


## SPECIAL ISSUE ARTICLE

# From food waste to value-added surplus products (VASP): Consumer acceptance of a novel food product category

Siddharth Bhatt<sup>1</sup>  | Jeonggyu Lee<sup>1</sup> | Jonathan Deutsch<sup>2</sup> | Hasan Ayaz<sup>3</sup> | Benjamin Fulton<sup>4</sup> | Rajneesh Suri<sup>5</sup>

<sup>1</sup>Department of Marketing, LeBow College of Business and Economics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA

<sup>2</sup>Professor of Culinary Arts and Food Science, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA

<sup>3</sup>School of Biomedical Engineering, Science and Health Systems, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA

<sup>4</sup>Food Science, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA

<sup>5</sup>LeBow College of Business and Economics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA

## Correspondence

Siddharth Bhatt, Department of Marketing, LeBow College of Business and Economics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA.  
Email: shb56@drexel.edu

## Abstract

Over one third of the food we produce is never consumed. Such a high rate of food waste is appalling. To address this, researchers have focused on creating foods from surplus ingredients or ingredients obtained during the manufacturing of other foods. We term such foods as value-added surplus products. But will consumers accept products made from ingredients destined for the trash bin? A series of studies that test 3 different cues that consumers utilize to evaluate foods suggests strong potential for consumer acceptance, and even preference for such foods. Study 1 tested description for value-added surplus products alongside those for conventional and organic foods to understand whether consumers discriminate between these foods. Study 2 tested consumer preference for 9 product labels for value-added surplus products. Study 3 examined whether benefits to self or to others will differentially influence consumers' perceptions of such value-added foods. Collectively, these studies suggest a strong potential for such foods to command position as a new category of foods that is distinct from both conventional as well as organic foods.

## 1 | INTRODUCTION

According to the Natural Resources Defense Council, up to 40% of the food produced in the United States ends up in the trash (Gunders, 2012). Such high quantities of food waste come with other negative externalities such as wasted resources, and an increase in the level of greenhouse gases, both in the production and decomposition of wasted food. Of course, ongoing food insecurity, malnutrition, hunger, and starvation could have been alleviated, at least in part, via this surplus food. In fact, it can be argued that enough food is produced to feed the world and that increasing food production is unnecessary if the vast amounts of food already being produced could be put to better use (ReFED.com). The real problem is more pernicious—food waste. Although some food waste is inevitable, much of it is due to preventable causes such as retailers' cosmetic standards for produce, signaling abundance and variety by overstocking buffets and food counters in foodservice establishments, concerns about the legalities and liability of donating foods, or the confusing regulations on food expiry labels, to name a few (ReFED.com). Although consumers are rightly reluctant to consume foods that are unsafe for consumption, they may also

disregard foods that are completely safe to eat but may not be appealing for other reasons. Narrowing the gap between the full amount of food we can safely, healthfully, and profitably keep in the food system (existing food supply plus that defined as “waste”) should then be a global priority. In this research, we propose that foods made from surplus ingredients that would have been otherwise wasted can be a promising solution to this crisis if appropriately marketed to consumers. We term such foods as value-added surplus products (VASP) and argue that the key to commercializing these foods lies in understanding and guiding consumers' perceptions of such foods that will make them more acceptable to consumers.

## 2 | CONCEPTUAL BACKGROUND

According to the Food Waste Reduction Alliance, more food is wasted in the preconsumption and production phase than in any other phase of the food lifecycle. Providers of food (such as retailers, hotels, producers, and others) waste food intentionally or unintentionally for multiple reasons (Gustavsson, Cederberg, Sonesson, Van Otterdijk, &

Meybeck, 2011; Parfitt, Barthel, & Macnaughton, 2010). To provide specific examples on the causes, falling market prices, gluts, or rising transportation, labor, or storage costs may make it more economical for a farmer to plow under a field of produce rather than pay for its harvest and processing; unnecessarily abundant displays at a supermarket are used as a merchandising tool to suggest fresh seasonal bounty even if projected demand is below supply (Aschemann-Witzel, De Hooge, Amani, Bech-Larsen, & Oostindjer, 2015).

Taking a macro perspective, the United States Environmental Protection Agency has proposed a “Food Recovery Hierarchy” that explains how food waste could be minimized starting with reduction at source (see Figure 1). The benefits of reducing waste taper and the external financial and environmental costs expand, as one tries to minimize waste through other avenues such as composting and landfill. It is, therefore, logical to conclude that efforts focused on minimizing food waste at early stages of the consumption cycle may yield the best results. More specifically, salvaging ingredients that would otherwise go waste and converting such ingredients into consumable foods may be an effective solution to the food waste problem.

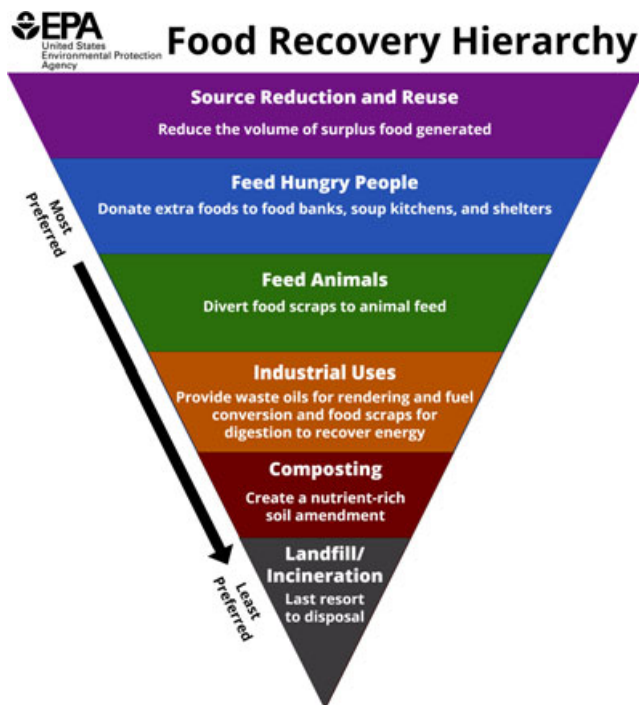
O'Donnell, Deutsch, Yungmann, Zeitz, and Katz (2015) “Food System Sensitive Model” provides an economic, environmental, and cultural argument for converting surplus foods into value-added products, keeping food, wherever possible, as food and not trash. These researchers found that in a supermarket, a clear majority of what was culled for donation or composted as unsellable was perfectly wholesome, safe, and nutritious, especially when cooked. Rather than adding to existing cost-neutral or cost-carrying efforts such as composting or donating surplus food as-is (which may then be wasted at the agency or postconsumer level), they argue for a market-driven solution whereby

surplus food (waste) can be converted to value-added food products: feeding people, creating opportunities for employment and entrepreneurship, and lowering environmental impact (Laufenberg, Kunz, & Nystroem, 2003). Based on these arguments, we examine the plausibility of food products made from surplus ingredients entering the food markets by studying how consumers perceive such foods that we term as value-added surplus products (VASP). VASP foods make use of ingredients that are generally wasted (e.g., carrot peel) but are safe and healthy for consumption (e.g., a powdered soup mix with dried carrot peel).

Although the economic argument for recovery and value-added surplus food may be sound from a production and operations standpoint (Laufenberg et al., 2003), consumers' perceptions of VASP foods are an important consideration when assessing commercial feasibility of such foods. Many researchers have argued in favor of creating such foods without providing any test of whether consumers will indeed view such foods favorably. For instance, Wolfe and Liu (2003) make a case for using powdered apple peels as a functional ingredient for foods (p. 1682); however, these authors do not provide measures of consumer acceptance of a product using such ingredients, leaving the commercial viability of such foods questionable. Although VASP foods are a promising new category of foods, consumers may be reluctant to consume foods that they may perceive as waste or suitable for trash. Hence, consumer attitudes against VASP could range from concerns of poor food safety to even outright disgust due to the nature of its ingredients. The problem is compounded by the fact that VASP foods are a radically new category of foods and consumers are likely to find it difficult to classify such foods into their existing schema of products and product categories (Moreau, Markman, & Lehmann, 2001). Such difficulty may lead consumers to develop unfavorable attitudes towards such foods, a major marketing hurdle. However, negative attitudes towards such products may be ameliorated if consumers' mental representation of such products could be shaped more favorably through appropriate communication (Moreau et al., 2001). Understanding consumers' decision-making process can help structure appropriate communication and cue utilization theory provides such an understanding.

## 2.1 | Cue utilization theory and consumers' acceptance of VASP foods

Research suggests that consumers use both intrinsic and extrinsic cues to infer a product's quality. Intrinsic cues describing product ingredients refer to characteristics of the product that cannot be changed without significantly altering the product, whereas extrinsic cues are characteristics that are related to the product but not an intrinsic part of it (Olson & Jacoby, 1972; Olson & Jerry, 1977). Extrinsic cues include, but are not limited to, category labels, brand name, and price. Consumers' use of cues in evaluating food products is well established in the literature. Often, consumers do not engage in elaborate processing of information in situations of low involvement such as in choosing everyday foods leading them to use product-related cues as a basis of evaluating such products. Kahneman (2011) proposes the dual systems perspective as an explanation for such a style of decision making. Kahneman (2011) suggests that initial processing of information occurs through System 1, which is instantaneous and less deliberative and heavily relies on readily accessible cues. System 2, which is deliberative



Source: Environmental Protection Agency (<https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy>)

**FIGURE 1** Food recovery hierarchy [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

and methodical, is invoked only when more systematic processing is called for. In the case of food products, findings thus far suggest that consumers rely rather heavily on product cues that are readily observable—both intrinsic (color, visible fat, and freshness) and extrinsic (brand, food presentation, and origins; Acebrón & Dopico, 2000; Bredahl, 2004). Although consumers assess the quality of food products by directly noting their intrinsic attributes such as fat content, cues that are extrinsic to the food product such as its labels and descriptions also weigh heavily in consumers' evaluation. Incidentally, the extrinsic cues are relatively easier to manipulate without substantially altering the core product. Therefore, we focus extrinsic cues that are particularly relevant to food products.

Grunert's (2005) review of research on perceived food quality and safety suggests that from a large spectrum of extrinsic cues known to influence consumer decision making, brand and labels are particularly relevant to food products. Findings from a study on how consumers' perception of waste water changes according to how it is labeled are of particular relevance to the current research. Menegaki, Mellon, Vrentzou, Koumakis, and Tsagarakis (2009) showed that consumers' perception of wastewater is affected by its labeling. These authors show that there is a greater consumer and industrial acceptance of waste water labeled "recycled water" over its conventionally-named "treated wastewater" (cf. Schmidt, 2008). These findings suggest that extrinsic cues such as labels may play a critical role in increasing consumers' acceptance of VASP foods. However, more systematic research on VASP foods is needed to advance our understanding of how these foods can be made more acceptable to consumers. To our knowledge, no study has examined how consumers will perceive such foods if they were offered at retailers. We believe that this research is the first attempt at understanding consumers' decision-making process with respect to VASP foods. Given that consumers use cues to assess quality of food products, this research examines how three extrinsic product cues for VASP foods—(a) product descriptions, (b) label, and (c) benefit—will influence consumer decision making for such foods. This research, based on cue utilization theory, is the first step towards gaining theoretical insights into consumer decision making with respect to this new category of food. This research will be of value to sustainability advocates, food marketers, and scholars in exploring consumer acceptance of, and perhaps even preference for VASP foods. This research may be the first to empirically examine this issue and shed light on consumers' evaluation of this novel category of foods that may ameliorate the global food crisis. In three studies, we examine the effects of three product cues (descriptions, labels, and benefits) on consumers' evaluation of VASP foods.

### 3 | STUDY 1: ARE VASP FOODS UNIQUE?

#### 3.1 | Method

In this study, we tested how food description is used by participants as a cue to evaluate the food. In this study, we used a single factor within-subjects design (conventional vs. organic vs. VASP) to test descriptions for the three types of foods (conventional, organic, and VASP). Fifty-one participants (48% female,  $M_{\text{age}} = 33.92$  years) from Amazon's

Mechanical Turk panel participated in the study for a small monetary compensation. First, participants were presented with an image composed of four food products (soup, juice, granola bars, and pasta sauce; see Appendix A) that were described as one of the three food categories (conventional vs. organic vs. VASP). Conventional foods were described as "foods produced through farming methods that may use acceptable amounts of synthetic fertilizers, pesticides, or herbicides. The vast majority of foods are produced using conventional methods." Organic foods were described as "foods manufactured from ingredients that avoid the use of synthetic fertilizers, pesticides, and livestock feed additives such as growth hormones. Irradiation and use of genetically modified organisms or products produced from GMOs are prohibited by legislation in the manufacturing of these foods." Finally, VASP foods were described as "foods created using byproducts from the manufacture of other products. These byproducts are then turned into something new. For example, spent grain from beer brewing can be dried and made into granola rather than being discarded; carrot peels can be dried and added to a powdered soup mix."

Participants were presented these three descriptions in a random order and were asked to evaluate each food category on three items (1 = *strongly disagree*, 9 = *strongly agree*). These items were "I feel that these foods are manufactured by a process different than that used for most other foods in that it helps the environment," "I feel that these foods are regular foods that people normally eat," and "I feel that these foods are organic." Finally, participants responded to demographic questions and were debriefed.

#### 3.2 | Results and discussion

Each item was analyzed separately. This was done because each item captured a different dimension of consumers' perceptions of VASP foods (Table 1 for cell means). Regarding VASP foods being manufactured using processes helpful to the environment ("I feel that these foods are manufactured by a process different than that used for most other foods in that it helps the environment"), these foods were perceived more helpful to the environment than conventional foods,  $t(50) = -1.78$ ,  $p = .08$ , but less helpful to the environment compared to organic foods,  $t(50) = -3.16$ ,  $p < .001$ . As expected, participants also perceived organic foods to be more helpful to the environment compared to conventional foods,  $t(50) = -4.18$ ,  $p < .001$ . These results suggest that participants clearly identified VASP foods as a unique food category with a unique perception within the spectrum of foods ranging from conventional to organic.

On the remaining two items, ie, VASP foods being those that people normally eat ("I feel that these foods are regular foods that people

**TABLE 1** Study 1: Perceptions of food categories

Perceptions	Food category					
	VASP		Organic		Conventional	
	Mean	SD	Mean	SD	Mean	SD
Being helpful to the environment	5.20	1.99	6.26	1.96	4.64	2.16
Being conventional	6.48	1.32	6.68	1.67	7.24	1.46
Being organic	5.61	2.11	6.29	2.05	4.04	2.25

Note. VASP = value-added surplus products.

normally eat”), the foods were perceived significantly less regular than conventional foods,  $t(50) = 3.66, p = .00$ . There was no significant difference between VASP and organic foods on this measure, implying that both foods do not follow consumers' normative food consumption behaviors,  $t(50) = -.75, p = .45$ . Finally, VASP foods were perceived significantly more organic (“I feel that these foods are organic”) than conventional foods,  $t(50) = -4.30, p = .00$ , and not significantly different than organic foods,  $t(50) = -1.58, p = .12$ . Such differences in ratings of the three food categories based on product descriptions suggest that consumers may perceive VASP foods to be different than conventional foods but find them closer to organic foods when it comes to helping the environment. Further, these results suggest that marketers may be able to differentiate VASP foods from conventional foods but consumers may find greater similarities between these and organic foods.

In our assessment, these findings point to the possibility that there may exist a unique space for VASP foods in the consumers' mental schema of food categories. However, to further define such a space for VASP foods, in addition to product descriptions, marketers of VASP foods will need to provide additional extrinsic cues that have been shown to assist consumers in decision making. As noted earlier, two such extrinsic cues—product labels and benefits—have been shown to be particularly relevant when deciding about food products. In the next two studies, we examine the impact of these cues on consumers' acceptance of VASP foods.

## 4 | STUDY 2: LABELS FOR VASP FOODS

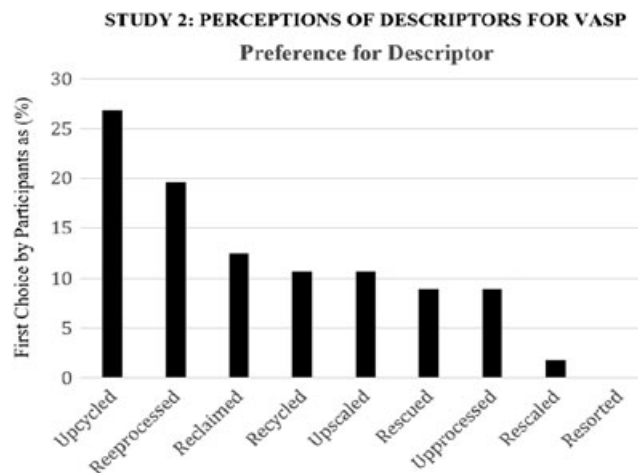
### 4.1 | Method

Given that consumers use product labels as important cues when evaluating products especially foods (Grunert, 2005), this study tested nine product labels for VASP foods. Fifty-six participants (57.1% female,  $M_{\text{age}} = 35.54$ ) from Amazon's Mechanical Turks (mTurks) were recruited to participate in a single factor within-subjects design. Participants were presented with the description of VASP foods, and the images of these foods were adapted from Study 1. Next, they were asked to rank the appropriateness (1 = most; 9 = least) of 9 product labels for VASP foods: “upcycled,” “recycled,” “upscaled,” “rescaled,” “reprocessed,” “reclaimed,” “up processed,” “resorted,” and “rescued.”

### 4.2 | Results and discussion

“Upcycled” was the most preferred label. It was ranked first by 26.8% of participants, followed by “reprocessed” (19.6%) and “reclaimed” (12.5%; see Figure 2 for complete rankings). Interestingly, no participant ranked “resorted” first, and only 1 participant ranked “rescaled” as their first preference suggesting that consumers do perceive certain labels as more appropriate to describe VASP foods with a very strong preference for the label “upcycled.” Further, it is likely that using the right product label will facilitate consumers on processing information of VASP foods more fluently (Janiszewski & Meyvis, 2001), thus increasing the likelihood of their acceptance.

Research also suggests that marketers often influence consumers' purchase decisions by highlighting the benefits of the product (Dahl & Hoefler, 2004). Two major types of benefit appeals commonly employed in marketing communications include self-benefits and



**FIGURE 2** Study 2: Perceptions of descriptors for value-added surplus products

other-benefits (White & Peloza, 2009). Both benefit appeals have been examined in past research but not in the context of value added foods, thus providing little insight into how consumers might use such product benefits when evaluating VASP foods. Study 3 examines consumers' perceptions of these two appeals.

## 5 | STUDY 3: DO VASP FOODS OFFER UNIQUE BENEFITS?

Consumers have been shown to have more positive attitudes towards pro-environmental products when such products highlight benefits to others (Yang, Lu, Zhu, & Su, 2015). Essentially, consumers forgo personal gains if they feel that purchasing pro-environmental products will contribute to the welfare of the society (Green & Peloza, 2014; Griskevicius, Tybur, & Van Den Bergh, 2010; Yang et al., 2015). On the other hand, individuals overgeneralize associations between nutrients and the health benefits related to such nutrients, which in turn leads them to perceive self-benefits from foods that are labeled healthy (Cornish, 2012; Schuldt & Schwarz, 2010). Given that VASP is a novel food category and the mixed findings in the literature about benefit attributions, a question of relevance is as follows: Which benefit appeal do consumers associate with VASP foods? In this study, we test the product benefit cue as an additional extrinsic cue that could assist consumers to evaluate VASP foods.

### 5.1 | Method

One hundred and forty-seven participants (54% female,  $M_{\text{age}} = 37.55$  years) were recruited from Amazon's Mechanical Turk and randomly assigned to one of the four conditions in a single factor (“upcycled” VASP, “reprocessed” VASP, organic, and conventional) between-subjects design. In Study 2, “upcycled” and “reprocessed” were found to be the two most preferred descriptors for VASP foods. Therefore, in this study, we use these two labels for VASP foods and contrast them vis-à-vis conventional and organic foods. The stimuli were adapted from earlier studies with one change—VASP foods were either called “upcycled” or “reprocessed.” Like Study 1, participants

first viewed an image composing of four food products (soup, juice, granola bars, and pasta sauce) along with descriptions of the food category (adapted from Studies 1 and 2). Participants in the upcycled (reprocessed) food condition read, "These upcycled (reprocessed) foods use byproducts from the manufacture of other products. These byproducts are then turned into something new. For example, spent grain from beer brewing can be dried and made into granola rather than being discarded; carrot peels can be dried and added to a powdered soup mix." The descriptions for conventional and organic conditions were the same as those used in Study 1 (see Appendix A).

Next, participants indicated their perceptions of self and other benefit for the described food category on two items measuring perceptions (1 = *not at all*, 7 = *very much*) of self-benefit and other-benefit associated with a food category—(a) "To what degree do you think buying these foods will benefit yourself?" and (b) "To what degree do you think buying these foods will benefit society?" These items were adapted from (Green & Pelozo, 2014; White & Pelozo, 2009).

## 5.2 | Results and discussion

Because the aim of this study was to understand which benefit (self vs. other) consumers were likely to associate with VASP foods, the two conditions of VASP ("upcycled" VASP and "reprocessed" VASP) were compared separately to conditions involving conventional and organic foods (Table 2 for cell means). Comparing the two descriptors for VASP foods (Upcycled and Reprocessed) to organic and conventional foods on benefit attribution will highlight an appropriate product label-benefit attribute association for such foods.

"Upcycled" VASP foods: Planned contrasts revealed that participants perceived this category descriptor to be associated with significantly more other-benefits than conventional foods,  $t(73) = -5.37$ ,  $p = .00$ . However, the other-benefits were not different than those for organic foods,  $t(72) = -1.65$ ,  $p > .10$ . In terms of self-benefits, "Upcycled" foods provided significantly higher self-benefits than conventional,  $t(73) = -2.03$ ,  $p = .04$ , but not organic foods,  $t(72) = 0.85$ ,  $p > .30$ .

"Reprocessed" VASP foods: Planned contrasts revealed that reprocessed as a category descriptor for VASP foods provided significantly higher other-benefits compared to conventional foods,  $t(71) = -3.56$ ,  $p < .01$ , but not compared to organic foods,  $t(70) = 0.22$ ,  $p > .82$ . Further, unlike the "Upcycled" VASP foods, "Reprocessed" VASP foods were perceived to offer significantly lower self-benefits than organic foods,  $t(70) = 2.33$ ,  $p = .02$ , but not conventional foods,  $t(71) = -0.87$ ,  $p > .38$ . More interestingly, "Reprocessed" VASP foods provided inferior other-benefits than "Upcycled" VASP foods,  $t(72) = 1.91$ ,  $p = .059$ , with differences between these two descriptors being nonsignificant for self-benefits,  $t(72) = 1.28$ ,  $p > .20$ .

**TABLE 2** Study 3: Benefits of VASP foods

Benefits	Food type descriptor							
	Upcycled		Reprocessed		Organic		Conventional	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Other-benefits	5.34	1.61	4.64	1.53	4.72	1.59	3.30	1.68
Self-benefits	4.76	1.97	4.25	1.42	5.14	1.80	3.97	1.30

Note. VASP = value-added surplus products.

These findings suggest that irrespective of the two product labels used in this study, participants perceived greater other benefits for VASP foods than conventional foods. The results also shed light on which label for VASP foods may be more appropriate to accentuate the benefits that such foods provide. Participants perceived greater benefits to others when these foods were labeled as "upcycled" rather than "reprocessed." However, no significant differences were observed between these two product labels in terms of benefits to oneself. Notably, participants' perceptions of "upcycled" VASP foods were similar to those observed in Study 1 with VASP foods being perceived significantly different than conventional foods but akin to organic foods. Conversely, "reprocessed" VASP foods were perceived to be similar to conventional foods in terms of self-benefits. Hence, it could be argued that, to brand VASP foods as a new category of foods, benefits to the society could be highlighted and "upcycled" may be a more appropriate product label to accompany such products.

## 6 | GENERAL DISCUSSION

Food waste continues to be a global issue with its intensity varying in different parts of the world. Academics, policy makers, and practitioners are equally keen to find solutions to this problem. As a promising solution to this problem, prior research has proposed that ingredients that are generally wasted during the production of food can be utilized to create other foods (O'donnell et al., 2015; Wolfe & Liu, 2003). There is a lot of merit to this approach, and in fact, researchers have created foods made from ingredients obtained during the production of other foods, which we term as value-added surplus products (VASP). However, the test of VASP foods lies in consumers' acceptance of such foods. For VASP foods to have any chance of becoming a solution to the food waste crisis, determining commercial feasibility along with appropriate communications for such foods is of supreme importance. Unfortunately, theory-driven research in this domain is sparse. In our review, we did not find any investigation on how consumers will perceive such foods if they became available in stores. To our knowledge, the current research is the first attempt to inquire into consumers' perceptions of such foods using cue utilization theory, a theoretical framework that has provided useful insights into consumers' decision-making process for a large range of consumer products. Drawing on prior research, we focused on cues that consumers focus on while evaluating food products. We argued and observed that consumers find it difficult to evaluate VASP foods because they belong to a novel food category (Lehmann, 1994). In such situations, consumers' decision making can be positively influenced if they are provided with appropriate cues to help them form an evaluation of such products. Through a theoretical lens, we systematically examined product cues that consumers are likely to use when evaluating food products—product descriptions, labels, and benefits.

Findings from three studies helped elucidate the effects of product cues on consumer decision-making process for VASP foods. More specifically, we uncovered that consumers indeed rely on extrinsic cues when evaluating VASP foods and when differentiating them from conventional and organic foods. Consumers perceived VASP foods to be significantly different from conventional foods. Notably, VASP

foods were perceived similar to organic foods (Studies 1 and 3). This suggests that consumers may accord VASP foods a premium status vis-à-vis conventional foods, indicating a promising possibility for promoting VASP foods as a new food category akin to organic foods. In addition to using product descriptions to differentiate VASP foods, our findings suggest that consumers also utilize product labels when evaluating VASP foods. The results show that for VASP foods "upcycled" label resonated the most with our participants. Further, our findings indicate that practitioners may do well by not calling such foods as "resorted" or "rescaled" (Study 2).

We also examined the effect of the two most preferred labels from Study 2 (upcycled and reprocessed) on participants' perceptions of benefits from VASP foods. Literature on benefits of pro-environmental products suggests that consumers might be more motivated to consume such foods when they perceive greater benefits for others than themselves (Yang et al., 2015). Our findings are consistent with the literature and confirm that indeed participants perceived that such foods may benefit the society more than they might benefit oneself. Additionally, we extend the literature on benefit framing by demonstrating that brand descriptors for such products may be an important moderator of this effect. When VASP foods were described as "upcycled," participants indicated higher perceived benefits for themselves and others compared to conventional foods, but not so when the same food was labeled as "reprocessed." Further, in terms of societal benefits, VASP foods were rated higher than conventional foods but similar to those from organic foods. These findings align with results from Study 1 suggesting that consumers perceive VASP foods as different from conventional foods and, if labeled appropriately, they may be perceived even closer to organic foods as a food category. This is encouraging in that it signals a possibility to promote VASP foods as a new category of foods that offers the greatest benefits to the society and might be able to fetch a price premium like those afforded to organic foods (Laroche, Bergeron, & Barbaro-Forleo, 2001; Lee, Bhatt, Kothandaraman, & Suri, 2016), a possibility that should be tested in future research.

Put together, these findings are also relevant to practitioners, in that, they suggest three diagnostic cues for marketers to focus on. Prior research has shown that of the many cues that consumers use to evaluate foods, extrinsic cues might be particularly relevant (Grunert, 2005; Kahneman & Frederick, 2005). By using appropriate product descriptions, labels, and benefit attributions, marketers can facilitate consumers' decision making with respect to these foods. Conversely, a failure to communicate the right cues is likely to lead to confusion and a less favorable evaluation of VASP foods by consumers.

Research also suggests that in addition to extrinsic cues, consumers also use intrinsic cues to evaluate food products (Bredahl, 2004). Intrinsic characteristics of food products such as texture, and fat content, among several others are an important consideration for consumers especially when they are more engaged with the product consumption decision (Kahneman, 2011). However, in this research, we did not examine the effects of intrinsic cues and relied more on the possibility that a majority of consumption decisions are less elaborate (Kahneman, 2011). Future research should examine how consumers use extrinsic cues and intrinsic cues in conjunction to form an overall assessment of VASP foods. For instance, do product labels and benefit preferences observed in this research apply to VASP foods with diverse intrinsic attributes? Can VASP foods also convey benefits to self if made with certain ingredients that are known to be healthy? How do other

extrinsic cues such as price, packaging, and store characteristics influence consumers' evaluations of VASP foods? These questions are relevant to both theory and practice and could be investigated in future research so that a theoretical framework around marketing of VASP foods proposed in this research can be validated and developed further. Given that the research on VASP foods is relatively limited, this research is still exploratory in nature and therefore does not provide explicit predictions. As understanding on this topic grows, more concrete insights to marketing of VASP foods could be found. In sum, this research is a promising first step in investigating the potential of VASP foods to become a new category of foods and, in turn, provide a potential solution to at least a portion of the food crisis.

## ORCID

Siddharth Bhatt  <http://orcid.org/0000-0001-5585-4407>

## REFERENCES

- Acebrón, L. B., & Dopico, D. C. (2000). The importance of intrinsic and extrinsic cues to expected and experienced quality: An empirical application for beef. *Food Quality and Preference*, 11(3), 229–238.
- Aschemann-Witzel, J., De Hooge, I., Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-related food waste: Causes and potential for action. *Sustainability*, 7(6), 6457–6477.
- Bredahl, L. (2004). Cue utilisation and quality perception with regard to branded beef. *Food Quality and Preference*, 15(1), 65–75.
- Cornish, L. S. (2012). It's good for me: It has added fibre! An exploration of the role of different categories of functional foods in consumer diets. *Journal of Consumer Behaviour*, 11(4), 292–302.
- Dahl, D. W., & Hoefler, S. (2004). Visualizing the self: Exploring the potential benefits and drawbacks for new product evaluation. *Journal of Product Innovation Management*, 21(4), 259–267.
- Green, T., & Peloza, J. (2014). Finding the right shade of green: The effect of advertising appeal type on environmentally friendly consumption. *Journal of Advertising*, 43(2), 128–141.
- Griskevicius, V., Tybur, J. M., & Van Den Bergh, B. (2010). Going green to be seen: Status, reputation, and conspicuous conservation. *Journal of Personality and Social Psychology*, 98(3), 392.
- Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, 32(3), 369–391.
- Gunders, D. (2012). Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill (Rep.). Natural Resources Defense Council.
- Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R. & Meybeck, A. 2011. *Global food losses and food waste, Food and Agriculture Organization of the United Nations, Rom.*
- Janiszewski, C., & Meyvis, T. (2001). Effects of brand logo complexity, repetition, and spacing on processing fluency and judgment. *Journal of Consumer Research*, 28(1), 18–32.
- Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.
- Kahneman, D., & Frederick, S. (2005). A model of heuristic judgment. In *The Cambridge handbook of thinking and reasoning* (pp. 267–293).
- Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of Consumer Marketing*, 18(6), 503–520.
- Laufenberg, G., Kunz, B., & Nystroem, M. (2003). Transformation of vegetable waste into value added products:: (a) The upgrading concept; (b) practical implementations. *Bioresource Technology*, 87(2), 167–198.
- Lee, J., Bhatt, S., Kothandaraman, P., & Suri, R. (2016). The effect of green-washing claims on value judgments: A communication dilemma. *Summer AMA Proceedings*, 27(1), B10–B11.
- Lehmann, D. (1994). Characteristics of "Really" New Products. REPORT-MARKETING SCIENCE INSTITUTE CAMBRIDGE MASSACHUSETTS, 1–1.

- Menegaki, A. N., Mellon, R. C., Vrentzou, A., Koumakis, G., & Tsagarakis, K. P. (2009). What's in a name: Framing treated wastewater as recycled water increases willingness to use and willingness to pay. *Journal of Economic Psychology*, 30(3), 285–292.
- Moreau, C. P., Markman, A. B., & Lehmann, D. R. (2001). "What is it?" Categorization flexibility and consumers' responses to really new products. *Journal of Consumer Research*, 27(4), 489–498.
- O'donnell, T. H., Deutsch, J., Yungmann, C., Zeitz, A., & Katz, S. H. (2015). New sustainable market opportunities for surplus food: A food system-sensitive methodology (FSSM). *Food and Nutrition Sciences*, 6(10), 883.
- Olson, J.C., & Jacoby, J. 1972. Cue utilization in the quality perception process, in: SV-proceedings of the third annual conference of the association for consumer research.
- Olson Jerry, C. (1977). *Price as an informational cue: Effects in product evaluation* (pp. 267–286). New York: North Holland Publishing Company.
- Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: Quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society, B: Biological Sciences*, 365(1554), 3065–3081.
- ReFED - Rethink Food Waste. 2017, www.refed.com/
- Schmidt, C. W. (2008). The yuck factor: When disgust meets discovery. *Environmental Health Perspectives*, 116(12), A524.
- Schuldt, J. P., & Schwarz, N. (2010). The "organic" path to obesity? Organic claims influence calorie judgments and exercise recommendations. *Judgment and Decision making*, 5(3), 144.
- White, K., & Pelozo, J. (2009). Self-benefit versus other-benefit marketing appeals: Their effectiveness in generating charitable support. *Journal of Marketing*, 73(4), 109–124.
- Wolfe, K. L., & Liu, R. H. (2003). Apple peels as a value-added food ingredient. *Journal of Agricultural and Food Chemistry*, 51(6), 1676–1683.
- Yang, D., Lu, Y., Zhu, W., & Su, C. (2015). Going green: How different advertising appeals impact green consumption behavior. *Journal of Business Research*, 68(12), 2663–2675.

**Siddharth Bhatt** is a PhD candidate in the Department of Marketing at Drexel University. Siddharth's primary research interests are behavioral pricing, retailing, sustainability, and applications of neuroimaging in marketing.

**Jeonggyu Lee** is a PhD candidate in the Department of Marketing at Drexel University. His main research interests are behavioral pricing, visual perception in retail environment, sustainable marketing, and applications of neuroimaging in marketing.

**Jonathan Deutsch**, PhD, is a Professor of Culinary Arts and Food Science in the Center for Food and Hospitality Management and Department of Nutrition Sciences of Drexel University in Philadelphia, PA. He is the James Beard Foundation's inaugural Impact Fellow, leading a national culinary school curriculum effort to educate future chefs to prevent food waste.

**Hasan Ayaz**, PhD, is an Associate Research Professor at Drexel University, School of Biomedical Engineering, Science and Health Systems, Philadelphia, PA. His research interests include functional neuroimaging, neuroergonomics, neuroengineering in human computer interaction, and clinical and field applications of optical brain monitoring.

**Benjamin Fulton** is a graduate student in the food science program offered by the Center for Food and Hospitality Management and

Department of Nutrition Sciences of Drexel University. He is also a part of the Drexel Food Lab team, which aims to solve real-world problems through culinary innovation.

**Rajneesh Suri** is a Professor of Marketing at the LeBow College of Business at Drexel University. Raj's work focuses on how price and brand name influence consumers value perceptions.

**How to cite this article:** Bhatt S, Lee J, Deutsch J, Ayaz H, Fulton B, Suri R. From food waste to value-added surplus products (VASP): Consumer acceptance of a novel food product category. *J Consumer Behav*. 2017;1–7. <https://doi.org/10.1002/cb.1689>

## APPENDIX A DESCRIPTIONS OF FOOD

### Conventional foods:



These foods have been produced through farming methods that may use acceptable amounts of synthetic fertilizers, pesticides, or herbicides. The vast majority of foods are produced using conventional methods.

### Organic foods:



These foods are manufactured from ingredients that avoid the use of synthetic fertilizers, pesticides, and livestock feed additives such as growth hormones. Irradiation and use of genetically modified organisms or products produced from GMOs are prohibited by legislation in the manufacturing of these foods.

### Upcycled foods:



These foods use byproducts from the manufacture of other products. These byproducts are then turned into something new. For example, spent grain from beer brewing can be dried and made into granola rather than being discarded; carrot peels can be dried and added to a powdered soup mix.