The Effects of Reduced Food Size and Package Size on the Consumption Behavior of Restrained and Unrestrained Eaters

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This research examines the moderating role of attempted dietary restraint on the amount of food consumed from small food in small packages versus large food in large packages. Four experiments demonstrate that restrained eaters consume more calories from small food in small packages, while unrestrained eaters consume more calories from large food in a large package. For restrained eaters, overconsumption of the small food in small packages results from a lapse in self-control caused by the stress of perceiving conflicting food information: the small food in small packages is perceived as both diet food and high in calories.

Many consumers are going on diets and buying diet foods in different sizes and packages that may help them increase their self-control and manage their consumption (Hoch and Lowenstein 1991; Stunkard 1980). Companies, at the same time, are developing products to meet consumers’ dieting demands. There are numerous foods on the market, of varying sizes, calories, and package designs, that target consumers seeking to control their consumption. For instance, many popular snacks, such as Pringles chips, Nutter Butter cookies, Pop-Secret popcorn, Chips Ahoy cookies, Doritos, Hostess cakes, and even Coca Cola, are now available in 100-calorie packages (Horovitz 2006; Myers 2006). These 100-calorie packages have proven successful for firms; for example, Kraft 100-Calorie Packs were introduced in 2004, and by 2005 the company had revenues totaling over $100 million (Thompson 2006). However, it is unclear whether these minipacks actually help consumers to lose weight (Myers 2006). We investigate what influences whether consumers are able to effectively reduce consumption when eating from such minipacks.

We present a series of studies that compare the amount of calories eaten of smaller foods in small packages versus larger food in a large package, while examining the moderating role of dietary restraint on the consumption of these food products. Furthermore, we offer a new perspective, based on restrained eaters’ emotion-laden relationship with foods, to explain the processes that drive their consumption of these foods. Our research differs from prior studies on the effects of packaging, labeling, and health claims on consumption quantities (e.g., Chandon and Wansink 2007; Wansink 1996; Wansink and Chandon 2006) in several important ways. Our research is the first to address how consumers who are restrained may respond to minipacks in very different ways as compared with consumers who are unrestrained. Because weight loss products make up a $40 billion industry (Sherrid 2003) and approximately one-quarter of all Americans are on a diet at any given time (Crossen 2003; Fetto 2002), it is important to understand factors that influence the consumption behavior of this segment of consumers. Consistent with the findings of previous researchers (e.g., Wansink 1996; Wansink and Cheney 2005), we find...
that unrestrained eaters tend to consume fewer calories when eating small foods in small packages; however, counter to these findings, we demonstrate that restrained eaters consume at least as many (and sometimes more) calories when eating small food from small packages.

More importantly, we examine the process by which restrained eaters and unrestrained eaters, while perceiving the same food stimuli in similar ways, exhibit different consumption behaviors. Our results are quite different from recent findings (Chandon and Wansink 2007; Wansink and Chandon 2006) that demonstrate that individuals eat more calories when health claims are present (e.g., from “low-fat” foods or from restaurants positioned as “healthy”), presumably because they feel less guilty when eating the healthy foods. In contrast, we find that smaller food in smaller packages (e.g., 100-calorie minipacks) can cause high levels of stress among restrained eaters. These snacks may simultaneously represent both a smaller package size, from which people typically eat less (Wansink 1996), and a perceived diet food, which typically causes people to eat more (Wansink and Chandon 2006), resulting in confusion among individuals who are trying to manage their weight.

Restrained eaters have an emotional response to foods that may cause them to react in a more impulsive manner than unrestrained eaters, particularly in response to smaller food in smaller packages. Our model proposes that restrained eaters encounter the same food-related information as unrestrained eaters and that restrained eaters perceive the characteristics of the food in the same way as unrestrained eaters (e.g., in terms of perceived caloric content and whether the food is diet food or regular food), yet in the end, restrained eaters’ emotional relationships with food result in very different consumption patterns as compared to those of unrestrained eaters.

**CONSUMPTION OF VARYING FOOD, PACKAGING, AND PORTION SIZES**

Existing theory on how individuals consume varying food sizes, package sizes, and portion sizes provides some direction regarding how restrained eaters and unrestrained eaters might respond differently to smaller foods in smaller packages (e.g., Mini Chips Ahoy cookies in multiple small packages) as compared to larger foods in larger packages (e.g., regular Chips Ahoy cookies in a larger package) of the same total caloric content. For example, research on food size and consumption generally predicts that smaller food morsels should reduce consumption, thereby reducing caloric intake, relative to larger food morsels. In particular, Wansink (2004) shows that increased effort tends to reduce consumption. For example, walking further to obtain a snack may yield lower consumption rates as compared to having it closer. There are also more hand-to-mouth motions required to eat a smaller-sized food, such as a minicookie, as compared to eating a larger-sized snack, such as a standard-sized cookie of equivalent calories. These extra motions might result in a decrease in the total amount consumed. In addition, Geier, Rozin, and Doros (2006) find that people tend to consume more total calories when eating larger-sized food morsels (e.g., large Tootsie Rolls) as compared to smaller-sized food morsels (e.g., small Tootsie Rolls) due to a heuristic that they term “unit bias.” They define unit bias as “a sense that a single entity (within a reasonable range of sizes) is the appropriate amount to engage, consume, or consider” (Geier et al. 2006, 521). The unit bias has emerged based upon early scholarly research, which found that participants felt compelled to consume all the food given to them due to a mechanism termed the “completion compulsion” (Siegel 1957). These findings suggest that consumers will tend to consume more total calories when eating a larger-sized food than when eating a smaller-sized food.

Prior research also suggests that, given equal caloric amounts in either one large package or multiple individual packages, consumers will eat more from one large package. Wansink (1996) demonstrated this effect by asking consumers to estimate how much food would be appropriate when dispensing food from large and small packages. Furthermore, consumers dispensed and consumed more food from one large bowl than from two smaller bowls (Wansink and Cheney 2005). Wansink, Painter, and North (2005) provided participants with unlimited refills of soup that were either replenished manually by a server or were imperceptibly refilled automatically; they found that people ate more calories when there was no visual cue (i.e., no empty bowl) to serve as a reminder to stop eating. Similarly, when given bags of potato chips of varying sizes, participants consumed significantly more potato chips as the overall package size increased (Rolls et al. 2004). According to these prior findings, we would expect consumers to eat less from smaller packages than from large packages, since finishing a smaller package can serve as an earlier cue that one is finished eating, relative to finishing a larger package.

Furthermore, research on factors that cause consumption acceleration suggests that the effort involved in opening multiple smaller packages should slow consumption relative to opening fewer larger packages (Wansink 2004). Therefore, consumers should eat more from one larger package than they should from the equivalent caloric amount of food in multiple smaller packages. In Geier et al.’s (2006) study, M&Ms were left out for people to eat in passing, and they were dispensed using either a large-sized scoop or a small-sized scoop on alternating days. More food was consumed when using the large scoop than when using the small scoop. These studies support the idea that consumers will eat fewer calories from a smaller package than a larger one.

A concept closely related to product size and package size is portion size, such as the amount of food presented as a single serving in a restaurant. Previous research suggests a positive relationship between portion size and consumption (Ello-Martin, Ledikwe, and Rolls 2005). For example, on average, people consumed 30% more macaroni and cheese (99 grams more) when they were given 1,000-gram portions as compared to when they were given 500-gram portions.
EFFECTS OF REDUCED FOOD AND PACKAGE SIZE

(Rolls, Morris, and Roe 2002). When randomly assigned sandwiches of varying lengths (6, 8, 10, and 12 inches), participants consumed significantly more total calories when eating the 12-inch sandwich as compared to eating the 8-inch sandwich (Rolls et al. 2004); in other words, whether they finish the sandwich or not, participants tend to consume more overall calories when the portion size is larger. These effects have been shown in various types of foods (Rolls, Roe, and Meengs 2006) and in both laboratory and restaurant settings (Diliberti et al. 2004). The steady increase of serving sizes since the 1970s has correlated with increased obesity (Young and Nestle 2002a) and has shaped consumers’ normative expectation for increasingly larger serving sizes.

In sum, research has shown that (a) consumers tend to consume more food when eating a larger-sized morsel than when eating a smaller-sized morsel, (b) people tend to consume more food when eating from a larger-sized package than when eating from a smaller-sized package, and (c) individuals tend to consume more food when eating from larger portions than when eating from smaller portions. Therefore, existing theory would predict that consumers will eat more from a larger food morsel, package, and/or portion than from a smaller food morsel, package, and/or portion, respectively. However, this prior research has not been linked to the interaction of three important factors: (1) whether or not the food is perceived as diet food, (2) the perceived caloric content of the food, and (3) the consumer’s level of dietary restraint. Understanding the role of these key factors can help to more accurately predict consumption behavior, particularly among the focal consumer group: restrained eaters. Whether or not the food is perceived as a diet food and the perceived caloric content of the food may have important implications for how consumers, and restrained eaters in particular, react to and consume the food. Dietary restraint is an important moderator because many consumers are integrating dieting into their lifestyles, either to achieve a particular appearance or to adhere to a weight that helps to prevent obesity or obesity-related diseases. To the extent that restrained eaters seek out specific types of food products to help them achieve these objectives, it is important to understand from a theory-based standpoint how their needs, responses, and consumption may differ from those of unrestrained eaters.

**H1:** Consumers will perceive smaller food in smaller packages to be more like diet food than larger food in a large package (of equivalent caloric content).

Although consumers are likely to perceive smaller morsels in smaller packages as relatively more like diet food than larger foods in a large package, they may simultaneously hold the belief that a set of these minipacks contains more calories than a single large package of larger food morsels (when the number of calories in each configuration is in fact equal). The numerosity heuristic suggests that, when a stimulus is divided into more numerous segments, people tend to overestimate the quantity (i.e., total amount) of the focal item (Pelham, Sumarta, and Myaskovsky 1994). For example, people judged the total area of a circle that was divided into nine segments to be greater than the total area of an intact circle (Pelham et al. 1994). Consistent with this heuristic, when estimating the caloric content of a snack food, individuals may anchor on the numerosity of the minipacks (e.g., four smaller packages vs. one larger package) and insufficiently adjust the perceived calories downward based on the smaller amount of food in each package (e.g., Wertenbroch, Soman, and Chattopadhyay 2007). In addition, when judging changes in size, individuals tend to underestimate the larger items of the same shape by a power function with an exponent of approximately 0.7 (Teghtsoonian 1965). For example, if
a consumer is presented with two cookies, one minicookie and one regular cookie that is exactly twice its size, the consumer may perceive the regular cookie to be less than twice the size of the minicookie. Conversely, we might expect the consumer to overestimate the number of calories in the minicookie, relative to the regular cookie, thereby overestimating the total number of calories in the minipack configuration. Therefore, consumers are likely to believe that the sum of the smaller food morsels in the smaller packages contains a relatively larger caloric content than the sum of the larger food morsels in a single large package.

**H2:** Consumers will perceive smaller food in smaller packages as higher in caloric content than larger food in a large package (of equivalent total caloric content).

**STUDY 1**

The purpose of study 1 was to evaluate consumers’ perceptions of diet food characteristics and caloric content for various food size and package size combinations. We implemented a 2 (package: small, large) × 2 (food: small, large) between-subjects design, N = 385. We operationalized package size as either one large plastic bag or four small plastic bags, and food size as either regular-sized M&Ms or mini-M&Ms. Each of the four food configurations contained a total of 200 calories. There were no labels of any kind placed on the food packages; rather, participants received the food in clear plastic bags. The two dependent variables were the extent to which each combination seemed like diet food and the perceived caloric content of each combination. Participants were undergraduate business students at Arizona State University. In this study, participants observed the food but they did not eat it.

The study began with each participant viewing one of the four food configurations and then answering questions about their perception of the food. To measure the extent to which the food and packages seemed like diet food, we asked participants to rate on a 7-point scale the extent to which they disagree/agree with the statement “Overall, the M&Ms in their packages seemed like diet foods.” Participants estimated the caloric content of the food configuration they were shown by answering the question “In total, how many total calories do you think are in [all four packages/the package] of M&Ms you saw?”

**Study 1 Results**

**Diet Food Characteristics.** A 2 (food size) × 2 (package size) ANOVA model demonstrated a significant main effect of food size (F(1, 379) = 6.40, p < .05) and a significant main effect of package size (F(1, 379) = 22.33, p < .001). Participants perceived the small food morsels to be significantly more like diet food than the large food morsels (M = 2.28 vs. M = 1.92 on a scale from 1 to 7), and they also perceived the small packages to be significantly more like diet food than the large package (M = 2.44 vs. M = 1.77). There was not a significant interaction between food size and package size (F < 1, p > .5). We also conducted a series of planned comparisons to test for significant differences between the conditions. Participants perceived no significant differences in diet characteristics between the small food in a large package (M = 1.94) and the large food in a small package (M = 2.23; t(381) = 1.47, p > .1). Therefore, we subsequently combined them into one “middle” group (M = 2.08). The small food, small package condition (M = 2.62) was perceived to be significantly more like diet food than the new middle group (M = 2.08; t(149.87) = 2.63, p < .01), which was perceived to be significantly more like diet food than the large food, large package condition (M = 1.59; t(272.07) = 3.43, p < .001). Most importantly, as predicted in hypothesis 1, participants perceived the small food in small packages (M = 2.62) to be significantly more like diet food than the large food in a large package (M = 1.59; t(382) = 5.18, p < .001).

**Caloric Content.** A 2 (food size) × 2 (package size) ANOVA model demonstrated a significant main effect of food size (F(1, 379) = 13.64, p < .001) and a significant main effect of package size (F(1, 379) = 22.07, p < .001). Participants perceived the small food morsels to contain significantly more calories than the large food morsels (M = 277.12 vs. M = 213.66), and they also perceived the small packages to contain significantly more calories than the large package (M = 285.75 vs. M = 205.03). There was a significant interaction between food size and package size (F(1, 379) = 5.35, p < .05). Furthermore, we conducted a series of planned comparisons to test for significant differences between the conditions. Participants perceived no significant difference in caloric content between the small food in a large package (M = 216.88) and the large food in a small package (M = 236.06; t(381) = .79, p > .1), and thus we combined them again into one “middle” group (M = 226.52). The small food, small package condition (M = 337.36) was perceived to have significantly more calories than the middle group (M = 226.52; t(117.78) = 4.24, p < .001), which was perceived to have marginally more calories than the large food, large package condition (M = 193.17; t(184.21) = 1.81, p = .07). Supporting hypothesis 2, participants perceived significantly more calories in the small food in small packages (M = 337.36) than in the large food in a large package (M = 193.17; t(382) = 5.99, p < .001), though each condition actually contained 200 calories.

**Discussion**

Based on the findings of study 1, the small food, small package condition appears to provide the largest inconsistency between perceptions of diet characteristics and perceptions of caloric content, whereas the other three conditions provide relative consistency between these perceptions. Moreover, since both food morsel size and package size produced significant main effects on participants’ diet and caloric perceptions, it is likely that each of these variables
will exert an independent influence on participants’ consumption levels. Therefore, the remaining studies in this article focus on the two conditions that produced the most extreme differences in perceptions: the small food, small package condition and the large food, large package condition. Furthermore, these two designs are consistent with consumers’ real-world choices between minipacks (or “100-calorie packs”) of small food in small packages, which are widely offered as weight loss aids, and regular food in regular-sized packages.

On the one hand, as proposed in hypothesis 1, consumers will characterize smaller food in smaller packages as “diet food” because this version is the opposite of the increasingly larger food, packages, and portions that have become the societal norm for regular food (Brown 2006). On the other hand, as proposed in hypothesis 2, consumers will perceive that the smaller food in smaller packages contains more calories than the larger food in a larger package (Pelham et al. 1994; Teghtsoonian 1965). Thus, the question remains: how does the presence of these dual, conflicting sets of information influence the consumption patterns of restrained eaters and unrestrained eaters? Our model predicts that this is the point in the process at which restrained eaters and unrestrained eaters diverge.

FOOD CONSUMPTION BY RESTRAINED AND UNRESTRAINED EATERS

A focus on dietary restraint is an important perspective since restrained eaters need to make sense of these varying food configurations and determine how to incorporate them into their weight loss strategies. Restrained eating is defined as “the deliberate effort to combat the physiologically-based urge to eat in order to lose weight or maintain a reduced weight” (Fedoroff, Polivy, and Herman 1997, 34). In Herman and Polivy’s (1980) 10-item scale, defining characteristics that differentiate restrained and unrestrained eaters include factors such as a concern with dieting (e.g., “How often are you dieting?”), a focus on weight fluctuation (e.g., “In a typical week how much does your weight fluctuate?”), and a focus on food intake (e.g., “Do you eat sensibly in front of others and splurge alone?”). Restrained eaters, compared to unrestrained eaters, are consciously and continuously aware of their eating behavior (Herman and Mack 1975), place considerably more emphasis on factors beyond their biological need for food, and may be hypersensitive to external food cues because they have chronically suppressed their internal physiological hunger indicators in order to lose weight (Herman and Polivy 1975; Schachter, Goldman, and Gordon 1968; Tom and Rucker 1975) and therefore may experience greater difficulty in turning off their consumption (Fedoroff et al. 1997).

A key component of restrained eaters’ unique responses to foods is their highly emotional relationship with it. Restrained eaters tend to experience emotional responses to food, including negative affect (Fletcher et al. 2007) and guilt about eating forbidden foods (King, Herman, and Polivy 1987). Restrained eaters’ emotional relationship with food, coupled with their general state of depletion, may influence their propensity to choose and therefore consume less healthful alternatives. Restrained eaters are likely to eat more in high-stress circumstances relative to low-stress circumstances (Heatherton and Baumeister 1991; Herman and Polivy 1975), and they particularly tend to overeat when they experience anxiety (Herman et al. 1987). In addition, restrained eaters have a propensity to demonstrate disinhibited eating as a result of dietary violations, such as eating a food that is forbidden based upon caloric content or food type (Ruderman, Belzer, and Halperin 1985; Spencer and Fremouw 1979; Ward and Mann 2000).

Restrained eaters also differ from unrestrained eaters with regard to willpower. Restrained eaters are striving to delay gratification of various immediate rewards (e.g., avoiding detrimental foods) in lieu of a larger delayed reward (e.g., achieving a weight-related goal). A hot/cool system influences an individual’s ability to sustain a delay of gratification over time, such that the hot system is reflected in impulsive, emotional choices, while the cool system is reflected in cognitive, long-term oriented choices (Mischel, Ayduk, and Mendoza-Denton 2003). When the immediate reward is salient, it is more difficult to wait because the desired item triggers the emotion-laden hot system (Mischel et al. 2003). For restrained eaters, food items are more likely to be highly emotionally arousing and thus are more likely to trigger the hot system. According to Mischel et al. (2003), experiencing stress and triggering the hot system can escalate each other, making it difficult to sustain willpower. Restrained eaters are attempting a high level of self-control and are in a perpetual state of regulatory resource depletion, which makes them more vulnerable to self-control breakdowns (Baumeister and Heatherton 1996), particularly when they are faced with food-related stress. Once restrained eaters reach a consumption threshold where they believe they have failed on a proximal goal, they tend to demonstrate disinhibited eating triggered by a perceived self-control failure termed the “what the hell effect” (Cochran and Tesser 1996, 99), in which the restrained eater may eat the entire package of the focal product.

For restrained eaters, we propose that the conflict of concurrently perceiving the smaller food in smaller packages to be both diet food and of relatively higher calories (hypotheses 1 and 2) creates stress. Restrained eaters have a high concern for dieting, and they want to know whether a food falls into an allowed category as well as the overall caloric content of a food (Fedoroff et al. 1997; Ruderman et al. 1985). The stress of not understanding whether a food is allowed or forbidden, coupled with an already vulnerable, depleted state, further triggers the hot system, resulting in increased consumption of the focal food, in this case small food in small packages.

Unrestrained eaters, by contrast, typically have a more balanced response to internal and external stimuli (Nisbett 1968; Schachter et al. 1968). In particular, unrestrained eaters tend to focus on internal cues as an indicator that they
have eaten enough (Tom and Rucker 1975), and they are able to balance factors such as satiety against how appetizing a food appears to be. We argue that unrestrained eaters, who by definition have a lower concern for dieting (Herman and Polivy 1980), will display less concern over whether the food seems like “diet food” and will place more emphasis on their internal physiological cues (e.g., hunger and satiety) and other environmental cues (i.e., the perception of whether the presented food will satisfy internal physiological cues), resulting in a consumption pattern predicted by existing consumption research (Geier et al. 2006; Wansink 1996). Hence, unrestrained eaters should consume more calories from larger food morsels in a larger package than from smaller food morsels in smaller packages.

In sum, we hypothesize that unrestrained eaters will behave in a manner predicted by existing theory, consuming more calories from large food in a large package (Geier et al. 2006; Wansink 1996). In contrast, we predict that restrained eaters will consume more calories from small food in smaller packages due to their emotional hot system response to the conflicting information they perceive about smaller foods in smaller packages.

**H3:** 
Restrained eaters will consume more calories when eating small food from small packages than when eating large food from a large package, but unrestrained eaters will consume more calories when eating large food from a large package than when eating small food from small packages.

Once a restrained eater opens a package and begins eating, she or he may find it difficult to stop. Supporting this notion, Polivy, Heatherton, and Herman (1988) found that restrained eaters (and particularly those with low self-esteem) consumed more ice cream after they were “preloaded” with a milkshake, as compared to when they consumed nothing in advance, while unrestrained eaters consumed less ice cream after drinking a milkshake. In particular, restrained eaters’ emotional responses to the small food in small packages may magnify these effects. Therefore, restrained eaters are expected to be more likely than unrestrained eaters to consume everything that is given to them when eating from the minipacks.

**H4:** 
Restrained eaters will be more likely to eat 100% of the small food from small packages than to eat 100% of the large food from a large package, but unrestrained eaters will be more likely to eat 100% of the large food from a large package than to eat 100% of the small food from small packages.

**STUDY 2**

**Method**

Study 2 examines whether restrained and unrestrained eaters exhibit different patterns of consumption when eating small food in small packages versus large food in large packages. Study 2 utilized a 2 (food configuration: small food, small package vs. large food, large package) × 2 (dietary restraint: restrained vs. unrestrained) between-subjects design with 343 student participants at Arizona State University. The small food in small packages condition was operationalized as 200 calories of mini-M&Ms evenly distributed across four small bags, while the large food in a large package condition was 200 calories of regular M&Ms in one large bag (see fig. A1 in the appendix).

To measure dietary restraint, participants completed the 10-item Restrained Eating Scale (Herman and Polivy 1980), a well-established measure of dietary restraint. The scale captures consumers’ concern for dieting with measures such as “How often are you dieting?” and “Do you give too much time and thought to food?” The scale measures weight fluctuation with items such as “What is your maximum weight gain within a week?” “Would a weight fluctuation of 5 pounds affect the way you live your life?” and “In a typical week, how much does your weight fluctuate?” In study 2 and all subsequent studies, we analyzed dietary restraint as both a continuous variable and a dichotomous variable (using a median split), with highly similar results. Prior research on restrained eating has typically used a median split to report distinct findings for restrained and unrestrained eaters (Herman and Mack 1975; Herman and Polivy 1975; Herman et al. 1987), and thus from here forward we will report only the median split results.

When participants arrived, they received the M&Ms and were told that they could eat as much as they wanted during the experimental session but that they would not be allowed to remove the food from the room after the session. They completed several other unrelated questionnaires while eating the M&Ms. From the time the participants were first given the food, they had 40 minutes in which to eat. At the end of the session, the participants were instructed to place any and all remaining food and food packages in an envelope that contained a unique ID that corresponded to their questionnaire.

We tested hypotheses 1 and 2 by measuring the extent to which the food was perceived as diet food and the perceived caloric content of the food. The extent to which the food was perceived as diet food was measured by asking participants to rate the extent to which they disagree or agree with the following statements using a 7-point scale (disagree/agree): “The M&Ms themselves seemed like diet snacks” and “The packages the M&Ms were in seemed like diet food packages.” To assess perceived caloric content, we asked participants, “In total, how many calories do you think were in [the four packages/the package] of M&Ms you were given?” To test hypotheses 3 and 4, the dependent variable was the administrator’s count of how much was eaten by each participant. We also included a measure of self-control to further explore hypothesis 4, in which we asked participants, “How difficult would it have been to eat just one M&M and no more?” (1 = not at all difficult, 7 = very difficult).
Study 2 Results

**Diet Food Characteristics.** Supporting hypothesis 1, participants perceived the smaller food morsels as well as the smaller packages to be significantly more like a diet version, while in their respective small food, small package combination. Participants perceived the smaller food morsels ($M = 1.72$) to be more like diet food than the larger food morsels ($M = 1.46; F(1, 341) = 4.84, p < .05$), and they perceived the smaller packages ($M = 3.19$) to be more like diet food packages than the larger package ($M = 2.61; F(1, 341) = 7.87, p < .005$). Restrained eaters and unrestrained eaters showed no significant differences in these responses.

**Caloric Content.** At the same time, consistent with hypothesis 2, participants perceived the caloric content of the small food, small packages ($M = 348.46$) to be significantly greater than the caloric content of the large food, large package ($M = 229.67; F(1, 340) = 7.67, p < .01$), although the two configurations were of equal caloric content (200 calories). These results were consistent for both restrained and unrestrained eaters.

**Quantity Consumed.** A 2 (dietary restraint) × 2 (food type) ANOVA model revealed a significant main effect of food type ($F(1, 339) = 5.25, p < .05$), and the main effect of dietary restraint was not significant. More importantly, and consistent with hypothesis 3, the dietary restraint × food type interaction ($F(1, 339) = 14.77, p < .001$; see fig. 1) was significant. Restrained eaters consumed directionally more calories from the small food in small packages ($M = 100.39$) than from the large food in a large package ($M = 88.08$, NS), while unrestrained eaters consumed more calories from the large food in a large package ($M = 129.73$) than from the small food in small packages ($M = 81.09; F(1, 339) = 21.30, p < .001$).

To test hypothesis 4, where the dependent variable was binary (whether people ate all the food given to them or some quantity less than all the food), we ran a binary logistic regression where the independent variables were dietary restraint and food type. Supporting hypothesis 4, there was a significant interaction between dietary restraint and food type on the percentage eating all of the food provided (Wald $\chi^2 = 6.56, p < .01$; see fig. 2). The results of a binary logistic regression show that restrained eaters more often ate all of the small food from small packages (18.82%) than the large food from a large package (10.61%; NS) but that unrestrained eaters more often ate all of the large food from a large package (27.96%) than the small food from small packages (13.54%; Wald $\chi^2 = 5.78, p < .05$). Our interpretation of this effect is supported by restrained eaters mentioning that they would not be able to stop eating the small food in small packages once they started eating it. Specifically, restrained eaters found it significantly more difficult to eat just one M&M and no more in the case of the small food, small packages condition ($M = 4.71$) as compared to the large food, large package condition ($M = 3.61; F(1, 339) = 7.06, p < .01$); unrestrained eaters showed no significant difference between small food in small packages ($M = 3.62$) and large food in a large package ($M = 3.68$, NS). Thus, restrained eaters seem to have difficulty stopping consumption of small food in small packages. A related question is whether restrained and unrestrained eaters start eating at different rates. Compared to unrestrained eaters, restrained eaters were just as likely to start eating the M&Ms, regardless of food type ($p > .40$ for all main effects and interactions), but, as our results demonstrate, restrained eaters found it more difficult to stop eating once they had started, particularly when eating the small food in small packages.
Study 3 tested whether restrained eaters and unrestrained eaters differ in their consumption of small food in small packages versus large food in large packages (hypotheses 3 and 4), and it generalized the findings to a different type of food—cookies. Participants were 96 undergraduate students at Arizona State University who were enrolled in an introductory marketing course. We implemented a 2 (food configuration: small food, small package vs. large food, large package) x 2 (dietary restraint: restrained vs. unrestrained) between-subjects design. The small food, small package condition was operationalized as eight minicookies equally distributed across four small bags (i.e., two cookies per bag); the large food, large package condition was operationalized as four large cookies in one bag. Both of these conditions had the same amount of calories (240 total calories).

The dependent variable was the total amount of food eaten by each participant. After the experiment, the administrator counted the number of cookies (or fragments of cookies) that each participant ate and then converted the number of cookies into the total number of calories consumed. For example, a participant in the large food, large package condition who had one large cookie remaining would be described as having eaten three cookies or 180 calories; a participant in the small food, small package condition who had two small cookies remaining would be described as having eaten six cookies or 180 calories. Once the cookies were collected at the end of the session, participants also completed items from the Restrained Eating Scale (Herman and Polivy 1980) in a manner consistent with the procedure of studies 1 and 2.

Study 3 Results

We analyzed the data using a 2 (food type) x 2 (dietary restraint) ANOVA model. The main effects of food type and dietary restraint were not significant. More importantly, and providing tentative support for hypothesis 3, the two-way interaction of food configuration and dieting behavior was marginally significant ($F(1, 92) = 3.35, p = .07$). Figure 3 illustrates this interaction. Restrained eaters consumed marginally more calories from the small food, small packages ($M = 106.36$) than from the large food, large package ($M = 55.64$; $F(1, 92) = 3.37, p = .076$), and unrestrained eaters consumed directionally more calories from the large food, large package ($M = 119.17$) than from the small food, small packages ($M = 99.23$, NS).

To test hypothesis 4, where the dependent variable was whether people ate the entire 240 calories versus some quantity less than all of the food, we ran a binary logistic regression where the independent variables were dietary restraint and food type. A binary logistic regression analysis revealed that restrained eaters were more likely to eat everything from the small food, small packages (18.18%) as compared to the large food, large package (4.35%), while unrestrained eaters did the opposite (11.54% vs. 30.56%); this marginally significant interaction (Wald $\chi^2 = 3.63, p = .057$) supports hypothesis 4 (see fig. 4), that restrained eaters seem to have a harder time stopping when they are eating from the small food, small packages relative to when they are eating the large food in the large package. Unrestrained eaters, by contrast, were more likely to consume the entire 240 calories when eating from the large food in the large package.

Discussion

Studies 1 and 2 support the hypotheses that participants perceive the smaller food in smaller packages configuration to (a) have a greater number of calories and (b) to be more like diet food, as compared to the larger food in a larger package. For unrestrained eaters, this conflicting information is relatively unimportant because unrestrained eaters balance...
internal cues (e.g., hunger and satiety) against environmental cues (e.g., perception of whether the presented food will satisfy internal physiological desires) when determining how much to consume. In contrast, restrained eaters may find this information more stressful because both pieces of information are of importance to them but the information is inconsistent. Studies 2 and 3 demonstrate how restrained eaters are likely to consume a greater amount of calories from smaller food in smaller packages while unrestrained eaters are likely to consume a larger amount of calories from the larger food in a larger package. Studies 2 and 3 also demonstrate that, once restrained eaters begin eating, they are less likely to stop eating from the smaller food in smaller packages, which suggests that they may be experiencing a lapse in self-control.

It may appear surprising that the results were stronger among unrestrained eaters (who ate significantly more from larger food in a larger package) than among restrained eaters (who ate directionally, but not significantly, more from smaller food in smaller packages). However, it is important to note that, from a theoretical standpoint, restrained eaters are also subject to the package size effects established previously in the literature (e.g., Wansink and Cheney 2005), which should shift their consumption behavior in the opposite direction. It is therefore telling that despite this “pull” in the opposite direction, restrained eaters still exhibit a different slope in the difference in consumption between small foods in small packages and large foods in a large package relative to unrestrained eaters. Another interesting question is whether restrained and unrestrained eaters are correct in their predictions about their consumption quantities from different packages. Given that restrained eaters seem to have more difficulty stopping when eating the small food in small packages, it is possible that they start with the intention to eat less from such packages but fail in the execution of this strategy. We next describe a follow-up study that addresses this question.

Follow-Up Study

We ran a follow-up study to examine desired and predicted consumption quantity among restrained and unrestrained eaters and the role of stress with anticipated consumption. The follow-up test was a 2 (food configuration: small food, small packages vs. large food, large package) x 2 (dietary restraint: restrained vs. unrestrained) between-subjects design (N = 201). These conditions were operationalized using M&Ms, as pictured in the appendix. Participants, undergraduate business students at Arizona State University, were allowed to view (but not to eat) the food for as long as they wanted, and they were then asked, “If you had been allowed to eat the M&Ms you were shown today, what percentage of the M&Ms would you want to eat?” and “If you had been allowed to eat the M&Ms you were shown today, what percentage of the M&Ms would you have actually eaten?” To measure stress, participants rated their disagreement/agreement (7-point scale [disagree/agree]) with “It is stressful to think about eating the M&Ms I was shown.” Dietary restraint was measured as in the previous studies.

Overall, participants (both unrestrained and restrained) predicted that they would want to eat a significantly smaller proportion of food from the small food in small packages (M = 40.80%) than from the large food in a large package (M = 63.90%; F(1, 197) = 17.08, p < .001); similarly, participants (both unrestrained and restrained) predicted that they would actually eat a significantly smaller proportion of food from the small food in small packages (M = 33.96%) than from the large food in a large package (M = 61.27%; F(1, 197) = 23.56, p < .001). Dietary restraint did not have a significant impact on desired consumption (F(1, 193) = 2.12, p > .1) or predicted consumption (F(1, 193) = .591, p > .40). In other words, both restrained and unrestrained eaters believed that they would eat less from the small food in small packages than from the large food in a large package. For unrestrained eaters, the patterns of these predictions are consistent with the actual consumption patterns exhibited in studies 2 and 3. For restrained eaters, however, the patterns of these predictions are inconsistent with the actual consumption patterns exhibited in studies 2 and 3, implying that restrained eaters make inaccurate predictions about their future consumption and may be unaware of the consumption patterns they exhibit when eating small foods in small packages.

Unrestrained eaters did not perceive any significant differences in stress when thinking about eating the small food in small packages (M = 1.29) as compared to the large food in a large package (M = 1.17; t(197) = .418, p > .50). However, restrained eaters perceived it to be significantly more stressful to think about eating the small food in small packages (M = 2.49) as compared to the large food in a large package (M = 1.83; t(197) = 2.98, p < .005). This result provides preliminary evidence that restrained eaters perceive significantly more stress when thinking about eating the small food in small packages than when thinking about eating the large food in a large package.

**DIETARY RESTRAINT AND WILLPOWER**

In addition to understanding the differences in consumption behaviors of restrained eaters and unrestrained eaters, another important focus of this research is to find ways to help restrained eaters reduce their consumption levels of smaller foods in smaller packages. One approach is to suggest techniques that may help restrained eaters reduce their emotional responses and increase their self-control when encountering these emotion-laden food products. As the emotional component is a key characteristic distinguishing restrained eaters’ responses to food from those of unrestrained eaters, reducing the degree to which the food is a hot system trigger for the restrained eater may help reduce consumption. Various cooling techniques may help increase self-control, such as thinking of the hot stimulus as a cooler object (e.g., thinking of marshmallows as clouds or thinking of pretzels as wooden logs; Mischel, Ebbesen, and Raskoff Zeiss 1972). Restrained eaters may be able to slow or reverse...
the effects of overconsumption of smaller foods in smaller packages by engaging the cool system over the hot system. Unrestrained eaters do not possess such an emotional relationship with food; hence, engaging their hot or cool systems will not affect their consumption of food. Therefore, engaging the cool system is expected to more profoundly reduce the consumption of small food in small packages among restrained eaters as compared to unrestrained eaters (and compared to the consumption when the hot system is engaged) because engaging the cool system helps restrained eaters control their emotional responses to the emotion-laden food stimuli.

**H5:** Restrainted eaters will consume significantly less of the small food from small packages when their cool systems are engaged than when their hot systems or control systems are engaged; unrestrained eaters’ consumption will be unaffected by their system focus.

If restrained eaters were able to override their natural inclinations and engage their cool system when making food related choices instead of their hot system (Mischel et al. 2003), they would also have better self-control over their consumption of such snacks. In study 4, we examine the role of willpower and how willpower can be increased among restrained eaters by triggering use of their cool system in response to food.

**STUDY 4**

Study 4 used a 2 (food configuration: small food, small package vs. large food, large package) x 2 (dietary restraint: restrained vs. unrestrained) x 3 (system focus: hot system, cool system, control) between-subjects design, N = 393. The food configuration factor was operationalized as in studies 1 and 2, with M&Ms. For the system-focus factor, we followed the approach used by Ayduk, Mischel, and Doyney (2002); they triggered the cool system by asking participants to think about the focal topic in terms of surrounding objects and spatial relations, and they triggered the hot system by asking participants to think about the focal topic in terms of feeling and emotions. For the present study, upon arrival, we gave participants, who were undergraduate business students at Arizona State University, the M&Ms and asked them to think about the M&Ms for 2 minutes and to then write several sentences based upon the system-focus condition they were in. For example, in the cool system condition, participants were asked to “think about the M&Ms as nonfood objects” such as buttons for a shirt, marbles, or painted rocks. They were encouraged to use their imagination to think about the M&Ms as something other than food. In the hot system condition, participants were asked to “think about the sensory experience of enjoying M&Ms,” such as the crunch of the candy shell and the taste of the chocolate. They were encouraged to use their imagination to think about how they would enjoy the M&Ms through their senses. In the control condition, participants were encouraged to “think about anything you would like to think about” as they observed the M&Ms. Participants were allowed to eat during and after this task, for a total of 40 minutes. The dependent variables included perceptions of diet characteristics and caloric content (as in studies 1 and 2) and consumption quantity.

**Study 4 Results**

**Diet Food Characteristics.** Supporting hypothesis 1, participants perceived the smaller food morsels and the smaller packages to be significantly more like a diet version while in their respective small food, small package combination. Participants perceived the smaller food morsels (M = 2.19) to be more like diet food than the larger food morsels (M = 1.69; F(1,381) = 13.68, p < .001) and the smaller packages (M = 3.16) to be more like diet food packages than the larger package (M = 2.30; F(1,381) = 20.59, p < .001). These patterns were significant for both restrained and unrestrained eaters.

**Caloric Content.** Supporting hypothesis 2, despite the fact that both food versions totaled 200 calories, participants perceived the caloric content of the small food in small packages (M = 321.04) to be significantly greater than the caloric content of the large food in large packages (M = 217.88; F(1,381) = 22.71, p < .001). This pattern was significant for both restrained eaters and unrestrained eaters. There was also a significant main effect of dietary restraint on caloric perceptions (M_restrained = 297.67 vs. M_unrestrained = 241.26; F(1,381) = 6.77, p < .01), which suggests that restrained eaters provide higher overall calorie estimates than unrestrained eaters.

**Quantity Consumed.** We used a 2 (food configuration) x 2 (dietary restraint) x 3 (system focus) ANOVA model to analyze the data. All main effects were significant: food configuration (F(1,377) = 18.29, p < .001), dietary restraint (F(1,377) = 10.53, p < .001), and system focus (F(1,377) = 4.60, p < .05), and the three-way interaction was significant (F(2,377) = 3.05, p < .05). Figure 5 shows the restrained eaters’ and unrestrained eaters’ consumption patterns of small food in small packages and large food in large packages across cool, control, and hot system conditions. For restrained eaters, we ran a 2 (food configuration) x 3 (system focus) ANOVA. For restrained eaters, the food configuration by system focus interaction was significant (F(2,197) = 6.67, p < .005), the main effect for system focus was significant (F(2,197) = 3.39, p < .05), and the main effect for food configuration was not significant. The food configuration by system focus interaction was significant due to a preference reversal in the cool system condition. In the cool system condition, restrained eaters consumed fewer calories from the small food in small packages (M = 41.74) than from the large food in a large package (M = 102.29; t(199) = 3.22, p < .001), and in the control condition, restrained eaters consumed more calories from small food in small packages (M = 109.00) than from large...
EFFECTS OF REDUCED FOOD AND PACKAGE SIZE

FIGURE 5
STUDY 4: CALORIES CONSUMED BY RESTRAINED EATERS AND UNRESTRAINED EATERS WITH COOL, CONTROL, AND HOT SYSTEM FOCUS

For restrained eaters, there is no significant difference between their consumption of small food in small packages in the control condition ($M = 109.00$) and the hot system condition ($M = 120.30$) as compared to the control condition ($M = 76.15$; $t(199) = 1.58$, $p > .1$), presumably because restrained eaters are in a perpetual hot state in the presence of food with conflicting information. In this case, small food in small packages. Restrained eaters consume significantly more large food in large packages in the hot system condition ($M = 120.30$) as compared to the control condition ($M = 76.15$; $t(199) = 3.25$, $p < .001$). Hence, there is a perpetual “hot state” for conflicting foods (e.g., small foods in small packages) that does not exist with other foods (e.g., large food in large packages).

For unrestrained eaters, we ran a 2 (food configuration) x 3 (system focus) ANOVA. The food configuration by system interaction was not significant, and the main effect for system was not significant. Consistent with hypothesis 5, for unrestrained eaters, the main effect for food configuration was significant: unrestrained eaters consumed more calories from the large food in a large package ($M = 137.10$) than from the small food in small packages ($M = 92.11$; $F(1, 179) = 16.86$, $p < .001$). Whether unrestrained eaters were in a cool, control, or hot system condition, their consumption patterns were consistent with prior literature, such that they consumed more calories from large food in large packages than from small food in small packages.

Discussion

Study 4 provides additional insight regarding why restrained eaters consume more calories from minipacks while unrestrained eaters consume more calories from regular packs. These differing consumption patterns appear to be driven by a self-control lapse experienced by restrained eaters, who feel stressed when faced with conflicting food-related information. However, a cool system focus represents an important boundary condition to the results established in studies 2 and 3. When restrained eaters are able to control their desires by focusing on surrounding objects and spatial relations, their consumption patterns reverse and become consistent with those of unrestrained eaters. Unrestrained eaters, who are generally in a cool system state on the topic of food, tend to reflect the same consumption pattern (i.e., consuming more calories from the large food in a large package and fewer calories from the small food in small packages), regardless of whether they receive cool, neutral, or hot triggers about the food. This is because the mechanisms presented in the existing literature predominantly influence the consumption patterns of consumers who do not have an emotion-laden relationship with food.

It is also noteworthy that restrained eaters provided significantly higher calorie estimates of the same foods than did unrestrained eaters. These significantly higher calorie estimates may have caused an overall decrease in the total amount consumed by restrained eaters ($M = 89.72$) as compared to unrestrained eaters ($M = 114.27$; $F(1, 377) = 10.53$, $p < .001$). However, if mere differences in calorie perceptions could explain our pattern of results, we would expect restrained eaters to eat less from the small food in small packages, where their calorie estimates were the highest, when in fact they ate more from these packages.

Taken together, our studies demonstrate that both restrained eaters and unrestrained eaters will perceive the small food in small packages to contain more calories than large food in a large package but that they will perceive the small food, small packages combination to be more like diet food. Restained eaters are highly emotionally involved with food, and their perception and evaluation of food items is paramount to them. Therefore, for restrained eaters, the conflict of these two important pieces of information, (a) the dietary categorization (i.e., that the small food, small packages is more like diet food) and (b) the perceived calorific content (that the small food, small packages is relatively higher in calories), will result in restrained eaters having a more difficult time holding back once they begin to consume. This consumption pattern is compounded by the fact that re-
strained eaters’ emotional hot system is engaged because they are faced with a confusing consumption situation. Thus, in contrast to existing theory and the behavior of unrestrained eaters, we find that restrained eaters will consume more calories when eating small food morsels from small packages. The conceptual framework is presented in figure 6.

**GENERAL DISCUSSION**

This research examined the effect of food size and package size on food consumption quantity. In particular, we investigated whether consumers would eat more small food contained in smaller packages or larger food contained in larger packages. Prior research has found that consumers will eat more when the food size and packages are larger. However, we hypothesized and found that this effect was moderated by whether consumers were restrained or unrestrained eaters. We found that unrestrained eaters tend to consume more food when presented with larger-sized food in larger packages, while restrained eaters consume at least as much (and sometimes more) food when presented with smaller-sized food in smaller packages. We also proposed and found support for a process that explains why this occurs. When consumers—both restrained eaters and unrestrained eaters—encounter smaller food morsels in smaller packages, they simultaneously tend to label that food as diet food and to perceive that food as containing a relatively higher amount of calories as compared to larger food in a larger package. Whether this conflict between beliefs about diet foods and amount of calories has an impact on consumption behavior depends on whether the consumer is a restrained eater or an unrestrained eater.

Restrained eaters are generally in an elevated hot system state when they encounter snack foods, particularly those foods with inconsistent information, due to their emotion-laden relationship with food. Because food and food information is highly important to restrained eaters, this inconsistent information is stressful and elevated stress levels tend to result in increased food consumption. The combination of having an elevated hot system and experiencing stress tends to escalate both experiences. Thus, restrained eaters not only tend to eat more smaller foods in smaller packages; they also are more likely to eat all of the small foods in small packages that are presented to them. We also showed that restrained eaters reduce their consumption of small food in small packages when they engage their cool system, which reduces the reliance on their otherwise hot system. In particular, we found that restrained eaters could engage their cool system by thinking about food in terms of surrounding objects and spatial dimensions rather than focusing on the emotions and feelings that food normally triggers. Unrestrained eaters, on the other hand, though they perceive the same type of conflict in their perceptions of small foods in smaller packages, are generally only concerned about whether the focal food will satisfy their hunger. Whether a food is categorized as diet food or regular food is relatively unimportant to them. Therefore, unrestrained eaters exhibit consumption biases consistent with the existing literature (Geier et al. 2006; Wansink 1996), regardless of whether their hot systems or cool systems are engaged.

Our research contributes to the literature on consumption in a number of ways. First, as mentioned above, our research finds that restrained consumers respond to minipacks differently than do unrestrained eaters. This is relevant because it shows an important moderator of prior findings, since many consumers are on diets and are trying to restrain their food consumption. Second, we show that restrained eaters and unrestrained eaters may behave quite differently when presented with conflicting information about whether a food is a diet food and how many calories it contains. While both restrained eaters and unrestrained eaters seem to perceive this information similarly, they act upon it, in terms of the amount of food consumed, in different ways. Restrained eaters tend to eat more when presented with this conflict due to their reliance on a hot system of emotions when it comes to food, while unrestrained eaters tend to eat less when presented with this conflict. Thus, our research also contributes to research on hot/cool systems (Mischel et al. 2003) and self-regulation (Baumeister and Heatherton 1996).

Our research has implications for marketers who sell reduced-calorie products. As mentioned earlier, many companies are now offering smaller-sized products in smaller packages, and many of these products are advertised as “reduced-calorie.” Our research suggests that restrained eaters...
eaters, who may be the main target market for these products, are in fact likely to consume even more of this type of food than they would of regular foods. While restrained eaters may be attracted to smaller foods in smaller packages initially, presumably because these products are thought to help consumers with their diets, our research shows that restrained eaters actually tend to consume more of these foods than they would of regular foods. Such a situation would help a company increase its sales of reduced-calorie products, as these products would be consumed faster than regular foods. This could also increase profits, as reduced-calorie foods offer less food for a more expensive price than do regular food, but firms may be better off in the long run if they consider not only profitability but also the health of their consumers (Garg, Wansink, and Inman 2007). Another interesting question is whether minipacks decrease consumption overall among restrained and unrestrained eaters. Our results do not indicate such a reduction. In particular, in study 2, participants ate fewer calories from small food in small packages than from large food in a large package, but in studies 3 and 4 (control system focus only), they ate more calories from small food in small packages than from large food in a large package. If 100-calorie packs do indeed make consumers heavier, it is unlikely that they will remain profitable in the long run. It is also possible that our results might extend to consumption of other products that offer conflicting cues. For example, restrained eaters might also overconsume foods that seem unhealthy but that claim to offer health benefits (e.g., sugar-free candy or calcium-enriched chocolate), and consumers who are watching their spending might find themselves overspending on “affordable luxuries.”

One limitation of the current research is that our participants were limited to college students, the vast majority of whom fall within normal BMI ranges. An outstanding question is whether overweight or obese participants would exhibit the same consumption patterns as those in our studies. However, because restrained eaters tend to exhibit similar behavior to those who are obese (Herman and Polivy 1980), we believe that obese consumers would also consume more from minipacks than from larger packs. Of course, this statement is fairly speculative, and future empirical work is needed to gain a deeper understanding of the role obesity plays in the overconsumption of minipacks for restrained eaters.

Future research might also explore the roles of guilt and regret on repeated episodes of overeating among restrained and unrestrained eaters. For example, while emotions such as guilt or regret over a previous episode of overconsumption (e.g., a Thanksgiving dinner) will likely cause unrestrained eaters to decrease their consumption at a subsequent meal, it is possible that restrained eaters, if in a hot system state, might continue to overconsume on subsequent occasions. Another possible area for future research could explore the interaction of dietary restraint, hot and cool systems, and the role of problem status (Bolton, Cohen, and Bloom 2006). There may be some foods for which restrained eaters encounter conflicting food information (which is a hot trigger) but do not experience stress because the restrained eater is not in a high problem state for the given food. For example, if the restrained eater has no history of overeating carrots, then the conflicting information provided by small carrots in small packages should not trigger overconsumption.

Our research also has public policy implications. Public policy scholars have underlined the need for firms to develop innovative, sustainable offerings that can support reduced-calorie consumption over the longer term (Menon, Raghubir, and Agrawal 2007; Seiders and Berry 2007). The finding that restrained eaters actually tend to consume more food when it is smaller sized and comes in smaller packages is another hurdle in the fight against obesity. To the extent that restrained eaters purchase such small product, small packaged foods at a premium price to help them reduce caloric intake (Peters 2007; Wertenbroch 1998) and then consume a greater number of calories from these versions relative to the regular foods, this behavior has detrimental effects to consumers’ health, well-being, and their bank accounts as they strive to reach their health-related goals. These individual overconsumption experiences at the micro level have macro-level implications in that they can cumulatively contribute to a growing obesity epidemic.
APPENDIX

FIGURE A1

PHOTOGRAPHS OF FOOD GIVEN TO PARTICIPANTS TO EAT

Large M&M / Large Bag
200 Calories Total

Small M&M / 4 Small Bags
200 Calories Total

NOTE.—Color version available as an online enhancement.

REFERENCES


