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You taste what you see: Do organic labels bias taste perceptions?

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ABSTRACT

Does simply believing that a processed food is organic improve how enjoyable it tastes, influence caloric estimations, or increase how much people are willing to pay for the item? In the present study, 115 participants recruited from a local shopping mall were asked to taste and evaluate three paired food samples (i.e., cookies, potato chips, and yogurt). Each of those food samples was labeled, specifying one of the items in the pair as 'organic' and the other label specifying its counterpart as 'regular', although they were identical and organically produced. Results found that participants estimated those foods with organic labels to be lower in calories than those without the organic label. Furthermore, foods with the organic label elicited a higher willingness-to-pay and yielded better nutritional evaluations (e.g., tastes lower in fat, higher in fiber) than foods without the organic label. Finally, results found that the effects of the organic label on caloric estimations were less pronounced among people who typically read nutritional labels, who often buy organic foods, and who often engage in pro-environmental activities. This underscores the idea that the health halo effect is primarily driven by automatic processing based on heuristics. Understanding how consumers use nutritional information on product labels has important implications for both public policy as well as processed food manufacturers who use such claims as tools to market their products.

1. Introduction

In recent years, marketers have been able to capitalize on the consumer trend towards healthier foods. This is especially true in the area of organic foods, which have become increasingly available to consumers. While there exist variable – and contested (e.g., Strom, 2012) – definitions for what constitutes organic food, the United States Department of Agriculture (USDA, 2009) defines organic foods as those "produced without using most conventional pesticides; fertilizers made with synthetic ingredients or sewage sludge; bioengineering; or ionizing radiation." As evidenced by reports that organic foods are available in nearly 3 of 4 conventional grocery stores (USDA, 2009), it now seems hard not to encounter organic foods in the local supermarket. Furthermore, it seems that organic foods have been a main contributing factor to revitalizing grocery sales in recent years. In fact, a 2004 survey conducted by the Organic Trade Association (2006) showed that organic food sales are growing at a faster rate than sales of conventional food products.

The growth of the organic market has been attributed, in part, to consumer concerns regarding various additives, pesticides, hormones, and antibiotics, which are believed to be more prevalent in conventional foods than in organic foods (Latacz-Lohmann & Foster, 1997). Yet, although there is little data to substantiate these claims (e.g., Smith-Spangler et al., 2012; Williams, 2002), preliminary evidence has suggested that the perceived legitimacy of the USDA's 'organic' label can influence consumer purchases in a favorable way, leading consumers to perceive organic-labeled foods to be healthier than conventional foods (Magnusson, Arvola, Hursti, Åberg, & Sjödén, 2003). If those same labels can influence how people judge a food product's overall healthfulness, perhaps it is important to assess whether these labels are truly beneficial for helping consumers construct a healthier diet.

1.1. Package labels and consumer information processing

Past research suggests that package elements, especially package labels, can influence how consumers evaluate a food product as well as how much they consume (see Bublitz, Peracchio, & Block, 2010, for a review). While traditional food quality aspects, including sensory attributes such as appearance, taste, and smell are significant to most consumers, non-sensory attributes of foods, such as nutritional value, the absence of food additives and residues, or the process through which a food is produced have become increasingly prominent as well (Torjusen, Lieblein, Wandel, & Francis, 2001; Wilkins & Hillers, 1994).

On the other hand, research also suggests that routine buying situations, such as weekly grocery shopping, constitute a type of consumer behavior which entails processing at lower levels of

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involvement (Park, Iyer, & Smith, 1989). This low-involvement level is characterized by a negligible information search and little deliberation in brand and product choice (Beharrell & Denison, 1995; Brucks, Mitchell, & Staelin, 1984; Silayoi & Speece, 2004). Importantly, the limited cognitive involvement makes people prone to a phenomenon known as the halo effect. The halo effect occurs when an individual's evaluation of one attribute of an entity strongly influences or biases his or her perceptions of other attributes of that entity.

Indeed, Nisbett and Wilson (1977) have deemed the halo effect to be an unrecognized process, proposing that people have little awareness of the existence of the cognitive processes that underlie their judgments and inferences. Consistent with dual-process models of social cognition (e.g., Bargh, 1989; Chaiken, 1980), people unconsciously use heuristics to make judgments when an object belongs to a product category whose 'members' have judgment-relevant attributes, unless people deliberately avoid such automatic influence on judgment. Examples of halo effects include the ways in which familiarity with a person's positive and negative traits can correspondingly influence – without deliberate thought – how a person's relative attractiveness is perceived (e.g., Kniffin & Wilson, 2004).

Accordingly, health halo effects have been found to occur in the case of consumer evaluations of health claims on food packages. For example, Roe, Levy, and Derby (1999) found that the presence of a health claim (e.g., high in calcium for yogurt) induced consumers to rate a product healthier and more likely to purchase it. In addition, Roe et al. found that the presence of health claims increased the probability that respondents limited their information search, such that only information from the front label – rather than information from the Nutrition Facts panel – was viewed. Those results suggest that health claims may, in fact, help to generate a halo effect whereby consumers make relatively automatic extrapolations about a given product's healthfulness if claims for health benefits were featured on the package.

Similarly, Schuldt and Schwarz (2010) examined the impact of organic claims on biasing calorie judgments. Specifically, they asked participants to rate the organic- versus non-organic-labeled cookie on a computer screen, and found that participants inferred that an organic-labeled cookie was lower in calories and could be consumed more frequently. It is important to note, however, that the presence of an organic claim not always induced consumers to rate a product in positive ways. For instance, Schuldt and Hannahan (2013) recently demonstrated that, while organic foods were perceived as more healthful than conventional foods, they were rated as less tasty (see also Westcombe & Wardle, 1997).

Because the two studies by Schuldt and colleagues employ computer-based measurements to assess the effects of the organic versus non-organic labels on the calorie and taste evaluation, it is unclear if a person's actual taste experience of organic-labeled foods also leads to lower calorie and taste ratings. Thus, the purpose of the present study is to examine actual taste evaluations in an attempt to elicit more realistic judgments concerning the influence of an organic label, by employing a within-participants design where participants tasted and rated both the organic-labeled food and the non-organic-labeled food. This study includes both healthy (i.e., yogurt) and less healthy (i.e., cookies and potato chips) organic foods, and those three items provided examples of organic foods of differing tastes (sweet, salty, and slightly sour) and textures (crunchy, smooth, and creamy).

Furthermore, because it is important to address specific domains of evaluations (e.g., healthy versus tasty) on organic-labeled foods as indicated in Schuldt and Hannahan (2013), this study also asked participants to rate four nutrition-related evaluations (i.e., high in fat, high in calories, nutritious, and a lot of fiber) and four taste-related evaluations (i.e., appetizing, flavorful, tasted good, and tasted artificial) in addition to overall caloric estimations. Additionally, we asked participants to indicate how much they are willing to pay (WTP) for those foods. Thus, we examined whether participants who eat foods labeled organic will rate them higher on several different nutritional and sensory attributes (e.g., higher in fat, more appetizing) in addition to providing a higher caloric estimation and WTP than foods that are not labeled organic.

In addition, this study seeks to examine if the health halo effect – the effects of the organic label on perceptions and evaluations – are less pronounced among people with three behavioral characteristics. Consistent with the dual process models, we wanted to examine if the effects were weaker for those who often engaged in careful, deliberative processing than those who typically engaged in low involvement or automatic processing based on heuristics. The first moderator is the frequency with which a consumer reads nutrition labels. Namely, those who read nutrition labels are motivated to acquire more nutritional knowledge, leading to more deliberative processing and more accurate estimations and perceptions. Thus, we hypothesize that participants who reported higher frequency of reading nutrition labels on food packages would be less susceptible to exhibiting this health halo effect.

The second moderator is the frequency of purchasing organic foods. Because those who possess prior awareness of organic foods may engage in more deliberative processing than those who are less familiar with organic foods, they may not be as susceptible to the health halo effect during evaluations of a product. We thus hypothesize that those who possess a higher frequency of purchasing organic foods would be less susceptible to the health halo effect.

Finally, as in Schuldt and Schwarz's (2010) study, the third moderator we examine is pro-environmentalism. Specifically, at high levels of pro-environmentalism as assessed by New Ecological Paradigm scale (Dunlap, Van Liere, Mertig, & Jones 2000), Schuldt and Schwarz found that participants exhibited the predicted halo effect whereby the organic claim biased caloric judgments downwards in contrast with participants at lower levels of pro-environmentalism who did not exhibit the halo effect. If one assumes, however, that people who pursue pro-environmental activities tend to be more knowledgeable about organic food, then one would expect that pro-environmental actors should engage in deliberative processing, which would minimize any halo effect. The present study intended to focus on the behavioral elements of pro-environmentalism – by assessing whether participants engage in recycling and hiking. Consistent with the dual-process model, we hypothesize that participants who report relatively high levels of environmental activity would be less likely to show the health halo effect than those who rate lower on our pro-environmentalism measures.

2. Method

2.1. Participants and design

One hundred fifteen (50 male, 60 female, 5 unreported) participants were recruited from a local shopping mall in Ithaca, New York, over a period of two days[1] . Participants received $5 in cash in exchange for their participation. The participants' ages ranged from 16 to 76 years old (M = 34.24, SD = 16.75) and their Body Mass Index (BMI) ranged from 16.4 to 55.8 (M = 27.95, SD = 7.08). We applied a within-participants design in which participants were asked to taste and evaluate three food samples. The experimental conditions and order of food presentations were counterbalanced to avoid

[1] Data from 29 additional participants who failed to respond to crucial measures (e.g., caloric estimation) were excluded.

confounds associated with a within-participant design, such as sequence or carryover effects. The study had Institutional Review Board approval and participants were treated in accordance with American Psychological Association guidelines.

2.2. Procedure and materials

After being recruited, participants were asked to have a seat at a long table in front of the food court inside the mall. Participants were then served food products on a tray. Each participant received a tray with 3 paired food items, consisting of 6 products in total: 2 cookies, 2 potato chip portions, and 2 yogurt cups. Similar items were paired horizontally with a label beneath each item, one label specifying one of the items in the pair as 'organic' and the other label specifying its counterpart as 'regular'. However, all of the foods in each pair were identical and were, in reality, organically produced. Each participant was also exposed to the regular versus organic product packages of the items, which were located in close proximity to the table. The product packages were three-dimensional and incorporated all of the major design elements, including the organic label or the phrase 'organic' on the main display face, and were not altered in any way; however, the specific brands of the products were not mentioned by the experimenters. All of the packages were available for inspection by the participants during the study. Participants were then asked to taste each pair of products according to the order in which the products were arranged on the tray, from left to right and top to bottom. The order of the items, as well as the labels, was counterbalanced with 6 variant arrangements.

After tasting each pair of items, participants were instructed to answer a series of questions in the form of a paper questionnaire. Each participant received a variation of the questionnaire that corresponded to the arrangement they were randomly assigned. The questionnaire asked the participants to rate the organic and non-organic items they tasted in terms of taste- and nutrition-related attributes, and to report the overall calories and WTPs for each food. The same questions were repeated across all three food items.

Finally, participants were asked to complete a questionnaire that asked about behavioral characteristics regarding their shopping habits, pro-environmental activities, and restrained eating. Participants were then asked to complete a separate questionnaire that asked for their age, gender, and weight as well as height in order to estimate their BMI. At the conclusion of the study, participants were thanked and debriefed.

2.3. Measures

2.3.1. Taste- and nutrition-related attributes

Participants were asked to rate the organic and non-organic items they tasted in terms of taste- and nutrition-related attributes on a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). Specifically, participants rated whether the food was appetizing, flavorful, tasted good, tasted artificial (i.e., taste-related evaluations), tasted high in fat, tasted high in calories, was nutritious, and contained a lot of fiber (i.e., nutrition-related evaluations). These taste- and nutrition-related evaluations follow on previous research (e.g., Wansink, Shimizu, Cardello, & Wright, 2012).

2.3.2. Caloric estimation and WTPs

Participants were asked to estimate the number of calories that a snack-sized portion of each item would contain (e.g., Van Kleef, Shimizu, & Wansink, 2012), and were also asked to report the highest amount of money (in dollars) that he or she would be willing to pay (WTP) for a snack-sized portion of the item (e.g., Schulze & Wansink, 2012).

2.3.3. Shopping habits (reading nutrition labels and buying organic foods)

To measure whether participants usually read nutrition labels and buy organic foods on foods, they were asked to respond to the items "I usually read nutrition labels on foods" and "I usually buy organic foods," respectively, on a 9-point scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*).

2.3.4. Pro-environmental activities

To measure whether participants engaged in pro-environmental activities, they were asked to report whether they (a) like to recycle, (b) recycle whenever they can, (c) enjoy going on nature hikes or leisurely walks, and (d) enjoy spending time with nature, on a 9-point scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). Those items were conceptually adapted from Dunlap et al. (2000) pro-environmentalism scale, but focused more on behaviors rather than attitudes to assess their actual pro-environmental engagement. By simply averaging the scores from those four items, a single index for 'pro-environmentalism' was created ($\alpha = .83$).

2.3.5. Dietary restraint

Because past research suggests an important role of dietary restraint status in various eating behavior and food-related perceptions (e.g., Ruderman, 1986), participants were asked to complete the 10-item Restrained Eating Scale (Herman & Polivy, 1980). Participants responded to the items such as "How are you dieting?" As in previous research (e.g., Papies, Stroebe, & Aarts, 2007), we simply summed scores from those 10 items to create a single index of restrained eating ($\alpha = .57$).

2.4. Data analysis

We conducted a series of within-participants analysis of variances (ANOVAs) to examine if the organic label influenced participants' caloric estimations and WTPs for each of the three food items. Furthermore, given consistent results across the three foods, we conducted the same ANOVA to examine if there was an overall health halo effect of caloric estimations by combining participants' caloric estimations for all three foods into a single composite index. Similarly, by combining their WTPs for all three foods into a single composite index, we conducted the same ANOVA to examine if there was an overall health halo effect of WTPs. Finally, we conducted a series of the same ANOVAs to examine if the organic label influenced participants' nutrition- and taste-related evaluations for each three food item. As for caloric estimations and WTPs, we conducted the same ANOVAs to examine the overall effect of the label condition across the three foods for each of those evaluations by creating composite indices.

To examine possible interaction effects, we first divided participants into those who were high versus low in their frequency of reading nutrition labels (Median = 5.00), those who were high versus low in their frequency of purchasing organic foods (Median = 2.00), and those who were high versus low in their environmental activities (Median = 7.25). We then conducted a series of mixed-model ANOVAs analyzing the effect of the label condition on the composite indices of caloric estimations, WTPs, and nutrition-related evaluations as a within-participant factor and each moderator as a between-participants factor[2].

Finally, if we observed any significant interaction effect, we then conducted two paired-sample *t*-tests by focusing on each group to determine if the effect of the organic label was less pronounced among participants who were (1) high (versus low) in

[2] Because the main effects of the label condition on the taste-related evaluations did not yield consistent results, we did not examine the interaction effects of three moderators on the taste-related evaluations.

their frequency of reading nutrition labels, (2) high (versus low) in their frequency of purchasing organic foods, and (3) high (versus low) in their environmental activities.

3. Results

3.1. Main effects

3.1.1. Caloric estimation and WTP

As predicted, a series of within-participants ANOVAs revealed that the organic label did influence participants' evaluations across all three food items (see Table 1). The organic-labeled cookies, $F(1, 114) = 56.63$, $p < .001$, chips, $F(1, 114) = 58.98$, $p < .001$, and yogurt, $F(1, 114) = 46.22$, $p < .001$, were estimated to be significantly lower in calories than foods without the organic labels. The effect of the label condition on the composite index of caloric estimations was also significant, $F(1, 114) = 80.02$, $p < .001$. Similarly, the organic-labeled cookies, $F(1, 109) = 23.87$, $p < .001$, chips, $F(1, 111) = 33.04$, $p < .001$, and yogurt, $F(1, 109) = 21.72$, $p < .001$, also evoked a higher WTP than foods without the organic labels. The effect of the label condition on the composite index of WTP was also significant, $F(1, 106) = 39.82$, $p < .001$.

3.1.2. Nutrition-related evaluations

Second, the nutrition-related evaluations showed a consistent health halo effect (see Table 2). Namely, the organic cookies, $F(1, 109) = 9.92$, $p < .001$, chips, $F(1, 111) = 46.79$, $p < .001$, and yogurt, $F(1, 112) = 13.69$, $p < .001$, were reported to 'taste lower in fat' compared to their non-organic counterparts. Similarly, organic-labeled cookies, $F(1, 106) = 14.86$, $p < .001$, chips, $F(1, 111) = 42.64$, $p < .001$, and yogurt, $F(1, 112) = 12.84$, $p = .001$, were reported to 'taste lower in calories' compared to their non-organic counterparts. Furthermore, the organic-labeled cookies, $F(1, 111) = 20.95$, $p < .001$, and chips, $F(1, 113) = 17.57$, $p < .001$, were considered to be more 'nutritious' than their non-organic counterparts, although the presence of an organic label on yogurt failed to reach significance, $p = .26$. Finally, the organic-labeled cookies, $F(1, 112) = 11.80$, $p = .001$, chips, $F(1, 112) = 8.70$, $p = .004$, and yogurt $F(1, 112) = 9.22$, $p = .003$, achieved significance with regards to the amount of fiber they contained, compared to their non-organic counterparts. The effects of the organic label on the composite indices of each attribute were also significant, $Fs > 21.90$, $ps < 001$.

3.1.3. Taste-related evaluations

Finally, the taste-related evaluations appeared to yield inconsistent effects (see Table 3). The organic chips were rated as marginally significantly more 'appetizing', $F(1, 113) = 3.87$, $p = .052$, although the organic cookies and organic yogurt failed to reach significance, $p = .12$ and $p = .35$, respectively. Secondly, the organic-labeled yogurt was considered more 'flavorful' than its non-organic counterpart, $F(1, 112) = 4.93$, $p = .03$, while the regular cookies were considered more 'flavorful' than their organic counterpart, $F(1, 112) = 6.29$, $p = .01$. Similarly, the organic-labeled yogurt was rated higher on 'tasted good' than their non-organic counterpart, $F(1, 110) = 5.73$, $p = .02$, while the regular cookies were rated higher on 'tasted good' than their organic counterpart, $F(1, 111) = 8.17$, $p = .005$. Lastly, for the attribute of 'tasted artificial', both the cookies and the chips yielded significant differences, $F(1, 110) = 4.70$, $p = .03$ and $F(1, 112) = 19.57$, $p < .001$, with the organic-labeled versions perceived as tasting less artificial than the non-organic versions.

Table 1
Mean and standard deviation in caloric estimation (kcal) and willingness-to-pay (in dollar) under organic and regular label conditions.

	Organic Label		Regular Label		*F*-value
	M	*SD*	*M*	*SD*	
Caloric estimation					
Cookies	144.93	97.51	191.07	126.64	56.63*
Chips	153.18	86.46	199.08	108.95	58.98*
Yogurt	90.39	53.76	113.13	60.02	46.22*
Willingness to pay					
Cookies	1.95	1.30	1.68	1.20	23.87*
Chips	1.74	1.17	1.41	.92	33.04*
Yogurt	1.40	1.26	1.14	1.17	21.72*

* $p < .001$.

Table 2
Mean and standard deviation in nutrition-related evaluations under organic and regular label conditions.

	Organic Label		Regular Label		*F*-value
	M	*SD*	*M*	*SD*	
High in fat					
Cookies	5.85	2.22	6.48	2.14	9.92*
Chips	5.83	2.38	7.05	1.86	46.79**
Yogurt	3.04	1.93	3.79	2.27	13.69**
High in calories					
Cookies	5.99	2.25	6.67	2.10	14.86**
Chips	5.81	2.24	6.89	2.00	42.64**
Yogurt	3.07	1.87	3.67	2.06	12.84*
Nutritious					
Cookies	3.65	2.08	2.93	1.91	20.95**
Chips	4.19	2.18	3.31	2.03	17.57**
Yogurt	5.48	2.35	5.27	2.20	1.28
A lot of Fiber					
Cookies	3.24	1.87	2.81	1.72	11.80*
Chips	4.17	2.08	3.69	2.10	8.70*
Yogurt	3.72	1.94	3.37	1.87	9.22*

Notes: All items are measured on 9-point scales ranging from 1 (strongly disagree) to 9 (strongly agree).
* $p < .01$.
** $p < .001$.

Table 3
Mean and standard deviation in taste-related evaluations under organic and regular label conditions.

	Organic Label		Regular Label		*F*-value
	M	*SD*	*M*	*SD*	
Appetizing					
Cookies	5.96	2.31	6.21	2.24	2.47
Chips	6.61	1.94	6.35	2.05	3.87*
Yogurt	3.18	2.46	3.05	2.29	.88
Flavorful					
Cookies	6.18	2.29	6.58	2.15	6.29*
Chips	6.65	1.92	6.46	2.13	1.44
Yogurt	3.35	2.56	3.04	2.28	4.93*
Tasted good					
Cookies	6.06	2.45	6.52	2.13	8.17**
Chips	6.75	1.88	6.61	2.03	.67
Yogurt	2.97	2.44	2.66	2.14	5.73*
Tasted artificial					
Cookies	5.18	2.44	5.63	2.30	4.70*
Chips	3.82	2.31	4.78	2.54	19.57***
Yogurt	3.80	2.64	4.14	2.65	1.90

Notes. All items are measured on 9-point scales ranging from 1 (strongly disagree) to 9 (strongly agree).
* $p < .05$.
** $p < .01$.
*** $p < .001$.

3.2. Interaction effects

3.2.1. Reading nutrition labels

First, the interaction effect of the frequency of reading nutrition labels was significant for cookies, $F(1, 105) = 9.15$, $p = .003$, for

chips, $F(1, 105) = 12.71$, $p = .001$, and for yogurt, $F(1, 105) = 7.56$, $p = .007$. The same ANOVA found a significant interaction effect on this composite index of participants' total caloric estimations, $F = 14.49$, $p < .001$. Two paired-sample t-tests focusing on each group revealed that, although the effect was significant for both groups, those who rated themselves to be low in their frequency of reading nutrition labels showed a stronger effect, $t = -7.92$, $p < .001$, than those who rated themselves to be high in their frequency of reading nutrition labels, $t = -5.61$, $p < .001$. On the other hand, the moderation effects on WTP and the nutrition-related evaluations for each food were not significant, $ps > .62$.

3.2.2. Purchasing organic foods

Second, the interaction effect of the frequency of purchasing organic foods was significant for cookies, $F(1, 105) = 7.83$, $p = .006$, for chips, $F(1, 105) = 5.80$, $p = .02$, and for yogurt, $F(1, 105) = 4.97$, $p = .03$. This interaction effect was also significant for the single composite index of total caloric estimation, $F = 8.84$, $p = .004$. Two paired-sample t-tests for each group revealed that those with a lower frequency of purchasing organic foods showed a slightly stronger effect, $t = -6.93$, $p < .001$, than those who rated themselves higher in their frequency of purchasing organic foods, $t = -6.42$, $p < .001$. On the other hand, the moderation effects were not significant for WTP and the nutrition-related evaluations.

3.2.3. Pro-environmental activities

Finally, the interaction effect of the pro-environmental activity was significant only for chips, $F(1, 102) = 7.80$, $p = .006$. Using the single composite index of caloric estimation as the dependent variable, the ANOVA only revealed a marginally significant interaction effect, $F = 3.19$, $p = .08$. Two paired-sample t-tests focusing on each group revealed that those who considered themselves to be low in pro-environmentalism showed a slightly stronger effect, $t = -7.49$, $p < .001$, than those who considered themselves to be high in pro-environmentalism, $t = -5.44$, $p < .001$. Thus, in contrast to Schuldt and Schwarz's (2010) findings, these results suggest that participants who rated themselves *lower* on pro-environmental activities actually showed a *more* pronounced halo effect, compared to those who rated themselves higher on pro-environmental activities. On the other hand, there were again no moderation effects on WTP and the nutrition-related evaluations, $ps > .56$[3].

4. Discussion

The goal of the present study was to provide concrete and specific findings regarding the influence of the organic label on consumer perceptions of a food product. The results indicated that the presence of an organic label can exert an influence on one's caloric estimation, WTP, and nutritional evaluations. First, across 3 food items, foods labeled organic were estimated to be significantly lower in calories than foods without the organic label. Namely, participants estimated 20.1% fewer calories for 'organic' yogurt, 23.1% fewer calories for 'organic' potato chips, and 24.1% fewer calories for 'organic' cookies.

Second, across the three foods items, participants were likely to pay more for the organic-labeled foods than for the foods without the organic label. Participants reported that they were willing to pay 22.8% more for 'organic' yogurt, 23.4% more for 'organic' potato chips, and 16.1% more for 'organic' cookies. While past research had demonstrated that consumers were willing to pay 5–10% more for organic foods (e.g., Ott, 1990), our results indicate an even higher WTP for foods labeled 'organic'.

Third, our results also revealed that organic-labeled foods were perceived to be more nutritious than their non-organic counterparts (see Table 2). Overall, participants rated foods labeled organic to be lower in calories and fat as well as higher in fiber and nutrition. These results suggest that the health halo phenomenon may not necessarily be limited strictly to specific nutritional attributes such as calories, but may also extend to other attributes of a product, such as fiber content. The only exception to this pattern is the absence of a significant difference for how 'nutritious' participants rated yogurt, which could be attributed to a common perception of yogurt as a *healthy* food. Namely, because consumers generally assume that yogurt is nutritious even when it is conventional, the effect of organic label may have been diminished.

However, the taste-related evaluations – whether the food items were 'appetizing', 'flavorful', 'tasted good', or 'tasted artificial' – seemed to be inconclusive, as evidenced by fewer significant findings for each of these attributes (see Table 3). These results match with Schuldt and Hannahan's (2013) recent findings that organic foods could be perceived in negative ways, such as being rated as less tasty. In fact, the taste ratings of the organic-labeled cookies appear to be *less* favorable for two of the four taste attributes, compared to the taste ratings of the regular cookies. Because cookies are not typically considered to be healthy foods, consumers may perceive that the 'healthier' food item would not taste as good. This is consistent with a number of previous studies, which have posited that consumers hold a misleading, yet common, view that most healthy foods taste bad and most unhealthy foods taste good (Wansink, 1994). Raghunathan, Naylor, and Hoyer (2006) attest that this perception holds true among consumers, proposing what is known as the 'unhealthy = tasty' intuition. This intuition posits that people tend to believe that an unhealthy food is inherently tastier; correspondingly, this might also suggest that people would perceive *healthy* products as *less* tasty.

Because these findings were neither found across four specific domains of taste-related evaluations nor across three food items, however, it may be important for future research to address what might differentiate the influence of organic labels in taste-related evaluations. In any case, the present study provided further evidence suggesting that organic labels led to higher caloric estimation, WTP, and nutrition-related evaluations by extending Schuldt and Schwarz's (2010) findings.

The present study also found significant moderators. First, we found that those who read nutrition labels on foods more often showed weaker health halo effects, suggesting that consumers who read nutritional labels more often engage in deliberative processing. Our results corroborate previous research, which show that participants with more general nutritional knowledge (e.g., nutritional labeling) tend to recall more nutritional information and will have it encoded at a more abstract level in their memories (Andrews, Netemeyer, & Burton, 2009; Brucks et al., 1984).

The next moderator that we examined was familiarity with organic food, as assessed by one's frequency of purchasing organic foods. Our results demonstrated that those who bought organic foods more often showed weaker susceptibilities to the health halo effect, which is consistent with the idea that a higher degree of familiarity with the organic term may promote deliberative processing concerning the term, and ultimately lead to more accurate assessments of organic labels (see also Hong & Wyer, 1989).

Finally, contrary to the results found in the study by Schuldt and Schwarz (2010), our study found that participants who deemed themselves to engage in environmentally friendly activities more often were less susceptible to the halo effect (albeit the effect was only marginally significant), making more accurate nutritional estimations. This may indicate that those who are more environ-

[3] In addition to those three moderators, we also examined the moderating roles of age, gender, BMI, and restrained eating status (see Bublitz et al., 2010). However, none of them were found to be significant, $ps > .19$.

mentally active are also more knowledgeable about the term 'organic' as representing a method of production, resulting in more deliberative processing and accurate caloric estimations. As indicated in Schuldt and Schwarz's study, merely holding pro-environmental attitudes does not make people less immune – but, instead, more prone – to the health halo effect.

Thus, consistent with the idea that the health halo effect is primarily driven by automatic processing that relies on heuristics, the results of those three moderators suggested that people were more likely to show the halo effect if they (1) did not typically read nutrition labels, (2) did not frequently buy organic foods, and (3) did not regularly engage in pro-environmental activities. It is worth highlighting that the halo effect was robust across gender, BMI, and dietary restraint, as indicated by no interaction effects between those variables and the halo effect (see Footnote 3).

4.1. Limitations and future research

This study has several limitations. First, because our participants consisted of only consumers recruited from a local shopping mall, the external validity was limited given that the population was socioeconomically as well as ethnically biased. Second, while we expanded the variety of foods from previous studies to include both healthy and less healthy food items, the study was limited to only three foods. Ideally, a greater variety of food categories – for example, using food products that are perceived to be more neutral in healthfulness (e.g., pretzels, crackers) – would be necessary to generalize our conclusions and broaden its scope.

In addition, although we found significant interaction effects for the frequency of reading labels and buying organic food, and a marginally significant interaction effect for pro-environmentalism, we need to interpret those effects – especially the effect for pro-environmentalism – with caution because the effects were only observed for the caloric estimations and not for WTP or other nutrition-related evaluations. It may be possible that estimating calories is not a popular activity for most consumers, which leads them to rely more on automatic or heuristic-based processing than on deliberate processing. Thus, it is important for future research to examine why caloric estimation appears to be most prone to those moderation effects.

Finally, it is important to note that health claims with lower nutrient criteria requirements might elicit compensating nutritional behavior. In particular, Putler and Frazao (1991) theorize that consumers often deliberately choose a healthy food product in one category with a health claim and then compensate for this perceived sacrifice by consuming products from other categories that are not as healthy (e.g., eating a low-fat main course allows for an ice cream dessert). In fact, a series of laboratory experiments and field studies conducted by Chandon and Wansink (2007) revealed that a health halo can be associated with certain restaurants perceived to be healthy, leading people to underestimate calories in perceived healthier foods, resulting in the consumption of larger portions. In the same way, it is possible that such perceptions hold for organic foods as well, and it is worth testing whether consumers use the organic label to justify indulging in other foods (see also Chernev, 2011).

4.2. Implications

The present results hold important practical implications for the role of organic labeling. Most importantly, although our moderator analyses suggested that certain individuals were less prone to the health halo effect, the organic label still imposed an influence on caloric ratings, WTPs, and various nutrition-related evaluations. These results suggest that food companies have been able to benefit from its favorable perception by displaying the organic label prominently on their food products as a marketing tool. However, this study presents another set of challenges that the government must consider in addressing labeling issues. Namely, it is important that agencies such as the FDA and USDA take this into account to ensure how they can create labeling policies that achieve the goal of promoting better informed dietary choices to consumers without creating the health halo effects that our studies indicated.

4.3. Conclusions

The purpose of the present study was to examine whether organic labels influence various evaluations toward food products. We found that foods with organic labels evoked lower caloric estimations and higher WTP than foods without organic labels. Furthermore, organic labels yielded more positive nutritional evaluations toward the food (e.g., lower in fat, more fiber) than non-organic labels. In addition, three moderators demonstrated that these effects were less pronounced among people who typically read nutritional labels, who often buy organic foods, and who often engage in pro-environmental activities. This underscores the idea that the health halo effect is primarily driven by automatic processing based on heuristics.

The use of organic labels on processed food items may seem attractive to retailers and manufacturers in order to advocate the benefits of organic methods of production. However, this study demonstrates that these labels may instead impart an undue perception of increased healthfulness of a food item. Given the disparity between the intended message and actual consumer perception, more caution should be taken in determining whether and how the organic label – as well as other health claims – should be included on a given food package.

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