based on F. Chen, Sengupta, and Zheng 2023), an emotional expression manipulation check ("Do you have the impression that the tomatoes on the left side are rather happy or sad?," 1 = sad, 4 = neutral, 7 = happy), and an attention check ("Which product was depicted on the shelf?," 1 = tomato, 2 = cucumber, 3 = beef). We additionally collected control variables regarding consumers' usual purchase patterns in the product category. More specifically, we asked participants how much they like consuming tomatoes, how often they buy them, how many they typically buy, which type they usually buy (i.e., relating to size, packaging, and single/bunch), and for whom they buy them (see Supporting Information S1: Appendix A). We also asked participants to reproduce the items from the shopping list they were supposed to memorize (which we did not analyze) and to indicate whether they honestly memorized them or cheated in some way (e.g., by taking a screenshot). Finally, participants responded to the four-item Perceived Awareness of Research Hypothesis scale (PARH; Rubin, Paolini, and Crisp 2010).

5.2 | Results and Discussion

5.2.1 | Attention Check

Following our preregistered exclusion criterion, two participants who failed the attention check were excluded from all analyses, so that our final sample consisted of 1988 participants (52.4% female, 45.4% male, 2.2% other; $M_{age} = 39.83$).

5.2.2 | Manipulation Checks

As intended, a one-way ANOVA indicated that the sad tomatoes were perceived as significantly less happy than the happy tomatoes ($F(1, 1986) = 637.62$, $p < 0.001$, $\eta^2 = 0.243$; $M_{sad} = 2.38$, $SD_{sad} = 1.38$, $M_{happy} = 4.10$, $SD_{happy} = 1.64$). However, a one-way

ANOVA revealed that they were also perceived as significantly more human than the happy tomatoes ($F(1, 1986) = 9.39$, $p = 0.002$, $\eta^2 = 0.005$; $M_{sad} = 2.34$, $SD_{sad} = 1.51$, $M_{happy} = 2.14$, $SD_{happy} = 1.45$). Hence, we control for anthropomorphism in the analyses with control variables (see Table W1 in Supporting Information S1: Appendix B), which does not affect our findings.

5.2.3 | Choice

A two-way ANOVA revealed a significant main effect for emotion ($F(1, 1984) = 14.80$, $p < 0.001$, $\eta^2 = 0.007$), a marginally significant effect for cognitive load ($F(1, 1984) = 3.48$, $p = 0.062$, $\eta^2 = 0.002$), but no significant interaction ($p = 0.779$). Participants were more likely to choose the single tomatoes when they were depicted as sad ($M_{sad} = 3.53$, $SD_{sad} = 1.78$) as opposed to happy ($M_{happy} = 3.22$, $SD_{happy} = 1.78$), replicating our earlier findings. Choice of the single tomatoes was marginally higher ($M_{low\_load} = 3.45$, $SD_{low\_load} = 1.78$) when cognitive load was low (vs. high; $M_{high\_load} = 3.30$, $SD_{high\_load} = 1.79$), suggesting that consumers are more likely to comply with the point-of-sale communication to buy single tomatoes when they have cognitive capacities left. These results remain robust when including our collected control variables (anthropomorphism, product liking, purchase frequency, number and type typically bought, actual consumer, PARH) in the analysis or when excluding participants who indicated that they cheated (see Table W1 in Supporting Information S1: Appendix B).

Hence, Study 3 provides two key findings. First, it provides confirmatory evidence for the effectiveness of sad (vs. happy) anthropomorphism in boosting choice of single produce (H1) and shows that our observed effects of Studies 1 and 2 generalize to a different produce category. Second, Study 3 indicates that cognitive load does not moderate this relationship and suggests that it is robust even under high cognitive load.

6 | Study 4: Moderation by Price Discount

Study 4 (preregistered: https://aspredicted.org/dr8v-vnfx.pdf) examined whether the effect of depicting sad expressions on single produce is mitigated when it is marked down (H4). Again, as in Study 3, we focused on the comparison between two conditions to simplify our experimental design. While it would be theoretically interesting to examine our previous focal contrast of happy versus sad emotional expressions, it is less informative from a practical standpoint. For a food retailer who needs to choose an intervention to sell single produce (i.e., a discount versus a potentially more cost-effective alternative), the relevant question is whether to use the best anthropomorphism intervention available (i.e., sad anthropomorphism based on our findings from Studies 1–3) or not. Hence, we tested sad against no anthropomorphism as this comparison is most relevant in a practical context.

An a priori power analysis based on Study 2 indicated that a sample size of 222 would be required to detect the effect of sad anthropomorphism with 90% power and 5% type-I error probability. As we were interested in the interactive effect with price discount as the moderator, we generously quadrupled the intended sample size to test the moderating effect with sufficient power and aimed at collecting roughly 1000 participants.

6.1 | Method

In total, 995 US Prolific participants completed a 2 (product emotion: control, sad) by 2 (price discount: no, yes) between-subjects experiment. Again, participants imagined going to the supermarket to buy bananas. Participants were presented with the same stimuli as in Study 2 (see Figure 2) for the no-price-discount conditions (we only changed the wording in the control condition from "should be bought" to "want to be bought" to use consistent wording across the conditions); in the price-discount conditions, a red sign reading "30% price discount" was shown in the bottom-left corner of the sign (see Figure 6).

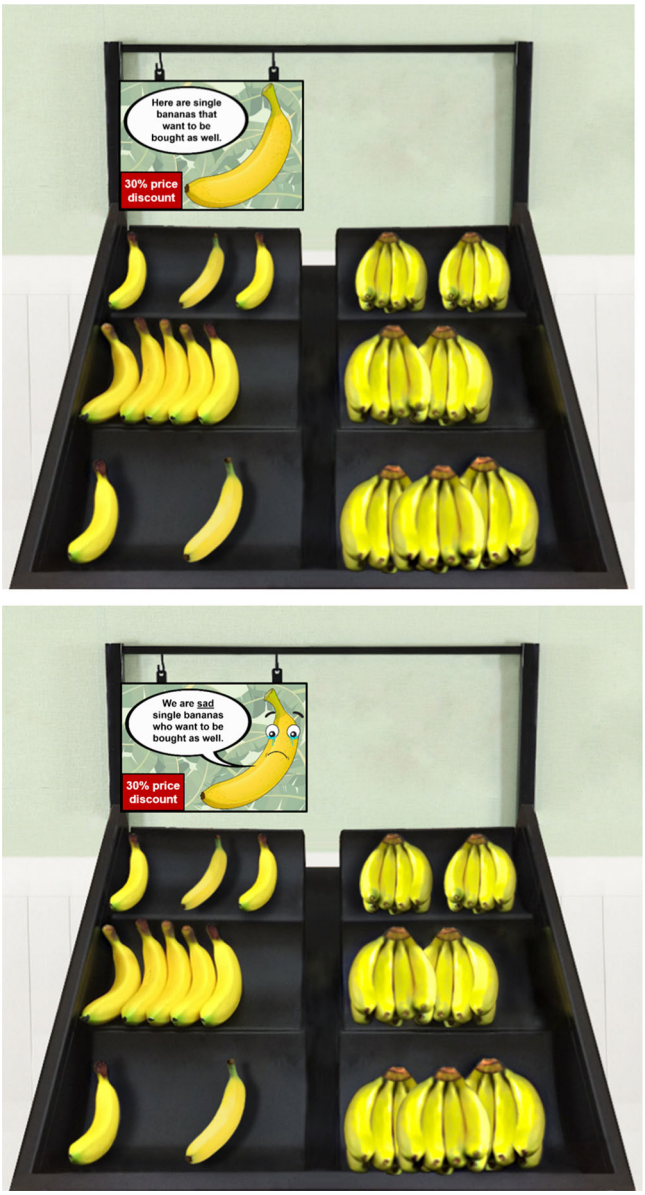

FIGURE 6 | Stimuli used for the price discount condition in Study 4.

Participants also responded to the same anthropomorphism and emotional manipulation checks and the same attention check (except regarding bananas instead of tomatoes) as in Study 3 and, additionally, to a price discount manipulation check ("Did you notice a price discount on the display?," 1 = There was a 30% price discount, 2 = There was a 10% price discount, 3 = There was no price discount). Similar to Study 3, we again collected control variables regarding consumers' usual purchase patterns of bananas (product liking, purchase frequency, number of bananas typically bought, single vs. bunch type typically bought, consumer; see Supporting Information S1: Appendix B) and responses to the PARH scale (Rubin, Paolini, and Crisp 2010).

6.2 | Results and Discussion

6.2.1 | Attention Check

Following our preregistration, we excluded one participant who failed the attention check from all analyses, leaving a final sample of 994 participants (50.2% female, 48.6% male, 1.2% other; $M_{age} = 38.58$).

6.2.2 | Manipulation Checks

As intended, a one-way ANOVA indicated that the sad bananas were perceived as significantly less happy than the non-anthropomorphized bananas ($F(1, 992) = 120.25$, $p < 0.001$, $\eta^2 = 0.108$; $M_{sad} = 2.47$, $SD_{sad} = 1.38$, $M_{control} = 3.38$, $SD_{control} = 1.24$). Additionally, a one-way ANOVA revealed that they were also perceived as significantly more human than the non-anthropomorphized bananas ($F(1, 992) = 56.46$, $p = 0.002$, $\eta^2 = 0.054$; $M_{sad} = 2.24$, $SD_{sad} = 1.44$, $M_{control} = 1.62$, $SD_{control} = 1.12$).

6.2.3 | Choice

A two-way ANOVA revealed significant main effects for emotion ($F(1, 990) = 3.91$, $p = 0.048$, $\eta^2 = 0.004$) and price discount ($F(1, 990) = 69.52$, $p < 0.001$, $\eta^2 = 0.065$), which were qualified by a marginally significant interaction ($F(1, 990) = 3.42$, $p = 0.065$, $\eta^2 = 0.003$). As before, when a price discount was absent, participants were more likely to choose the single bananas when they were depicted as sad ($M_{sad\_no\_discount} = 3.61$, $SD_{sad\_no\_discount} = 1.77$) compared to when they were not anthropomorphized ($M_{control\_no\_discount} = 3.18$, $SD_{control\_no\_discount} = 1.87$; $p = 0.036$). However, in the presence of a price discount, the choice of single bananas did not differ between the emotion conditions ($M_{sad\_discount} = 4.35$, $SD_{sad\_discount} = 1.79$; $M_{control\_discount} = 4.34$, $SD_{control\_discount} = 1.75$; $p = 0.999$). These results remain robust when adding our collected control variables (product liking, purchase frequency, number and type typically bought, actual consumer, PARH) to the analysis or when excluding participants who failed the price discount manipulation check (see Table W2 in Supporting Information S1: Appendix B).

Hence, Study 4 provides support for our hypothesis that the effect of sad anthropomorphism on choice of single produce is mitigated in the presence of a price discount (H4) and thus highlights a practically relevant moderator of our key effect. Consequently, our findings suggest that when retailers cannot or do not want to reduce the price, using sad anthropomorphism is an effective strategy to boost sales of single produce. However, when marketers implement a price discount, the combination with sad anthropomorphism does not provide higher effectiveness above and beyond reducing the price.

7 | General Discussion

Our findings contribute to the growing literature on marketing imperfect products (Cooremans and Geuens 2019; Grewal et al. 2019; Koo, Oh, and Patrick 2019; Loebnitz, Schuitema, and Grunert 2015; Mookerjee, Cornil, and Hoegg 2021) and the literature on anthropomorphism (e.g., Schroll 2023). Previous research has shown that the general use of anthropomorphism can help boost choice of imperfect produce and has particularly focused on deformations or discoloring as imperfections. The present research explicitly tests depicting two primary emotions, happiness and sadness, against each other to examine which is more effective and examines a novel type of imperfect food; when fresh produce is no longer in its original bunched form but—be it intentionally by customers or accidentally by transportation—has become a loose "single." We show that consumers are more likely to choose this type of imperfect produce when it is anthropomorphized with sad rather than happy emotional expressions, that this effect operates through compassion, and that it is eliminated in the presence of a price discount.

Interestingly, a happy emotional expression compared to no anthropomorphism significantly increased choice in our online study (Study 2) but not in our field study (Study 1). One potential explanation may relate to a "voltage drop" problem (e.g., Al-Ubaydli et al. 2021), meaning that the effect found in a laboratory setting may not be strong enough to materialize in a noisier field environment—arguably, because of a change in the choice problem (hypothetical vs. actual choices) and/or the sample employed (clickworkers vs. actual shoppers).

From a practical perspective, our research provides retailers and policymakers with clear guidelines on how to promote produce "singles" effectively. Consistent with previous studies on anthropomorphizing imperfect food, our research shows that an intervention that is very easy to implement—putting up a sign depicting an anthropomorphized image of the product with an emotional expression—is sufficient to significantly boost choice of single produce. However, to boost sales of such food most effectively, our findings imply that sad rather than happy emotional expressions should be used.

Importantly, these effects were revealed even when the imperfect products were not sold at a discount; on the contrary, the sad emotional expression loses its effectiveness compared to the non-anthropomorphized standard in the presence of price discounts. Hence, while retailers typically sell imperfect food at

drastically slashed prices (e.g., Misfits Market, Too Good To Go), humanizing such food in some way might be best used as a stand-alone intervention at the point of sale. In particular, food retailers could apply a step-wise intervention approach where they first use anthropomorphism as a sales-boosting strategy before turning to price discounts.

One direction for future research is to examine under which conditions sad expressions are not more effective than happy expressions. Critically, while single bananas and tomatoes may be less popular purchase items, they might arguably be more desirable than "ugly" produce. The differential effects of emotions might be less pronounced when consumers feel they do not get the same value from imperfect produce (e.g., cracks might imply having to cut away more product; irregular shapes might require more effort to prepare the product). Similarly, other product imperfections beyond the fresh produce category might require different interventions; dented cans or crushed boxes might evoke contamination concerns (White et al. 2016) that could render emotional anthropomorphism interventions ineffective. Furthermore, our focal imperfect produce was placed in a separate shelf and was not intermingled with the rest of the category (e.g., single and bunched bananas placed together). While we presume that the placement should not change our findings, physically isolating the single produce might have potentially reinforced our observed effects. Relatedly, in the domain of green consumption, Chang, Huang, and Liu (2018) found that the effectiveness of different emotions conveyed through anthropomorphism depends on physical or temporal proximity.

Another direction could be to dive deeper into the underlying processes and examine to what extent emotions or perceptions related to compassion, such as induced guilt, perceived cuteness, loneliness, or social rejection, might be relevant when examining emotional expressions. The associations people hold with particular emotions, as well as their reactions in response to witnessing them, might not only differ interindividually but also cross-culturally. Singleness might be more strongly perceived as an undesirable state in collectivistic (e.g., China) than individualistic cultures (e.g., Germany or the United States, as were our samples; Mesquita 2001). Similarly, just as individuals differ in their tendency to anthropomorphize, humanizing inanimate items might be more prevalent in some cultures than in others (e.g., the *Kawaii* cuteness esthetic originating from Japanese culture).

Finally, other messaging factors that might influence consumers' attitudes towards imperfect produce could be examined. This could include the additional provision of information regarding produce waste at the point of sale, different affective framing of the imperfections (e.g., framing a discoloring as a "stain" vs. "beauty spot"), or examining secondary (e.g., pride and shame) and mixed (i.e., emotions causing contradictive feelings; "eerily beautiful") emotions.

Acknowledgments

Open Access funding enabled and organized by Projekt DEAL.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

All data sets, statistical code, and stimuli are available on the Open Science Framework at https://osf.io/8k6pb/.

Endnotes

[1] Our preregistration did not specify the prediction that sad anthropomorphism is more effective than happy anthropomorphism (H1). We preregistered this pattern for Study 3, where we provide confirmatory evidence for H1.

[2] Our preregistration did not explicitly specify the prediction that the effect of sad anthropomorphism on choice would be mediated by compassion (H2).

References

Aggarwal, P., and A. L. McGill. 2007. "Is That Car Smiling at Me? Schema Congruity as a Basis for Evaluating Anthropomorphized Products." *Journal of Consumer Research* 34, no. 4: 468–479. https://doi.org/10.1086/518544.

Ahn, H.-K., H. J. Kim, and P. Aggarwal. 2014. "Helping Fellow Beings: Anthropomorphized Social Causes and the Role of Anticipatory Guilt." *Psychological Science* 25, no. 1: 224–229. https://doi.org/10.1177/0956797613496823.

Al-Ubaydli, O., M. S. Lee, J. A. List, C. L. Mackevicius, and D. Suskind. 2021. "How Can Experiments Play a Greater Role in Public Policy? Twelve Proposals From an Economic Model of Scaling." *Behavioural Public Policy* 5, no. 1: 2–49. https://doi.org/10.1017/bpp.2020.17.

Bagozzi, R. P., and D. J. Moore. 1994. "Public Service Advertisements: Emotions and Empathy Guide Prosocial Behavior." *Journal of Marketing* 58, no. 1: 56–70. https://doi.org/10.1177/002224299405800105.

Bassili, J. N. 1979. "Emotion Recognition: The Role of Facial Movement and the Relative Importance of Upper and Lower Areas of the Face." *Journal of Personality and Social Psychology* 37, no. 11: 2049–2058. https://doi.org/10.1037/0022-3514.37.11.2049.

Baumeister, R. F., and M. R. Leary. 1995. "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation." *Psychological Bulletin* 117, no. 3: 497–529. https://doi.org/10.1037/0033-2909.117.3.497.

BCG. 2024. "BCG Insights & Solutions." Closing the Food Waste Gap. http://www.bcg.com/featured-insights/closing-the-gap/food-waste.

Chandler, J., and N. Schwarz. 2010. "Use Does Not Wear Ragged the Fabric of Friendship: Thinking of Objects as Alive Makes People Less Willing to Replace Them." *Journal of Consumer Psychology* 20, no. 2: 138–145. https://doi.org/10.1016/j.jcps.2009.12.008.

Chang, C.-T., G.-H. Huang, and P.-C. Liu. 2018. "Dire Straits, Sad Planet: How Facial Emotion, Anthropomorphism, and Issue Proximity Affect Green Communication." In *Boundary Blurred: A Seamless Customer Experience in Virtual and Real Spaces, AMSAC 2018. Developments in Marketing Science: Proceedings of the Academy of Marketing Science*, edited by N. Krey, and P. Rossi, 43–53. Cham: Springer. https://doi.org/10.1007/978-3-319-99181-8_18.

Chen, F., J. Sengupta, and J. Zheng. 2023. "When Products Come Alive: Interpersonal Communication Norms Induce Positive Word of Mouth for Anthropomorphized Products." *Journal of Consumer Research* 49, no. 6: 1032–1052. https://doi.org/10.1093/jcr/ucac027.

Chen, T., A. Razzaq, P. Qing, and B. Cao. 2021. "Do You Bear to Reject Them? The Effect of Anthropomorphism on Empathy and Consumer Preference for Unattractive Produce." *Journal of Retailing and*

Consumer Services 61: 102556. https://doi.org/10.1016/j.jretconser.2021.102556.

Choueiki, Z., M. Geuens, and I. Vermeir. 2021. "Animals Like Us: Leveraging the Negativity Bias in Anthropomorphism to Reduce Beef Consumption." *Foods* 10, no. 9: 2147. https://doi.org/10.3390/foods10092147.

Cooremans, K., and M. Geuens. 2019. "Same but Different: Using Anthropomorphism in the Battle Against Food Waste." *Journal of Public Policy & Marketing* 38, no. 2: 232–245. https://doi.org/10.1177/0743915619827941.

Darke, P. R., and C. M. Y. Chung. 2005. "Effects of Pricing and Promotion on Consumer Perceptions: It Depends on How You Frame It." *Journal of Retailing* 81, no. 1: 35–47. https://doi.org/10.1016/j.jretai.2005.01.002.

Delbaere, M., E. F. McQuarrie, and B. J. Phillips. 2011. "Personification in Advertising." *Journal of Advertising* 40, no. 1: 121–130. https://doi.org/10.2753/JOA0091-3367400108.

Dovidio, J. F., J. L. Allen, and D. A. Schroeder. 1990. "Specificity of Empathy-Induced Helping: Evidence for Altruistic Motivation." *Journal of Personality and Social Psychology* 59, no. 2: 249–260. https://doi.org/10.1037/0022-3514.59.2.249.

EcoWorlder. July 7, 2022. "The Zero-Waste Tip Nobody Talks About. Buying Single Bananas." *EcoWorlder*. http://ecoworlder.com/the-zero-waste-tip-nobody-talks-about-buying-single-bananas/.

Ekman, P. 1993. "Facial Expression and Emotion." *American Psychologist* 48, no. 4: 384–392. https://doi.org/10.1037/0003-066X.48.4.384.

Epley, N., A. Waytz, and J. T. Cacioppo. 2007. "On Seeing Human: A Three-Factor Theory of Anthropomorphism." *Psychological Review* 114, no. 4: 864–886. https://doi.org/10.1037/0033-295X.114.4.864.

Food and Agriculture Organization. (2019). The State of Food and Agriculture. 2019. Moving Forward on Food Loss and Waste Reduction. Rome.

Feldman Barrett, L., and J. A. Russell. 1998. "Independence and Bipolarity in the Structure of Current Affect." *Journal of Personality and Social Psychology* 74, no. 4: 967–984. https://doi.org/10.1037/0022-3514.74.4.967.

Fiske, S. T., A. J. C. Cuddy, and P. Glick. 2007. "Universal Dimensions of Social Cognition: Warmth and Competence." *Trends in Cognitive Sciences* 11, no. 2: 77–83. https://doi.org/10.1016/j.tics.2006.11.005.

Goetz, J. L., D. Keltner, and E. Simon-Thomas. 2010. "Compassion: An Evolutionary Analysis and Empirical Review." *Psychological Bulletin* 136, no. 3: 351–374. https://doi.org/10.1037/a0018807.

Gray, H. M., K. Gray, and D. M. Wegner. 2007. "Dimensions of Mind Perception." *Science* 315, no. 5812: 619. https://doi.org/10.1126/science.1134475.

Greene, J. D., S. A. Morelli, K. Lowenberg, L. E. Nystrom, and J. D. Cohen. 2008. "Cognitive Load Selectively Interferes With Utilitarian Moral Judgment." *Cognition* 107, no. 3: 1144–1154. https://doi.org/10.1016/j.cognition.2007.11.004.

Grewal, L., J. Hmurovic, C. Lamberton, and R. W. Reczek. 2019. "The Self-Perception Connection: Why Consumers Devalue Unattractive Produce." *Journal of Marketing* 83, no. 1: 89–107. https://doi.org/10.1177/0022242918816319.

Hayes, A. F. 2018. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York, NY: Guilford Press.

Hinson, J. M., T. L. Jameson, and P. Whitney. 2003. "Impulsive Decision Making and Working Memory." *Journal of Experimental Psychology. Learning, Memory, and Cognition* 29, no. 2: 298–306. https://doi.org/10.1037/0278-7393.29.2.298.

Jackson, C. L., and J. A. LePine. 2003. "Peer Responses to a Team's Weakest Link: A Test and Extension of Lepine and Van Dyne's Model." *Journal of Applied Psychology* 88, no. 3: 459–475. https://doi.org/10.1037/0021-9010.88.3.459.

Keltner, D., P. Ekman, G. C. Gonzaga, and J. Beer. 2003. "Facial Expression of Emotion." In *Handbook of Affective Sciences*, edited by R. J. Davidson, K. R. Scherer, and H. H. Goldsmith, 415–432. Oxford University Press.

Ketron, S., and K. Naletelich. 2019. "Victim or Beggar? Anthropomorphic Messengers and the Savior Effect in Consumer Sustainability Behavior." *Journal of Business Research* 96: 73–84. https://doi.org/10.1016/j.jbusres.2018.11.004.

Koo, M., H. Oh, and V. M. Patrick. 2019. "From Oldie to Goldie: Humanizing Old Produce Enhances Its Appeal." *Journal of the Association for Consumer Research* 4, no. 4: 337–351. https://doi.org/10.1086/705032.

Landwehr, J. R., A. L. McGill, and A. Herrmann. 2011. "It's Got the Look: The Effect of Friendly and Aggressive "Facial" Expressions on Product Liking and Sales." *Journal of Marketing* 75, no. 3: 132–146. https://doi.org/10.1509/jmkg.75.3.132.

Loebnitz, N., G. Schuitema, and K. G. Grunert. 2015. "Who Buys Oddly Shaped Food and Why? Impacts of Food Shape Abnormality and Organic Labeling on Purchase Intentions." *Psychology & Marketing* 32, no. 4: 408–421. https://doi.org/10.1002/mar.20788.

Mattsson, L., H. Williams, and J. Berghel. 2018. "Waste of Fresh Fruit and Vegetables at Retailers in Sweden—Measuring and Calculation of Mass, Economic Cost and Climate Impact." *Resources, Conservation and Recycling* 130: 118–126. https://doi.org/10.1016/j.resconrec.2017.10.037.

Mesquita, B. 2001. "Emotions in Collectivist and Individualist Contexts." *Journal of Personality and Social Psychology* 80, no. 1: 68–74. https://doi.org/10.1037//O022-3514.80.1.68.

Mookerjee, S., Y. Cornil, and J. Hoegg. 2021. "From Waste to Taste: How "Ugly" Labels Can Increase Purchase of Unattractive Produce." *Journal of Marketing* 85, no. 3: 62–77. https://doi.org/10.1177/0022242920988656.

Mukherjee, A., A. Mukherjee, and P. Iyer. 2021. "Imperfect Produce: Retailer Actions and Service Outcomes." *Journal of Services Marketing* 35, no. 8: 1061–1072. https://doi.org/10.1108/JSM-11-2020-0444.

Rameson, L. T., S. A. Morelli, and M. D. Lieberman. 2012. "The Neural Correlates of Empathy: Experience, Automaticity, and Prosocial Behavior." *Journal of Cognitive Neuroscience* 24, no. 1: 235–245. https://doi.org/10.1162/jocn_a_00130.

Rees. October 23, 2023. "Better Homes and Gardens." Why You Should Always Buy Single Bananas. http://www.bhg.com.au/zero-waste-single-bananas.

Rubin, M., S. Paolini, and R. J. Crisp. 2010. "A Processing Fluency Explanation of Bias Against Migrants." *Journal of Experimental Social Psychology* 46, no. 1: 21–28. https://doi.org/10.1016/j.jesp.2009.09.006.

Schroll, R. 2023. "Ouch!" When and Why Food Anthropomorphism Negatively Affects Consumption." *Journal of Consumer Psychology* 33, no. 3: 561–574. https://doi.org/10.1002/jcpy.1316.

Shao, X., E. Jeong, and S. Jang. 2021. "Effectiveness of Anthropomorphism in Ugly Food Promotion: Do Gender and Age Matter?" *Journal of Foodservice Business Research* 24, no. 5: 596–611. https://doi.org/10.1080/15378020.2021.1883215.

Shao, X., E. Jeong, S. Jang, and Y. Xu. 2020. "Mr. Potato Head Fights Food Waste: The Effect of Anthropomorphism in Promoting Ugly Food." *International Journal of Hospitality Management* 89: 102521. https://doi.org/10.1016/j.ijhm.2020.102521.

Shiv, B., and A. Fedorikhin. 1999. "Heart and Mind in Conflict: The Interplay of Affect and Cognition in Consumer Decision Making." *Journal of Consumer Research* 26, no. 3: 278–292. https://doi.org/10.1086/209563.

Small, D. A., and N. M. Verrochi. 2009. "The Face of Need: Facial Emotion Expression on Charity Advertisements." *Journal of Marketing Research* 46, no. 6: 777–787. https://doi.org/10.1509/jmkr.46.6.777.

Sweller, J. 2011. "Cognitive Load Theory." In *Psychology of Learning and Motivation*, edited by J. P. Mestre and B. H. Ross, Vol. 55, 37–76. San Diego, CA: Academic Press. https://doi.org/10.1016/B978-0-12-387691-1.00002-8.

UN Environment Programme. 2024. *Food Waste Index Report 2024*. Think Eat Save: Tracking Progress to Halve Global Food Waste. https://wedocs.unep.org/20.500.11822/45230.

Vohs, K. D., N. L. Mead, and M. R. Goode. 2006. "The Psychological Consequences of Money." *Science* 314, no. 5802: 1154–1156. https://doi.org/10.1126/science.1132491.

Walsh, D., and C. Darriet. 2020. "What a Cute Lemon! The Effect of Whimsical Cuteness on Willingness-to-Pay for Imperfect Produce." In *NA - Advances in Consumer Research*, edited by J. J. Argo, T. M. Lowrey, and H. Jensen Schau, Vol. 48, 1232.

White, K., L. Lin, D. W. Dahl, and R. J. B. Ritchie. 2016. "When Do Consumers Avoid Imperfections? Superficial Packaging Damage as a Contamination Cue." *Journal of Marketing Research* 53, no. 1: 110–123. https://doi.org/10.1509/jmr.12.0388.

Wojciszke, B. 2005. "Morality and Competence in Person- and Self-Perception." *European Review of Social Psychology* 16, no. 1: 155–188. https://doi.org/10.1080/10463280500229619.

Wu, A. Y., M. S. Malter, and G. V. Johar. 2023. "Recycle Me!" Product Anthropomorphism Can Increase Recycling Behavior." *Journal of the Association for Consumer Research* 8, no. 3: 351–363. https://doi.org/10.1086/724999.

Supporting Information

Additional supporting information can be found online in the Supporting Information section.