

When Do Consumers Eat More? The Role of Appearance Self-Esteem and Food Packaging Cues

Prior research has found that under certain conditions, small packages can paradoxically increase consumption. The authors build on this work by suggesting that people low in appearance self-esteem (ASE) are particularly sensitive to external control properties (i.e., packaging-related factors that signal the ability of packaging to regulate food intake) and, as a result, increase consumption levels when packages are small (vs. large or absent). Factors that highlight the external control properties of small packages, such as the visibility of product quantity, location of the caloric content, and communicated caloric content, further increase consumption, particularly among people with low ASE. The underlying process appears to be, at least in part, cognitively driven. The effects are mitigated when participants are under cognitive load, and the findings are mediated by cognitions regarding the ability of small packages to regulate food intake. The results have important practical implications suggesting that to quell the effects of small packages on overconsumption, emphasis on the external control properties of small packages should be minimized.

Keywords: package size, self-regulation, external controls, overconsumption, appearance self-esteem

Obesity rates worldwide have escalated to the point of becoming a problem of epidemic proportions (World Health Organization 2007). It is estimated that 64% of American adults more than 20 years of age are overweight or obese and that if the current trend continues, this number could reach 75% by 2015 (Centers for Disease Control and Prevention 2003/2004). This has profound medical and economic consequences, with total health costs related to overweight people in the United States alone estimated at \$92.6 billion in 2002 (National Center for Health Statistics 2004). Given the serious implications of consumers' expanding waistlines, it is critical to gain an understanding of factors fostering caloric overconsumption. The current research focuses on the impact of one such factor: the way marketers present their products through packaging. In 2004, Kraft initiated a now highly popular trend in the marketplace: small package sizes for snack products that limit caloric intake. Within three years, annual sales of these small packages surpassed \$200 million (Meitus and

Dedrick 2006). The overwhelming success of these small package options is likely due to the perception that they allow consumers to indulge in foods they love while feeling virtuous for eating only small amounts. Indeed, recent research has found that consumers intuitively believe that small packages can limit caloric intake (Coelho do Vale, Pieters, and Zeelenberg 2008) and that, under certain conditions, consumers will consume more when the package format is small as opposed to large (Coelho do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008). In the current research, we build on this prior work by demonstrating that size alone can influence consumption (i.e., we show a main effect for package size) and that this is moderated by appearance self-esteem (ASE)—that is, the self-worth a person derives from his or her body-image and weight. We posit that the size of small packages conveys information about the package's regulatory ability (i.e., that the small package size can function as an external control of food intake) and that certain types of consumers are more likely to rely on this information. We propose that consumers low in ASE are particularly likely to rely on the external control that small packages offer and will consume more when multiple small packages are present than when large packages are present or when individual packages are absent. Furthermore, we suggest that additional factors (i.e., visibility of the product quantity, location of the caloric content, and communicated caloric content) that further highlight (or downplay) the small package's ability to control consumption will augment (or mitigate) this effect. Finally, we argue that responses to small packages are driven, at least in part, by low-ASE consumers engaging in a cognitive process of transferring the responsibility of controlling food intake from the self to the package. When they do, they rely on the

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small packages to manage their consumption, a tendency that ultimately leads them to increase their caloric intake.

The current research makes several contributions to the marketing and self-regulation literatures. First, to our knowledge, the current research is the first to demonstrate a main effect for package size, revealing that consumption is increased when package size is small (in comparison with large package size and absent package). Whereas previous research has found that increased consumption occurs when the package is small as opposed to large under specific conditions (i.e., when self-regulatory concerns are activated [Coelho do Vale, Pieters, and Zeelenberg 2008] and for restrained eaters [Scott et al. 2008]), neither of these investigations has indicated a main effect such that consumption increases when package size is small (vs. large). Although Scott et al. (2008) find a main effect for package format, this effect is reversed such that people consume more when the package is large than when it is small (see also Wansink 1996).

Second, our conceptualization makes the novel prediction that low ASEs are more sensitive than their high-ASE counterparts to the presence of external controls (i.e., external sources that can assist in self-regulation efforts—in this case, the regulation of food intake). In our context, we propose that low ASEs are more sensitive to the regulatory assistance that small packages may offer, as well as to factors that highlight the external control properties of small packages. This is because, much like restrained eaters, low ASEs are chronically concerned with monitoring and regulating food intake (Herman and Polivy 1975, 1980). This sensitivity to external controls makes low ASEs more likely to rely on small packages to control their food intake, leading them to consume more when the product is offered in multiple small packages. Our focus on low-ASE consumers' sensitivity to external controls builds on classic work in eating behavior that indicates that those concerned with monitoring and regulating food intake are particularly susceptible to ambient cues related to the food itself, such as its smell (Federoff, Polivy, and Herman 1997, 2003). We show an important nuance: Low-ASE consumers are also particularly sensitive to information in the environment that signals the ability of an external control to regulate food intake.

Third, and most important, our conceptualization enables us to identify additional aspects of the packaging that further highlight (or downplay) perceptions of the ability of small packages to control consumption. We propose and find that conditions that highlight the external control properties of small packages—including making the product quantity visible, increasing the salience of the caloric information on the package itself, and communicating low caloric content—enhance consumption, particularly among low-ASE consumers. This contributes to previous research that has examined overconsumption in response to small package formats (Coelho do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008) by highlighting that in addition to the moderating role of individual differences, features related to the small packages themselves can further increase consumption. As such, we identify viable ways marketers might modify packaging to either increase or decrease consumption from small packages.

Finally, we build on previous work that has proposed both heuristic (Coelho do Vale, Pieters, and Zeelenberg 2008) and affective (Scott et al. 2008) accounts of the effects of package size on consumption by demonstrating the role that cognition can play in determining overconsumption in response to small packages. We find that the size of a small package serves as a source of information that signals the package's ability to regulate food consumption (i.e., to act as an external control) for the consumer. This encourages low-ASE consumers to engage in a cognitive process of relinquishing portion control to the small packages. These consumers subsequently rely on the package rather than the self to regulate food intake, resulting in increased consumption. We highlight this cognitively driven process by examining the moderating role of cognitive load and demonstrate the counterintuitive finding that low ASEs consume more when they are not under cognitive load than when they are under cognitive load. We also demonstrate the mediating role of package responsibility cognitions in underlying our effects.

Theoretical Background

Packaging and Consumption

Packaging is often the first product attribute to which consumers are exposed. To date, research has studied the impact of various packaging features such as design (McDaniel and Baker 1977), imagery (Underwood, Klein, and Burke 2001), and size (Wansink 1996) on consumer responses. Specifically, consumers often use packaging to infer information about the product itself, including its quality (McDaniel and Baker 1977), innovativeness (Underwood, Klein, and Burke 2001), and healthiness (Coelho de Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008).

The majority of marketing research studying packaging has focused on size as an attribute. This research largely demonstrates that consumers tend to eat more from a larger (vs. smaller) package (e.g., Rolls et al. 2004; Wansink, Painter, and North 2005) because smaller packages (vs. larger packages) contain smaller portions, thereby inducing people to eat less (Diliberti et al. 2004; Ledikwe, Ello-Martin, and Rolls 2005; Wansink and Kim 2005; Young and Nestle 2002). However, small packages may not always curb consumption and may even increase it when multiple small packages are available. We propose that a reason this may happen is because a small package can convey information that suggests that the package itself can regulate consumption (i.e., the package can act as an external control), and for some consumers, this can result in a relinquishing of regulatory control.

Small Package Size as a Source of External Control

Consumers presented with tempting, yet unhealthy, food options are often motivated to self-regulate the amount they consume (e.g., Vohs and Heatherton 2000). Wertenbroch (1998), for example, shows that one strategy used to regulate consumption is to intentionally ration access to impul-

sive goods by not purchasing larger quantities in response to a unit price reduction. Research has highlighted this counteractive self-control as a process whereby consumers proactively make decisions in ways that serve long-term rather than short-term goals (e.g., in our case, regulating food intake for long-term goals such as health and weight control, rather than eating too much of an immediately gratifying treat; Fishbach and Trope 2005). Moreover, research suggests that people will sometimes forgo previous reliance on self-regulation in favor of passing on this control to an external source (Fishbach and Trope 2005; Trope and Fishbach 2000).

Extending these findings to the current context, we propose that consumers infer that small packages can act as an external source of control. In doing so, they transfer control of regulating food intake from the self to the small package. In essence, the decision to consume from the small package is seen as a regulatory act: The package itself can substitute for self-control, and further self-imposed control is no longer necessary (see Fishbach and Trope 2005; Kruglanski et al 2002; Trope and Fishbach 2000). The consequence of this relinquished control is that people may subsequently fail to self-regulate and will consume more food if multiple small packages are present. It is important to note that consumers are making the rational assumption that small packages will be more effective than large packages at regulating their food intake for them because a single small package contains less product (and fewer calories) than a single large package. However, transferring portion control to the small package only regulates consumption if a single small package is indeed available or consumed. Often, small packages are sold in bulk in larger bags and boxes. When multiple small packages are available, the transference of self-regulation control to the package may be problematic because package size only determines serving size and cannot limit the total number of packages consumed. That is, if consumers surrender self-control to the small packages, under certain conditions, this may backfire because they may eat more than one package of the product.

Moderating Role of ASE

We propose that small packages will have a detrimental effect on consumption levels for all consumers, but we anticipate that this will be especially pronounced for those low in ASE. Importantly, compared with high ASEs, low ASEs are more concerned about regulating and monitoring their food intake (Heatherton and Polivy 1991).¹ To provide additional support for this notion, we conducted a pretest in which undergraduate students ($n = 52$) completed the ASE scale (Heatherton and Polivy 1991; $\alpha = .80$) along with items that assessed the extent to which they focused on

¹We note that ASE is a similar construct to that of restrained eating (i.e., the deliberate effort to combat the physiologically based urge to eat to lose weight or maintain a reduced weight; Federoff, Polivy, and Herman 1997, p. 34; Polivy, Heatherton, and Herman 1988). Indeed, restrained eaters also show a tendency to monitor and regulate their food intake (Herman and Polivy 1975, 1980). In a pretest ($n = 97$), we found measures of both ASE and restrained eating to be correlated ($r = -.49, p < .001$).

monitoring and regulating food intake: “I often try to control how much I eat,” “I often try to control my portion sizes when eating,” “I often consciously eat less than I want,” “I often try to regulate how much I eat,” “I am constantly controlling how much I eat,” and “I am constantly monitoring how much I eat” (on five-point scales; $\alpha = .89$). We found that ASE was negatively correlated with monitoring and regulating food intake ($r = -.49, p < .001$). In addition, participants completed items to assess their confidence in their regulatory abilities: “I am confident that I can be successful in controlling my food intake,” “I am confident in my abilities to control how much I eat,” “I am certain that I will be able to regulate my food intake,” “I am certain that I will be able to meet my weight management goals,” and “I am certain that I will be able to regulate how much food I eat” ($\alpha = .96$). The results revealed that ASE was positively correlated with confidence ($r = .40, p < .01$), suggesting that low ASEs are less confident in their own abilities to control food intake than are high ASEs. Taken together, the pretest results suggest that while those low in ASE are particularly concerned with monitoring and regulating their food intake, they also exhibit low confidence in their ability to do so.

We propose that because low ASEs chronically monitor and regulate their food intake, they may be more responsive to information indicating that an option possesses external control properties. This is because the presence of an external control allows them to transfer regulatory responsibility to the package, offering them a welcome respite from the self-regulation of food intake. In addition, given that those low in ASE are less confident about their own regulatory abilities, they may be particularly apt to rely on an external source of control when it is available. Research suggests that, compared with their high-ASE counterparts, low ASEs are particularly responsive to external food signals (Federoff, Polivy, and Herman 1997), situational cues related to consumption (McFerran et al. 2010), and external information related to body image (Dahl, Argo, and Morales 2011). On the basis of these findings, we propose that because small packages convey information regarding external control capabilities (i.e., they contain a small amount of product), low-ASE consumers will be particularly sensitive to this information. As a preliminary test of this concept, we conducted a pretest. Undergraduate students ($n = 37$) evaluated a series of products that were matched to be equal in caloric content and were presented in small (e.g., four 40-gram packages of Lay’s potato chips) and large (e.g., one 160-gram package of Lay’s potato chips) package sizes. Each product was evaluated on four seven-point scales, which we averaged to create a perceptions of external control index (i.e., “This option would allow me to control my portion sizes,” “This option would help me to control how much of the product I ate,” “This option would help me to eat less in one sitting,” and “This option would help me to eat fewer calories at a time”; small packages: $\alpha = .95$; large packages: $\alpha = .98$.) Small packages were believed to be more effective as external controls ($M = 4.91$) than large packages ($M = 2.81$; $t(36) = 5.25, p < .001$). Notably, this effect was heightened among low ASEs (correlation between ASE and the difference score between small minus

large packages, $r = -.37, p < .05$). Thus, low ASEs appear to be particularly responsive to the external control properties of small packages.

The Current Research

We organize the remainder of the article as follows: In Study 1, we first demonstrate a main effect for package size and further show that package size interacts with ASE, such that people consume the most when they are low in ASE and small packages are present (versus absent). Given that our conceptualization suggests that low ASEs are highly sensitive to external control properties, it stands to reason that not only will they be likely to overconsume in response to small packages but that additional information (i.e., visibility of the product quantity, location of the caloric content, and communicated caloric content) that further highlights (downplays) the external control properties of the small package will augment (mitigate) the predicted effects. In Study 2, we find that when the product quantity is visible (as opposed to not visible), low ASEs consume even more when the package is small (vs. large). In Studies 3 and 4, we test the impact of caloric information as another external source of control. In Study 3, we manipulate the location of the caloric information on the package. We predict and find that when the information is on the front (rather than on the back or not present), it will make salient that the small package has a low caloric content, and thus, low ASEs will consume the most. In Study 4, we vary the degree to which the caloric content communicates external control properties and find that low ASEs eat the most when they learn that a small package contains 50 (compared with 150) calories. Finally, Study 5 provides evidence for the underlying process by examining the moderating role of cognitive load and by demonstrating the mediating role of package responsibility cognitions.

Study 1

Following our conceptual framework, we anticipate that consumers will eat more when a small package is present than when it is absent. More important, we predict that low ASEs are particularly sensitive to the external control properties that small packages offer and will be more likely to consume when small packages are present than when they are absent:

H_{1a}: Low ASEs will consume more when small packages are present (vs. absent).

H_{1b}: No differences in consumption will emerge among high ASEs as a function of packaging.

Method

Participants and procedure. Seventy-six female undergraduate students participated in a 2 (small package status: present vs. absent) \times ASE between-subjects design.² Par-

²Consistent with prior work on eating behaviors, in this study, we restricted our examination to women only (e.g., McFerran et al. 2010; Polivy and Herman 1995; Smeesters and Mandel 2006).

ticipants completed the experiment individually and were seated in a cubicle facing away from a female experimenter. Each participant was told that we were interested in evaluations of a variety of products and that they would be asked to sample one of the products while completing a questionnaire. They were then provided with a survey and the target product: a bowl of gumdrops. In the small-package-present condition, the bowl of candy contained five small packages (each consisted of four candies), while in the small-package-absent condition, the candy was loose in the bowl (i.e., no packaging). To decrease the possibility that consumption in the absent condition was related to negative evaluations of the product because it was loose in the bowl, the product was presented as untouched by anyone else (i.e., participants saw the experimenter pour the candy into the bowl from a new bag). The initial weight of the product was identical in both package conditions.

Consistent with the cover story, the survey contained various filler questions about the product. In addition, participants reported their evaluations of the product using seven-point scales (“unfavorable/favorable,” “dislikeable/likeable,” “bad/good”; $\alpha = .95$; e.g., White and Dahl 2007). We measured ASE on six five-point item scales ($\alpha = .80$; e.g., “I am dissatisfied with my weight” [reverse-scored]; Heatherton and Polivy 1991).³ After the participant left the study, her bowl was weighed, and the difference between its weight and the initial weight was recorded as a measure of total consumption. We calculated the dependent variable using this method in all the studies. Finally, participants completed an open-ended suspicion probe assessing what they thought was the purpose of the research. Responses indicated that participants were not cognizant of the hypotheses in this or any of the other studies.

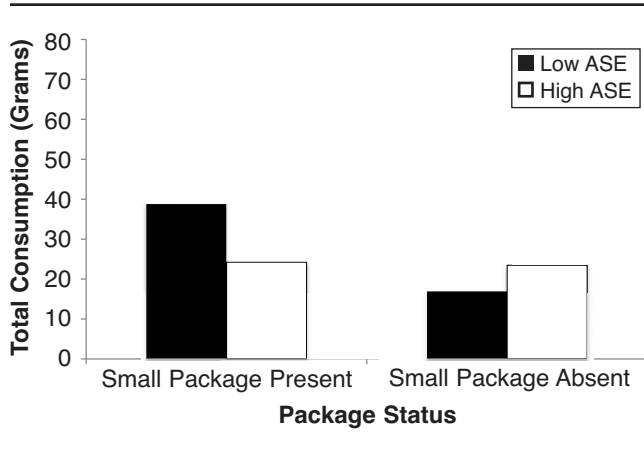
Results

We conducted a 2 (small package status) \times the continuous mean-centered ASE index analysis of variance (ANOVA).⁴ The results revealed a significant main effect for small package status ($F(1, 72) = 5.57, p < .05$) and, more important, the predicted significant two-way interaction ($F(1, 72) = 5.02, p < .05$; see Figure 1). Consistent with H_{1a}, low-ASE participants consumed significantly more candy when the small package was present ($M = 38.78$) than when it was absent ($M = 16.92; t(72) = 3.20, p < .01$). In support of H_{1b}, no differences emerged among high-ASE participants regardless of the small package status ($M_{\text{small}} = 24.26$ and $M_{\text{large}} = 23.48; t(72) = .47, p > .60$). To confirm that the two-way interaction did not arise because participants had negative evaluations of the product when it was loose in the bowl, we conducted a 2 (small package status) \times ASE ANOVA on total consumption, including evaluations as a covariate. The results revealed that the two-way interaction

³We note that the ASE scale is designed to assess individual differences (i.e., it is a trait measure). Consistent with this, package status did not affect ratings of ASE ($t(74) = .88, p > .30$). In all the studies that measured ASE after exposure to the packages, the manipulated independent and their interaction terms did not predict ASE.

⁴Across all the studies, we used SAS PROC GLM for analysis.

FIGURE 1
Total Consumption as a Function of Package Status and ASE (Study 1)



remained significant when we included the evaluation index as a covariate ($F(1, 72) = 3.99, p < .05$). Given these findings, it is unlikely that negative attitudes toward the loose candy account for the effects.

Discussion

Study 1 demonstrates a main effect for package size such that consumption increases when small packages are present versus absent. Furthermore, this effect is particularly pronounced among low ASEs. Among high-ASE consumers, no differences in consumption emerged as a function of package status. The pattern of means reveals that those in the low-ASE/small-package condition consumed the most compared with all the other conditions.

Notably, this pattern of results differs from Coelho do Vale, Pieters, and Zeelenberg (2008) and Scott et al. (2008), who did not predict or find consumption differences across their small package conditions. For example, Coelho do Vale, Pieters, and Zeelenberg's effects were driven by responses when the packages were large: Consumption decreased when regulatory concerns were activated versus not activated. In contrast, we find that when the packages are small, more consumption occurs among low ASEs than among high ASEs. This difference may have emerged because of key differences between our methodology and that of prior research: We study active (i.e., eating while focused on the task of consumption) rather than passive (i.e., eating while watching television) consumption.

At first glance, the findings may appear inconsistent with previous work showing that people consume more from larger versus smaller packages (e.g., Wansink 1996; Wansink, Painter, and North 2005; Wansink, Rozin, and Geiger 2008). A difference between the previous and current research is that we investigate consumption levels in response to multiple (rather than single) packages. This distinction is important: We suggest that small packages may be helpful for regulating consumption when only one package is available (e.g., Wansink and Kim 2005) but that the presence of multiple small packages leads to overconsumption because consumers forgo self-regulation. Consistent

with our theorizing, given that each package in this study weighed 17 grams, low ASEs in the small-package condition ate more than one package on average. Moreover, in previous work, the packages studied were not always small packages of food per se. The comparison is often between regular and large-sized packages, and thus the package format does not provide external control.

Our research also differs from work that has found that interruptions (i.e., visual cues and physical barriers) are useful in managing portion sizes (Wansink, Painter, and North 2005; Wansink, Rozin, and Geiger 2008). To illustrate, researchers have found that consumption is more controlled when a colored potato chip is present versus absent in a can of potato chips (Wansink, Rozin, and Geiger 2008), when a bowl of soup becomes empty and is replenished by an experimenter than when continuously replenished through an automatic mechanism (Wansink, Painter, and North 2005), and when partitions exist in packaging (Cheema and Soman 2008). Taking these findings together, it seems that small packages, which are arguably visual cues and potential "interruptions," should also limit consumption. However, there are important methodological differences between this prior research and the current work. In Wansink, Rozin, and Geiger's (2008) research, participants were not focused on the product per se (i.e., they were distracted by watching a video). Moreover, in the soup study, an experimenter provided more food and cleared the empty bowl away, which provided a public acknowledgment that the participant had finished his or her first portion and a delay in the participant's ability to continue consuming the next serving. Finally, in Cheema and Soman's (2008) research, the conditions under which consumption occurred were long term: Participants had a week to consume the product. In contrast, in our research, the product being consumed is the focal task, food is consumed privately, subsequent servings are immediately available, and consumption is more short term. Most important, in the current work (i.e., our pretest), we demonstrate that small packages are viewed as external controls, something not accounted for in previous research.

Study 2

Study 2 builds on our first study by examining the moderating role of the degree to which the consumer can see the contents of the package. We propose that being able to actually view the package's contents makes the external control properties of the small package salient because seeing the contents of the small package confirms that there is indeed only a small quantity of the product available and that the product does indeed have external control potential. However, when the contents of the small package cannot be viewed, the control properties will not be salient to the consumer. Thus, we predict that the observed interaction between package status and ASE will be enhanced when the contents of the package are visible. Finally, because high ASEs are not expected to be sensitive to external control information, we expect that their consumption will remain unchanged regardless of whether the packages' contents are visible. More formally,

H_{2a}: When packages are small, low ASEs will consume more when the product quantity is visible than when it is not visible. Total consumption for high ASEs will not differ as a function of the visibility of the product quantity.

H_{2b}: When packages are large, total consumption will not vary as a function of the visibility of the product quantity and ASE.

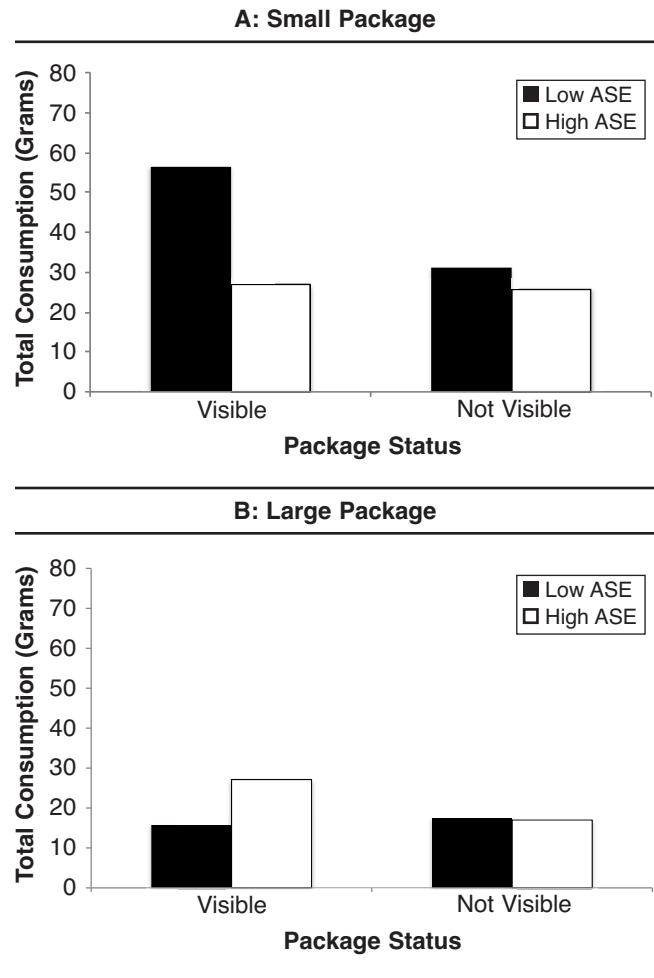
Method

Participants and procedure. To enhance the generalizability of our findings, both male ($n = 84$) and female ($n = 123$) undergraduate students took part in a 2 (package status: small vs. large) \times 2 (visibility of product quantity: visible vs. not visible) \times ASE between-subjects design. Total consumption was the key dependent variable. We used a procedure similar to that described in Study 1, with the following modifications. First, we measured ASE in an earlier session, and later we linked ASE scores to participants' responses in the focal session. In addition, we extend the generalizability of our previous findings in two ways. First, we examine a different type of product (candy-coated chocolates). Second, instead of using a package-absent control, we used a large-package control condition. In the small-package condition, participants were presented with eight small packages, whereas in the large-package condition they were presented with two large packages. In both conditions, the total quantity of candy presented to participants was identical. To achieve the visibility of product quantity manipulation, the product was presented to the participants in packages that were either transparent (visible condition) or opaque (not visible). At the end of the study, participants indicated their gender. Inclusion of gender in the analysis failed to reveal any main effects or interactions with other independent variables when predicting consumption.

Results

Total consumption. A 2 (package status) \times 2 (visibility of product quantity) \times the continuous mean-centered ASE index ANOVA revealed significant main effects for package status ($F(1, 199) = 20.30, p < .001$), visibility of product quantity ($F(1, 199) = 15.38, p < .001$), and the continuous ASE index ($F(1, 199) = 23.83, p < .001$) and significant two-way interactions between package status and ASE ($F(1, 199) = 5.98, p < .05$) and between visibility of product quantity and ASE ($F(1, 199) = 8.92, p < .01$). Most important, a significant three-way interaction emerged ($F(1, 199) = 4.11, p < .05$). To better interpret the three-way interaction, we split the data on package status. First, selecting for when the package is small, the results revealed significant main effects for ASE ($F(1, 125) = 26.71, p < .001$) and visibility of the product quantity ($F(1, 125) = 11.99, p < .001$). As we anticipated, there was a significant two-way interaction between ASE and visibility ($F(1, 125) = 11.27, p < .01$). Consistent with H_{2a}, planned contrasts revealed that low ASEs consumed more when the product quantity was visible ($M = 56.54$) than when it was not visible ($M = 31.29$; $t(199) = 4.99, p < .001$), while total consumption did not differ for high ASEs regardless of the visibility of the product quantity ($M_{\text{visible}} = 26.83$ and $M_{\text{not visible}} = 25.78$; $p > .20$; see Figure 2). Second, selecting for when the packages

FIGURE 2
Total Consumption as a Function of Package Status, Visibility, and ASE (Study 2)



were large, consistent with H_{2b}, total consumption did not differ as a function of the visibility of the product quantity and ASE ($ps > .20$). Finally, when the product quantity was visible, low ASEs consumed significantly more when the package size was small than when it was large ($t(199) = 2.53, p < .05$). When the product quantity was not visible, total consumption for low ASEs was higher in the small-package group than in the large-package group ($t(199) = 4.12, p < .001$).

Discussion

The results of Study 2 reveal that when another aspect of the packaging makes the external control properties of the small packages particularly salient (i.e., the quantity in the package is visible), low-ASE participants increase their food intake compared with when this property is not salient (i.e., the quantity in the package is not visible). In the case of large packages, consumption does not differ as a function of the visibility of product quantity. These results support the notion that low-ASE consumers are particularly susceptible to the external control properties that small packages offer.

Study 3

Study 3 builds on the previous studies by examining an additional moderator that increases the salience of the small packages' external control properties: the location of the caloric information on the package. We propose that presenting the caloric information on the front of the package makes the external control properties of the small package salient (as opposed to when the caloric information is located on the back of the package or not present). This is of practical relevance because marketers often highlight caloric information on the front of small packaging (e.g., 100-calorie packs). We conducted a pretest to examine the notion that the presentation of caloric information enhances perceptions regarding the ability of the package to act as an external control. Participants viewed both small and large package sizes and were either provided with or not provided with information regarding the package's caloric content. They then completed the perceptions of external control index (for items used, see the pretest in the section "Moderating Role of ASE"). A mixed-model ANOVA with caloric information (present vs. absent) as a between-subjects factor and package size as a within-subject variable revealed a significant interaction ($F(1, 72) = 4.71, p < .001$). Although participants in the caloric-information-absent condition believed that small packages were more effective than large packages as external controls ($M_{\text{small}} = 4.69$ vs. $M_{\text{large}} = 3.30$), this difference was magnified when caloric information was present ($M_{\text{small}} = 5.24$ vs. $M_{\text{large}} = 2.70$; t -test on the difference score: $t(72) = 2.41, p < .05$). Thus, the presence (vs. absence) of caloric information increases the salience of the ability of small packages to act as external controls. Given these findings, it seems likely that low ASEs will be most sensitive to the external control properties of the small package and will overconsume when the caloric information is particularly salient. Given that high ASEs are not as responsive to external control information, we do not expect their consumption to vary as a result of the caloric information's location.

H_{3a} : When packages are small, low ASEs will consume more when caloric information is located on the front of the package than when this information is on the back or not present. Total consumption will not differ for low ASEs when the caloric information is located on the back or not present.

H_{3b} : When packages are small, total consumption will not differ for high ASEs as a function of the location of the caloric information.

Method

Participants. We drew 187 participants from the general population (men = 66, women = 120, 1 unreported; average age = 35 years), which covered a wide range of occupations (e.g., teachers, agriculturalists, engineers, graphic designers) to complete the study in exchange for a \$10 coffee gift card. To enhance the generalizability of the findings, the tasks were completed at each respondent's desk (in an office or a cubicle) rather than in a lab setting. We used a 3 (location of the caloric content: front vs. back vs. absent) \times ASE between-subjects design. We held package size con-

stant as small. Again, we assessed total consumption of candy-coated chocolates as the key dependent variable.

Procedure. Participants were presented with the same cover story described as in Study 1. They were then given a bag that contained eight small packages of chocolates. We manipulated the location of the caloric content by the placement of a nutrition label on the bag that indicated the number of calories in each individual package of chocolate: In the front condition, the label appeared on the front of the bag in the bottom right-hand corner, in the back condition the label appeared on the back of the bag in the bottom right-hand corner, and in the absent condition there was no label. We calculated total consumption as described in Study 1.

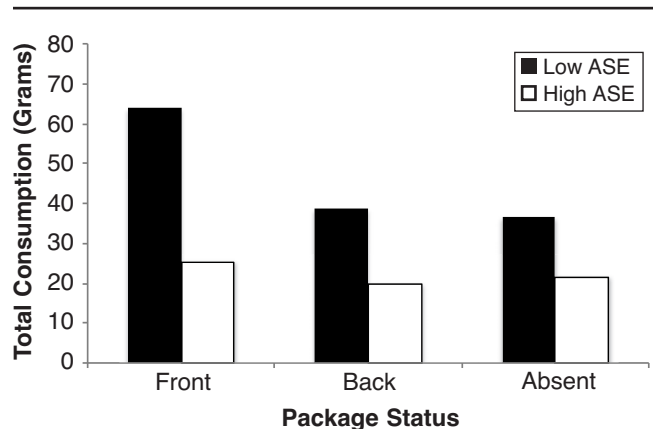
Results

Total consumption. We conducted a 3 (location of the caloric content) \times ASE index ANOVA with total consumption as the dependent variable. The results revealed significant main effects for both location ($F(2, 181) = 6.14, p < .01$) and ASE ($F(1, 181) = 50.31, p < .001$) and a significant two-way interaction ($F(2, 181) = 4.41, p < .05$; see Figure 3). First, consistent with H_{3a} , low-ASE participants consumed significantly more when the caloric information was located on the front ($M = 63.86$) than when it was on the back ($M = 38.55$; $t(122) = 3.85, p < .001$) and when caloric information was absent ($M = 36.54$; $t(122) = 4.07, p < .001$). The difference in total consumption did not differ when the caloric information was located on the back compared with when it was not present ($t(119) = .315, p > .70$). Second, in line with H_{3b} , high ASEs exhibited no significant differences across location conditions ($M_{\text{front}} = 25.44, M_{\text{back}} = 19.88, M_{\text{absent}} = 21.67$; $ps > .50$).

Discussion

Study 3 examines the impact of the location of the caloric content on the package. The results indicate that low ASEs are particularly sensitive to the location of the caloric information and consume more of a product when the caloric information is displayed in a highly salient location (i.e., on

FIGURE 3
Total Consumption as a Function of Location of Caloric Information and ASE (Study 3)



Notes: Package status was held as small in this study.

the front) rather than in a less conspicuous location (i.e., on the back) or not displayed at all. Thus, making low caloric information on small packages salient to low ASEs can ironically lead them to consume more. In contrast, high ASEs did not demonstrate differences in consumption levels as a function of the salience of caloric information.

Study 4

Study 4 tests our conceptualization that low ASEs are particularly sensitive to the external control properties of small packages by directly manipulating the communicated ability of the package to control consumption. We do so by manipulating the communicated caloric content. In particular, when consumers learn there is a low caloric content in a small package, this confirms the belief that the small package can serve as an effective external control. However, when provided with disconfirming information—that the package contains a high number of calories—this signals that the small package is not a reliable external control. Following our framework outlined previously, we predict that low-ASE consumers will be particularly sensitive to the communicated caloric content of small packages. Given that we do not expect high-ASE consumers to be as responsive to external control information, we do not expect their consumption to differ as a function of the communicated caloric content.

H_{4a} : When small packages are present, low ASEs will consume more when communicated caloric content is low than when it is high or absent (and more when communicated caloric content is absent than when it is high). When small packages are present, total consumption among high ASEs will not differ as a function of communicated caloric content.

H_{4b} : When small packages are absent, total consumption will not vary as a function of communicated caloric content and ASE.

Method

Participants and procedure. Female undergraduate students ($n = 297$) completed the study for a \$10 honorarium and took part in a 2 (small package status: present vs. absent) \times 3 (communicated caloric content: high vs. low vs. absent) \times ASE between-subjects design. Again, the product was candy-coated chocolates. We used the same general procedure and cover story as described in Study 1, with a few notable changes. First, we measured ASE in an earlier session and subsequently linked ASE scores to participants' responses in the focal session. In the session itself, participants were first given either eight small packages of candy-coated chocolates or a bowl of loose product (with the same quantity). In addition, before receiving the product, participants were provided with caloric information regarding the candy. In the high-calorie condition, they were told that 11 candies contained 150 calories, in the low-calorie condition they were informed that 11 candies contained 50 calories, and in the information-absent condition they were not provided with any caloric information. We note that 11 candies is equivalent to the content of one small package. Partici-

pants were then given the product to consume and the survey to complete, and total consumption was recorded.

Results

Total consumption. A 2 (small package status) \times 3 (communicated caloric content) \times ASE index ANOVA revealed significant main effects for small package status ($F(1, 285) = 85.05, p < .001$), communicated caloric content ($F(2, 285) = 12.85, p < .001$), and ASE ($F(1, 285) = 24.56, p < .001$) and significant two-way interactions between small package status and communicated caloric content ($F(2, 285) = 4.28, p < .05$), small package status and ASE ($F(1, 285) = 41.45, p < .001$), and communicated caloric content and ASE ($F(2, 285) = 15.76, p < .001$). Most important, a significant three-way interaction emerged ($F(2, 285) = 6.66, p < .01$). We split the data on small package status to examine the three-way interaction. First, selecting for when the small package was present, the results revealed significant main effects for ASE ($F(1, 200) = 31.71, p < .001$) and communicated caloric content ($F(1, 200) = 13.41, p < .001$), as well as a significant two-way interaction between ASE and caloric content ($F(1, 200) = 18.08, p < .01$). Consistent with H_{4a} , planned contrasts revealed that low ASEs consumed significantly more when they were informed that the caloric content was low ($M = 69.99$) than when they were informed that it was high ($M = 23.97; t(178) = 10.02, p < .001$) or when caloric information was absent ($M = 55.86; t(178) = 2.15, p < .05$; see Figure 4). Furthermore, when the package was present, low ASEs consumed significantly more when the communicated caloric content was absent than when it was high ($t(184) = 5.79, p < .001$). Selecting for when the small package was absent, as H_{4b} predicts, consumption did not differ as a function of ASE and communicated caloric content ($p > .20$).

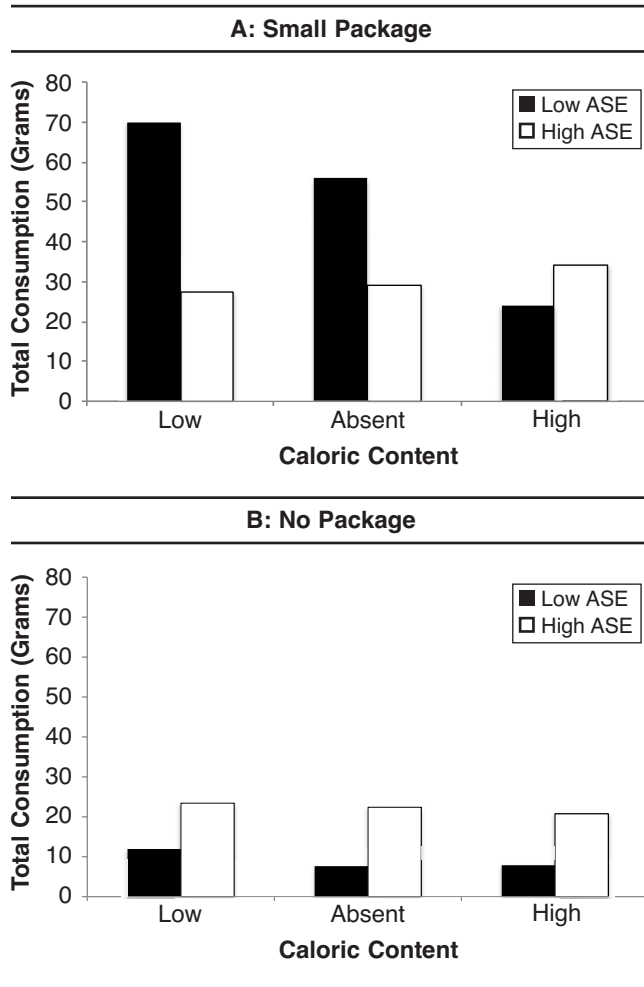
Discussion

The results of Study 4 demonstrate that when small packages are present, low ASEs consume significantly more when caloric content is low than when it is high or unknown. Importantly, when packages size is small, consumption is curbed for low ASEs when caloric content is high compared with when it is unknown. When small packages are absent, consumption did not differ as a function of ASE and/or caloric content. The findings of this study suggest that for self-control to be relinquished to an external source, an external control indicator (in the form of small packages) must be present.

Study 5

In our final study, we shed light on the process underlying our effects. Previous research has identified two potential explanations as to why small packages may heighten consumption levels. The first, more heuristic account suggests that small packages “fly under the radar”: Consumers spend less time and effort deliberating about consumption when the package size is small versus large (Coelho do Vale, Pieters, and Zeelenberg 2008). This is because while large packages contain more than an acceptable serving amount and lead to a more deliberative response, the limited quan-

FIGURE 4
Total Consumption as a Function of Package Status, Communicated Caloric Content, and ASE (Study 4)



tity in small packages leads consumers to rely on the consumption heuristic that the quantity is acceptable. The second explanation proposes that small product configurations (i.e., small packages containing small morsels) convey inconsistent pieces of information because the package size implies that the product is diet food, but the presence of many small morsels implies higher caloric content (Scott et al. 2008). Scott et al. (2008) argue that this inconsistent information creates negative, stress-related affect (i.e., the activation of a hot system) for consumers, leading to increased consumption. The current research extends this prior work by exploring the possibility that more effortful cognition can also play a role in driving the tendency for small packages to lead to increased consumption.

Consistent with our previous discussion, we propose that small packages lead to increased consumption because consumers first transfer control of regulating food intake from the self to the small package. When this happens, the consumer assumes that the package will do the work of regulatory control for them. Such a two-step process is consistent with the notion that small packages can act as pre-commitment devices (Wertenbroch 1998) and research on

counteractive self-control (e.g., Fishbach and Trope 2005). In essence, the decision to consume from the small packages is considered a regulatory act: The package itself can substitute for self-control, and further self-imposed control is no longer necessary (see Fishbach and Trope 2005; Kruglanski et al. 2002; Trope and Fishbach 2000). The consequence of this is that people will fail to self-regulate and will consume more in response to small packages. We propose that low-ASE consumers are most susceptible to transferring the responsibility for the regulation of food intake from the self to an external control (i.e., the small packages).

Importantly, previous research has described self-control in general (Baumeister, Heatherton, and Tice 1994; Muraven, Tice, and Baumeister 1998) and counteractive self-control as a cognitively effortful process (Fishbach and Trope 2005). Building on this prior work, we propose that the transfer of self-control from the person to an external control is also a cognitively effortful process. This implies that in the absence of cognitive resources, such transference should not arise and overconsumption in response to multiple small packages will not occur. Prior research has demonstrated that people whose cognitive resources are otherwise occupied are less able to allocate those cognitive resources to a focal task (Chun and Kruglanski 2006) and that cognitive processing is more likely to occur when people are able to allocate resources to the task at hand (Shiv and Fedorikhin 1999). Given that we expect that our effects are cognitively driven (i.e., low ASEs cognitively pass on regulatory responsibility to small packages), we propose that the effects will be eliminated when consumers are placed under cognitive load.

H_{5a}: When small packages are present, low ASEs will consume more when cognitive load is low versus high. When small packages are present, high ASEs will not differ in total consumption as a function of cognitive load.

H_{5b}: When small packages are absent, differences in consumption will not emerge as a function of cognitive load and ASE.

We further examine the role of cognition by investigating whether consumer cognitions regarding the ability of small packages to regulate their food intake underlie the effects.

H₆: Package responsibility cognitions will mediate the aforementioned effects.

We note that our key prediction—that low-ASE consumers are most susceptible to overconsumption in response to small packages when not under cognitive load—may, at first, seem counterintuitive in light of previous research. For example, prior research has shown that people concerned with self-regulating food intake consume more when under high versus low cognitive load under conditions in which multiple categories of food products (e.g., cookies, potato chips, candy) were available in bowls (Ward and Mann 2000). The current research diverges from this work in that we examine a single product category and show that it is the presence of multiple small packages that leads low ASEs to consume more food when under low versus high cognitive load. The key difference between these two lines of research is that, in our context, consumers cognitively

transfer the regulation of food intake to the external source of control (i.e., the small package options), whereas this was not a possibility in the past studies.

Method

Participants and procedure. Female undergraduate students ($n = 105$) completed the study for a \$10 honorarium and took part in a 2 (small package status: present vs. absent) \times 2 (cognitive load: low vs. high) \times ASE between-subjects design. The procedure was similar to that used in Study 1, except participants were told that they would be completing multiple surveys and that the first study involved memory. A common method used to demonstrate whether a particular process is cognitively effortful is a cognitive load task (e.g., Drolet 2002; Shiv and Fedorikhin 1999; Shiv and Huber 2000). Thus, following Shiv and Huber (2000), participants in the low-load condition were asked to memorize a two-digit number, whereas those in the high-load condition were asked to memorize an eight-digit number. Participants were then given the product (i.e., candy-coated chocolate) to consume and the survey to complete. We assessed the extent to which participants cognitively relied on the package as an external control with four items using seven-point scales (i.e., “You relied on the packaging to control how much candy you ate,” “You relied on the packaging to assist you in controlling how much candy you ate,” “You believed the packaging helped you control how much candy you ate,” and “You relied on the package to help you control how much candy you ate”; package responsibility cognitions index: $\alpha = .92$). They were also asked to recall the number they had memorized. Performance on this measure served as a manipulation check for cognitive load. Total consumption was again recorded.

Results

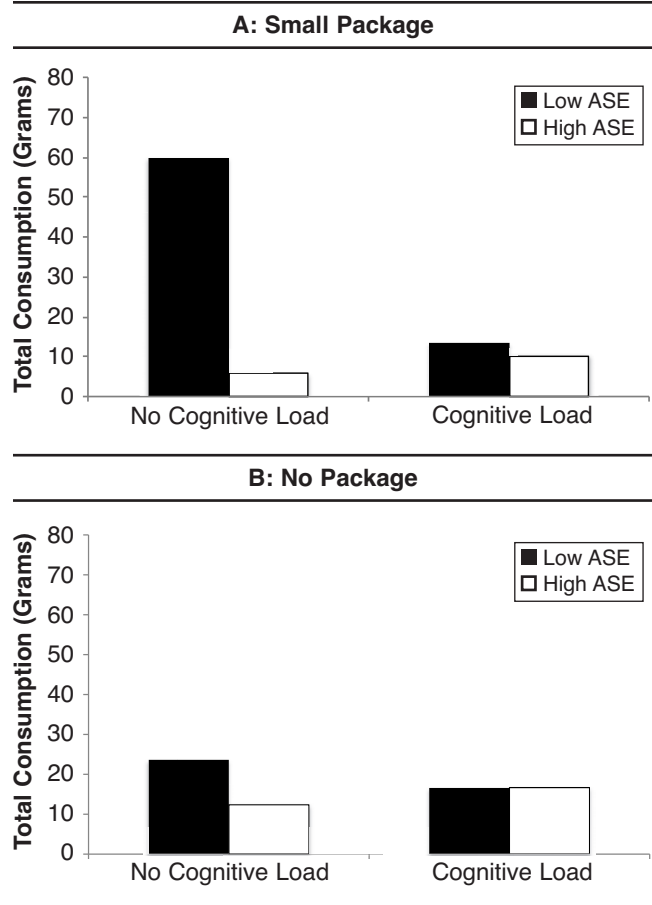
Preliminary analysis. An examination of participants’ recall of the memorized number indicated that there was a 94% (100%) accuracy rate in the high- (low-) load condition. This provides evidence that those in the high-load condition were cognitively rehearsing the number while completing the study. Following previous work, we used less stringent guidelines for cognitive busyness and included all participants in the analyses (Pontari and Schlenker 2000; White and Willness 2009). The pattern and significance of results remained the same when we excluded those who did not correctly recall the number from the analyses.

Total consumption. We conducted a 2 (small package status) \times 2 (cognitive load) \times ASE index ANOVA with total consumption as the dependent variable. The results revealed significant main effects for cognitive load ($F(1, 97) = 16.41, p < .001$) and ASE ($F(1, 97) = 12.54, p < .001$); two-way interactions between small package status and ASE ($F(1, 97) = 4.38, p < .05$), cognitive load and small package status ($F(1, 97) = 11.45, p < .01$), and cognitive load and ASE ($F(1, 97) = 14.86, p < .001$); and the predicted three-way interaction ($F(1, 97) = 6.24, p < .05$). First, selecting the small-package-present condition revealed significant main effects for cognitive load ($F(1, 51) = 14.21, p < .001$) and

ASE ($F(1, 51) = 21.84, p < .001$) and, more important, the significant two-way interaction ($F(1, 51) = 17.45, p < .001$). Consistent with H_{5a} , when small packages were present, low ASEs consumed significantly more when cognitive load was low ($M = 59.81$) than when it was high ($M = 13.31; t(97) = 6.64, p < .001$), while high ASEs did not differ in consumption as a function of cognitive load ($M_{load} = 5.81$ and $M_{no\ load} = 10.29; p > .20$; see Figure 5). Selecting the small-package-absent condition, consistent with H_{5b} , total consumption did not vary as a function of cognitive load and ASE ($ps > .10$).

Mediating role of package responsibility cognitions. We conducted mediation analysis to determine whether the tendency to pass regulatory responsibility on to the package underlies the observed effects (Baron and Kenny 1986). Linear regression analyses with package status, cognitive load, the ASE index, and their interaction terms as predictors produced significant three-way interactions for total consumption ($\beta = -.213, t(97) = 2.50, p < .05$) and package responsibility cognitions ($\beta = -.258, t(97) = 2.81, p < .01$). Inclusion of package responsibility cognitions in the original regression analysis predicting total consumption revealed a significant main effect for package responsibility ($\beta = .277, t(96) = 3.05, p < .01$), while the three-way inter-

FIGURE 5
Total Consumption as a Function of Package Status, Cognitive Load, and Appearance Self-Esteem (Study 5)



action fell from significance ($\beta = -.142$, $t(96) = 1.67$, $p > .10$; Sobel $Z = -2.07$, $p < .05$). Therefore, package responsibility cognitions statistically mediated the indirect effect of the three-way interaction on the amount of candy participants consumed.

We conducted additional mediation analysis when selecting the package-present condition only. Regression analysis using cognitive load, the continuous ASE index, and the interaction term as predictors of total consumption ($\beta = .493$, $t(48) = 4.18$, $p < .001$) and package responsibility cognitions ($\beta = .597$, $t(48) = 4.70$, $p < .001$) revealed significant two-way interactions. Inclusion of package responsibility cognitions into the original regression analysis predicting total consumption revealed a significant main effect for the package responsibility cognitions index ($\beta = .303$, $t(47) = 2.38$, $p < .05$), while the two-way interaction decreased in significance ($\beta = .312$, $t(47) = 2.29$, $p < .05$; Sobel $Z = 2.12$, $p < .05$). Thus, package responsibility cognitions mediated the interactive impact of cognitive load and ASE on total consumption.

Discussion

By examining the moderating role of cognitive load, Study 5 supports our proposition that effortful cognition, at least in part, drives the tendency for low ASEs to overconsume when multiple small packages are present. The finding that the influence of small packages on consumption was eliminated when low ASEs were cognitively occupied indicates that a cognitively effortful process may have been involved during consumption (Shiv and Huber 2000). At first glance, this is a counterintuitive effect: People consumed *less* under cognitive load. Importantly, however, this finding provides evidence for the notion that consumers cognitively give up control when an external source of control is present. Our mediation analysis also suggests that cognitions regarding the ability of the package to regulate food intake underlie the effects.

An alternative explanation for our observed effects is that cognitive load simply distracts participants in a way that inhibits the behavioral process of eating. Our perspective, drawn from a large body of work on cognitive load research, is that cognitive load inhibits participants' cognitive effort (e.g., Drolet 2002; Shiv and Fedorikhin 1999; Shiv and Huber 2000). Consistent with our perspective, Ward and Mann (2000) find that, under certain conditions, consumption *increases* among restrained eaters in a high- (vs. low-) cognitive-load condition. More recently, McFerran et al. (2010) find that while low ASEs tend to decrease consumption in the presence of an overweight target person, this tendency reverses, leading to comparatively more consumption under cognitive load. These findings suggest that a cognitive load task does not inhibit the behavioral function of eating.

General Discussion

Previous research has found that, under certain conditions, small packages can paradoxically increase consumption (Coehlo do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008). The current study builds on this work by further

exploring the conditions under which people overconsume when they have access to multiple small packages. The findings demonstrate that the availability of multiple small package options does not provide regulatory assistance for anyone and that small packages are especially detrimental for consumers who most desire regulatory assistance (i.e., low ASEs). Counter to commonly held beliefs that small packages are consumption regulators, low ASEs consume *more* when presented with small (vs. large or no) packages of the product. Furthermore, consistent with our conceptualization that low ASEs are highly sensitive to external control properties, novel factors that increase the salience of the external control abilities of the small package (i.e., visibility of the product quantity, location of the caloric content, and communicated caloric content) enhance the effects.

In Study 1, we demonstrate that consumption increases when small packages are present and that this effect is most pronounced among low ASEs. In Study 2, making the product quantity visible (as opposed to not visible) results in greater consumption on the part of low-ASE consumers when the package is small. In Study 3, we manipulate the location of the caloric information on small packages and find that low-ASE people consume the most when caloric information is on the front compared with on the back or not available. In Study 4, we vary the degree to which the caloric content communicates external control properties and find that low-ASE people consume the most when they learn that a small package contains 50 (compared with 150) calories. Finally, Study 5 elucidates the underlying process by providing evidence consistent with the notion that consumers are cognitively conferring responsibility for the regulation of food intake to the small package. We do so by examining the moderating role of cognitive load and by demonstrating the meditational role of package responsibility cognitions. Taken together, the results across five studies suggest that low-ASE consumers are highly sensitive to the external control properties that small packages offer and, as a result, cognitively confer responsibility from the self to the package to regulate their food intake.

Theoretical Implications of the Research

This research makes several theoretical contributions to the literature. We build on previous research (Coehlo do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008) by demonstrating a main effect for package size such that consumption increases in response to small packages. Moreover, consistent with this work, we find that package size effects can be enhanced under certain circumstances. In particular, we complement this work by making the novel prediction that low ASEs are more sensitive than their counterparts to the presence of external controls. This sensitivity makes them more likely to rely on small packages to control food intake for them, leading them to consume more when the product is offered in small packages.

Second, we contribute to previous work that has identified individual difference moderators of the effects of package format on consumption (Coehlo do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008) by demonstrating that features related to the small packages themselves can fur-

ther increase food intake. Our conceptualization enables us to identify additional features of a small package (i.e., visibility of the product quantity, location of the information regarding caloric content, and the communicated caloric content) that further enhance (or mitigate) perceptions of the package's ability to control consumption. By showing that aspects of the packaging itself can signal external control properties, our research also adds to the growing body of literature regarding environmental influences on food intake (e.g., Garg, Wansink, and Inman 2007; Khare and Inman 2006; McFerran et al. 2010).

Our research also contributes to the literature through its demonstration that the effects appear to be, at least in part, driven by consumers cognitively placing responsibility on the small packages to regulate their food intake for them. In doing so, we extend previous research that has suggested that overconsumption from small packages is a result of a heuristically driven process (Coelho do Vale, Pieters, and Zeelenberg 2008) or stress-related negative affect (Scott et al. 2008). By examining a cognitively relevant moderator, cognitive load, along with the meditational role of package responsibility cognitions, we demonstrate that effortful cognition may also play a role in the tendency to increase consumption in response to small packages.

The finding that consumers cognitively transfer control to an external source contributes to research on precommitment (e.g., Ariely and Wertenbroch 2002). In particular, unlike our research, which indicates that an external source of control (i.e., small packages) is ineffective for portion control in the context of consumption, work on precommitment finds that in the context of deadlines, externally imposed controls can outperform self-imposed controls. Thus, the context in which an external source serves as a controlling agent is important to consider.

Practical Implications of the Research

The current research also sheds light on the inconsistency between consumer intuitions and reality and thus has implications for marketing managers. First, consumers believe that multipacks of products in smaller individual servings (or subpackaging) are an effective approach to decreasing overall food consumption (e.g., Coelho do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008). Our research highlights a finding that counters this belief: Small packages do not necessarily decrease consumption for any consumers and actually increase consumption among certain consumers (see also Coelho do Vale, Pieters, and Zeelenberg 2008; Scott et al. 2008). Thus, the current research has implications for marketers wanting to communicate to consumers through decreased usage messages (White and Willness 2009). Socially responsible companies, diet-food and weight-loss companies, and firms wanting to portray a particular image to the public may want to promote the consumption of their products in moderation. An implication arising from the current findings is that such companies may want to focus on selling small packages individually rather than bundling them together in a larger container, because overconsumption from small packages is partly caused by the availability of multiple small packages. Fur-

thermore, such companies might not want to follow the small package trend and instead offer their products in more moderately sized packages.

Importantly, the current studies point to factors that marketing managers can directly control to either increase or decrease consumption levels. For example, presenting snack products in a transparent package might lead to increased consumption if the package is small as opposed to large. For example, at Halloween, candies such as Smarties and Twizzlers are often available in packages that make the product highly visible to the consumer yet that are smaller than their traditional package format. Similarly, soda is often sold in transparent containers that are offered in various sizes. According to the findings of the current research, the implications of transparent formats would result in higher levels of consumption for low-ASE consumers when multiple small packages are available. Marketers wanting to decrease consumption from small packages, such as those offering health-food snacks and diet supplements, might be advised to ensure that the contents of the packaging are not clearly visible to consumers.

Our work also suggests that increasing the salience of the external control properties of the small package through the location of caloric information can heighten consumption, particularly among low-ASE consumers. This is relevant given that marketers often highlight caloric content as a determinant attribute that can aid consumers in regulating their food intake. For example, the front of the packaging of a box of Special K bars promotes the regulatory features of the product: "This food may assist in achieving and maintaining a healthy body weight because it is portion controlled." Despite this trend, our results suggest that indicating the caloric content on the front of the package can be detrimental because consumers eat more when the external control properties of small packages are made salient. This is consistent with findings that consumers eat more of a low-fat option and routinely underestimate caloric intake when eating at "healthy" food chains such as Subway (Chandon and Wansink 2007; Wansink and Chandon 2006). Public policy makers should counter the recent marketing trend of highlighting caloric content of small packages as a determinant attribute that consumers should use in making product choices. Instead, they should downplay caloric information and highlight that it is ultimately up to the consumer to regulate food intake, particularly when the target market is likely to consist of low-ASE consumers.

Finally, the results of Study 4 show that providing information that disconfirms the notion that small packages serve as effective external controls reduces overconsumption among low-ASE people. In a conceptual replication of Study 4 ($n = 124$), we examined a different method of communicating that small packages are ineffective as external controls. We varied whether consumers received information that highlighted that small packages are not always effective in regulating consumption. The results of a 3 (package status: small vs. large vs. no package) \times 2 (warning information: present vs. absent) \times ASE ANOVA on total consumption revealed a significant three-way interaction ($p < .05$). Low ASEs consume significantly more candy when the warning is absent and the packages are small versus

large ($p < .001$) and small versus absent ($p < .001$). No significant differences emerged for package status when the warning information was present for low ASEs regardless of the package status. Analysis for high-ASE consumers did not produce any significant findings. Taken together, the results of Study 4 and the conceptual replication provide converging evidence that when low ASEs learn that small packages are ineffective external controls, their tendency to increase consumption in response to small packages is attenuated. This suggests that public policy makers would be well advised to educate consumers about the paradoxical effects of small packages and that such education strategies will likely be effective in ameliorating the adverse effects of these packaging options on overconsumption.

The current findings also have implications for consumers who are buying into the possibility and spending a great deal of money in the hopes that small packages are a potential aid in consumption regulation. Indeed, small serving bags/boxes (e.g., 100-calorie packs) cost approximately two-and-a-half times more per ounce as the same product sold in larger packages (Center for Science in the Public Interest 2007). According to the Hartman Group, 29% of consumers believe that the extra costs associated with small packages are worth the portion control they offer. Ironically, our findings demonstrate that the extra money consumers are spending to purchase these “solutions” may not be worth it in contexts in which multiple small packages are available. Furthermore, from a consumer perspective, this research highlights that the effects of small packages most adversely affect low ASEs, who are arguably the consumers most in need of tools to help regulate their consumption. Importantly, if these consumers are aware of these unintended package effects, these deleterious effects can be mitigated.

Directions for Further Research and Conclusion

There are several avenues for further research. First, small packages are typically sold in multiples within a larger package. Under conditions in which these small packages are sold individually (i.e., on a shelf or in a vending

machine), perhaps the extra commitment of purchasing more than one would serve as a regulatory signal to consumers to choose to buy, and subsequently eat, only one package. Thus, further research could examine whether the configuration of the product at the point of purchase (i.e., whether single items or multipacks are available) influences consumption. Second, further research could examine the moderating role of product category. For example, would the same effects emerge for healthy products (e.g., packages of baby carrots), or do the findings only emerge when the product category itself invokes a desire to regulate food intake? Finally, further research could explore the impact that other types of environmental cues have on consumption from small packages. For example, can the location of a product (e.g., whole wheat chips) in the store (e.g., in the chip/junk-food aisle vs. the health-food/diet area) interact with package size to influence overall consumption?

We believe that using ASE as a measured variable is of both theoretical and practical importance because our key predictions are based on the notion that low-ASE consumers chronically and dispositionally tend to monitor and regulate their food intake (across time and situations). Indeed, we propose that it is this tendency that makes them susceptible to the external control properties of small packages. However, one alternative explanation for our findings is that low willpower or greater desire for high caloric foods might affect ASE, as opposed to ASE influencing these factors. As such, further research could manipulate ASE so that the direction of causality can be determined. A possible way to manipulate ASE is to expose participants to idealized (vs. normal) body images.

The current research demonstrates conditions under which small packages fail to be effective regulatory tools. Given the health and economic implications of overweight and obese people (World Health Organization 2007), it is imperative that research continues to uncover new factors that influence consumption. The current research is a step in that direction.

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