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Research report

The effect of brand and caloric information on flavor perception and food consumption in restrained and unrestrained eaters

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ABSTRACT

The goal of the current study was to determine whether provision of brand and caloric information affects sensory perception and consumption of a food in restrained ($n = 84$) and unrestrained eaters ($n = 104$). Using a between-subjects $2 \times 2 \times 3$ design, female restrained and unrestrained eaters were asked to taste and rate a cookie that was labeled with a brand associated with healthful eating (Kashi®) or one associated with unhealthful eating (Nabisco®). Additionally, some participants were presented with a nutrition label alongside the brand name indicating that one serving contained 130 calories (Low-Calorie Condition), or 260 calories (High-Calorie Condition). The remaining participants were not shown a nutrition label (No Label Condition). Results indicated that those in the No Label or the High-Calorie Condition perceived the healthful branded cookie to have a better flavor than those who received the unhealthful branded cookie regardless of their restraint status. However, restrained eaters in the No Label Condition consumed more of the healthful than the unhealthful branded cookie, whereas those in the Low-Calorie Condition consumed more of the unhealthful than the healthful branded cookie. In contrast, unrestrained eaters ate more of the healthful branded cookie regardless of the caloric information provided. Thus, although restrained and unrestrained eaters' perceptions are similarly affected by branding and caloric information, brands and caloric information interact to affect restrained eaters' consumption. This study reveals that labeling foods as low calorie may create a halo effect which may lead to overconsumption of these foods in restrained eaters.

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Introduction

Everyday consumers are faced with numerous decisions about when to eat, which foods to eat, and how much to eat. These decisions are determined in part by internal cues such as hunger, satiety, and cravings. However, they are also affected by external factors such as marketing approaches that manipulate the presentation and packaging of foods in ways that make them appealing and desirable (for a review see Wansink, 2004). Because food packaging contains a great deal of information, daily food choice decisions can be complex.

Perhaps the most noticeable type of information on food packaging is the brand name of the product. Previous research has indicated that brands can serve as a rich source of information for the consumer (Aaker & Biel, 1993; Ward & Lee, 2000). The caliber of a brand is reflected by its ability to communicate meaning and quality to consumers (Herbig & Milewicz, 1993; Keller, 2003), thereby reducing levels of perceived risk (McNeal & Zerren, 1981; Shimp, 1993). Messages communicated by brands become associated with their larger image, which serves to differentiate products from one another

(Aaker, 1991, 1996; de Chernatony & McDonald, 1998) and provides a long-lasting sense of purpose and meaning to a targeted group of consumers. Some believe that a well-known brand is one of the most valuable assets a company can have (Neumeier, 2006).

Well-communicated brand images play an important role in determining consumers' food perceptions from a young age (Park, Jaworski, & MacInnis, 1986). For example, young children who were given identical food and drink with either McDonald's or unbranded packaging preferred the meal from McDonald's over the same food in an unbranded package (Robinson, Borzekowski, Matheson, & Kraemer, 2007). Similar results have been found with adults (Allison & Uhl, 1964; Makens, 1965). Other studies have shown that brands become associated with perceived healthfulness which in turn is associated with perceptions of caloric content (for a review see Chandon, 2012). This was demonstrated in a recent study by Chandon and Wansink (2007) in which people were asked to imagine that they had received a coupon for either an unhealthful food; a McDonald's Big Mac that contained 600 calories, or a food generally viewed as more healthful; a foot-long Subway sandwich, which contained 900 calories. Participants subsequently ordered more calories worth of dessert and sodas to go with the Subway sandwich compared to the McDonald's burger. As a result, the meal with the Subway sandwich had 56% more calories than the meal with the

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McDonald's burger. However, little research has focused on how restrained eaters; i.e., those who restrict their food intake to avoid gaining weight, are specifically affected by branding information relative to unrestrained eaters.

In a recent study from our laboratory (Cavanagh & Forestell, 2013), we found that regardless of whether people were restrained eaters or not, they provided higher ratings of liking for a cookie labeled with a brand associated with healthful eating than a cookie labeled with a brand associated with unhealthy eating. These findings were consistent with a recent study by Provencher, Polivy, and Herman (2009), in which cookies provided to the participants were described as containing either natural, healthy ingredients or unnatural, unhealthy ingredients. However, they are in contrast to earlier papers suggesting that people generally tend to enjoy unhealthy foods more than healthful foods (Raghunathan, Naylor, & Hoyer, 2006; Tuorila, Cardello, & Leshner, 1994).

In addition, Cavanagh and Forestell (2013) reported that restrained but not unrestrained eaters consumed more of the cookie if it was labeled with the healthful rather than the unhealthy brand. A similar result was reported by Irmak, Vallen, and Robinson (2011) in a study in which participants were given identical sets of jelly beans that were either described as 'fruit chews' or 'candy chews'. Results revealed that restrained eaters consumed significantly more of the jelly beans when they were described in a more healthful manner ('fruit chews') than when they were described in an unhealthy manner ('candy chews') while unrestrained eaters did not differ in their consumption. However, they are in contrast to Provencher et al. (2009) who reported that all participants, regardless of their restraint status, generally ate about 35% more when cookies were described as healthy as when they were described as unhealthy. We hypothesized that these discrepant results may have occurred because of differences in the type of manipulation employed in the studies. Given the strong image that brands can project, participants' behavior may have been affected more by presenting a brand logo, which may have more direct access to semantic information than a verbal description of ingredients (De Houwer & Hermans, 1994; Huijding & de Jong, 2005).

However, our previous study was limited in that only brand information was manipulated. Other aspects of packaging, such as caloric content, were not manipulated. While a brand name is one of the most recognizable aspects of packaging design, information about the nutritional contents of a food, which is typically contained in a "Nutrition Facts Label", may also be used to guide consumers' selection of food products (Campos, Doxey, & Hammond, 2011). This is especially true for certain demographics, such as women (Drichoutis, Lazaridis, & Nayga, 2006) and individuals under 35 years of age (Neuhouser, Kristal, & Patterson, 1999). Nutrition facts labels inform the consumer about the nutritional components of foods, such as fat and cholesterol, which are associated with chronic diseases, and provide information about nutrients such as sodium, protein, and sugar contained in each serving of a food or beverage (NLEA, 1990). Among the most recognizable aspects of the nutrition facts labels is the caloric information presented at the top of the label (Cho & Yu, 2007). The fact that caloric information plays an important role in food choice decisions has been demonstrated in studies in which participants ordered a meal from a restaurant menu that contained caloric information beside each food or no caloric information. Those who ordered from the menu with caloric information consumed 14% less than those who were provided with no caloric information (Roberto, Larsen, Agnew, Baik, & Brownell, 2010).

In the present study, we were interested in determining whether we could replicate and extend the findings of our previous study (Cavanagh & Forestell, 2013) by investigating how caloric information interacts with brand healthfulness to affect restrained and unrestrained eaters' perception and consumption of a snack. As in

Cavanagh and Forestell (2013) participants were presented with cookies and were randomly assigned to groups that were given different information about the cookies; either cookies that were labeled with a brand that is considered to be healthful (Kashi®) or a brand that is generally considered to be unhealthy (Nabisco®; Cavanagh & Forestell, 2013). Additionally some participants within each of these groups were also provided with a nutrition facts label in which the caloric content of the cookie was listed as 130 calories or 260 calories, while other participants were not shown a nutrition facts label.

Based on our previous findings (Cavanagh & Forestell, 2013), we hypothesized that all participants, regardless of their restraint classification, would like the cookies labeled with the more healthful brand better than those labeled with the unhealthy brand on a variety of dimensions. Furthermore, if restrained eaters' consumption is guided by the heuristic that healthful = low calorie, we hypothesized that restrained eaters would consume more of the healthful brand cookie when no nutritional label or a low calorie label was provided relative to the high calorie label. On the other hand, for the unhealthy brand, we hypothesized that restrained eaters would consume more of this food only if given a justification in the form of a low calorie label. In contrast, we predicted that unrestrained eaters' consumption would not be differentially affected by the labeling manipulation because their intake is motivated by internal rather than external cues.

Materials and method

Participants

One hundred and eighty-eight undergraduate women between 18 and 26 years of age participated for course credit between January and June of 2013 at a medium-size liberal arts university. They were recruited through their introductory psychology course and received course credit or a \$5 gift card for their participation. All procedures were approved by the school's Protection of Human Subjects Committee, and written informed consent was obtained from each participant.

Design



This study used a 3 × 2 × 2 between-subjects design with Caloric Information (Low-Calorie, High-Calorie, No Label), Brand (Healthful, Unhealthful), and Restraint group (Restrained, Unrestrained) as independent variables. Outcome variables included ratings of the flavor of the cookies and satisfaction of consumption of the cookies, which were obtained by asking participants to complete a taste-test, and intake of the cookies.

Test stimuli

Each participant was given three soft-baked, oatmeal and dark chocolate Kashi® cookies, each of which was broken in half. One cookie (30 g) was considered one serving size and contained 130 calories. These cookies were chosen because they are ambiguous in that they have ingredients that are associated with a healthy lifestyle (e.g., whole grains) as well as ingredients that are typically associated with unhealthy eating (e.g., chocolate chips).

Questionnaires

In addition to collecting demographic information (e.g., age and race) for all participants, several other questionnaires were administered and are described below.

Taste-test questionnaire

For half of the participants, the logo for Kashi®, a brand associated with healthful eating, was displayed at the top of the

questionnaire, and for the remaining participants Nabisco®, a brand not associated with healthful eating, (Cavanagh & Forestell, 2013) was displayed. One third of the participants from the healthful and unhealthy brand groups were also provided with an entire nutrition facts label with a serving size of one cookie listed as 130 calories (Low Calorie Condition), another third were provided with the same nutrition facts label, except one serving size was listed as 260 calories (High Calorie Condition). The remaining third were not provided with any nutrition information (No Label Condition). The group that received no nutritional label gave us the ability to provide a replication of Cavanagh and Forestell (2013). This was followed by Likert-scale questions (ranging from 1 = *Strongly Dislike* to 7 = *Strongly Like*) such as “How visually appealing does the snack look?”; “How much do you like the flavor of this snack?”; “How much did you like consuming these cookies as a snack food?” (Satisfaction), and “How would you rate the snack overall?” (Overall rating). Participants were asked to complete this questionnaire as they were sampling the cookies.

Three-factor eating questionnaire (TFEQ)

All participants completed the 21-item subscale for cognitive dietary restraint (the degree to which individuals cognitively restrain their food intake in order to lose or maintain their weight) of the Three-Factor Eating Questionnaire/Eating Inventory (Stunkard & Messick, 1985). A sample question from this scale would be: “When I have eaten my quota of calories, I am usually good about not eating anymore.” Because this subscale is scored on a dichotomous scale, we calculated Kuder–Richardson Formula 20 (KR-20) for the current sample. These analyses revealed acceptable levels of internal consistency for cognitive restraint (KR-20 = 0.92). Consistent with Stunkard and Messick (1985), cut-off scores were used to separate participants into dichotomous categories. Participants with restraint scores higher than 11 were classified as restrained eaters.

Brand engagement in self-concept scale (BESC)

All participants completed an eight-item scale that measured consumer’s general engagement with brands (Spratt, Czellar, & Spangenberg, 2009) to ensure that there were no between-group differences on this construct. A sample question from this scale would be: “I feel as if I have a close personal connection with the brands I most prefer.” Measures for this scale are taken on a seven-point scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree*. For the current sample, Chronbach’s α was .93.

Time since last ate

We asked participants at what time they last consumed a food or beverage in order to control for the inherent variability in participants’ level of hunger. While all participants complied in that they did not eat for 2 hours before the session, several participants indicated they had not eaten since the night before.

Procedure

Participants were tested individually and randomly assigned to one of the two Brand Conditions and one of the three Caloric Information Conditions before they arrived at the laboratory. Upon arrival, they completed the informed consents and were told that the purpose of the study was to examine taste-perceptions in snack foods popular among college students and that they would be given 10 minutes to taste and rate cookies made by Kashi® (Healthful Brand) or Nabisco® (Unhealthy Brand). In an effort to ensure that participants correctly associated Kashi® with healthful foods and Nabisco® with unhealthy foods, a short script was recited to participants that differed according to their group assignment. For the Healthful Brand Condition, participants were told: “Today you will

be sampling cookies made by Kashi®. Kashi® is well-known for making products such as organic granola bars and GOLEAN Crunch Cereals.” An identical script was used for the Unhealthy Brand Condition **except that** Chips-A-Hoy! and Oreos were used as examples. This script was created in an effort to standardize participants’ brand perceptions.

Participants were told that they could eat as much or as little as they wanted, and to answer all questions on the questionnaire as accurately as possible. At this point, the experimenter left the room for 10 minutes. When the experimenter returned, the uneaten cookies were collected. Cookies were weighed before and after each session to measure consumption. Participants were then seated in front of a computer to complete questionnaires using Qualtrics survey software (Qualtrics Labs Inc., Provo, UT). Upon completion of the online questionnaires, the experimenter weighed the participants and measured their height. Participants were then debriefed before leaving and asked not to share information about the study with other students who may participate.

Data analyses

Analyses of participant demographics and the rating dimensions (i.e., flavor, visual appeal, satisfaction, and overall rating) were subjected to separate $2 \times 2 \times 3$ univariate ANOVAs with Brand (Healthful, Unhealthy), Restraint group (Restrained, Unrestrained), and Caloric information (Low-Calorie, High-Calorie, No Label), as independent variables. Similar analyses were conducted for flavor ratings and consumption. In order to control for family-wise error rate, Bonferroni correction was applied for all post hoc analyses.

Results

Participant characteristics

Of the 188 participants, 133 participants (70.7%) were Caucasian, 29 (15.4%) were African-American and 26 (13.9%) were Asian. As shown in Table 1 there were no differences between the groups’ age, BMI, time since last ate, or brand engagement. Moreover, participants’ restraint scores did not differ as a function of group assignment (i.e., no differences between Brand or Caloric Information Conditions, p values > .05).

Flavor perception

Analyses revealed that although there was no effect of Restraint Group, there was a main effect of Caloric Information, $F(2, 176) = 3.75, p < .03, \eta^2 = .04$, such that participants liked the flavor of the cookie better if it was low calorie than if it had no label, $p < 0.03, \eta^2 = .04$. There was also a marginal main effect of Brand for satisfaction, $F(1, 176) = 3.70, p < 0.06, \eta^2 = .02$, and a significant effect of Brand for flavor, $F(1, 176) = 8.10, p < .01, \eta^2 = .04$ and overall rating, $F(1, 176) = 8.52, p < .01, \eta^2 = .05$, such that participants’ ratings were higher for the Healthful than for the Unhealthy Brand.

In addition, there were significant Brand \times Caloric Information interactions for flavor $F(2, 176) = 5.55, p < .005, \eta^2 = .06$, satisfaction $F(2, 176) = 3.29, p < .040, \eta^2 = .04$, and a marginal Brand \times Caloric Information interaction for the overall rating $F(2, 176) = 2.79, p < .07, \eta^2 = .03$. In order to break down the two-way interactions, we conducted separate analyses for each of the Caloric Information Conditions. As observed in Fig. 1A, there were no significant differences between brands on any of the taste-test questionnaire variables for participants in the Low Calorie Condition (all p values > .05). However, as shown in Fig. 1B, analyses for participants in the High Calorie Condition revealed a significant main effect of Brand for flavor $t(62) = 3.39, p < 0.01, \eta^2 = .40$, satisfaction $t(62) = 3.61, p < 0.01, \eta^2 = .42$

Table 1
Participant characteristics (Mean ± SE).

	Restrained eaters			Unrestrained eaters		
	High-calorie	Low-calorie	No label	High-calorie	Low-calorie	No label
Group <i>Kashi</i>: sample size (n)	12	17	16	20	14	15
Age (years)	19.42 ± 0.38	19.00 ± 0.32	19.63 ± 0.33	19.00 ± 0.30	19.57 ± 0.35	19.27 ± 0.34
BMI	21.80 ± 1.31	22.56 ± 1.10	22.18 ± 1.17	23.71 ± 1.04	23.58 ± 1.22	23.90 ± 1.17
Time since last ate (hours)	5.79 ± 1.51	5.79 ± 1.27	7.89 ± 1.31	7.42 ± 1.17	4.57 ± 1.40	4.60 ± 1.35
Brand engagement	2.48 ± 0.31	2.22 ± 0.26	2.21 ± 0.27	2.34 ± 0.24	2.11 ± 0.29	2.32 ± 0.28
Restraint score (TFEQ)*	17.67 ± 0.85	17.71 ± 0.72	17.13 ± 0.74	6.75 ± 0.66	8.71 ± 0.79	7.53 ± 0.76
Group <i>Nabisco</i>: sample size (n)	10	16	13	22	15	18
Age (years)	18.60 ± 0.42	19.31 ± 0.33	19.69 ± 0.37	18.68 ± 0.28	19.40 ± 0.34	19.28 ± 0.31
BMI	21.60 ± 1.44	19.68 ± 1.14	21.05 ± 1.26	19.79 ± 0.97	22.61 ± 1.17	21.76 ± 1.07
Time since last ate (hours)	7.60 ± 1.66	5.48 ± 1.31	4.96 ± 1.45	7.37 ± 1.12	6.87 ± 1.35	6.19 ± 1.24
Brand engagement	2.44 ± 0.34	1.96 ± 0.27	2.10 ± 0.30	2.49 ± 0.23	2.69 ± 0.28	2.28 ± 0.26
Restraint score (TFEQ)*	16.40 ± .93	17.81 ± 0.74	16.15 ± 0.82	7.41 ± 0.63	6.27 ± 0.76	7.28 ± 0.70

* Refers to a significant main effect of restraint group, such that restrained eaters scored significantly higher than unrestrained eaters.

and overall rating $t(62) = 3.23, p < 0.01, \eta^2 = .38$, with participants in the Healthful Brand Condition rating the cookies higher on all of these dimensions than those in the Unhealthful Brand Condition. A similar pattern of results was found when we included only participants in the No Label Condition. As shown in Fig. 1C, consistent with Cavanagh and Forestell (2013), these analyses revealed a significant main effect of Brand for flavor $t(60) = 2.74, p < .01, \eta^2 = .33$, satisfaction $t(60) = 2.52, p < .02, \eta^2 = .30$, and overall rating $t(60) = 2.24, p < .03, \eta^2 = .28$.

Because visual inspection of Fig. 1 suggested that the Brand × Caloric Information interaction may have occurred because there were lower ratings for the Healthful Brand in the High-Calorie and the No Label Conditions relative to the Low-Calorie Condition, additional analyses were conducted. These analyses revealed that while ratings for the Healthful Brand Condition did not differ as a function of the caloric information provided, ratings for the Unhealthful Brand were significantly lower in the High-Calorie and the No Label Conditions when compared to the Low-Calorie Conditions (all p values < 0.05).

Food consumption

As shown in Fig. 2A and B, there was a main effect of Brand; $F(1, 176) = 6.92, p < 0.01, \eta^2 = .04$, such that participants generally consumed more of the cookies if they were labeled with the Healthful Brand ($M = 40.87$ g, $SE = 2.24$) than if they were labeled with the Unhealthful Brand ($M = 32.45$ g, $SE = 2.28$). There was also a main effect of Caloric Information; $F(2, 176) = 7.13, p < .01, \eta^2 = .08$. Post hoc analyses revealed that participants consumed more of the cookies labeled as low calorie ($M = 45.12$ g, $SE = 2.73$), relative to those labeled as high calorie ($M = 31.73$ g, $SE = 2.83; p < .01$); and those with no label ($M = 33.13$ g, $SE = 2.74; p < .01$).

There was also a significant three-way interaction of Caloric Information, Brand, and Restraint Group, $F(2, 176) = 4.40, p < .01, \eta^2 = .05$. In order to break down the three-way interaction, ANOVAs were conducted separately for each Restraint Group. For unrestrained eaters, results indicated that there was a marginal main effect of Brand; $F(1, 99) = 3.53, p < .07$ with participants in the Healthful Brand Condition consuming marginally more than those in the Unhealthful Brand Condition. However, there was no observed main effect of Caloric Information; $F(2, 99) = 1.13, ns$, and no significant Brand × Caloric Information interaction; $F(2, 99) = 0.55, ns$.

For restrained eaters, there was a main effect of Brand; $F(1, 78) = 4.05, p < .05, \eta^2 = .05$, such that participants in the Healthful Brand Condition consumed more of the snack compared to those in the Unhealthful Brand Condition. There was also a main effect of Caloric Information; $F(2, 78) = 9.69, p < .01, \eta^2 = .20$, such that overall individuals in the Low-Calorie Condition consumed more of

the snack than those in the High-Calorie or No Label Conditions. Finally, these main effects were qualified by a Brand × Caloric Information interaction; $F(2, 78) = 6.73, p < .01, \eta^2 = .15$.

To probe the two-way interaction in restrained eaters, simple main effects analyses were conducted separately for each brand. This revealed a main effect of Caloric Information in the Unhealthful Brand Condition, $F(2, 36) = 13.93, p < .001, \eta^2 = .44$ with restrained eaters consuming more of the snack when presented with a low calorie label than when presented with a high calorie label; $t(24) = 3.74, p < .01, \eta^2 = .61$ or no label; $t(27) = 4.62, p < .01, \eta^2 = .66$. Comparatively, simple main effects analysis for restrained eaters in the Healthful Brand Condition indicated that there was no main effect of Caloric Information; $F(2, 42) = 1.94, ns$.

In order to determine whether participants' consumption was simply a reflection of their flavor ratings (i.e., perceived tastiness) for the cookie, we ran additional analyses in which we included flavor rating as a covariate (see Cavanagh & Forestell, 2013). These analyses revealed similar patterns to those reported above.

In order to determine whether the results of the current study replicated those of Cavanagh and Forestell (2013), we conducted additional analyses that included only participants in the No Label Condition. Thus, a two-way mixed ANCOVA was conducted with Brand and Restraint Group as the independent variables, the amount of cookies consumed as the dependent variable, and perceived flavor and time since last ate as covariates. Consistent with Cavanagh and Forestell (2013) analyses revealed a main effect of Brand; $F(1, 43) = 11.60, p < .01, \eta^2 = .23$ and a Brand × Restraint Group interaction; $F(1, 41) = 4.50, p < .04, \eta^2 = .10$. Simple main effects analyses revealed that for restrained eaters, those in the Healthful Brand Condition consumed more than those in the Unhealthful Condition; $t(21) = 3.32, p < .01$, whereas the unrestrained eaters did not differ in their consumption of the two brands $t(21) = 0.52, ns$.

Discussion

The results of the current study demonstrated that brand names and caloric information influence flavor perception separately and interact to predict food intake. Consistent with previous research (Cavanagh & Forestell, 2013; Provencher et al., 2009), both restrained and unrestrained participants in the Healthful Brand Condition rated the cookie higher (i.e., in terms of flavor, satisfaction, visual appeal and overall rating) than those in the Unhealthful Brand Condition, suggesting that undergraduate women may have a predetermined idea that healthful foods are more palatable. These findings are also in line with findings reported by Pelchat and Pliner (1997) who reported that participants between the ages of 14 and 22 years were more willing to try foods that were described to be "good for you." However, these findings are inconsistent with

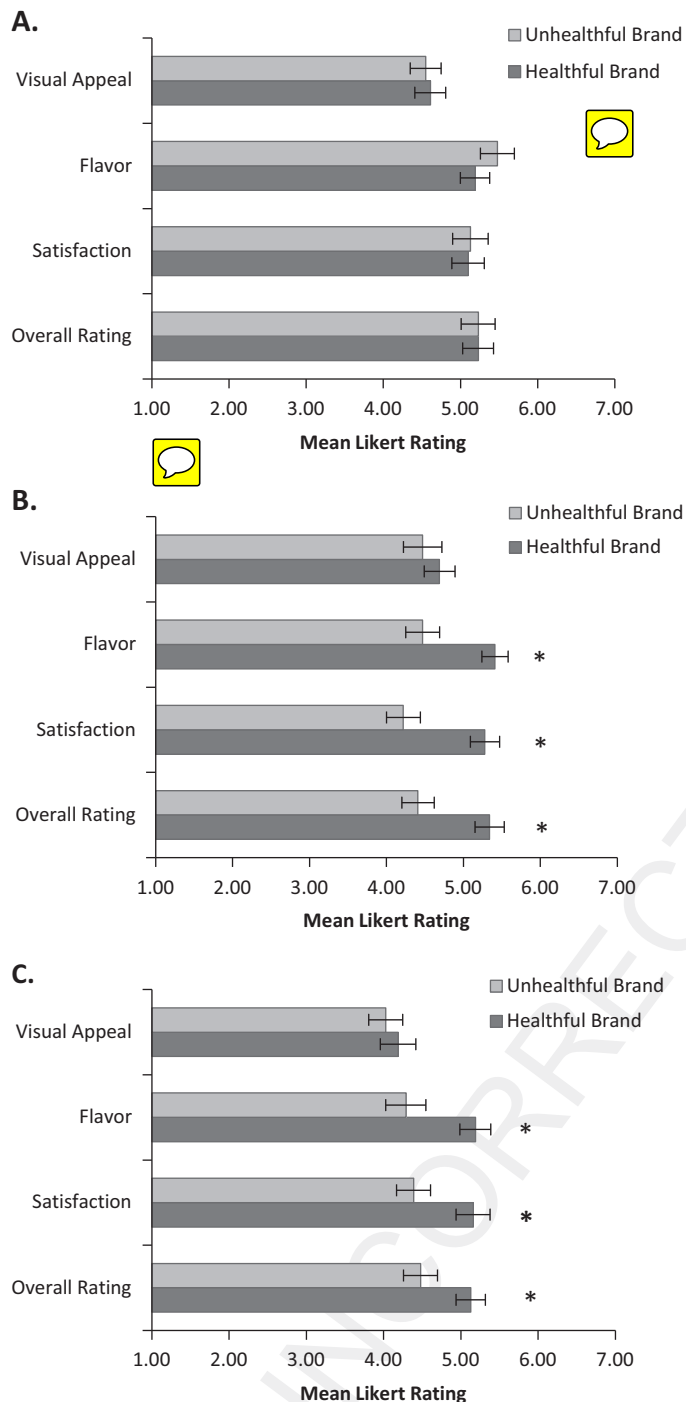


Fig. 1. Mean Likert score ratings of the cookies which were labeled as either Kashi (black bars) or Nabisco (grey bars) for the Low Calorie Condition (A), the High Calorie Condition (B), and the No Label Condition (C). Error bars depict standard error of the mean; * $p < 0.05$.

previous studies that suggest that people tend to prefer unhealthy over healthy snacks (e.g., Raghunathan et al., 2006; Tuorila et al., 1994). Given that these studies differ in a range of methodological details (e.g., participant characteristics and the foods provided), further research is needed to understand the factors responsible for these conflicting results.

In addition, the current study demonstrated that the provision of caloric information differentially affected ratings of the Healthy and Unhealthy Brand Conditions. Whereas participants indi-

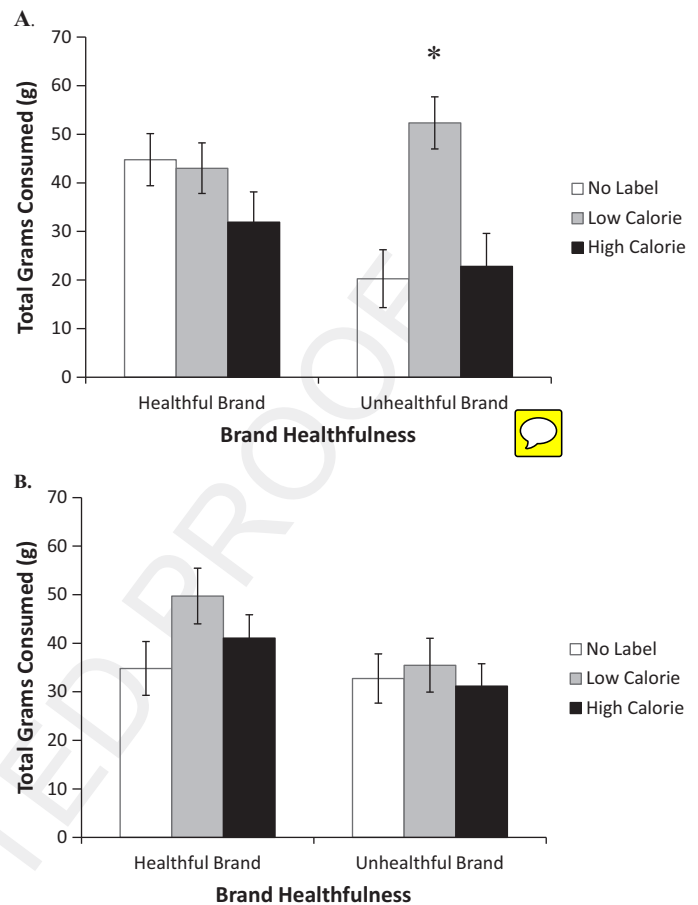


Fig. 2. Total grams of the cookies consumed in restrained (A) and unrestrained eaters (B) as a function of the brand and nutrition label conditions. Error bars depict standard error of the mean; * $p < 0.05$.

cated that they liked the brands equally in the Low-Calorie Condition, in the High-Calorie and the No Label Conditions, they indicated that they liked the healthy brand significantly more than the unhealthy brand. There are two possible reasons why this might have occurred; first it is possible that liking for the unhealthy brand was enhanced, or liking for the healthy brand was depressed in the low calorie Condition relative to the other Conditions. In the present study, the former scenario was supported; ratings of the unhealthy brand were higher in the Low-Calorie Condition than in the High-Calorie and the No Label Conditions, whereas ratings of the healthy brand did not differ between the Caloric Information Conditions. Thus it appears that when unhealthy snacks are labeled as “low calorie” a halo effect may occur that makes them seem more appealing relative to when they contain more calories or when no caloric information is provided.

With respect to consumption, we found that restrained eaters consumed more of the cookie labeled with the unhealthy brand when it was presented with a low calorie label relative to when it was presented with either a high calorie label or with no label. In contrast, when the cookies were labeled with the healthy brand, restrained eaters' consumption did not differ as a function of the caloric label. This pattern of results was different from that of the unrestrained eaters who generally ate more of the healthy brand than the unhealthy brand regardless of the caloric label. Thus, it appears that while the unrestrained eaters may have been genuinely concerned about eating healthfully, restrained eaters may have “justified” consuming more of the unhealthy cookie when it was presented as being low in calories.

It is also interesting to note that restrained eaters' consumption of the cookies labeled with the unhealthful brand mirrored that of their flavor perception ratings (i.e., those in the Low-Calorie Condition indicated that they liked cookies better and ate more of them than those in the High-Calorie or No Label Conditions). However, their consumption of the cookies labeled with the healthful brand did not coincide with their ratings. While those in the High-Calorie Condition indicated that they liked the cookies more, they did not consume more than those in the Low-Calorie or No Label Conditions. This is of interest and is consistent with previous research that implicit and explicit ratings of foods with high calorie content do not always correspond for restrained eaters (Hoeffling & Strack, 2008). In combination, these findings suggest that in some cases restrained eaters are conflicted about high calorie foods; although they may like these foods more than low calorie foods, their consumption, which likely reflected their dieting goals, did not reflect their hedonic ratings in the current study.

The current study provides further evidence that external information about the healthfulness of foods affects restrained eaters' consumption more than that of unrestrained eaters. Thus it appears that while unrestrained eaters rely on internal restraints (e.g., when they feel full, they stop eating) restrained eaters appear to be motivated by the perceived positive-incentive value of food (i.e., how much they enjoy eating the food), and tend to respond more to external cues in their environment such as branding (Cavanagh & Forestell, 2013) and nutritional information (Bolles, 1990; Pinel, Assanand, & Lehman, 2000). Although eating palatable food is highly desirable for restrained eaters, they often attempt to inhibit thoughts about palatable foods (Fedoroff, Polivy, & Herman, 1997) in an attempt to reduce their consumption. However, it appears that suppression of thoughts about palatable foods may instead result in a behavioral rebound, whereby restrained eaters subsequently consume more than they would have had they not attempted to suppress their thoughts about food (Erskine & Georgiou, 2010).

It should be noted that the current study did have limitations. First, in an attempt to be consistent with previous literature (e.g., Cavanagh & Forestell, 2013; Provencher et al., 2009), only female participants were included. Because dieting is such a prevalent behavior in women, the restrained eating literature has focused primarily on understanding the factors that lead some women to engage in cognitive food restraint and others to not engage in this behavior. However, given that men also struggle with body image issues, future research should investigate what factors affect men's food choices. Second, the experimental manipulation was somewhat oversimplified in that before most adult consumers decide whether or not they will consume most foods, they must first decide whether to purchase them. Although branding and calories play an important role in purchasing decisions, other factors also play a role such as price. Future research should expand upon our results in order to fully conceptualize the entire process involved in making food choices. Finally, it is possible that participants' consumption may have been partially influenced by their expectations and perceptions about the quality of the brands. That is, it is possible that participants considered the quality of the Healthful Brand; Kashi® to be better than the Unhealthful Brand; Nabisco®. If this is the case, our results may actually indicate that perception of brand quality, and not brand healthfulness, was the driving force behind participants' flavor perceptions. However, there is no theoretical argument as to why restrained and unrestrained eaters' would differentially consume cookies as a function of brand quality.

Despite these limitations, this paper replicates and extends our previous work to provide additional insight into the factors that interact to affect restrained eaters' food perceptions and consumption. Continuing to develop an understanding of these and other factors is important from a public health perspective. While it is generally important to promote policy and environmental changes that

make healthful foods more accessible and decrease marketing of unhealthful foods, our data suggest that educating people about the caloric content of foods may further enable effective weight management and improved health.

Uncited references



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