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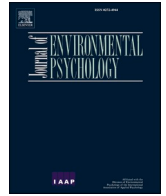
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Are consumers more or less averse to wasting organic food?

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ABSTRACT

Organic food is often perceived as being more environmentally friendly than non-organic food due to its production methods. However, little is known about how consumers treat organic food compared to non-organic food when it comes to waste. This study aims to fill this gap by examining consumer waste aversion towards organic and non-organic food. The results of four studies show that controlling for perceived price differences, consumers are less averse to wasting organic food than non-organic food. This finding holds across both healthy and unhealthy food. The lower waste aversion towards organic food is driven in part by the decreased perception of environmental harm associated with wasting organic food. These findings suggest that consumers' perception that a product is sustainable and more environmentally friendly (organic vs. non-organic) may have surprising effects in the food disposal stage, potentially diminishing their reluctance to waste food, a topic that warrants further research.

1. Introduction

Over the last few decades, consumers have become concerned about the environmental impact of their food choices, and more consumers are buying organic food to protect the environment (Magnusson, Arvola, Hursti, Åberg, & Sjöden, 2003; Nie & Zepeda, 2011; Whitmarsh, 2009). This increased concern and feeling of responsibility for the environment has led to a significant increase in the global market for organic food products, which has grown from just 15 billion euros in 2000 to 120 billion euros in 2020 (Willer, Trávníček, Meier, & Schlatter, 2022). Compared to non-organic products, organic products are considered better for the environment by reducing greenhouse gas emissions, sustaining biodiversity, preserving natural resources, and minimizing land, air, and water pollution (Müller et al., 2016).

Although prior research has extensively studied how individuals consume organic food, focusing on attitudes and perceptions of organic products (Lee & Yun, 2015; Magnusson et al., 2003; Massey, O'Cass, & Otahal, 2018), and motivations and barriers to purchasing organic products (Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; Rana & Paul, 2017), our knowledge of how they fail to consume organic food is in its infancy. While purchasing organic food is considered as a pro-environmental act, wasting it will still have unfavorable environmental consequences. It is therefore important to understand how organic claims influence not only consumers' consumption decisions but also their waste practices. Our research fills this void and investigates

whether consumers' aversion to wasting organic food differs from their aversion to wasting non-organic food. For instance, imagine that when you visited the supermarket last week you bought a number of apples, and now some are left uneaten. Would you feel worse to waste these apples when you know they are organically produced or less so? And why? These are the main questions we aim to answer in the present research.

Previous studies have found that consumers are generally concerned about the consequences of food waste, and this concern drives consumer aversion to food waste (Bolton & Alba, 2012; Le Borgne, Sirieix, Valette-Florence, & Costa, 2021; Raghunathan & Chandrasekaran, 2021). Food waste aversion stems from the perception that wasting food is morally wrong, sinful, and undesirable (Bolton & Alba, 2012; Schanes, Dobernig, & Gözet, 2018) leading to the emergence of negative self-conscious emotions (e.g., guilt, shame, and embarrassment; Tracy & Robins, 2004) associated with engaging in wasteful behavior (Catlin, Leonhardt, Wang, & Manuel, 2021; Graham-Rowe, Jessop, & Sparks, 2014; Sun & Trudel, 2017).

The two important concerns about food waste are financial concerns such as squandering money (Graham-Rowe et al., 2014; Neff, Spiker, & Truant, 2015), and environmental concerns such as harming the environment (Qi & Roe, 2016; Quested, Marsh, Stunell, & Parry, 2013). In the context of organic food, both financial and environmental concerns are likely to influence consumers' aversion to food waste. Since organic products typically cost 30–100% more and are also perceived as more

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expensive by consumers (Aschemann-Witzel & Zielke, 2017; Van Doorn & Verhoef, 2015), we would expect consumers to be more reluctant to waste more expensive organic food. At the same time, organic food is closely linked to sustainability, informing consumers about the environmental friendliness of their food choices (Lazzarini, Zimmermann, Tobler, Visschers, & Siegrist, 2016). The associations of 'organic' with nature and the environment (Lusk & Briggeman, 2009) also signal to consumers that they should care for the natural environment. As a result, this awareness may prompt consumers to refrain from harming the environment by wasting good food, which could further amplify their aversion to wasting organic food.

In contrast, we argue that the financial concerns associated with wasting organic food may be countered by perceptions of the environmental impact of wasting organic food. Consumers may believe that because organic food production is more sustainable and environmentally friendly, wasting it is less harmful to the environment. As a consequence, they may be less averse to wasting organic food than wasting non-organic food.

Across four studies we find evidence that consumers are less averse to wasting organic food than non-organic food, controlling for perceived price differences. We further show that this effect is explained in part by the differences in perceived environmental harm of wasting food (organic vs. non-organic). Our findings make two important contributions. Foremost, we offer the first academic investigation of how consumers react to wasting organic food. While past work has contributed significantly to our understanding of organic food consumption, no work has investigated how consumers treat organic food during the disposal stage. Moreover, our research also contributes to a growing food waste literature by demonstrating that the food production method (organic vs. non-organic) can influence food waste aversion. Specifically, we show that environmentally friendly and sustainable food production alleviates consumers' concerns about the environmental impact of wasting food, thereby reducing their aversion to food waste.

On a broader level, we provide a fuller account of consumers' post-purchase reactions by investigating their aversion to waste, an important yet understudied topic when it comes to disposal of organic food. After all, while purchasing organic food may be considered as beneficial for the environment, our findings suggest that its positive effect may be undermined if consumers are less reluctant to wasting it. Overall, it is important to consider the various factors that can influence food waste aversion and strive to avoid food waste in all forms, both organic and non-organic, in order to conserve resources and reduce the negative environmental impact of food disposal.

1.1. Organic food perceptions and evaluations

A large literature on organic food has examined consumers' perceptions and evaluations of organic products and their motivation to buy them. A well-established finding is that consumers perceive organic food as sustainably produced and better for the environment (Lazzarini, Zimmermann, Visschers, & Siegrist, 2016; Lee & Yun, 2015; Tobler, Visschers, & Siegrist, 2011). There is also evidence that organic claims can bias consumer perceptions and that products perceived as environmentally friendly are also perceived as better in a number of other unrelated dimensions (Schuldt & Schwarz, 2010). For example, when compared to conventional food, organic food is perceived as healthier (Nadricka, Millet, & Verlegh, 2020; Schuldt & Hannahan, 2013), safer to consume (Ellison, Duff, Wang, & White, 2016; Hoefkens, Verbeke, Aertsens, Mondelaers, & Van Camp, 2009), and having better nutritional qualities (Lee, Shimizu, Kniffin, & Wansink, 2013; Sörqvist et al., 2015). Consumers are also willing to pay more for organic products and are more likely to recommend them to others (Lee et al., 2013; Sörqvist et al., 2013; Wiedmann, Hennigs, Behrens, & Klarmann, 2014). In addition to influencing product evaluations, organic claims also lead to various inferences about the consumption of organic food. For example, consumers infer that organic cookies are lower in calories and can be

eaten more often than non-organic cookies, and foregoing physical exercise is considered more acceptable if a person has eaten an organic rather than a non-organic dessert (Prada, Rodrigues, & Garrido, 2016; Schuldt & Schwarz, 2010).

While it is clear from the literature that consumers view organic products differently than non-organic products and thus draw various consumption-related inferences, research has yet to provide insights into how consumers' perception that a product is sustainable and more environmentally friendly (organic vs. non-organic) influence their decisions (or reluctance) to waste food.

1.2. Environmental consequences and aversion to wasting organic food

Organic food is produced with sustainable production methods that protect natural resources, conserve biodiversity, and animal welfare, and do not use pesticides, chemicals, and fertilizers (Müller et al., 2016). Therefore, the organic claim signals various environmental benefits through which consumers draw simplified conclusions about the product being "natural", "pure" and "good" (Lusk & Briggeman, 2009; Schifferstein & Ophuis, 1998; Seufert, Ramankutty, & Mayerhofer, 2017). Moreover, consumers often simplify the meaning of food and categorize it into good and bad (Rozin, Ashmore, & Markwith, 1996). Since natural food is seen as intrinsically good (Rozin et al., 2004), we argue that consumers should also perceive organic food to be intrinsically good. Against this backdrop, we turn to our focal research question in the present paper: Would consumers' aversion to wasting organic food differ from their aversion to wasting non-organic food?

One possibility is that the association between organic and values such as nature, goodness, and the environment (Lusk & Briggeman, 2009; Schifferstein & Ophuis, 1998) would make it salient to consumers that they should care for the natural environment, and thus not waste good food. Indeed, when people feel more connected to nature and show a commitment to the natural environment, they are more likely to act in a way that protects the environment and prevents environmental harm (Mackay & Schmitt, 2019; Martin et al., 2020). This argument would suggest that the organic claim could amplify consumers' aversion to wasting organic food.

We, however, offer an alternative hypothesis. Specifically, if consumers believe that organic food is produced in an environmentally friendly and natural way (without the use of harmful chemicals and pesticides), they might conclude that wasting organic food is less harmful to the environment than wasting non-organic food. In a way, they are returning "something good for the environment" back into the environment. As a result, we predict that consumers will be less averse to wasting organic food than non-organic food.

As much as environmental concerns are an important driver for waste aversion, financial concerns also matter. This is important in our context, because organic food is commonly perceived as significantly more expensive than non-organic food (Aschemann-Witzel & Zielke, 2017; Van Doorn & Verhoef, 2015), which should naturally increase waste aversion (Bolton & Alba, 2012). Since our primary focus is on environmental considerations associated with organic food waste aversion, we control for perceived price differences between organic and non-organic food across all our studies.

1.3. Overview of studies

We examined consumers' aversion to wasting organic vs. non-organic food across four studies. In line with previous research, we consistently observed that organic products were perceived as more expensive (Van Doorn & Verhoef, 2015), and the higher the perceived price, the stronger the aversion to food waste was (Bolton & Alba, 2012; Neff et al., 2015). Therefore, we controlled for price perceptions in each of our studies (see Meyvis & Van Osselaer, 2018 for a discussion of using covariates in experimental social science).

Study 1 ($N = 413$) provides evidence that consumers are less averse

to wasting organic apples than non-organic apples. Study 2 ($N = 497$) generalizes Study 1 findings across healthy and unhealthy food. The (preregistered) Study 3 ($N = 654$) provides evidence for the hypothesized mediation that consumers perceive lower environmental harm from wasting organic (vs. non-organic) food, which in turn diminishes consumers' aversion to wasting organic (vs. non-organic) food. Finally, the (preregistered) Study 4 ($N = 540$) provides further support for the proposed mechanism by showing that a reminder about the environmental impact of wasting an organic apple mitigates the predicted effect of organic food on waste aversion. All studies were conducted in accordance with the Ethical guidelines of the American Psychological Association (APA). The data for all studies and pre-registrations of Studies 3 and 4 can be found on Research Box (<https://researchbox.org/1090>).

2. Study 1

The goal of the first study is to test the basic proposition that controlling for perceived price differences, consumers are less averse to wasting organic food than to wasting non-organic food.

2.1. Method

We recruited a total of 438 U.K. residents from Prolific based on a power analysis (using G*Power 3.1; [Faul, Erdfelder, Lang, & Buchner, 2007](#)) for an F-test (effect size $\eta_p^2 = 0.02$, power $1 - \beta = 0.80$, required $N = 387$). We removed participants who failed the attention check ($n = 8$) and who never buy organic food ($n = 17$), leaving a sample size of $N = 413$ (284 females, $M_{age} = 42$).¹

Participants were randomly assigned to either a non-organic condition or an organic condition. After reading an introductory page, all participants read the following scenario which included the manipulation of non-organic/organic food: "Please imagine that you went shopping at your local supermarket. You want to buy, among other things, fresh (organic) apples. You notice these red (organic) apples in a tray and you decide to buy them." In the organic condition, the apples had the EU organic logo on them. After that, participants read: "You come home and unpack your groceries including the (organic) apples that you bought". All participants then completed a three-item waste aversion scale (1 = not at all; 7 = extremely) adapted from [Catlin, Leonhardt, Wang, and Manuel \(2021\)](#) and [Trudel, Argo, and Meng \(2016\)](#). The three items were (1) "How guilty would you feel about wasting some of the (organic) apples?", (2) "How embarrassed would you feel about wasting some of the (organic) apples?", and (3) "How ashamed would you feel about wasting some of the (organic) apples?". The three items were combined to form an index measure of waste aversion that served as our dependent variable ($\alpha = 0.88$).

Participants then were asked to indicate perceived price by answering the following question: "In your opinion (organic) apples are: (1 = very cheap, 7 = very expensive)." Next participants indicated their level of perceived hunger (1 = not hungry, 4 = very hungry) and how much they liked the taste of (organic) apples (1 = not at all, 7 = very). Participants then responded to the organic consumer identity scale adapted from [White and Dahl \(2007\)](#) which included four randomly presented items (e.g. "Buying organic products has a great deal to do with how I see myself", "Being a consumer of organic products is an important part of my self-image", "Choosing to purchase organic products is important to my sense of the kind of person I am", "I strongly identify with being a consumer of organic products"; 1 = strongly disagree, 7 = strongly agree). We combined and averaged these four items ($\alpha = 0.93$). At the end of the study, all participants answered demographic questions (e.g., age, gender, nationality).

¹ 209 in the non-organic condition; 204 in the organic condition.

2.2. Results and discussion

A one-way ANCOVA with price perception as a covariate revealed a significant effect of condition on waste aversion ($F(1, 410) = 16.84$, $p < .001$, $\eta_p^2 = 0.039$, 95% CI = [0.386, 1.095]). In support of our prediction, participants were less averse to wasting organic apples compared to wasting non-organic apples ($M_{organic} = 4.21$, $SD = 1.55$ vs. $M_{non-organic} = 4.95$, $SD = 1.48$). Perceived price, as a covariate, had the expected significant positive effect on waste aversion ($F(1, 410) = 33.23$, $p < .001$, $\eta_p^2 = 0.075$; 95% CI = [0.268, 0.545]).² Including the additional measured covariates (product taste liking, perceived hunger, organic consumer identity, age, and gender) in the analysis did not change the results, therefore they are not discussed further.

Overall, Study 1 provides initial evidence that consumers are less averse to wasting organic food compared to wasting non-organic food.

3. Study 2

The purpose of Study 2 is to extend the initial findings and test whether the effect generalizes across both healthy and unhealthy food.

3.1. Method

We recruited a total of 549 U.K. residents from Prolific based on a power analysis (using G*Power 3.1; [Faul et al., 2007](#)) for an F-test (effect size $\eta_p^2 = 0.02$, power $1 - \beta = 0.80$, required $N = 387$). We removed participants who failed the attention check ($n = 18$) and who never buy organic food ($n = 34$), leaving a sample size of $N = 497$ (310 females, $M_{age} = 40$).³

Participants were randomly assigned to one of the four conditions of a 2 (condition: non-organic vs. organic) x 2 (product type: healthy vs. unhealthy) between-subjects design. Participants imagined shopping for a variety of food products which they carried home and unpacked them. In the healthy condition, the products were apples, strawberries, and whole grain bread, whereas in the unhealthy condition the products were potato chips, chocolate chip cookies, and sugary cereal. These products were selected based on their perceived healthiness and familiarity shown in a pretest by [Nadricka et al. \(2020\)](#), and were presented randomly to participants. The manipulation of organic food was the same as in Study 1. Next, participants reported their waste aversion using the same three-item waste aversion scale as in Study 1 for each of the randomly presented products. We calculated participants' waste aversion for each product which we then combined into an index measure of waste aversion that served as our dependent variable ($\alpha = 0.95$ for healthy products, $\alpha = 0.93$ for unhealthy products).

After that, participants rated each product in terms of perceived price (1 = very cheap, 7 = very expensive), and how much they liked the taste (1 = not at all, 7 = very). Next, participants indicated their level of perceived hunger (1 = not hungry at all, 4 = very hungry) and answered demographic questions (e.g., age, gender, nationality).

3.2. Results and discussion

A two-way ANCOVA on waste aversion with perceived price as a covariate revealed significant main effects of condition ($F(1,492) = 10.12$, $p = .002$, $\eta_p^2 = 0.02$, 95% CI = [0.200, 0.848]), and product type ($F(1,492) = 21.04$, $p < .001$, $\eta_p^2 = 0.041$, 95% CI = [0.371, 0.927]), and

² There was a significant effect of condition on perceived price ($F(1,411) = 238.37$, $p < .001$, $\eta_p^2 = 0.367$, 95% CI = [-1.746, -1.352]). As expected, participants perceived the organic apples as more expensive ($M = 5.36$, $SD = 0.88$) than the non-organic apples ($M = 3.81$, $SD = 1.14$).

³ 126 in the non-organic healthy condition; 127 in the non-organic unhealthy condition; 121 in the organic healthy condition; 123 in the organic unhealthy condition.

no interaction effect ($F(1,492) = 1.21, p = .272$). Participants were less averse to wasting organic food ($M = 3.74, SD = 1.61$) than non-organic food ($M = 4.26, SD = 1.62$). In addition, participants were more averse to wasting healthy food ($M = 4.33, SD = 1.55$) than unhealthy food ($M = 3.68, SD = 1.57$). Perceived price, as a covariate, had a significant positive effect on waste aversion ($F(1, 492) = 20.01, p < .001, \eta_p^2 = 0.039, 95\% CI = [0.180, 0.461]$).⁴ Including the additional measured covariates (product taste liking, perceived hunger, age, and gender) in the analysis did not change the results, therefore they are not discussed further.

Study 2 shows that consumers are less averse to wasting organic food than wasting non-organic food regardless of the type of food (whether it is healthy or not). In addition, our results demonstrate that consumers are more averse to wasting healthy food compared to unhealthy food. While we had no a-priori prediction about this effect, future research could investigate further consumers' aversion to wasting healthy vs. unhealthy food.

4. Study 3

The results of the previous two studies show that consumers are less averse to wasting organic food than non-organic food. The goal of Study 3 is to provide evidence for our hypothesized mediation that consumers perceive lower environmental harm from wasting organic (vs. non-organic) food, which in turn leads consumers to be less averse to wasting organic (vs. non-organic) food.

4.1. Method

We preregistered the study (<https://aspredicted.org/dt8et.pdf>) and recruited a total of 707 U.K. residents from Prolific. As preregistered, we removed participants who failed the attention check and who never buy organic food, leaving a sample size of $N = 654$ (332 females, $M_{age} = 36$).⁵ This is in line with the envisioned sample size of 639 (see preregistration).

We randomly assigned participants to one of the two between-subjects conditions (non-organic vs. organic). As in Study 1, all participants imagined buying (organic) apples and completed the same three-item waste aversion scale as in the previous studies. We combined and averaged these three items ($\alpha = 0.87$). Participants then completed a two-item perceived environmental harm scale. The two items were (1) "To what extent do you think wasting (organic) apples is: (1 = not at all environmentally harmful, 7 = very harmful)", and (2) "To what extent do you think wasting (organic) apples is: (1 = not at all environmentally irresponsible, 7 = very environmentally irresponsible)". The items were combined to create our perceived environmental harm measure that served as our mediator variable ($\alpha = 0.81$).

Next, participants indicated the perceived price of the (organic) apples (1 = very cheap, 7 = very expensive). At the end of the study, all participants answered demographic questions (e.g., age, gender, nationality).

4.2. Results and discussion

4.2.1. Waste aversion and environmental harm perception

Two separate one-way ANCOVAs with price perception as a covariate revealed a significant effect of condition on waste aversion ($F(1, 651) = 21.94, p < .001, \eta_p^2 = 0.033, 95\% CI = [0.420, 1.026]$) and a significant effect of condition on perceived environmental harm ($F(1,$

⁴ There was a significant effect of condition on perceived price ($F(1,495) = 201.13, p < .001, \eta_p^2 = 0.289, 95\% CI = [-1.446, -1.094]$). As expected, participants perceived the organic food as more expensive ($M = 5.18, SD = 0.92$) than the non-organic food ($M = 3.90, SD = 1.07$).

⁵ 324 in the non-organic condition; 330 in the organic condition.

$651) = 15.85, p < .001, \eta_p^2 = 0.024, 95\% CI = [0.293, 0.862]$). Participants were less averse to wasting organic apples compared to wasting non-organic apples ($M_{organic} = 3.84, SD = 1.64$ vs. $M_{non-organic} = 4.56, SD = 1.48$) and perceived wasting organic apples as less harmful to the environment compared to wasting non-organic apples ($M_{organic} = 4.11, SD = 1.52$ vs. $M_{non-organic} = 4.68, SD = 1.40$). Perceived price, as a covariate, had a significant positive effect on waste aversion ($F(1, 651) = 31.72, p < .001, \eta_p^2 = 0.046, 95\% CI = [0.212, 0.440]$) and on environmental harm perception ($F(1, 651) = 26.91, p < .001, \eta_p^2 = 0.04, 95\% CI = [0.175, 0.389]$).⁶

Including the additional measured covariates (age and gender) in the analysis did not change the results in this and in the following study, therefore they are not discussed further.

4.2.2. Mediation

A mediation analysis using PROCESS model 4 (Hayes, 2017, 5000 bootstrapped samples) with waste aversion as a dependent variable, perceived price as a covariate, and environmental harm as a mediator revealed a significant indirect effect ($\beta = -0.34, 95\% CI [-0.537, -0.164]$). Furthermore, while the effect of condition on waste aversion ($\beta = -0.72, 95\% CI [-1.026, -0.420]$) was reduced by 47% when controlling for environmental harm, it remained significant ($\beta = -0.38, 95\% CI [-0.632, -0.124]$; see Fig. 1) which suggests that environmental harm partially mediates the effect of organic food on waste aversion. Overall, in Study 3 we find support for our hypothesized mediation that consumers consider organic food waste to be less harmful to the environment than non-organic food waste, therefore they are less averse to wasting organic food than wasting non-organic food.

5. Study 4

The goal of Study 4 is to provide further evidence for the underlying process of perceived environmental harm by adopting a moderation-of-process design (Spencer, Zanna, & Fong, 2005). Our research proposes that consumers are less averse to wasting organic food than wasting non-organic food because they consider wasting organic food to be less harmful to the environment compared to wasting non-organic food. Accordingly, a reminder (i.e., intervention) that wasting organic food is as harmful to the environment as wasting non-organic food should mitigate the effect of organic food on waste aversion. Study 4 tests this prediction.

5.1. Method

We preregistered the study (<https://aspredicted.org/tt6zv.pdf>) and recruited a total of 599 U.K. residents from Prolific. As preregistered, we removed participants who failed the attention check and who never buy organic food, leaving a sample size of $N = 540$ (265 females, $M_{age} = 35$).⁷ This is in line with the envisioned sample size of 543 (see preregistration). Participants were randomly assigned to one of three between-subjects conditions: non-organic condition, organic condition, and organic intervention condition. Similar to previous studies, participants first imagined purchasing apples. We included the "intervention" condition in order to test the prediction that a reminder that wasting an organic apple is as harmful to the environment as wasting a non-organic apple mitigates the effect. Therefore, participants read the following message in this condition: "Food waste is very harmful to the environment as it produces greenhouse gas emissions and represents a great

⁶ There was a significant effect of condition on perceived price ($F(1,652) = 438.02, p < .001, \eta_p^2 = 0.402, 95\% CI = [-1.848, -1.531]$). As expected, participants perceived the organic apples as more expensive ($M = 5.28, SD = 0.88$) than the non-organic apples ($M = 3.59, SD = 1.17$).

⁷ 176 in the non-organic condition; 183 in the organic condition; 181 in the organic intervention condition.

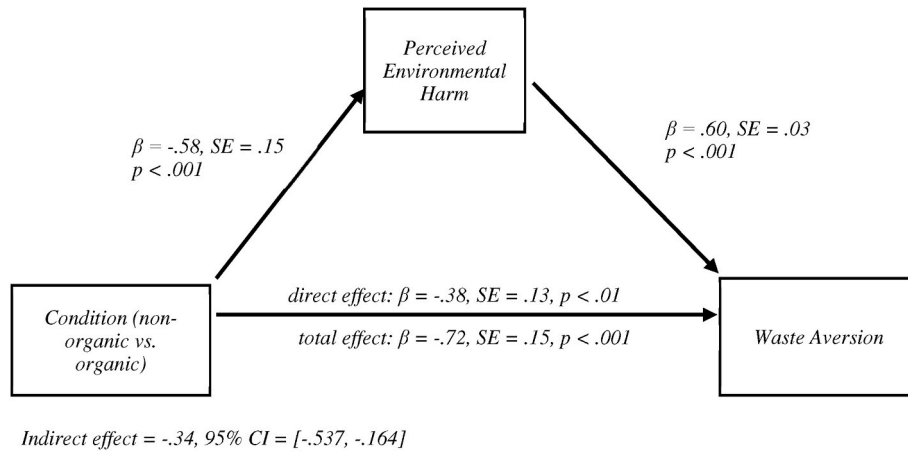


Fig. 1. Study 3: Mediation.

waste of freshwater and groundwater resources. Nearly 125 litres of water are wasted when someone throws away an apple. Wasting an organic apple is as harmful to the environment as wasting a non-organic apple!". The message included the image of a non-organic and an organic apple (with the EU organic logo on it) side by side (see Appendix A for the intervention message). Next, all participants read: "You come home and unpack your groceries including the (organic) apples that you bought" and completed the same three-item waste aversion scale as in the previous studies. We combined and averaged these three items ($\alpha = 0.89$). Next, participants indicated the perceived price of the (organic) apples (1 = very cheap, 7 = very expensive), which was included as a covariate. At the end of the study, all participants answered demographic questions (e.g., age, gender, nationality).

5.2. Results and discussion

A one-way ANCOVA with price perception as a covariate revealed a significant effect of condition on waste aversion ($F(2, 536) = 9.68, p < .001, \eta_p^2 = 0.035$). In support of the proposed underlying process, planned contrasts confirmed that participants were less averse to wasting food in an organic condition compared to a non-organic condition ($M_{\text{organic}} = 3.91, SD = 1.52$, vs. $M_{\text{non-organic}} = 4.64, SD = 1.58$, $t(536) = -4.00, p < .001, 95\% CI = [-1.092, -0.373]$), or compared to an organic intervention condition (vs. $M_{\text{organic intervention}} = 4.42, SD = 1.39$, $t(536) = -3.28, p = .001, 95\% CI = [-0.816, -0.205]$), whereas the non-organic and organic intervention condition did not differ from each other ($t(536) = 1.19, p = .234$). Perceived price, as a covariate, had a significant positive effect on waste aversion ($F(1, 536) = 13.26, p < .001, \eta_p^2 = 0.024, 95\% CI = [0.114, 0.382]$).⁸

The results are consistent with our proposed mechanism providing additional support that consumers perceive wasting organic food to be less environmentally harmful and, therefore, are less averse to wasting it. We do so by blocking the effect with the intervention message (a reminder about the environmental impact of wasting an organic apple) - a pattern that provides evidence of the process by moderation.

⁸ There was a significant effect of condition on perceived price ($F(2,537) = 139.55, p < .001, \eta_p^2 = 0.342$). Participants perceived the apples to be less expensive in the non-organic condition than in the organic ($M_{\text{non-organic}} = 3.71, SD = 1.04$ vs. $M_{\text{organic}} = 5.10, SD = 0.91$, $t(537) = -14.08, p < .001, 95\% CI = [-1.588, -1.199]$), and the organic intervention conditions (vs. $M_{\text{organic intervention}} = 5.19, SD = 0.87$, $t(536) = -14.92, p < .001, 95\% CI = [-1.678, -1.288]$).

6. General discussion

The present research offers the first academic investigation into consumers' aversion to wasting organic food. Our research demonstrates that the nature of the production process (organic vs. non-organic) influences food waste aversion. The results of the four studies consistently indicate that controlling for perceived price differences, consumers are less averse to wasting organic food than non-organic food. The results hold across both healthy and unhealthy food. In addition, we also identify that the effect is driven in part by the differences in perceived environmental harm from wasting organic vs. non-organic food.

Our research makes several contributions. First, we extend the research on organic food by investigating consumer reactions in the disposal stage, a topic that has received little attention in the literature. Previous literature on organic food has largely focused on consumer perceptions, evaluations, and behavior in the prepurchase and purchase stages. However to date, little was known about how consumers dispose of organic food. This work reveals an unintended consequence of environmentally friendly organic food production: consumers are less averse to wasting organic food because they perceive the waste of organic food as less harmful to the environment than the waste of non-organic food. This unintended consequence highlights the importance of considering the full cycle of organic products, from production to disposal.

Second, our research contributes to the food waste literature, by providing evidence that the food production method (organic vs. non-organic) can influence food waste aversion. Prior research has shown that various product attributes, such as price (Arkes & Blumer, 1985; Neff et al., 2015), price promotions (van Lin, Aydinli, Bertini, van Herpen, & Von Schuckmann, 2023), freshness date (Sen & Block, 2009), package and portion size (Block et al., 2016; Petit, Lunardo, & Rickard, 2020), appearance (Trudel & Argo, 2013; Van Giesen & de Hooge, 2019), and serving plate material (Williamson, Block, & Keller, 2016) can impact consumer food waste practices. We extend this literature by demonstrating that when a food product is produced in an environmentally friendly manner, consumers exhibit a decreased aversion to wasting it because they perceive the waste of organic food products as less environmentally harmful.

Paradoxically, our findings also reveal that consumers display heightened aversion to wasting organic food due to its higher price. This is consistent with previous research highlighting the role of financial considerations in avoiding food waste (Graham-Rowe et al., 2014; Neff et al., 2015). As a result, the opposing influences of perceived harm and perceived cost might lead to a lack of observable differences in wasting organic vs. non-organic food (see Appendix B). Nevertheless, our pattern of findings suggests a noteworthy possibility: price reductions in organic food might lead to (unanticipated) increases in food waste. For policymakers, it is crucial to be aware of these opposing forces and anticipate

potential unforeseen outcomes on food waste when aligning the prices of non-organic and organic food (e.g. through financial incentives to make organic food more affordable).

Finally, our findings have implications for policymakers and marketers, when considering that, from the perspective of environmental sustainability, organic products are seen as helping the environment (Müller et al., 2016). Policymakers, non-profit organizations, and marketers have invested a great deal of effort in encouraging consumers to buy more organic products, including creating organic labeling guidelines and communicating organic product benefits for environmental sustainability and people's health, which all have resulted in the growing demand for organic products. Now as the demand for organic products continues to grow, there are also more appeals to make organic food cheaper and more accessible (Aschemann-Witzel & Zielke, 2017). However, the evidence from this research suggests that making organic products more affordable is not always consistent with sustainability objectives.

Consequently, policymakers and marketers should be aware that consumers are less averse to wasting organic food because of perceived environmental harm and that lowering prices of organic food could potentially lead to more food waste. An important recommendation for marketers would be to inform consumers about the environmental consequences of food waste when promoting sustainable organic products. Our research suggests that a simple reminder that wasting organic food is as harmful to the environment as wasting non-organic food mitigates the negative effect of organic food on waste aversion.

6.1. Limitations and future research

Given that our research is the first to investigate how the food production method (i.e. organic vs. non-organic) influences consumer waste aversion, there is more work that needs to be done in future research. A major limitation of our findings is that all studies used hypothetical scenarios to gauge aversion to food waste, rather than examining actual waste behavior. While previous literature has established the link between waste aversion and waste avoidance behaviors (Bolton & Alba, 2012; Le Borgne et al., 2021; Sun & Trudel, 2017) across various food and non-food domains, it is still worthwhile for future research to investigate if our observed effects manifest in actual wasting of organic food, be it in controlled lab settings and/or in the field.

Second, we provide evidence that consumers are less averse to wasting organic food than non-organic food, primarily due to differences in perceived environmental harm from wasting. However, the findings of Study 3 suggest that price perceptions and environmental harm perceptions do not fully explain the effect of organic (vs. non-organic) food on waste aversion. Therefore, future research is needed to investigate other potential mechanisms that may help to explain the impact of the food production method on waste aversion. For instance, given that organic food is produced without chemicals and pesticides, closely associated with purity and naturalness (Lusk & Briggeman, 2009; Schifferstein & Ophuis, 1998), it is plausible that consumers perceive organic food as more prone to spoilage, which may negatively influence their waste aversion.

Third, we observed in Study 2 that participants were more averse to wasting healthy than unhealthy food. This raises the question why so. One potential reason could be that "wasting" unhealthy food is not necessarily seen as negative since it may help people protect their "waist" and thus maintain personal health. This insight raises the possibility that wasting unhealthy food may even serve as a positive self-

signal, signaling one's commitment to self-care. Future research may investigate this phenomenon further, investigating its robustness and exploring potential underlying mechanisms to better understand what drives food waste aversion.

Fourth, our research primarily investigated food waste aversion in the context of one specific sustainable food production method, organic versus non-organic food. However, various food production methods impact the environment, with plant-based foods generally having lower emissions than animal-based foods (Tilman & Clark, 2014; Clune, Crossin, & Verghese, 2017). Therefore, future research may examine waste aversion across different food production methods, considering their perceived and actual environmental impact. This could include comparisons between plant-based and animal-based foods or fresh and processed foods.

Finally, in Study 3 we observed a positive correlation between the perceived price of a food product and the perceived environmental harm associated with its waste. The higher the perceived price of a food product, the more harm people expect from its waste. Thus, it appears that consumers associate the waste of more expensive foods with greater environmental consequences. Further research is needed to gain a deeper understanding of this relationship and its impact on consumer food waste practices.

6.2. Conclusion

In conclusion, the present research provides the first academic investigation into the effect of food production method (organic vs. non-organic) on consumers' reactions during the food disposal stage, a topic that has not been addressed yet in the literature. Our findings contribute to the literature on organic food and food waste aversion, revealing that (1) controlling for perceived price differences, consumers are less averse to wasting organic food than non-organic food, (2) the results apply to both healthy and unhealthy food, and (3) the effect is driven in part by differences in perceived environmental harm from wasting organic vs. non-organic food. From a practical perspective, these findings have important implications for policymakers and marketers. They not only provide insight into how sustainable food production methods (organic vs. non-organic) impact food waste aversion but also suggest a simple intervention strategy to mitigate consumers' reduced aversion to wasting organic food compared to non-organic alternatives.

Author statement

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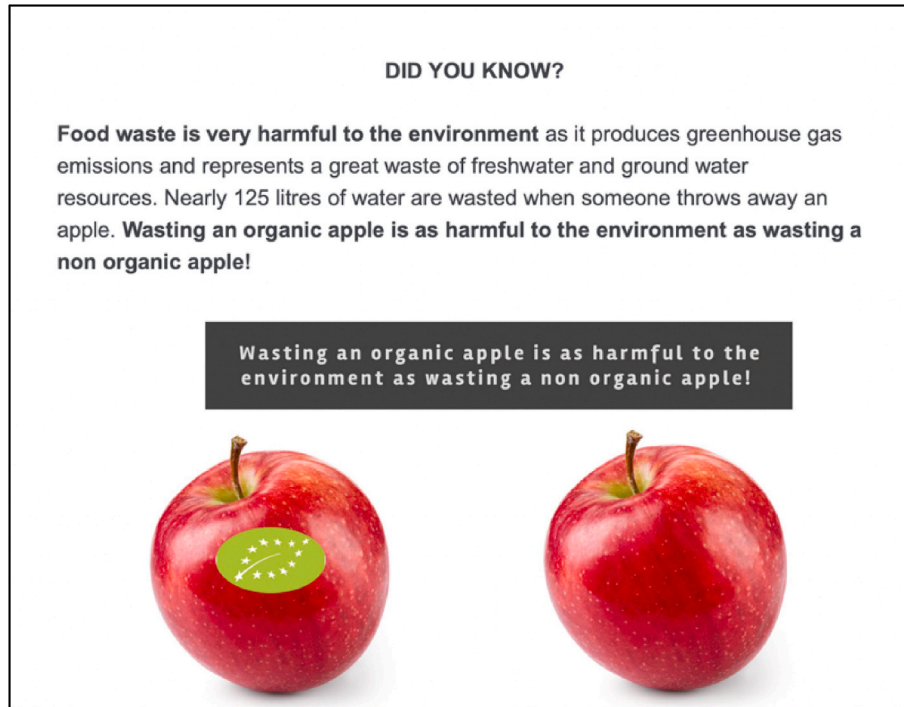
Author note

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Declarations of interest

None.

Appendix A. A Reminder Message About Environmental Harm in the Organic Intervention Condition in Study 4



Appendix B. Main Results with and without Controlling for Perceived Price Differences

	Adjusted Means Controlling for Perceived Price Differences				Raw Means without Controlling for Perceived Price Differences ^a			
	Non-organic M (SD)	Organic M (SD)	Organic Interv. M (SD)	p-value	Non-organic M (SD)	Organic M (SD)	Organic Interv. M (SD)	p-value
Study 1, N=413								
Waste Aversion	4.95 (1.48)	4.21 (1.55)		p < .001	4.63 (1.48)	4.52 (1.55)		p = .460
Study 2, N=497								
Waste Aversion	4.26 (1.62)	3.74 (1.61)		p = .002	4.06 (1.62)	3.94 (1.61)		p = .403
Study 3, N=654								
Waste Aversion	4.56 (1.48)	3.84 (1.64)		p < .001	4.28 (1.48)	4.11 (1.64)		p = .160
Environmental Harm	4.68 (1.40)	4.11 (1.52)		p < .001	4.44 (1.40)	4.34 (1.52)		p = .380
Study 4, N=540								
Waste Aversion	4.64 (1.58)	3.91 (1.52)	4.42 (1.39)	p < .001	4.40 (1.58)	4.01 (1.52)	4.54 (1.39)	p = .002

^a Whereas the majority of results turns out to be insignificant when not controlling for perceived price differences, this should not be interpreted as evidence against the existence of the demonstrated effect, but rather as a confirmation that the a priori decision to include price perceptions as a covariate was effective (Meyvis & Van Osselaer, 2018).

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