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When product attitudes go to waste:

Wasting products with remaining utility decreases consumers' product attitudes

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Abstract

23 Consumers regularly waste products with unused utility (e.g., edible food, functioning
24 appliances), but also have an aversion to such wastefulness. The present paper demonstrates
25 that this wasting conflict has relevant managerial implications. Drawing upon cognitive
26 dissonance theory, the authors predict and reveal in three experiments that brand attitudes for
27 everyday mundane products can suffer when the unused utility of such products is wasted.
28 Two scenario studies show that wasting a product with unused utility leads to feelings of
29 discomfort (Experiment 1), and to lower product attitudes (Experiment 2). A final study
30 (Experiment 3) replicates the effect on brand attitudes in an actual consumption situation.
31 Moreover, it shows that brand visibility is a moderator in this process: wasting tends to lead to
32 lower brand attitudes when the brand is visible at the moment of wasting, but not when the
33 brand is not visible. Collectively, these experiments provide novel insights into how and when
34 the generation of waste can have detrimental effects on brand attitudes, demonstrating the
35 importance of consumer waste acts for industry.

36 Keywords: Waste, Attitude, Cognitive Dissonance, Discomfort

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1. Introduction

In 2014, the total generation of waste in the European Union (28 countries) by all economic activities and households amounted to 2 598 million tons (Eurostat, 2016). This high level of waste is considered problematic from multiple perspectives, as it has unfavorable environmental, economical, and social consequences (Rockstrom et al., 2009). One of the main sources of waste generation appears to be the waste behavior of consumers (Griffin, Sobal & Lyson, 2009; Xue et al., 2017). Households are estimated to be responsible for about 82% of the total amount of municipal solid waste (Eurostat, 2016), amounting to 463.3 kilograms of waste per person per year in the European Union and 622.5 kilograms in the US (Karak, Bhagat, & Bhattacharyya, 2012). Of particular concern is the waste of 'unused utility': the throwing away of still-functioning consumer appliances, of unused products, and of edible food items. For example, electronic waste is a fast growing waste stream, partly due to psychological obsolescence that induces product replacement before technical failures occur (Echegaray, 2016). As a consequence of this wastefulness of consumers, there is a tendency to position consumer culture as a 'throwaway society', in which "current volumes of waste generation [are taken] as incontrovertible evidence for the excessive, wanton nature of contemporary consumerism" (Evans, 2012, p. 42).

Yet, empirical evidence consistently indicates that, despite individual differences between consumers in understanding of the issue (Richter, 2017), wasting is not a careless or carefree activity for many consumers. Research across various domains suggests that consumers have an aversion to waste generation. Sociological food research has uncovered that consumers follow complex procedures to manage the residual value of discarded food

items in an attempt to lessen anxieties and concern about wastage (Evans, 2012). Consumers tend to feel that good food cannot be thrown out, and describe themselves as worrying and feeling bad or guilty about wasting food (Abeliotis, Lasaridi, & Chroni, 2014; Qi & Roe, 2016). Relatedly, research in consumer psychology has shown that waste aversion can lead consumers to forego desired utility or to make choices that are contrary to their economic self-interest. That is, consumers favor options with less perceived unused utility (Bolton & Alba, 2012), persevere in a failing project when stopping would involve the generation of waste (Arkes, 1996), and forgo additional free food or drink in ‘any size same price’ promotions (Moore & Taylor, 2010). In sum, despite the continuous generation of household waste (Karak et al., 2012), and despite that consumers tacitly accept that waste is an inevitable consequence of consumption (De Coverly, McDonagh, O’Malley, & Patterson, 2008), consumers feel that generating waste is undesirable.

The current study examines whether the existence of consumer aversion to wastefulness can have negative consequences for consumers’ attitudes towards products, and under which circumstances this effect may occur. Such findings would reveal that waste behavior not only has environmental, economical, and social implications, but also managerial implications for manufacturers, for whom product attitudes are of vital importance. Drawing upon the theory of cognitive dissonance (Festinger, 1957), we aim to show that product attitudes can suffer when a product is wasted, and thereby to contribute to a recent and growing stream of literature on product waste (Kallbekken and Sælen, 2013; Stefan et al., 2013). Moreover, as Trudel and colleagues (2016) have shown that products that are linked to a consumers’ identity are more likely to be recycled rather than thrown in the trash, the current study extends insights on consumer wasting behavior by showing that trashing an everyday, mundane product that is *not* linked to a consumer’s identity can result in lowered evaluation of this product.

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2. Waste

The current study focuses on waste that still possesses value. In line with Bolton and Alba (2012), we examine the unused (or “leftover”) utility of a product that goes unconsumed. Thus, whereas both throwing away a food container that still holds leftovers and throwing away an emptied food container would lead to the generation of waste, there is an important difference in the unused utility that is wasted, in this case in the form of uneaten food. Even though the emptied container in itself could potentially have utility left, the unused utility is more prominent for the uneaten food. In Western consumer society, a system has emerged that protects consumers from observing the (unused) utility of their waste. Putting waste in trash cans makes it less visible: “the trash can becomes iconic, absolving those who use them from the rubbish they have created” (De Coverly et al., 2008, p. 296). This can be seen as a corollary of paradigmatic consumption, in which consumer burdens are taken over by technological advances (Borgmann, 2000). Consumers are freed from discomfort, at the expense of less engagement with material reality.

Yet, a confrontation with waste still leaves people feeling uncomfortable (De Coverly et al., 2008). We propose that such feelings of discomfort when encountering waste can have negative consequences for product attitudes. Until now, there is only one study that provides an indication that wasting products may have an effect on attitudes (Roper & Parker, 2013). Yet, this study focused on how seeing littering of emptied fast-food packaging on the streets could influence brand evaluations, and does not concern the self-generated waste of products with unused utility. Cognitive dissonance theory (Festinger, 1957) may provide an explanation of when and why waste can decrease product attitudes in situations where consumers waste the product themselves.

3. Cognitive dissonance

Following its introduction by Festinger in 1957, cognitive dissonance theory has become one of the most influential theories in social psychology (Starzyk, Fabrigar, Soryal, & Fanning, 2009; Wakslak, 2012) and one of the key concepts relevant for pro-environmental behavior (MacDonald & She, 2015). The core idea of cognitive dissonance theory is that the occurrence of “non-fitting” or dissonant relations among cognitive elements (which could entail attitudes, beliefs, or behaviors) is unpleasant and leads to a state of psychological discomfort. This psychological discomfort gives rise to pressures to reduce the dissonance between the cognitive elements and to alleviate discomfort (Elliot & Devine, 1994), for instance by changing behavior, changing cognitions, or by exposure to new information.

In the current context, consumers are waste-averse, but still waste unused utility. By obtaining ownership of products, consumers are in possession of the utility that these products entail (Bolton & Alba, 2012), and discarding unused utility is dissonant with the perception of remaining value. Hence, discarding unused utility is psychologically discomforting (Evans, 2012; Graham-Rowe, Jessop, & Sparks, 2014) and can generate negative emotions (Trudel et al., 2016). For instance, Evans (2012) concludes that people “... appeared not to hold a callous or careless disregard for the food that they waste. To the contrary, the process of ridding was shown to be anxiety laden...” (p. 52). We presume that the level of dissonance from discarding a product is related to the value of the unused utility that is wasted. Mundane products that can be obtained almost effortlessly and that seem limitlessly available can lead consumers to feel disengaged from them (Borgmann, 2000), and are usually perceived as less valuable than products that require effort to obtain. In the present study, we examine such mundane products as a stringent test for our proposed effect of product wastage on feelings of discomfort and on product attitude.

When consumers discard a product with unused utility, this utility is not necessarily wasted. There are different disposition behaviors possible, such as throwing the product away, giving it away, donating it to charity, trading it, recycling it, and selling it (Harrell & McConocha, 1992). Only after throwing the product away, the unused utility is completely wasted. For the other types of disposition behaviors, some or all of the unused utility is transferred to another consumer or to future use, and the level of dissonance and subsequent psychological discomfort should be lower than if the unused utility is lost forever. This is in line with prior research showing that consumers increase their paper usage when the option to recycle is available (Catlin & Wang, 2013). The possibility to recycle products with unused utility presumably avoids the psychological discomfort associated with wasteful consumption, such as feelings of guilt, because recycling signals that at least part of unused utility will be re-used. Similarly, selling products with unused utility on a local market, donating such products to second-hand stores or charity, or cutting up products to use it in different ways should all avoid the psychological discomfort that is felt when throwing the product away. Indeed, in an exploratory study, donating a product to charity or passing it on to an acquaintance has been associated with positive feelings of helping someone (Harrell & McConocha, 1992). Therefore, we expect that:

H1: Wasting a product with unused utility will lead to higher levels of discomfort compared to other ways of disposing the product.

4. Resolving dissonance through product attitude

The way in which dissonance is resolved depends upon how easily cognitive elements such as attitudes, beliefs, or behaviors, can be altered (Gosling, Denizeau, & Oberlé, 2006; Simon, Greenberg, & Brehm, 1995; Starzyk et al., 2009). Because in general attitudes can be altered more easily than behaviors, attitude change is a common way in which people reduce

dissonance (Galinsky et al., 2008). This would imply in our waste context that, rather than reducing their waste generation, consumers may form a lower attitude towards the product to resolve cognitive dissonance and subsequent feelings of discomfort. We thus expect that:

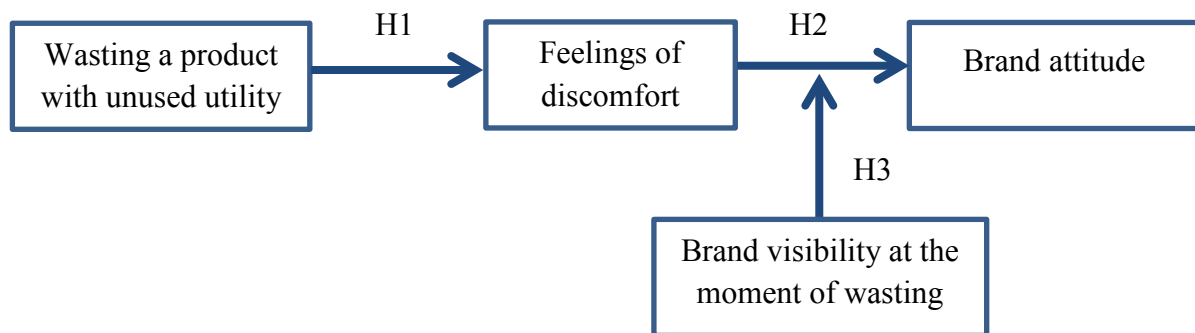
H2: Wasting a product with unused utility will lead to lower product attitudes compared to not wasting the product or to other ways of disposing the product.

Attitude change is both a common way to reduce dissonance (Galinsky et al., 2008) and relevant for managers. Yet, it is not the only way to reduce dissonance: dissonance reduction may also occur for example by adding consonant elements to the conflict or by trivializing the conflict (Festinger, 1957; Gosling et al., 2006; Simon et al., 1995). The likelihood that consumers will resolve the dissonance between ‘liking a product’ and ‘throwing a product with remaining unused utility in the waste’ by lowering product attitudes should be higher when it is easier for consumers to devalue the product compared to using other modes of dissonance reduction. For example, dissonance reduction through attitude change should be more likely when the brand itself is more salient when wasting the product. When wasting a product, consumers can be reminded of the product and brand name through packaging or the presence of the brand name on the product itself (e.g., throwing away food in the original packaging or electronic devices with the brand name on its exterior). Alternatively, consumers may dispose of products for which the brand name is not visible (e.g., throwing away food scraps from plate leftovers or unlabeled clothing items). Visibility of the brand will act as a reminder of the brand name, and thus will make brand devaluation more accessible as a dissonance reduction strategy. Therefore,

H3: The effect of wasting a product with unused utility on attitudes should be stronger when the brand is visible compared to when the brand is not visible at the moment of wastage.

Figure 1 provides a conceptual framework of our hypotheses, which are tested in three experiments. Because prior research on the relation between disposition behaviors and feeling of psychological discomfort is relatively scarce, Experiments 1A and 1B empirically examine this relationship in two distinctly different product categories (books and foods) to establish generalizability of the effect (H1). Building upon these findings, Experiment 2 establishes the proposed effect that product attitudes suffer when a product is wasted (H2). Experiment 3 investigates an actual consumption and wasting situation to replicate the effect in a realistic context, and studies the role of the moderator brand visibility (H3).

Figure 1. Conceptual framework



5. Experiments 1A and 1B: Waste and feelings of discomfort

The objective of Experiments 1A (books) and 1B (food) is to assess feelings of discomfort resulting from four different ways of disposing a product with unused utility (hypothesis 1). These involve the complete wasting of the product's remaining utility, wasting while preserving some value through recycling, transfer of unused utility for the original intended purpose and transfer of utility for a different purpose. Throwing a product in the garbage implies that unused utility is completely wasted, whereas recycling or composting

ensures that some utility is kept (cf. Catlin & Wang, 2013). Therefore, recycling or composting should lead to slightly lower discomfort compared to throwing a product in the garbage. Transferring utility through gift giving may be associated with positive feelings of helping others (Harrell & McConocha, 1992), and should lead to the lowest feelings of discomfort. By comparing these four ways of product disposal, we can thus assess whether wasting more of a product's utility leads to higher levels of psychological discomfort.

5.1. Method

Participants. Participants were students (Experiment 1A: $N = 96$ (after excluding non-students); 61.5 % female, $M_{\text{age}} = 21.7$; Experiment 1B: $N = 311$ (after excluding one participant who indicated to have misinterpreted questions); 47.6 % female, $M_{\text{age}} = 20.41$ years). They were recruited around campus using flyers (Experiment 1A, pen-and-paper study) or participated in partial fulfilment of a course requirement (Experiment 1B, online study).

Study design. Participants were randomly assigned to one of four groups of a between subjects design. The setup of both experiments consisted of two phases: (1) participants read one out of four scenarios and (2) participants answered questions on feelings of discomfort.

Scenarios. In Experiment 1A, participants imagined that they would go abroad and, while going through their belongings, decided to dispose of a series of 10 books. In Experiment 1B, participants imagined having food leftovers after a party (for exact scenarios see the methodological details appendix). Depending on the condition, participants imagined that they (Experiment 1A / Experiment 1B):

1. threw the books with the garbage / put the leftover food in the bin (Waste condition);
2. threw the books in the paper recycling bin / put the leftover food in a home composting bin (Recycling condition);

3. took the books to an exchange point for books, so others could take these / put the leftover food in the fridge for their roommate (Transfer for original purpose condition);
4. took the books to an art collective to be used in artworks / put the leftover food in a bucket for their roommate to give to animals in the zoo where he/she works (Transfer for different purpose condition).

Care was taken to ensure that no interaction with other people was indicated in the scenarios, and that the effort of disposal was equal across conditions. Experiment 1A mentioned that the disposal point was at approximately 5 minutes of distance, and Experiment 1B used in-home disposal points.

Measures. After reading the scenario, participants answered questions on discomfort feelings (3 items cf. Elliot & Devine, 1994). In Experiment 1A, the items were: ‘I would feel at ease – uncomfortable’, ‘it would not bother me – it would bother me’, ‘I would not have an uneasy feeling about it – I would have an uneasy feeling about it’, on scales ranging from 1 to 9, $\alpha = .94$. In Experiment 1B the latter item was rephrased into ‘bad – good’ and questions were answered on a slider ranging from 0 to 100, $\alpha = .90$. Items were recoded, such that higher scores reflected more discomfort, and averaged into one measure. Experiment 1A included some additional questions, as described in the methodological details appendix.

5.2. Results and discussion

As expected, felt discomfort depended upon the manner of product disposal ($F(3, 95) = 8.77, p < .001$ in Experiment 1A and $F(3, 307) = 46.92, p < .001$ in Experiment 1B; see Table 1 for means and standard deviations). Results showed that wasting and recycling led to higher feelings of discomfort than when utility was transferred to another person or for another purpose. Contrast analyses showed that wasting and recycling did not significantly differ from

each other in Experiment 1A (book experiment; $t(92) = 1.34, p = .18$), and marginally significantly differed in Experiment 1B ($t(307) = 1.84, p = .07$). The two ways of transferring utility did not significantly differ from each other (Experiment 1A: $t(92) < 1, p = .69$; Experiment 1B: $t(307) = 0.29, p = .77$), whereas wasting and recycling significantly differed from both ways of transferring utility (Experiment 1A: all $t_s(92) > 2.75, p_s < .01$; Experiment 1B: all $t_s(307) > 7.29, p_s < .01$).

Table 1. Feelings of discomfort in Experiments 1A and 1B

Condition	Experiment 1A (books)		Experiment 1B (food)	
	<i>N</i>	<i>M (SD)</i>	<i>N</i>	<i>M (SD)</i>
Waste	19	6.30 (2.32) ^a	78	65.42 (23.92) ^a
Recycling	25	5.39 (2.21) ^a	79	58.41 (22.20) ^a
Transfer for original purpose	27	3.41 (2.41) ^b	79	30.69 (23.70) ^b
Transfer for different purpose	25	3.65 (1.97) ^b	75	29.95 (25.70) ^b

Note: Feelings of discomfort could range from 1 to 9 in Experiment 1A, and from 0 to 100 in Experiment 1B. Higher scores reflect stronger feelings of discomfort. Within each experiment, rows with different superscripts differ significantly, with $t_s > 2.75, p_s \leq .01$. For Experiment 1B, the Waste condition differed marginally significantly from the Recycling condition, $t(307) = 1.84, p = .067$.

Consumers thus have an aversion to throwing away unused utility, indicated by feelings of discomfort, whereas transferring utility to another consumer does not lead to similar feelings of discomfort. This effect occurs irrespective of whether the transferred utility is used in its originally intended purpose or not. It is thus the act of wasting versus transferring utility that matters, not what exactly happens with the product afterwards. The marginally significant

difference between wasting and composting food (1B) is in line with prior research showing that recycling versus wasting affects consumption decisions (Catlin & Wang, 2013). A potential explanation for the lack of a significant difference between wasting and recycling in Experiment 1A could be the product category that was used. For books, the product itself degrades only little due to consumption, and the salient remaining utility is destroyed in the recycling process. For other product categories, differences between wasting and recycling may be larger.

6. Experiment 2: Waste and product attitude

The objective of this experiment is to test whether wasting unused utility leads to lower product attitudes (H2), and to rule out two alternative explanations for our findings. By providing information about product attributes and the consumption experience, participants have a basis for constructing their attitude, but we still expect that the act of wasting leads to lower attitudes.

Prior research has shown that consumers believe that disgusting products can transfer their offensive properties through physical contact with other products (Morales & Fitzsimons, 2007). In our case, a (dirty) waste bin could elicit feelings of disgust, which might be transferred to the wasted products. Consequently, the transferred feelings of disgust could reduce product attitudes. To rule out this alternative explanation for our findings, the experiment compares a condition with product waste to a condition without product waste. In both conditions, the product packaging (either containing leftover product or no leftover product) is thrown in the bin. For the transfer of disgust to occur, whether a wasted product container contains unused product utility or has been fully emptied should not matter, leading to comparable product attitudes in both cases. On the contrary, our hypothesis based on cognitive dissonance theory suggests that wasting a product container with unused product

utility creates *more* cognitive dissonance compared to wasting an emptied container.

Consequently, we expect a lower product attitude for the container with leftover product than for the emptied container.

Moreover, experiment 2 includes the reason why a product is wasted, to rule out the possibility that the effect of wasting on product attitude is caused by the attribution of waste to the company, rather than by cognitive dissonance. Leftover products can be wasted due to consumers themselves (e.g., lack of storage space or transportation capacity) or due to the product (e.g., packaging preventing long-term storage or transportation). Consumers often spontaneously construct attributions of blame when a product is faulty (Klein & Dawar, 2004), and in the current case, they may blame the brand when the product container prevents storage of unused product utility. The explanation of attribution to the company would predict that product attitudes are affected more strongly when the reason for waste is the container compared to when the reason for waste is the consumer (i.e., an interaction effect between reason for waste and type of waste). On the contrary, our cognitive dissonance hypothesis predicts that wastage should lead to discomfort and affect product attitude regardless of the reason for wasting. We thus expect no significant interaction effect between reason for waste and type of waste.

6.1. Method

Participants and design. Participants were recruited by e-mail from a list of students who had signed up for participation in studies, and by distributing flyers around campus. Participants were randomly assigned to one of the conditions of a 2 (type of waste: package only vs. product) x 2 (reason for waste: self vs. product) between-subjects design. After deleting one person who attended the study twice in different sessions and one non-student, the dataset contained 93 participants (53.8 % female; $M_{\text{age}} = 21.8$ year). Data collection was

part of a lab session in which participants also answered questions for another, unrelated, study.

Procedure and measures. Participants read a scenario and answered questions on a laptop. In the scenario, they were asked to imagine buying a new drink in the university canteen. The drink was from the fictitious brand Rhoon, with an apple-cranberry flavor. Participants imagined that they drank a bit more than half of the bottle before their thirst disappeared. Upon noticing the time, they realized that they had to hurry home to meet friends. Wanting to take the remainder of the drink home, they discovered that they could not save the leftover either because they did not bring a bag (Self-caused waste condition) or because the bottle could not be closed again (Product-caused waste condition). As a consequence, the scenario either had the participant throwing away the half emptied bottle in a dirty bin (Product waste condition) or gulping down the remainder of the drink and throwing the emptied bottle in a dirty bin (Package only waste condition).

To test H2, product attitude was measured by asking participants to score their impression of the drink on five semantic differentials: “unenjoyable – enjoyable”, “awful – nice”, “disagreeable – agreeable”, “useless – useful”, and “worthless – valuable” (ranging from 1 to 7, based on Batra & Ahtola, 1991; $\alpha = .82$). Although our conceptual model does not include repurchase intentions, it is possible that changes in product attitude also affect repurchase intentions (Ajzen, 1985; Trivedi, Patel, & Acharya, 2018). Therefore, repurchase intentions were measured by asking participants what they would do if they saw the drink in the cafeteria, with 3 items: “definitely not buy – definitely buy”, “definitely would not try – definitely would try”, and “would definitely not recommend to friends – would definitely recommend to friends” (ranging from 1 to 7, $\alpha = .74$). Summary scores for the scales were constructed by averaging across the items. Participants also answered questions concerning the realism of the scenario (two items: “The description was detailed enough for me to

imagine the situation” and “the situation was described in a realistic way”, on 7-point scales ranging from totally disagree (1) to totally agree (7)). As background information, participants answered questions on perceived package size, general affect, and prior experience with the situation and type of drink described in the scenario (see methodological details appendix). Finally, participants reported demographics and could select a free snack product as reward for their participation.

6.2. Results and discussion

Concerning the realism of the scenario, participants reported that the scenario contained enough detail ($M = 4.82$) and was described in a realistic way ($M = 4.99$). The realism measures did not differ across conditions (none of the main or interaction effects was significant; all F s < 1).

A 2 (type of waste: package only vs. product) x 2 (reason for waste: self vs. product) between-subjects ANOVA showed the expected main effects of both type of waste ($F(1, 88) = 5.55, p = .02, \eta_p^2 = .06$) and reason for waste ($F(1, 88) = 7.32, p = .01, \eta_p^2 = .08$) on product attitudes (see Table 2 for results). Participants who wasted a partially-filled bottle reported lower product attitudes ($M = 4.24$) than participants who wasted an emptied bottle ($M = 4.71$). Additionally, participants who attributed the waste to the product had lower product attitudes ($M = 4.20$) than participants who attributed the waste to themselves ($M = 4.73$). Supporting our reasoning, there was no significant interaction ($F(1, 88) = .02, p = .89$).

For repurchase intentions, only the type of waste had a significant effect ($F(1, 88) = 4.16, p = .044, \eta_p^2 = .05$; $F(1, 88) = .37, p = .55$ for reason for waste and $F(1, 88) = .27, p = .61$ for the interaction). In line with the attitude results, participants indicated lower repurchase intentions when they wasted a partially-filled bottle ($M = 3.82$) than when they wasted an emptied bottle ($M = 4.28$). Thus, the effects of wasting in this experiment were

strong enough to not only affect product attitudes, but also to spill over into repurchase intentions.

Table 2. Product attitudes and purchase intention in Experiment 2

Dependent variable	Waste condition			
	Product waste		Packaging only waste	
	Self-caused	Product-caused	Self-caused	Product-caused
	<i>N</i> = 24	<i>N</i> = 24	<i>N</i> = 23	<i>N</i> = 22
Product attitude	4.62 (1.02)	3.98 (1.03)	4.95 (0.94)	4.45 (0.73)
	4.29 (1.07)		4.71 (0.87)	
Repurchase intention	3.87 (1.26)	3.81 (1.18)	4.41 (0.88)	4.15 (0.97)
	3.84 (1.21)		4.28 (0.93)	

Note: Brand attitude and repurchase intentions could range from 1 to 7. Cells contain means with standard deviations between brackets.

Experiment 2 demonstrates that wasting unused product utility can result in lower product attitudes. We do not find evidence for a transfer of disgust as the underlying process: participants experienced more positive product attitudes when only the product container was wasted compared to when a product container with unused utility was wasted. The absence of an interaction effect between type of waste and the reason for waste further supports our predicted underlying process of cognitive dissonance.

7. Experiment 3: Actual consumption and waste

7.1. Method

The main objective of Experiment 3 is to investigate the influence of product waste on attitudes in a real product consumption and wasting situation, to generalize our results beyond the imagined situations sketched in the previous experiments. In addition, we test the moderating effect of brand visibility (H3). We expect that when the brand is visible, and thus more salient at the time of product disposal, it will increase the likelihood that consumers resolve their cognitive dissonance by devaluing the brand. We test this in a situation with multiple products of the same brand, to extend effects from product attitudes (Experiments 1 and 2) to general brand attitudes. Brand attitudes should be more affected by a wasteful act when the brand is visible than when it is not visible at the moment of product disposal.

In Experiment 3, a condition in which leftover products are wasted is compared to a condition in which leftover products can be left for future usage. This allows us to rule out self-perception as an alternative explanation. According to self-perception theory (Bem, 1968), people often infer their attitude from their behavior, in a similar way as an outside observer would. In the current context, self-perception theory would suggest that not consuming the entire product leads consumers to infer that they probably did not like the product. To prevent such inferences from affecting our results, all conditions contain leftover products. Constructed attitudes based on self-perception of the behavior should therefore not differ between conditions, and differences found instead are likely due to the cognitive dissonance resulting from the waste of unused utility.

Participants and design. Participants were 124 students (72.6 % female; $M_{\text{age}} = 22.2$ years), who were randomly assigned to one of the conditions of a 2 (waste: yes vs. no) x 2 (brand visibility: yes vs. no) between-subjects design ($N_{\text{waste, brand not visible}} = 32$; $N_{\text{no waste, brand not visible}} = 30$; $N_{\text{waste, brand visible}} = 33$; $N_{\text{no waste, brand visible}} = 29$). Participants were recruited by e-mail

and flyers, with eating a free salad as the reward for participation.

Procedure and measures. Participants were seated in individual cubicles and provided with various ingredients: lettuce, croutons, pickles, nut mix, pearl onions, and a dressing. A salad was chosen because this allows participants to put in some effort in preparing the product, and because salads are among the most thrown away food categories (Quested et al., 2011). The branded salad ingredients all carried the same brand name (Markant), a relatively unknown retail brand in the city where the study was run. Ingredients were provided in bowls (see Appendix A for the setup). In the Brand visible condition, the emptied product containers with the brand name were visibly placed next to the bowls. In the Brand not-visible condition, only the unlabeled bowls were provided. In both conditions, participants were made aware of the brand name in the instructions.

Participants filled a bowl with salad to eat later on during the experiment. The amount of ingredients provided was large enough to ensure that there were leftover ingredients, and as a result only two participants used all ingredients (both in the Waste condition). Disregarding these participants in our analyses did not change the pattern of results. The salad itself was fully consumed by all participants, so leftovers consisted only of unused ingredients from preparing the salad.

In the Waste condition, participants were told that unused ingredients could not be used further. Dissonance is more likely to occur when people have the perception that they freely choose the behavior rather than when they have been told by someone else to perform a behavior (Harmon-Jones, 2000). When people feel as if they have no choice but to engage in counter-attitudinal behavior, this can ameliorate their felt psychological discomfort and can provide a plausible explanation for the behavior, thereby eliminating the need to adjust attitudes (Galinsky et al., 2008). Therefore, we aimed to provide a feeling of choice by giving participants the opportunity to ask for a sandwich bag to take unused ingredients home.

Because participants had to explicitly ask for the sandwich bag, and because this is an inconvenient way of transporting ingredients, most participants discarded the leftovers in the waste bin. Only six participants asked for a bag and took ingredients home (one took some ingredients home and discarded other ingredients; five participants took all remaining ingredients home. Disregarding the participants who asked for a bag in the analyses resulted in the interaction effect of waste x visibility on attitudes becoming marginally significant). Participants were asked to put unused ingredients in a bin that was provided to them. In the No-waste condition, participants were likewise given the opportunity to take unused ingredients home, but could also leave the ingredients on the table for future participants to use. None of the participants in this condition took ingredients home.

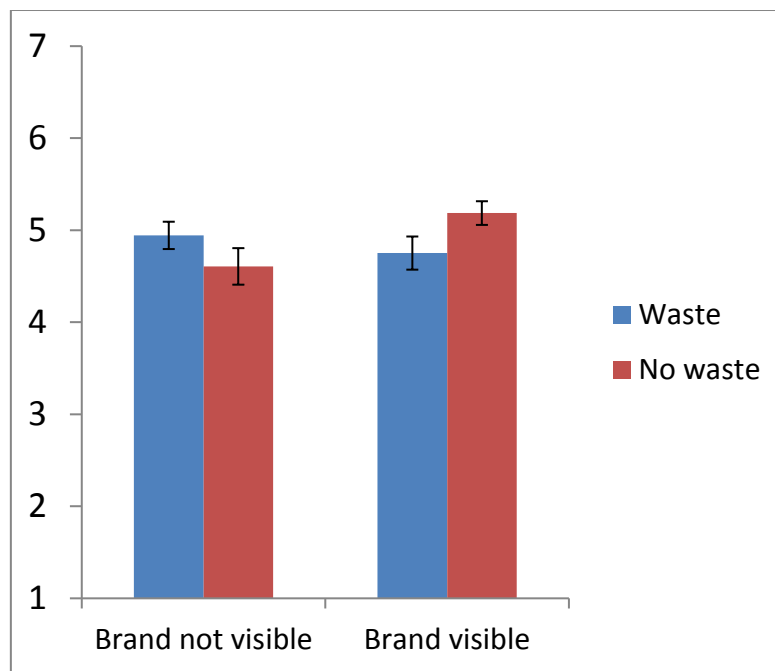
Next, participants answered questions concerning liking of the ingredients for each ingredient separately (ranging from not at all tasty (-3) to very tasty (3)). Brand attitude was measured with the items from Experiment 2 (ranging from -3 to 3; $\alpha = .89$). After eating the salad, participants answered background questions on their salad-eating habits ("How often do you prepare a salad for yourself?" ranging from never (-3) to very often (3)), how much they liked the salad ("How tasty was the salad you just prepared?" ranging from not at all tasty (-3) to very tasty (3)), and their perception of the amount of ingredients provided ("The amount of ingredients was too much for my salad" and "The content of the ingredient packages was too large", ranging from completely disagree (-3) to completely agree (3); $\alpha = .64$). These items were interspersed with other questions (e.g., on eating organic food) to obscure the focus of the study (see methodological details appendix). For all scales, summary scores were calculated by averaging across the items. In addition, items that were rated on -3 to 3 scales by participants were recoded into 1 to 7 scales, to ensure consistency with Experiment 2.

7.2. Results and discussion

Background. Most participants (82.3 %) indicated that they ‘sometimes’ to ‘often’ prepare a salad for themselves. None indicated that (s)he had never made a salad before, so the task was familiar to all participants. In general, participants liked the salad that they prepared and subsequently ate ($M = 5.56$; $SD = 1.00$), and, as we would expect, liking of the salad did not significantly differ between conditions (all $ts < 1$).

Perception of ingredient amount. The perception of the amount of ingredients received a score around the midpoint of the scale ($M = 3.37$; $SD = 1.05$), indicating that participants perceived these as generous but not overly so. An ANOVA revealed only a significant main effect of waste ($F(1, 120) = 5.26$, $p = .024$, $\eta_p^2 = .04$; $F(1, 120) = 0.22$, $p = .64$ for brand visibility, and $F(1, 120) = 1.73$, $p = .19$ for the interaction). Participants who wasted ingredients perceived the amount of ingredients as more excessive ($M = 4.05$; $SD = 1.74$) than participants who could leave the ingredients for future use ($M = 3.37$; $SD = 1.49$).

Brand attitude. Although there were no main effects of brand visibility and waste on brand attitude ($F(1, 120) = 0.09$, $p = .77$ and $F(1, 120) = 1.34$, $p = .25$, respectively), the results showed the predicted waste x visibility interaction effect ($F(1, 120) = 5.32$, $p = .023$, $\eta_p^2 = .04$; see Figure 2). This revealed that there was an effect of waste, albeit one that depended on whether the brand was visible or not. Contrast analyses showed that when the brand was visible, participants reported marginally lower brand attitudes when wasting the ingredients ($M = 4.75$; $SD = 1.03$) compared to when saving the ingredients for future use ($M = 5.19$; $SD = 0.70$; $t(120) = 1.84$, $p = .07$). When the brand was not visible, wasting ($M = 4.94$; $SD = 0.94$) or saving the ingredients for future use did not significantly affect brand attitudes ($M = 4.61$; $SD = 1.09$; $t(120) = 1.43$, $p = .16$).

Figure 2. Effects of waste and brand visibility on brand attitudes in Experiment 3

Discussion. The findings of Experiment 3 provide further support that wasting unused utility can lead to lower brand attitudes. In a consumption situation, participants reported lower brand attitudes when wasting unused products with a visible brand name, replicating the findings of Experiment 2. Effects on brand attitudes were not significant when the brand was not visible, which supports our proposed process.

8. General discussion

8.1. Conclusions of the findings and theoretical implications

The current research demonstrates how consumer wasting can have severe consequences for manufacturers. Wasting products with unused utility, even when these products are mundane, can lead to feelings of discomfort. Consequently, consumers tend to decrease their attitude towards the wasted product. These negative effects especially occur when the brand is visible at the moment of wasting, suggesting that the present findings may apply in all contexts where unused utility is wasted in a packaging that contains a brand name.

The current findings provide support for cognitive dissonance as the underlying process, whereby “non-fitting” relations between the unused utility of a product and the act of wasting result in feelings of discomfort. At the same time, the current findings do not support the processes of self-perception, transfer of disgust, and causal attribution to the brand. Experiment 3 reveals that attitude devaluation results from wasting a product with unused utility, but not from transferring this unused utility to another person, ruling out self-perception. In Experiment 2, attitude devaluation does not occur for an emptied container with little or no unused utility, making transfer of disgust an unlikely process as well. Finally, Experiment 2 reveals that attitude devaluation occurs regardless of whether the consumer or the packaging is the reason for the act of wasting, ruling out the process of causal attributions to the brand. Overall, cognitive dissonance thus appears to be a pertinent process in the effect of wasting unused product utility on attitudes.

Importantly, our findings reveal that different forms of disposal can generate different levels of discomfort. Multiple lines of research are currently focused on how products can most successfully be recycled (Trudel et al., 2016; Welfens, Nordmann, & Seibt, 2016). Instead, when trying to reduce the potential negative consequences of wasting on brand attitudes, it seems more relevant to study alternative ways in which the unused utility of products can be (partially) reused or transferred to other people or goals. Potential ways of collaborative consumption such as sharing, lending, donating, and gift giving may provide interesting alternatives to wasting. To benefit both brand attitudes and a sustainable future, future research is therefore poised to examine the ways in which products with unused utility can be reused or transferred instead of wasted.

8.2. Practical implications

The present findings add a new perspective to the discussion around consumer waste and sustainability. Whereas prior studies have mainly focused on the unwanted consequences of wastefulness for the environment and for consumers' own financial situation (Graham-Rowe et al., 2014; Trudel et al., 2016), our study demonstrates how a seemingly consumer-related behavior, the act of wasting a purchased product with unused utility, can have undesirable consequences for other supply chain actors such as manufacturers. This suggests that it is important for researchers and supply chain actors alike to be more involved in consumer behaviors that take place after the purchase decision. Our research can provide supply chain actors with compelling arguments to focus on consumer waste behaviors, and inspire brand managers to spend additional effort on preventing their products from being wasted. For example, companies may engage in activities that ensure that products do not contain excess utility beyond what consumers need (e.g., food products in package sizes for smaller households), or in technological innovations that are aimed at helping consumers to fully use all product utility within a package (e.g., storage and safekeeping capacities of packaging for partially used products). Companies may also focus on providing mechanisms for the collection of products with remaining utility (e.g., collection points for household appliances). Such activities may avoid the potential negative effects that wasting unused utility of products can have on brand attitudes.

8.3. Limitations and future research

Experiments 1 and 2 are based on hypothetical scenarios. Hypothetical scenarios have the advantage that all factors not of interest to the present study can be kept constant, while the situation resembles daily life. Yet, participants may experience difficulty in projecting themselves in the situations and in anticipating their responses. It is therefore reassuring that

the final experiment, in which actual consumption and wasting occurs, shows consistent results with the hypothetical scenario studies.

As another limitation, our study focused on attitude devaluation as the most common and relevant strategy of dissonance reduction. It is, however, possible that consumers engage in other dissonance reduction strategies when being confronted with feelings of discomfort after wasting, especially when the brand is not visible. For instance, consumers may trivialize the impact of wasting as a way of ridding themselves of the negative emotions surrounding this practice. Future research may investigate the conditions under which brand devaluation versus trivialization are more likely.

Moreover, our experiments focused on relatively mundane products as a stringent test for our proposed effect of product wastage on feelings of discomfort and on brand attitude. Results show that wasting such mundane products with limited value can already result in feelings of discomfort and attitude devaluation. The effects may be more severe for more valuable products, or when the amount of wasted utility is larger. Likewise, effects may depend on the amount of effort that consumers had to put in to obtain or make the product (e.g., wasting a home-cooked meal may lead to more discomfort than wasting a ready-meal).

Finally, it is unclear what the long-term effects are of wasting a product with unused utility. The effects of a single waste occasion may diminish over time. Yet, some products (e.g., caps of bread) are wasted repeatedly. How these repeated wasting occasions affect attitudes is currently unclear, providing a relevant topic for future research.

8.4. Main conclusion

Although consumers tend to waste many products on a daily basis, they often feel bad about wasting products with leftover utility. How do consumers deal with the negative feelings that are generated when wasting products with such leftover utility? Our research is

583 one of the first to demonstrate that consumers experience feelings of discomfort when wasting
584 products that have utility left, and that consumers address these feelings with a relatively easy
585 and effortless mode of dissonance reduction that is available: reducing their attitudes towards
586 the brand that is wasted. These findings suggest that the consumer behaviour that occurs after
587 purchase decisions are relevant for both scholars and practitioners. Thus, both researchers and
588 managers would do well to look beyond the consumer purchase process, and to focus on
589 potential sustainable solutions to prevent product waste.

590

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714 Appendix A. Setup of the conditions in Experiment 3



715

716 *Note:* Top pictures show waste condition, bottom pictures non-waste conditions. Pictures on
717 the left show conditions with the brand visible (on product packaging), whereas pictures on
718 the right show conditions with the brand not visible.