The Effect of Brand and Caloric Information on Flavor Perception and Food Consumption in Restrained and Unrestrained Eaters

Kevin Vincent Cavanagh

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The Effect of Brand and Caloric Information on Flavor Perception and Food Consumption in Restrained and Unrestrained Eaters

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A Thesis presented to the Graduate Faculty of the College of William and Mary in Candidacy for the Degree of Master of Arts

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The College of William and Mary
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ABSTRACT

Because consumers are often bombarded with excessive information about foods, they rely on simple heuristics to decide whether to purchase or consume a food. The goal of Study 1 was to determine whether sensory perception and food intake would be affected by brand information in chronic dieters (restrained eaters) and unrestrained eaters. To this end, restrained (n = 33) and unrestrained (n = 33) eaters were asked to taste and rate a cookie that was labeled with a healthful brand or an unhealthful brand. Results indicated that while all participants rated the cookies labeled with the healthful brand as having a better taste and flavor, only restrained eaters consumed more of the healthful brand than the unhealthful brand. In Study 2, restrained (n = 71) and unrestrained (n = 73) eaters were again asked to taste and rate a cookie that was labeled with a healthful brand or an unhealthful brand. However, for some participants a Nutrition Facts label was also presented alongside the brand name with altered levels of caloric content; i.e., either low-calorie (130 Calories) or high-calorie (260 Calories). Results indicated that while participants in the low calorie condition did not perceive differences in the cookies as a function of branding, those who were in the no nutrition label or the high calorie label condition perceived the healthful brand-labeled cookie to have an overall better taste and flavor than the cookie labeled with the unhealthful brand. While restrained eaters consumed more of the healthful brand when no nutrition label was presented, as in Experiment 1, those who were presented with the low calorie labeled consumed more of the unhealthful than the healthful branded cookie. These studies reveal that while hedonic perceptions are modified by nutritional and branding information in all consumers, for restrained eaters, branding and nutritional information interact to affect consumption.

Keywords: Brands, Healthful, Restrained Eating, Flavor Perception
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Without question, the most memorable experiences I will take from my time at The College of William & Mary are the relationships I have developed with Dr. Cheryl Dickter and Dr. Catherine Forestell.

On June 29th, 2010 I sat down to write Dr. Cheryl Dickter an e-mail looking for a lab to volunteer in over the summer with the hopes of learning the ins and outs of research to prepare me for a doctoral program. She responded less than an hour later to set up a meeting with me. She assisted me with my learning of important computer applications and the fundamentals of research design. She helped me to think like a researcher. She trusted me to make my own schedule, develop new ideas, and contribute in any way that I could. It was because of my experience in her lab that I feel I was accepted to the MA program in experimental psychology at William & Mary.

On August 25th, 2011 I sat down to write Dr. Catherine Forestell an e-mail looking for a graduate school advisor. She responded one day later to set up a meeting with me. She continued to assist me with fundamentals of research design and extended that to assisting me with my academic writing. She embraced my research ideas even though they did not directly tie into her own. I cannot express how much her dedication over the past two years has helped me to grow as an academic.

I will now take the next step of my academic journey: pursuing a PhD in Organizational Behavior at Case Western Reserve University. I feel prepared largely in part to these two incredible people who have helped me grow as a scholar, an academic, and as a person.
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The Effect of Brand and Caloric Information on Flavor Perception and Food Consumption in Restrained and Unrestrained Eaters

In an increasingly obesogenic environment, health care professionals encourage individuals to make healthier decisions about the types and amount of foods they consume (Faith, Fontaine, Baskin, & Allison, 2007; Goldberg & Gunasti, 2007; Howlett, Burton, & Kozup, 2008). However, while previous research suggests that most adults are capable of identifying healthful foods (Carels, Harper, & Konrad, 2006; Carels, Konrad, & Harper, 2007; Oakes & Slotterback, 2001), other factors such as palatability, price, and convenience often interfere with consumption of these foods (Steptoe, Pollard, & Wardle, 1995). This is due, in part, to the vast amount of information that is present on food packaging, which contributes to the complexity of daily food choice decisions. Among the most prevalent information on packaging is the brand name of the product and nutritional information.

Effects of Brands on Food Perception and Choice

Brands serve as a rich source of information for the consumer (Aaker & Biel, 1993). The caliber of the brand lies in its ability to communicate meaning and quality to consumers (Herbig & Milewicz, 1993) thereby reducing levels of perceived risk (McNeal & Zerren, 1981; Shimp, 1993). In accordance with the importance placed on brands, marketing executives often design food packages in an attempt to persuade consumers to purchase their particular brand over their competitors. Messages displayed on product packaging become associated with the larger brand image which serves to differentiate products from one another (Aaker 1991, 1996) and, in the mind of the consumer, create associations that are strong, favorable and unique (Keller, 1993; Krishnan, 1996). In this
manner, brand identities are established by companies to provide a long-lasting sense of purpose and meaning to a targeted group of consumers.

Well-communicated brand images can play an important role in determining consumers’ product perceptions (Allison & Uhl, 1964; Park, Jaworski, & MacInnis, 1986) and loyalty from a young age. For example, young children who were given identical foods and drinks with either McDonald’s or unbranded packaging preferred the meal from McDonald’s over the food in the unbranded package (Robinson, Borzekowski, Matheson, & Kraemer, 2007). Similar results have been found with adults; consumers, when presented with identical slices of turkey marked with either a familiar or an unfamiliar brand name, indicated that it tasted better if it was branded as a well-recognized brand name than an unfamiliar brand name (Makens, 1965). Similarly, Allison and Uhl (1964) found that consumers’ overall liking of the taste of a beer increased significantly if they were familiar with the brand than if the brand was unknown. Finally, Hartley (1992) provided an example of the powerful effect that loyalty can have on consumers’ purchasing behavior in his discussion of Coca Cola’s failed attempt to introduce a newer, improved version of Coke into the market in 1985. When consumers tasted Classic Coke® and “New Coke®” in a blind taste-test, they rated New Coke® as tasting better than Classic Coke®. Yet when New Coke® was officially launched into the market, consumers rejected the product because it tasted and looked different than the cola previously represented by the brand name, to which they had become loyal.

While a considerable amount of research has compared the food perceptions of familiar and unfamiliar brand names, little research has focused on how consumers’
perceptions of the healthfulness of brands affect their liking of associated food and their consumption. As will be discussed below, most of the work in this area has focused primarily on the effect of nutritional information (Aaron, Mela, & Evans, 1994; Roberto, Larsen, Agnew, Baik, & Brownell, 2010; Tandon, Wright, Zhou, Rogers, & Christakis, 2010), package size (Scott, Nowlis, Mandel, and Morales, 2008), and product description (Provencher, Polivy, & Herman, 2009) independently of branding.

**Effects of Caloric Information on Food Perception and Choice**

While a brand name is one of the most recognizable aspects of packaging design, providing the consumer with information about the nutritional contents of a food, in the form of a nutritional label, is another important source of information. Almost 25 years ago the Nutrition Labeling and Education Act (NLEA) was passed by congress requiring that companies provide a ‘Nutrition Facts’ label on food and beverage packaging. These 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). Additionally, Nutrition Facts labels include recommended serving sizes and percent daily value; a measure of the percentage of recommended intake based on a 2,000 calorie diet (Pennington & Hubbard, 1997). Ultimately, the goal of providing a Nutrition Facts label is to provide easy-to-understand information about the nutritional content of a product that allows consumers to easily compare foods and plan a healthful diet (Pennington & Hubbard, 1997; Wiesenfeld, 1995).

According to Campos, Doxey, and Hammond (2011) consumers perceive nutrition labels as a highly credible source of information and use them to guide their
selection of food products. However, it is true that certain demographics are more likely to use these labels than others. For example, it has been shown that women are more likely to use nutritional information when making their purchasing decisions than men (Drichoutis, Lazaridis, & Nayga, 2006) as well as individuals under 35 years of age (Neuhouser, Kristal, & Patterson, 1999).

Among the most recognizable aspects of nutritional labels is the caloric information presented at the top of the label (Cho & Yu, 2007), which can play an important role in participants’ food consumption (Roberto et al., 2010; Tandon et al., 2010). That caloric information plays an important role in determining food choice and intake has been demonstrated in studies in which participants have been asked to order from a meal from a restaurant menu that either contained caloric information or no information. Those who ordered from a menu with caloric information consumed 14% less than those who were provided with no caloric information (Roberto et al., 2010).

Other research suggests that individuals tend to misinterpret caloric content of food products. More specifically, healthful foods are often perceived to have fewer calories than they actually do (Carels et al., 2006), while unhealthful foods are perceived to have more calories than they actually do (Booth, 1987; Carels et al., 2006).

What remains absent from empirical work are studies that address how individuals utilize caloric information when combined with other aspects of information presented on food packaging. Understanding how these types of information interact to influence food perception and consumption would provide important insights for public health practices that are focused on improving eating habits for both the general
population and for those who restrict their food intake in an effort to lose or maintain their weight.

**Restrained Eaters and their Food Perceptions and Consumption.**

Herman and Polivy (1975) coined the term “restrained eaters” to describe individuals who engage in cognitive control of their food intake rather than their internal hunger and satiety cues in an attempt to maintain or lower their weight. Behaviorally, restrained eaters tend to avoid fattening foods, eat smaller portions of food, and stop eating before reaching satiation (Bryant, King, & Blundell, 2007). While restrained eaters attempt to regulate their food consumption by adhering to self-set dieting rules, once they violate these rules they often overeat because they feel their diet has failed (Herman & Mack, 1975; Herman & Polivy, 1984).

Restrained eaters’ food consumption is influenced by many aspects of food packaging, including the size of the package. For example, Scott and colleagues (2008) found that restrained eaters consumed more of a small snack food when placed in a small package compared to large snack food placed in a large package. The authors theorized that restrained eaters’ consider smaller foods and packages as dieting-appropriate, while larger foods and larger packages are incongruent with their dieting behavior.

On the other hand, Provencher and colleagues (2009) found that restrained eaters’ consumption was not affected by healthful information provided about a food. In this study, participants were exposed to cookies that were verbally described as consisting of natural, healthy ingredients or unnatural, unhealthy ingredients. They found that all participants, regardless of their restraint classification, consumed significantly more of the cookies described with “healthful” ingredients compared to those with “unhealthful”
ingredients. Similarly, Aaron et al (1994) failed to find differences between restrained and unrestrained eaters’ perceptions or consumption of foods labeled as “high fat” and “low fat”.

With regards to caloric information, restrained eaters have demonstrated behavior that reflects the conflicted nature of their relationship with food. This has been documented with research that has investigated restrained eaters’ attitudes toward high-calorie and low-calorie products by comparing their implicit and explicit attitudes (Hoefling & Strack, 2008). In this study, implicit attitudes were measured by using a modification of the Extrinsic Affective Simon Task (EAST; De Houwer, 2003). This task requires participants to complete two categorization tasks. In the first task, various generic adjectives (e.g., flower, love, dark, cry) are presented in white text. The participants are asked to use two response keys to categorize the words as positive or negative, which serves to associate keys with an evaluative reaction. In the second task, the participants are asked to categorize the printed color of the target words (e.g., either green or blue) using the same two keys. Thus, target words that evoke a positive evaluative reaction should be responded to more quickly when paired with the key for categorizing positive white words than when paired with the key for categorizing negative white words, providing an indicator of implicit evaluative reactions toward the target. In the Hoefling and Strack (2008) study participants were first instructed to categorize generic white colored words/phrases by positive or negative valance and colored words simply by their color, ignoring the content of the word. In the second task, participants were given food specific words/phrases such as creamy, deep-fried, no-fat, or steamed to place into the appropriate color categories. They were then shown those same
phrases and asked to explicitly rate on a 9-point likert scale how much they like eating foods with those characteristics. They found that while restrained eaters evaluated words typically associated with high-calorie content more positively than unrestrained eaters on the EAST, they evaluated high-calorie content more negatively on an explicit level. These data suggest that restrained eaters are conflicted about high-calorie foods; although they like these foods more than low-calorie foods; these hedonic responses are inconsistent with their explicit responses which likely reflect their dieting goals.

The conflicted nature of restrained eaters’ relationship with foods requires cognitive energy as they make food choices. This has been demonstrated by Boon and colleagues (2002), who exposed restrained and unrestrained eaters either to a distracting cognitive task, or to no task in the presence of foods labeled as high or low calorie. They found that restrained eaters consumed more of the low-calorie food than the high-calorie food, when they were not distracted. However, when distracted by a cognitive task, they consumed more of the high calorie food. No such effects were observed for unrestrained eaters, presumably because their consumption is controlled by physiological feelings of hunger and satiety, rather than by external factors.

The goal of the present set of studies was to investigate how product information influences restrained and unrestrained eaters’ flavor perception and food consumption. In both studies all participants were presented with a snack of the same cookie, and were randomly assigned to groups that were given different information about the brand (Study 1) or about the brand and the caloric content (Study 2) of the cookie. In Study 1, we were interested in determining how a food that was labeled with a brand that was typically associated with healthful snacks would be perceived and consumed (as in Carels et al.,
2006; Provencher et al., 2009), relative to a food labeled with a label typically associated with unhealthful snacks. In the second study, a nutrition label that included caloric content was additionally presented to participants. We manipulated the caloric content of the nutritional label, with the goal of determining how branding and nutritional information interacted to affect restrained and unrestrained eaters’ perception and consumption of the food presented.

**Study 1**

The primary goal of Study 1 was to extend research to determine whether restrained eaters would differentially respond to brands that are typically associated with healthful versus unhealthful foods. To this end, restrained and unrestrained eaters were invited to participate in a taste-test in which they were offered a snack in the form of cookies. However, rather than providing a verbal description of their ingredients (as in Provencher et al, 2009), the cookies were labeled with one of two brand names; either one that is typically associated with healthful snack foods, or one that is commonly associated with unhealthful snack foods. It was hypothesized that similar to Provencher et al, (2009) participants would fall prey to the heuristic that foods associated with healthy brands taste better than those associated with unhealthy brands. Consistent with Carels et al (2006) we also predicted that they would fall prey to the heuristic that healthy foods are less caloric than those associated with unhealthful brands. This in turn would differentially affect restrained and unrestrained eaters’ consumption of the foods, with restrained eaters consuming more of the snack labeled with the healthful label relative to the unhealthful label, and unrestrained eaters’ consuming similar amounts of the snacks associated with both labels.
Method

Participants

Ninety nine undergraduate women between 18 to 23 years of age participated between January and February of 2012. They were recruited through their introductory psychology course at a medium-sized liberal arts college and received course credit 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 2x2 between-subjects design with Brand (healthful vs. unhealthful) and Restraint group (restrained vs. unrestrained) as independent variables. Participants participated in a taste-test in which they consumed and rated cookies for their flavor and palatability. Half of the participants were told that the cookies were made by a brand that is typically associated with healthful eating (i.e., Kashi®), whereas the remaining participants were told the cookies were made by a brand not associated with healthful eating (Nabisco®; Appendix A).

Test stimuli

Cookies: Each participant was given three soft-baked, oatmeal dark chocolate Kashi® cookies, each of which was broken in half. 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). Based on pilot testing conducted in the form of an online questionnaire with a sample of 28 undergraduate psychology students, approximately 92% of undergraduate students were familiar with these brands (91.0% for Kashi®, 93.0% for
Nabisco®) and most considered Kashi® to be healthy (92.6%) and Nabisco® to be unhealthy (92.9%).

**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:* A taste-test questionnaire was created based on formatting (Sepple & Read, 1989) and validation (Parker *et al.*, 2004) of the Visual Analog Scale (VAS) methodology. Using an 80 mm VAS scale, participants rated qualities of the cookies; i.e., sweetness, bitterness, saltiness, sourness, crunchiness. The questionnaire also included 7-point likert-scale questions such as “How much do you like the taste/odor/flavor of this snack?” (1 = *Strongly Dislike*, 7 = *Strongly Like*); “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. The logo for Kashi® or Nabisco® was displayed at the top of the questionnaire depending on the group to which the participant was assigned (See Appendix B).

*Three-Factor Eating Questionnaire (TFEQ):* All participants completed the Three-Factor Eating Questionnaire/Eating Inventory (Stunkard & Messik, 1985; Appendix C). This questionnaire contains subscales for cognitive dietary restraint (the degree to which individuals cognitively restrain their food intake in order to lose or maintain their weight), disinhibition (the extent to which an individual perceives that their control of food intake
diminishes in response to factors such as preloads of food and dysphoric emotions), and susceptibility to hunger. Internal consistency ($\alpha = .90$) and test–retest reliability ($r = .91$) have been shown to be adequate for this measure. Because this questionnaire is scored on a dichotomous scale, we calculated Kuder-Richardson Formula 20 (KR-20) for each of the subscales for the current sample. These analyses revealed acceptable levels of internal consistency for cognitive restraint (KR-20 = 0.86), disinhibition (KR-20 = 0.79), and susceptibility to hunger (KR-20 = 0.75). Consistent with Stunkard and Messik (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 8-item scale that measured consumer’s general engagement with brands (Sprott, Czellar, & Spangenberg, 2009; Appendix D). 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 7-point scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree*. Sprott et al. (2009) showed that this scale has adequate internal consistency ($\alpha = .86$). For the current sample, Chronbach’s $\alpha$ was .93.

**Procedure**

Participants were tested individually and randomly assigned to one of the two brand conditions before they arrived at the laboratory. Upon arrival, they 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® (Kashi Condition) or Nabisco® (Nabisco Condition). Participants were told that they could eat as much or as little as they wanted, and to answer all questions as
accurately as possible on the questionnaire. After completion of informed consent, 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) which included questions that asked about their demographics, as well as a question that asked “What brand of cookies did you eat today?” with four options (Kashi®, Nabisco®, & two distracters), and about the healthfulness of Kashi® and Nabisco® brands. This served as a manipulation check to ensure participants’ awareness of the brand to which they were exposed and their perception of its healthfulness relative to the other brand. Participants then completed the validated questionnaires described above. Upon completion of the online questionnaires, the experimenter took the height and weight of each participant. Before leaving, participants were fully debriefed and asked not to share information about the study with other students who may take the study.

Results

Participant Characteristics

Of the 99 participants recruited, nine participants were excluded because they suspected the study was evaluating brands on food consumption (n = 2), did not complete the online questionnaire (n = 1), or failed the manipulation check (n = 6). Additionally, participants were removed if they incorrectly evaluated the healthfulness of the brands used in the study. For example, participants who rated Nabisco® as more healthful than Kashi® or Kashi® as less unhealthful than Nabisco® were removed from analysis (n = 24).
These participants were removed because the goal of the manipulation was for participants to associate Kashi® with healthful snacks and Nabisco® with unhealthful snacks.

Of the 66 remaining participants, fifty two participants (78.8%) were Caucasian, seven were African-American (10.6%), and seven were Asian (10.6%). As shown in Table 1 there were no differences between the groups’ age, BMI, disinhibition, susceptibility to hunger, time since they last ate, or overall brand loyalty (all \( p \) values > .05). However, the restrained eaters’ restraint scores were significantly higher than those of the unrestrained eaters, \( F(1, 64) = 46.00, p<.001 \).

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**Taste Perception**

Participant’s ratings of the cookies sampled were analyzed by Brand and Restraint group using separate mixed two-way Analyses of Variance (ANOVA) for all the variables measured with the VAS (e.g., sweetness, crunchiness) and the likert scales (e.g., visual appeal, flavor, satisfaction, and overall rating). For this and all subsequent analyses, IBM SPSS statistics for windows, Version 19.0 (IBM Corp, 2010) was used. These analyses revealed that there was no effect of Brand on any of the variables measured with the VAS scale. Similarly, as shown in Figure 1, Brand did not affect ratings of visual appeal, \( t(64) = 0.14, ns \), or smell, \( t(64) = 1.19, ns \). However, these analyses revealed a main effect of Brand for taste \( t(64) = 4.01, p<.001 \), flavor \( t(64) = 3.90, p<.001 \), satisfaction \( t(64) = 3.97, p<.001 \), and overall rating \( t(64) = 3.05, p < .01 \), with
participants in the Kashi Condition rating the cookies higher on all of these dimensions than those in the Nabisco Condition.

--- INSERT FIGURE 1 ABOUT HERE ---

Food Consumption

In order to examine how brand names affected food consumption, a 2-way mixed Analysis of Covariance (ANCOVA) with Brand and Restraint group as the independent variables, the amount of cookies consumed as the dependent variable, and flavor and time since last ate as covariates was conducted. Flavor was included as a covariate because individuals in the Kashi Condition may have consumed more cookies simply because they thought the product tasted better. Time since last ate was included as a covariate in order to control for the inherent variability in participants’ level of hunger. While all participants complied in that they did not eat for two hours before the session, several participants indicated they had not eaten since the night before.

As shown in Figure 2, these analyses revealed a main effect of Brand; $F(1, 64) = 9.74, p < .005, \eta^2 = .136$ and a Brand x Restraint group interaction; $F(1, 64) = 4.17, p < .05, \eta^2 = .063$. Simple main effects analyses revealed that for restrained eaters, those in the Kashi Condition consumed more than those in the Nabisco Condition; $t(31) = 3.68, p < .01$, whereas the unrestrained eaters did not differ in their consumption of the two brands; $t(31) = 0.76, ns$.

--- INSERT FIGURE 2 ABOUT HERE ---
Discussion

The results of the current study demonstrate that brand names influence flavor perception and predict food intake. Overall, participants rated the food with the healthful label as having a better taste and flavor. Similar to Provencher and colleagues (2009), participants consumed more of the food that was associated with a healthful brand than they did of the same food that was associated with unhealthful brand. However, in contrast to Provencher et al. (2009), this main effect was qualified by a significant interaction, in that restrained eaters ate more of the cookies if they were associated with a healthful brand than an unhealthful brand. No such differences were observed for unrestrained eaters who are less concerned about losing or maintaining their weight. This study is the first to report differential consumption between restrained and unrestrained eaters as a function of branding.

Given that restrained, but not unrestrained eaters, consumed more of the healthful than the unhealthful brand it is possible that participants mistakenly assumed that the healthful brand was less caloric. Because unrestrained eaters do not focus on caloric content of foods, we theorize their consumption was not significantly affected by this heuristic. However, for restrained eaters, who strive to limit their caloric intake, the heuristic that healthful foods are less calorically dense may have led to overconsumption of the Kashi-labeled cookie relative to the Nabisco-labeled cookies. If restrained eaters typically follow this heuristic when caloric information is not available, this may contribute to their inability to control their intake and lose weight, especially if they fail to compensate for these additional calories in later meals. Future research should further examine whether this branding effect extends to other foods items; that is, how would
restrained eaters respond to a range of healthful, yet caloric foods (such as avocados or nuts) relative to less healthful, equally caloric foods. Moreover, it would be interesting to determine whether restrained eaters’ intake is affected by brands to the same degree when caloric information is additionally available.

Although the current study closely followed the procedures of Provencher et al. (2009), there were differences between these studies that may help to explain our disparate results. While Provencher et al. (2009) provided a verbal description of the ingredients in the cookies that was either healthful or unhealthful, the present study provided participants with brand logos that are typically associated with healthful or unhealthful snacks. Given the strong image that brands can project, it is possible that participants’ behavior was affected more by associating past experiences about the brand of the cookie than by being told its ingredients. Furthermore, the presentation of a logo may have triggered an even stronger connection with the brand than presentation of the brand name alone, as previous research has shown that pictures have more direct access to semantic information than words (De Houwer & Hermans, 1994; Huijding & de Jong, 2005). It is also worth noting that while Provencher et al. (2009) used the Restraint Scale (Herman & Polivy, 1980), the TFEQ was used to measure restraint in the current study. Although these scales overlap considerably (as discussed in Craighead & Smith, 2011), it is possible that the use of different restraint scales explain the disparate results reported in these studies.

One limitation specific to Study 1 was that almost 25% of the participants were excluded from the final sample because they failed the manipulation check in which they were asked which of the two brands was more healthful. Given the high percentage of
participants who rated Kashi® as healthy and Nabisco® as unhealthy in the pilot test, it was surprising that so many participants rated Kashi® as *less* healthy than Nabisco®. It is possible that these inconsistencies resulted from differences between the questions in the pilot test and the study. Whereas, the pilot test required participants to rate brands on a dichotomous scale (e.g., healthful or unhealthful), the questions in the main study required participants to rate the healthfulness of Nabisco® and Kashi® cookies on 5-point likert scales. Second, participants in the study answered these questions after the taste test, which may have swayed their responses.

Despite the limitations of Study 1, the findings continue to build on an existing body of literature and shows that restrained eaters’ may have vulnerabilities to branding (Abratt & Sacks, 1988). Future research may look to focus on factors other than restrained eating to determine what role concerns about health, price, and the environment (Steptoe *et al*., 1995) play in the purchasing and consumption of various brands. In addition, it would be interesting for future research to examine the effect that various other types of information (e.g., nutritional labels, health claims) have in combination with brands on consumers’ flavor perception and food intake. Whether the branding effect reported in the current study is further amplified by the inclusion of nutritional information is unknown and the focus of Study 2.

**Study 2**

The results of Study 1 demonstrated that brand names can influence flavor perception and predict food intake. All participants, regardless of restraint classification, rated the snack with the healthful label as having a better taste and flavor and participants consumed more of the food that was associated with a healthful brand than they did of the
same food that was associated with unhealthful brand. Of considerable interest, however, was that restrained eaters ate more of the snack if it was associated with a healthful brand than an unhealthful brand while no such difference was observed for unrestrained eaters. While the results of Study 1 highlight the importance of brands on flavor perception and food consumption, especially with regards to restrained eaters, they do not give a complete picture on how the branding interacts with other types of information available on food packaging. In reality, consumers are faced with many different types of information other than brand names when determining what food to purchase.

Therefore, the primary goal of Study 2 was to extend the findings of Study 1 to determine whether high and low caloric information interact with healthful and unhealthful brand names to differentially affect restrained and unrestrained eaters hedonic perceptions and consumption of a snack. To this end, participants were either shown a nutrition label alongside a brand name (Kashi® or Nabisco®) in which the caloric content was labeled as being relatively low in calories (130 calories), relatively high in calories (260 calories), or with the brand name alone. By including a no label condition, the current study accomplished a secondary goal of replicating Study 1.

Consistent with Study 1, it was hypothesized that all participants, regardless of their restraint classification, would rate Kashi® labeled cookies higher than Nabisco® labeled cookies on a variety of dimensions from the taste-test questionnaire (e.g., taste, flavor, overall rating). It was also hypothesized that the addition of caloric information would moderate these results. With regards to food consumption and consistent with Study 1, it was hypothesized that there would be a main effect of Brand in that participants in the Kashi Condition would consume more of the snack overall than
participants in the Nabisco Condition. Given that unrestrained eaters are likely to follow internal cues when determining when to eat and how much to eat, there were no expected effects of Nutritional information or Brand for this group. However, for restrained eaters it was hypothesized that there would be a significant Nutritional information x Brand interaction. That is, given that restrained eaters’ consumption may be guided by the heuristic that they can consume more of a food when it is healthful, we hypothesized that restrained eaters in the Kashi Condition would consume more of the snack when either no nutritional information or a low calorie label was provided, relative to the high calorie label. On the other hand, since Nabisco is well-known as an unhealthful 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.

Methods

Participants

One hundred forty four undergraduate women between 18 to 26 years of age participated for course credit between January and April of 2013. They were recruited through their introductory psychology course and received course credit 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 3x2x2 between-subjects design with Caloric information (Low-Calorie, High-Calorie, No Label), Brand (Kashi, Nabisco), and Restraint group (Restrained, Unrestrained) as independent variables. Participants participated in a taste-
test in which they consumed and rated cookies for their flavor and palatability. Half of
the participants were informed that the cookies were made by Kashi®, a brand typically
associated with healthful eating, and the remaining participants were told the cookies
were made by Nabisco®, a brand not associated with healthful eating. One third of the
participants were provided with a nutrition label with a serving size of 1 cookie listed as
130 calories, another third were provided a nutrition label with the same serving size
listed as 260 calories, and the remaining third were not provided any nutrition
information, only the brand name.

Test stimuli

Cookies: Each participant was given three soft-baked, oatmeal 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: A taste-testing questionnaire was created based on formatting
(Sepple & Read, 1989) and validation (Parker et al., 2004) of the Visual Analog Scale
(VAS) methodology. Using an 80 mm VAS scale, participants rated qualities of the
cookies (i.e., sweetness, bitterness, saltiness, sourness, crunchiness). The questionnaire also included 7-point likert-scale questions (1 = *Strongly Dislike*, 7 = *Strongly Like*) such as “How much do you like the taste/odor/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. The logo for Kashi® or Nabisco® was displayed at the top of the questionnaire depending on the group to which the participant was assigned. In addition, a ‘Nutrition Facts’ label was provided to participants. Participants were either given a label with one serving size listed as 130 calories (Low-Calorie Condition), 260 calories (High-Calorie Condition), or no ‘Nutrition Facts’ label at all (No-Label Condition). No other aspect of the nutrition label was manipulated for this study. Refer to Appendix B for an example of the labels used in this study.

*Three-Factor Eating Questionnaire (TFEQ):* All participants completed the Three-Factor Eating Questionnaire/Eating Inventory (Stunkard & Messik, 1985). This questionnaire contains subscales for cognitive dietary restraint (the degree to which individuals cognitively restrain their food intake in order to lose or maintain their weight), disinhibition (the extent to which an individual perceives that their control of food intake diminishes in response to factors such as preloads of food and dysphoric emotions), and susceptibility to hunger. Because this questionnaire is scored on a dichotomous scale, we calculated Kuder-Richardson Formula 20 (KR-20) for each of the subscales for the current sample. These analyses revealed acceptable levels of internal consistency for
cognitive restraint (KR-20 = 0.90), disinhibition (KR-20 = 0.81), and susceptibility to hunger (KR-20 = 0.79).

*Brand Engagement in Self-Concept Scale (BESC):* All participants completed an 8-item scale that measured consumer’s general engagement with brands (Sprott et al., 2009). 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 7-point scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree.* For the current sample, Chronbach’s α was .935.

**Procedure**

Participants were tested individually and randomly assigned to one of the two brand conditions and one of the three nutrition label conditions before they arrived at the laboratory. Upon arrival, they 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® (Kashi Condition) or Nabisco® (Nabisco Condition). In an effort to reduce the amount of participants who may incorrectly perceive the Nabisco® brand as more healthful than the Kashi® brand and vice versa, a small script was added. For the Kashi 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 Nabisco Condition except Chips-A-Hoy! and Oreos were used as the examples.
Participants were told that they could eat as much or as little of the cookie as they wanted, and to answer all questions as accurately as possible on the questionnaire. After completion of the informed consent, 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 further questionnaires using Qualtrics survey software (Qualtrics Labs Inc., Provo, UT) to answer the questionnaires as described in Study 1. Upon completion of the online questionnaires, the experimenter weighed each participant and measured their height. Participants were then debriefed and asked not to share information about the study with other students who may take the study before leaving.

Results

Participant Characteristics

Of the 144 participants, 110 participants (76.4%) were Caucasian, sixteen were African-American (11.1%), and eighteen were Asian (12.5%). In order to ensure there were no differences between the groups on a variety of demographic characteristics, a 3x2x2 univariate ANOVA was conducted with Caloric information (Low-Calorie, High-Calorie, No Label), Brand (Kashi, Nabisco), and Restraint group (Restrained, Unrestrained), as independent variables. As shown in Table 2 there were no differences between the groups’ age, BMI, time since last ate, or overall brand loyalty (all p values > .05). As expected, there was a main effect of restraint between the groups, F (1, 142) = 430.50, p< 0.001.
Flavor Perception

In order to extend the results of Study 1 to determine if Caloric information influenced participants’ ratings of the cookie in combination with Brand and Restraint group, separate 2x2 univariate ANOVAs were broken down as a function of Caloric information (Low-Calorie, High-Calorie, No Label) with Brand (Kashi, Nabisco) and Restraint group (Restrained, Unrestrained) as independent variables. First, we conducted analyses that included only participants in the No Label Condition which allowed us to determine whether the current study replicated the results from Study 1. As shown in Figure 3A and consistent with Study 1, Brand did not affect ratings of visual appeal, $t(43) = 0.32, ns$, or smell, $t(43) = 0.90, ns$. These analyses revealed a significant main effect of Brand for taste $t(43) = 2.04, p < .05$ and overall rating $t(43) = 2.17, p < .04$ as well a marginal main effect for satisfaction $t(43) = 1.42, p < .08$ and a marginal main effect for flavor $t(43) = 1.49, p < .08$ with participants in the Kashi Condition rating the cookies higher on all of these dimensions than those in the Nabisco Condition.

As observed in Figure 3B, there were no significant differences on any of the taste-test questionnaire variables for participants in the Low-Calorie Condition (All $p$ values $> .05$). However, as shown in Figure 3C, analyses for participants in the High-Calorie Condition revealed a significant main effect of Brand for taste $t(47) = 4.07, p < 0.01$, flavor $t(47) = 2.97, p < 0.01$, overall rating $t(47) = 2.58, p < 0.02$, and satisfaction $t(47) = 2.81, p < 0.01$ with participants in the Kashi Condition rating the cookies higher on all of these dimensions than those in the Nabisco Condition.
Food Consumption

In order to determine whether the results of Study 2 replicated those of Study 1, we conducted analyses that included only participants in the No Label Condition. Thus, a 2-way mixed ANCOVA 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 was conducted. As in Study 1, these analyses revealed a main effect of Brand; \( F(1, 43) = 11.60, p < .01, \eta^2 = .23 \) and a Brand x Restraint group interaction; \( F(1, 41) = 4.50, p < .04, \eta^2 = .10 \). As shown in Figure 4, simple main effects analyses revealed that for restrained eaters, those in the Kashi Condition consumed more than those in the Nabisco Condition; \( t(21) = 3.32, p < .01 \), whereas the unrestrained eaters did not differ in their consumption of the two brands \( t(21) = 0.52, ns \).

In order to examine how Brand and Caloric information affected food consumption in restrained and unrestrained eaters, a 3x2x2 mixed ANCOVA was conducted with Caloric information (Low-Calorie, High-Calorie, No Label), Brand (Kashi, Nabisco), and Restraint group (Restrained, Unrestrained) as independent variables, food consumption as the dependent variable, and perceived flavor and time since last ate as covariates. These analyses revealed a main effect of Brand; \( F(1, 142) = 5.71, p < 0.02, \eta^2 = .04 \), in which the participants ate more of the Kashi \( (M = 38.54, SE = 2.36) \) than the Nabisco \( (M = 30.44, SE = 2.39) \) labeled cookies. There was also a main
effect of Caloric information; $F(2, 141) = 6.30, p < .01, \eta^2 = .08$. Post hoc Bonferroni analyses indicated that those in the Low-Calorie Condition ($M = 42.60, SE = 2.85$) ate more overall than those in the High-Calorie Condition ($M = 29.24, SE = 2.88$); $t(97) = 3.04, p < .01$.

Finally, as shown in Figure 5, there was a significant three-way interaction of Caloric information, Brand, and Restraint group, $F(2, 132) = 5.69, p < .01, \eta^2 = .08$. In order to break down the three-way interaction, univariate 3x2 ANCOVAs were conducted separately as a function of Restraint group with Caloric information (Low-Calorie, High-Calorie, No Label) and Brand (Kashi, Nabisco) as the independent variables. For restrained eaters, these analyses revealed a marginal main effect of Brand; $F(1, 69) = 2.76, p < .10$, such that participants in the Kashi Condition consumed more of the snack compared to those in the Nabisco Condition. There was also a main effect of Caloric information; $F(2, 68) = 7.05, p < .01, \eta^2 = .18$, such that overall individuals in the low-calorie condition consumed more of the snack than those in the high-calorie or no label conditions. These main effects were qualified by a Brand x Caloric information interaction; $F(2, 64) = 10.99, p < .01, \eta^2 = .26$.

To further examine this interaction, analyses were conducted separately for each brand. Simple main effects analysis for restrained eaters in the Nabisco Condition revealed a main effect of Caloric information, $F(2, 30) = 15.37, p < .001$. Post hoc Bonferroni comparisons revealed that restrained eaters consumed more of the snack when presented with a low-calorie label ($M = 54.57 \text{ g}, SE = 5.86$) than when presented with a high-calorie label ($M = 21.66, SE = 5.66$); $t(21) = 2.99, p < .01$ or no label ($M = 14.60, SE = 3.60$); $t(22) = 3.85, p < .00$. Comparatively, simple main effects analysis for restrained
eaters in the Kashi Condition indicated that there was no main effect of Caloric information; $F(2, 35) = 1.90, ns$.

For unrestrained eaters, results indicated that there was a marginal main effect of Brand; $F(1, 71) = 3.29, p < .08$ in that participants in the Kashi Condition consumed more compared to those in the Nabisco Condition. However, there was no observed main effect of Caloric information; $F(2, 70) = 1.14, ns$, and no significant Brand x Caloric information interaction; $F(2, 66) = .220, ns$.

Discussion

Consistent with our hypotheses, the results of the current study demonstrated that brand names and caloric information interact to influence flavor perception and predict food intake. Overall, participants tended to rate the food with the healthful label as having a better taste and flavor, consistent with Study 1. These findings suggest that female undergraduate consumers may have a predetermined idea that healthful foods taste better and have a better flavor. Further, the addition of caloric information appeared to moderate hedonic ratings. Those who were exposed to the low-calorie Nabisco® label liked the taste of the cookie better than those who were exposed to the either the high calorie label or no label. In contrast, those who were exposed to a high-calorie Kashi® label liked the taste of the cookie better than those who were exposed to a low-calorie label or just the brand itself. Thus it appears that either a healthful brand or a low calorie food item is perceived to be better tasting than when both of these characteristics co-occur.
Although restraint classification did not interact with brand and caloric information to determine flavor perception, a different pattern of results was observed for consumption. While, restrained eaters’ consumption of the cookies labeled as Nabisco® mirrored that of their flavor perception ratings (i.e., they ate more of the low calorie cookie than either of the other two cookies), their consumption of the cookies labeled as Kashi® did not reflect their ratings of these cookies. Although they liked the taste of the high calorie Kashi-labeled cookie more than the other two cookies, they consumed more of the Kashi-labeled cookie when no nutritional labels were shown compared to the high- and low-calorie conditions. That restrained eaters’ food consumption seemed to be related to their ratings for the cookie perceived as unhealthful but not for the cookie perceived as healthful is of considerable interest and suggests that restrained eaters may have justified their consumption of the unhealthful Nabisco® brand when it was paired with a low-calorie label. On the other hand, those who were shown just the Kashi® label consumed more of the food when no amount of caloric information was shown.

One limitation specific to Study 2 is that it is unclear what effect including the entire Nutrition Facts label had on participants’ ratings and subsequent consumption. While only caloric information was manipulated, it is possible that the additional nutritional information provided may have biased participants’ intake. For example, previous research has shown that restrained eaters’ attempt to decrease their consumption of high-fat foods while increasing their consumption of low-fat foods more so than their unrestrained counterparts (Alexander & Tepper, 1995). Therefore, it is possible that including fat on the food label distracted restrained eaters’ attention away from the caloric content of the food. Another interesting observation is that while the caloric
content of the label was manipulated, calories from fat (i.e., 45 cal) remained the same on both the low-calorie and high-calorie label. Therefore, while the high-calorie label contained more calories than the low-calorie label, it also conveyed a smaller percentage of calories from fat, which may have affected restrained eaters’ consumption. Future research should attempt to understand how fat content interacts with calories and branding to affect food perception and consumption.

**General Discussion**

This set of studies revealed that hedonic perceptions and consumption can be modified by the type of information provided with a food. In general, adult women perceive healthful snacks to taste better than unhealthful snacks. However, consumption differed according to participants’ dieting habits. In both experiments, while unrestrained eaters’ consumption was relatively unaffected by external information, restrained eaters differentially consumed the snack as a function of the brand name and nutritional information provided.

These findings are consistent with previous research which has shown that information provided with foods can affect food choices and perceptions of the foods’ flavor (Aaron, Mela, & Evans, 1994; Goerlitz & Delwiche 2004; Raghunathan, Naylor, & Hoyer, 2006; Tuorila, Cardello, & Lesher, 1994; Wansink, Park, Sonka, & Morganosky, 2000). However, in contrast to previous research, participants in this study and Provencher et al (2009) preferred the taste and flavor of the healthful snack over the unhealthful snack. Several methodological differences between these studies may help to explain their conflicting results. For example, our study included only female participants whereas other studies have recruited participants of both genders (Raghunathan et al., 2006).
2006; Tuorila et al., 1994). Also, while participants in our study tasted the cookies, other studies have only analyzed results based on expected taste (as discussed in Reghunthan et al., 2006).

The current set of studies demonstrates that external information about the healthfulness of foods affects restrained eaters’ consumption more than that of unrestrained eaters. A similar result was first 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 found 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 as unhealthful (‘candy chews’) while unrestrained eaters did not differ in their consumption. 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 the eating the food), and tend to respond to external cues in their environment such as nutritional information (Bolles, 1990; Pinel, Assanand, & Lehman, 2000). For example, Jansen and van den Hout (1991) found that restrained eaters were more likely to overconsume and give in to their desires after smelling a preload compared to those who were not exposed to the odor of the preload. This is in contrast to unrestrained eaters who were not affected by the preload manipulation. That restrained eaters fail to respond to their physiological cues of satiety when there is additional food is in line with the current findings in which restrained eaters’ food consumption was affected by external information such as brand names (Study 1 and 2) and caloric information (Study 2) while unrestrained eaters’ consumption was not. These
research findings can all be explained by the ‘Goal Conflict Model of Eating’ in which the eating behavior of restrained eaters is metaphorically characterized as a struggle between two worlds, the enjoyment of eating and the goal of weight control (Stroebe et al., 2008). So while eating palatable food is highly desirable for restrained eaters, they often attempt to inhibit thoughts about, and their consumption of palatable foods (Fedoroff, Polivy & Herman, 1997).

The current set of studies were limited in several ways. In both studies, only female undergraduates were recruited for participation. Because much of the research in this area has been conducted with women, this was done in an effort to remain consistent with the literature (e.g., Provencher et al., 2009) and because weight concerns and dieting behaviors, in general, are more prevalent among women than men (Brenner & Cunningham, 1992; Rolls, Fedoroff, & Gurthrie, 1991; Serdula, Williamson, Anda, Levy, & Heaton, 1994; Timperio, Cameron-Smith, Burns, & Crawford, 2000; Williamson, Serdula, Anda, Levy, & Byers, 1992). More research is needed to extend the findings to men. It should be noted however, that this extension may require a paradigm shift as men approach dieting differently than women (Broom & Dixon, 2008). Men tend to focus more on increasing muscle mass than losing weight and may feel less masculine when ‘on a diet’ (Mallyon, Holmes, Cov eney, Zadoroznyj, 2010).

Another limitation of the current set of studies is that only one particular type of snack food (e.g., a cookie) was provided to the participants. This was done in an attempt to be consistent with previous research done in this area (for an example see Provencher et al., 2009). However, it is possible that the branding and nutritional label effects reported herein were specific to the snack food used. Future research should employ
different kinds of foods to expand the generalizability of the current findings. Additionally, it should be noted that another important aspect that was not addressed in the current set of studies was purchasing decisions. Before most adult consumers decide to whether or not they will consume most foods, they must first decide whether to purchase a food item. Here again, branding and calories play an important role, as well as other types of information, such as price. Future research should expand upon our results in order to fully conceptualize the entire process involved in making purchasing decisions.

Another important factor to consider is that it may be possible that our consumption results were partially influenced by restrained eaters’ expectations and perceptions about the quality of the brand. That is, participants who were given a Kashi® cookie may have thought the quality of a Kashi® cookie was better than those given a Nabisco® cookie. In this case, our results may actually indicate that perceptions of brand quality and not brand healthfulness were the driving force behind participants’ flavor perceptions. However, there is no theoretical argument as to why restrained and unrestrained eaters’ would differentially consume the cookies as a function of brand quality. Therefore, we are confident that the differential effects reported are a function of healthfulness.

Continuing to develop an understanding of the factors that moderate food choice, flavor perception, and food intake 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 on the caloric content of foods may further enable effective weight management and improved health.
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71 -83.

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Figure Captions

Figure 1: Mean Likert score ratings of the cookie which were labeled as either Kashi (black bars) or Nabisco (grey bars) in Study 1. Error bars depict standard error of the mean, * p < 0.05.

Figure 2: Total grams consumed as a function of Restraint Group and whether the cookies were labeled as Kashi (black bars) or Nabisco (grey bars) in Study 1. Error bars depict standard error of the mean.

Figure 3: Mean Likert score ratings of the cookie which were labeled as either Kashi (black bars) or Nabisco (grey bars) for the No Label condition (A), the Low-Calorie Condition (B), and the High-Calorie Condition (C) in Study 2. Error bars depict standard error of the mean, * p < 0.05; + p < 0.10

Figure 4: Total grams consumed as a function of Restraint Group and whether the cookies were labeled as Kashi (black bars) or Nabisco (grey bars) in Study 2. Error bars depict standard error of the mean. * p < 0.05

Figure 5: Total grams consumed as a function of Restraint Group, Nutritional Information, and whether the cookies were labeled as Kashi (black bars) or Nabisco (grey bars) in Study 2. Error bars depict standard error of the mean. * p < 0.05
Figure 1

Visual Appeal

Smell

Taste

Flavor

Satisfaction

Overall Rating

Mean Likert Rating

- Nabisco
- Kashi

*
Figure 2

[Bar chart showing total grams consumed for Kashi and Nabisco under restrained and unrestrained conditions. The chart indicates a significant difference (*) between the two conditions for Kashi.]
Figure 3A, No Label Condition

- Visual Appeal
- Smell
- Taste
- Flavor
- Satisfaction
- Overall Rating

Mean Likert Rating

* Nabisco
* Kashi

+
Figure 3B, Low Calorie Condition

[Bar chart showing mean Likert ratings for Visual Appeal, Smell, Taste, Flavor, Satisfaction, and Overall Rating for Nabisco and Kashi.]
Figure 3C, High Calorie Condition

- Visual Appeal
- Smell
- Taste
- Flavor
- Satisfaction
- Overall Rating

Mean Likert Rating

* Denotes significant difference.
Figure 4

![Bar graph showing total grams consumed under restrained and unrestrained conditions for Kashi and Nabisco products.](image)

- **Kashi**
- **Nabisco**

**Restraint Classification**

- **Total Grams Consumed**

- **Restrained**
- **Unrestrained**
Figure 5

Restrained Eaters  Unrestrained Eaters

Nutritional Information

Total Grams Consumed

No Label  Low-Calorie  High-Calorie  No Label  Low-Calorie  High-Calorie

Kashi  Nabisco

*
Table 1.

Descriptive characteristics of the sample in each experimental condition (Mean ± SE) for Study 1.

<table>
<thead>
<tr>
<th></th>
<th>Group Kashi</th>
<th></th>
<th>Group Nabisco</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Restricted Eaters (N = 15)</td>
<td>Unrestricted Eaters (N = 22)</td>
<td>Restricted Eaters (N = 18)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>18.60 ± 0.21</td>
<td>19.00 ± 0.23</td>
<td>18.67 ± 0.16</td>
<td>18.90 ± 0.38</td>
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<tr>
<td>BMI (kg/m²)</td>
<td>24.16 ± 1.29</td>
<td>21.58 ± 0.73</td>
<td>25.31 ± 0.95</td>
<td>24.70 ± 1.24</td>
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<tr>
<td>Three Factor Eating Questionnaire</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Restraint (Range: 1-21)</td>
<td>14.27 ± 0.77 a</td>
<td>6.64 ± 0.63 b</td>
<td>15.17 ± 0.65 a</td>
<td>5.90 ± 0.86 b</td>
</tr>
<tr>
<td>Disinhibition (Range: 1-18)</td>
<td>6.87 ± 1.00</td>
<td>5.82 ± 0.59</td>
<td>7.44 ± 0.90</td>
<td>4.40 ± 0.62</td>
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<tr>
<td>Hunger Susceptibility (Range: 1-14)</td>
<td>6.33 ± 0.80</td>
<td>7.00 ± 0.71</td>
<td>5.30 ± 0.72</td>
<td>5.88 ± 0.52</td>
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<tr>
<td>Time Since Last Ate (hours)</td>
<td>4.33 ± 0.46</td>
<td>5.32 ± 1.07</td>
<td>4.86 ± 1.11</td>
<td>4.85 ± 0.95</td>
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<tr>
<td>Overall Brand Loyalty (Range: 1-7)</td>
<td>2.22 ± 0.24</td>
<td>3.00 ± 0.30</td>
<td>2.09 ± 0.26</td>
<td>2.22 ± 0.34</td>
</tr>
</tbody>
</table>

Note. Different letters indicate significant difference at $p < 0.05$. 
Table 2. Participant characteristics (Mean ± SE) in Study 2.

<table>
<thead>
<tr>
<th></th>
<th>Restrained Eaters</th>
<th>Unrestrained Eaters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High-Calorie</td>
<td>Low-Calorie</td>
</tr>
<tr>
<td><strong>Group Kashi: Sample Size (n)</strong></td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Age (years)</td>
<td>19.27 ± 0.32</td>
<td>18.93 ± 0.27</td>
</tr>
<tr>
<td>BMI</td>
<td>21.46 ± 0.98</td>
<td>22.00 ± 0.84</td>
</tr>
<tr>
<td>Time Since Last Ate (Hours)</td>
<td>6.00 ± 1.44</td>
<td>5.35 ± 1.24</td>
</tr>
<tr>
<td>Overall Brand Loyalty</td>
<td>2.53 ± 0.30</td>
<td>2.16 ± 0.25</td>
</tr>
<tr>
<td>Restraint Score (TFEQ)</td>
<td>17.81 ± 0.85^a</td>
<td>17.73 ± 0.73^a</td>
</tr>
<tr>
<td><strong>Group Nabisco: Sample Size (n)</strong></td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Age (years)</td>
<td>18.33 ± 0.36</td>
<td>19.14 ± 0.29</td>
</tr>
<tr>
<td>BMI</td>
<td>21.36 ± 1.08</td>
<td>20.66 ± 0.87</td>
</tr>
<tr>
<td>Time Since Last Ate (Hours)</td>
<td>8.08 ± 1.57</td>
<td>4.13 ± 1.26</td>
</tr>
<tr>
<td>Overall Brand Loyalty</td>
<td>2.50 ± 0.37</td>
<td>1.70 ± 0.26</td>
</tr>
<tr>
<td>Restraint Score (TFEQ)</td>
<td>16.33 ± .93^a</td>
<td>18.36 ± 0.75^a</td>
</tr>
</tbody>
</table>

*Note.* Different letters indicate significant difference at $p < 0.05$
Appendix A

Brand Logos (Study 1 and Study 2)

Nutrition Labels (Study 2)
Appendix B

Taste Testing Study

Instructions: Before answering the following questions, please try a sample of the snack food that you have been assigned. You may have as much of the snack as you would like while you complete this questionnaire. Some information about the cookie has been provided.

Note: While only the brand logo was present for Study 1, the brand logo and Nutrition Facts were present in the Low and High calorie conditions in Study 2.
Please rate your taste perceptions by answering the following questions:

1. Using the line below please rate the strength of each of the following tastes using a tick mark.

   **EXAMPLE**
   
   Very Weak ──────────────────────I───────────────────── Very Strong

   A) Sweetness
   Very Weak ────────────────────── Very Strong

   B) Bitterness
   Very Weak ────────────────────── Very Strong

   C) Saltiness
   Very Weak ────────────────────── Very Strong

   D) Sourness
   Very Weak ────────────────────── Very Strong

   E) Crunchiness
   Very Weak ────────────────────── Very Strong

2. Using a scale from 1-7 (1=Very Bad, 7=Very Good) please rate the following statements:

   A) How visually appealing does the snack look?
      Very Bad  1  2  3  4  5  6  7  Very Good

   B) How much do you like the taste of this snack?
      Very Bad  1  2  3  4  5  6  7  Very Good

   C) How is the flavor of this snack?
      Very Bad  1  2  3  4  5  6  7  Very Good

   D) How does the snack smell?
      Very Bad  1  2  3  4  5  6  7  Very Good

   E) How would you rate the snack overall?
      Very Bad  1  2  3  4  5  6  7  Very Good
3. Using a scale from 1-7 (1 = Extreme Dislike, 7 = Extreme Like) please rate the following statements:

   A) How much did you like the snack that you sampled today?

   Extreme Dislike  1  2  3  4  5  6  7  Extreme Like

   B) How much did you like consuming cookies as your snack food?

   Extreme Dislike  1  2  3  4  5  6  7  Extreme Like

4. Using a scale from 1-7 (1 = Poor, 7 = Good) please rate the following statements:

   A) I think the nutrition level of this product is…

   Very Poor  1  2  3  4  5  6  7  Very Good

5. Using a scale from 1-7 (1 = Not Very Likely, 7 = Extremely Likely) please rate:

   A) How likely would you be to purchase the product, given the information shown?

   Unlikely  1  2  3  4  5  6  7  Likely

6. Please answer the following question given the choices provided

   A) Compared to other snacks like this, the caloric content of this product is…

   I. Much less than other products like this

   II. A little less than other products like this

   III. About to the same as other products like this

   IV. A little more than other products like this

   V. Much more than other products like this
Appendix C

Three Factor Eating Questionnaire

Please answer true or false to indicate if the following statements relate to you:

1. When I smell a chocolate cake baking or see a delicious cookie, I find it very difficult to keep from eating, even if I have just finished a meal.

2. I usually eat too much at social occasions, like parties and picnics.

3. I am usually so hungry that I eat more than three times a day.

4. When I have eaten my quote of calories, I am usually good about not eating anymore.

5. Dieting is so hard for me because I just get so hungry.

6. I deliberately take small helpings as a means of controlling my weight.

7. Sometimes things just taste so good that I keep on eating even when I am no longer hungry.

8. Since I am often hungry, I sometimes wish that while I am eating, an expert would tell me that I have had enough or that I can have something more to eat.

9. When I feel anxious, I find myself eating.

10. Life is too short to worry about dieting.

11. Since my weight goes up and down, I have gone on reducing diets more than once.

12. I often feel so hungry that I just have to eat something.

13. When I am with someone who is overeating, I usually overeat too.

14. I have a pretty good idea of the number of calories in common food.

15. Sometimes when I start eating, I just can’t seem to stop.

16. It is not difficult for me to leave something on my plate.

17. At certain times of the day, I get hungry because I have gotten used to eating then.

18. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.
19. Being with someone who is eating often makes me hungry enough to eat also.
20. When I feel blue, I often overeat.

21. I enjoy eating too much to spoil it by counting calories or watching my weight.
22. When I see a real delicacy, I often get so hungry that I have to eat right away.
23. I often stop eating when I am not really full as a conscious means of limiting the amount that I eat.

24. I get so hungry that my stomach often seems like a bottomless pit.
25. My weight has hardly changed at all in the last ten years.

26. I am always so hungry it is hard for me to stop eating before I finish the food on my plate.
27. When I feel lonely, I console myself by eating.
28. I consciously hold back at meals in order not to gain weight.
29. I sometimes get very hungry late in the evening or at night.
30. I eat anything I want, any time I want.

31. Without even thinking about it, I take a long time to eat.
32. I count calories as a conscious means of controlling my weight.

33. I do not eat some food because they make me fat.
34. I am always hungry enough to eat at any time.
35. I pay a great deal of attention to changes in my figure.

36. While on a diet, if I eat a food that is not allowed, I often then splurge and eat other high calorie goods.

Please answer the following questions by circling the number above the response that is appropriate to you.

37. How often are you dieting in a conscious effort to control your weight?
   1. rarely          2. sometimes       3. usually       4. Always
38. Would a weight fluctuation of 5 lbs. affect the way you live your life?
   1. not at all  2. slightly  3. moderately  4. very much

39. How often do you feel hungry?
   1. only at mealtimes  2. sometimes between meals  3. often between meals  4. almost always

40. Do your feelings of guilt about overeating help you control your food intake?
   1. never  2. rarely  3. often  4. always

41. How difficult would it be for you to stop eating halfway through dinner and not eat for the next four hours?
   1. easy  2. slightly difficult  3. moderately difficult  4. very difficult

42. How conscious are you of what you’re eating?
   1. not at all  2. slightly  3. moderately  4. extremely

43. How frequently do you avoid ‘stocking up’ on tempting foods?
   1. almost never  2. seldom  3. usually  4. almost always

44. How likely are you to shop for low calorie foods?
   1. unlikely  2. slightly unlikely  3. moderately likely  4. very likely

45. Do you eat sensibly in front of others and splurge alone?
   1. never  2. rarely  3. often  4. always

46. How likely are you to consciously eat slowly in order to cut down on how much you eat?
   1. unlikely  2. slightly unlikely  3. moderately likely  4. very likely

47. How frequently do you skip dessert because you are no longer hungry?
   1. almost never  2. seldom  3. at least once a week  4. almost every day

48. How likely are you to consciously eat less than you want?
   1. unlikely  2. slightly unlikely  3. moderately likely  4. very likely
49. Do you go on eating binges though you are not hungry?
   1. never  2. rarely  3. sometimes  4. at least once a week

50. On a scale of 0 to 5, what number would you give yourself? (Please circle a number)
   0 – eat whatever you want, whenever you want
   1 – usually eat whatever you want, whenever you want it
   2 – often eat whatever you want, whenever you want it
   3 – often limit food intake, but often ‘give in’
   4 – usually limit food intake, rarely ‘give in’
   5 – constantly limiting food intake, never ‘giving in’

51. To what extent does this statement describe your eating behavior? “I start dieting in
   the morning, but because of any number of things that happen during the day, by evening
   I have given up and eat what I want, promising myself to start dieting again tomorrow.”
   (Please circle a number.)
   1. not like me  2. little like me  3. pretty good description of me  4. describes me
      perfectly
Appendix D

Brand Engagement in Self-Concept Scale

Please answer the following questions using the scale provided

1. I have a special bond with the brands that I like.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

2. I consider my favorite brands to be a part of myself.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

3. I often feel a personal connection between my brands and me.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

4. Part of me is defined by important brands in my life.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

5. I feel as if I have a close personal connection with the brands I most prefer.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

6. I can identify with important brands in my life.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

7. There are links between the brands that I prefer and how I view myself.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)

8. My favorite brands are an important indication of who I am.
   
   (Strongly Disagree)  1  2  3  4  5  6  7  (Strongly Agree)