JULIO SEVILLA and BARBARA E. KAHN*

This research demonstrates the effect of the completeness of a product's shape on size perceptions, preference, and consumption quantities. The authors show that people estimate an incompletely shaped product to be smaller and, therefore, prefer it less in general than a completely shaped one of equal size and weight. They also find that the reduced size estimations for incompletely shaped products lead to increased consumption quantities of this type of item. Finally, the authors demonstrate that the "completeness heuristic" operates even when the incompletely shaped item has a larger primary dimension than its completely shaped counterpart.

Keywords: product shapes, packaging, consumption, retailing, public policy

The Completeness Heuristic: Product Shape Completeness Influences Size Perceptions, Preference, and Consumption

The United States Department of Agriculture website ChooseMyPlate.gov states that people should enjoy their food but should eat less and avoid oversized portions. To do so, the organization advises that people only eat half of the food on their plate. In the same spirit, Dr. Katz (2009), the diet doctor on Oprah Winfrey's website, recommends that people "eat a smaller—or half—sandwich." When dining out, Men's Health (2013) suggests that its readers ask for a to-go box to pack up half their entree to remove the temptation of finishing the whole thing.

In these diet tips, there is a consistent suggestion that consumers should consider eating only half—or at least less than all—of what is served to them. However, if people generalize from that rule and assume that half sandwiches are always smaller than full sandwiches, regardless of their relative sizes, this well-intentioned diet rule can backfire and give consumers a reason to justify overconsumption. In the extreme, this type of thinking can lead to mindless eating (e.g., Wansink 2006). For example, people may mindlessly eat the broken pieces of pretzels or chips at the bottom of a bag and feel justified that they have not eaten very much because they have not consumed any whole units.

Previous research has shown that consumers use aspects of the physical shape of a product or container to estimate quantity, preferences, and how much to consume (e.g., Folkes and Matta 2004; Krider, Raghubir, and Krishna 2001; Raghubir and Krishna 1999; Wansink and Van Ittersum 2003). The common explanation for these findings is that both perceptions and consumption decisions are influenced by faulty heuristic processing or consumption norms (e.g., Kahn and Wansink 2004) that can serve as a useful guide in some contexts but can distort decision making in others. For example, Raghubir and Krishna (1999) demonstrate that people overestimate product sizes because they anchor their perceptions on the most elongated or primary dimension and do not sufficiently adjust for a smaller secondary one (Krider, Raghubir, and Krishna 2001). Wansink (2006) similarly provides examples of consumers using the size of plates or the shape of glasses to inaccurately estimate appropriate serving sizes.

In this work, we show that the degree of "completeness" of the shape of a product can serve as a robust determinant

*Julio Sevilla is Assistant Professor of Marketing, Terry College of Business, University of Georgia (e-mail: sevilla@uga.edu). Barbara E. Kahn is Patty and Jay H. Baker Professor of Marketing, the Wharton School of the University of Pennsylvania (e-mail: kahn@wharton.upenn.edu). The authors thank Joseph P. Redden, Claudia Townsend, and participants from workshops at University of Miami; University of Technology, Sydney; and the Wharton School of the University of Pennsylvania for their helpful comments on earlier versions of this work. Joel Huber served as guest editor and Jeffrey Inman served as associate editor for this article.

ISSN: 0022-2437 (print), 1547-7193 (electronic)

Journal of Marketing Research
Vol. LI (February 2014), 57–68

of how people perceive, choose, and consume products. In general, we propose that consumers may use the heuristic that a complete unit contains more quantity than an incomplete one without accurately taking into consideration the actual item sizes. We define an item as complete if its shape appears to be a full unit of the product. What constitutes a whole unit depends first on the notion of unity or the "congruity among the elements of the design of an item, such that they look as though they belong together or as though there is some visual connection beyond mere chance that has caused them to come together" (Veryzer and Hutchinson 1998, p. 374). Yet a complete unit also can depend on past experience and prior expectations about the typical shape of an item within a specific product category. For example, a traditional pretzel shape is one with three loops linked, so a pretzel snack shaped in that way would be perceived as a complete unit, even though it has "holes." Conversely, if the category were pretzel rolls, for which the expectation is that the complete product should be shaped like a hot dog roll, both a roll with a hole in it and half a roll would seem incomplete. Even if the half roll or the roll with a hole in it were the same size (or contained as much pretzel bread) as a complete, oval-shaped roll, people would perceive it as less than one unit because of its incomplete shape.

We can make a distinction in our studies between items that are complete units and prototypes. A complete unit differs from the prototype of a category in that prototypes are the best representatives of the group, or "the average or modal value of the attributes of that category" (Veryzer and Hutchinson 1998, p. 376). A prototype for a category is always a complete unit, but a complete unit may not always be the prototype. Furthermore, the concept of a complete unit can change as a function of people's expectations. For example, when defining a category as "bagels," a roll with a hole in it is both the prototype and a complete unit. However, when defining a category as "rolls," a round roll without a hole is not necessarily the prototype. Nonetheless, a round roll is a complete roll (as opposed to a half a roll).

Previous research has shown that consumers respond more favorably to highly prototypical objects (Barsalou 1985), and thus we would expect them also to have a high level of preference for complete items, especially when they are the prototypes of the category. However, the current research suggests a different type of motivation for liking and consuming a complete (vs. incomplete) unit, and it relates to consumers' perceptions of quantity. We hypothesize that, keeping size and weight constant, people will perceive a completely shaped item to be larger than an incompletely shaped one because the complete one represents one unit, whereas the incomplete one equals less than one. Prior research on the "numerosity heuristic" has demonstrated that people are especially sensitive to the number of units when judging quantity and tend to ignore other important aspects, such as the size of each item (Pelham, Sumarta, and Myaskovsky 1994). This leads them to estimate that a constant amount of an object contains more quantity when it is partitioned into many smaller units than into fewer larger ones. On these grounds, consumers may suffer from a similar bias when they compare sizes of completely and incompletely shaped items. Specifically, because we expect that they will consider a completely shaped object one unit and an incompletely shaped object less than one, consistent with the numerosity heuristic, we hypothesize that this counting mechanism will lead them to misestimate the former to contain more quantity. Thus, our central thesis is that consumers believe that a completely shaped item contains more quantity and, thus, will prefer it to an incompletely shaped one, holding actual amount constant. Furthermore, because consumers believe that incompletely shaped items contain less quantity (and are less than one unit), we propose that they will choose more of them when given the opportunity to consume freely.

We conducted a series of experiments to provide empirical support for our hypotheses. First, we report the findings from a field study held during a business lunch attended by physicians and health care executives. Consistent with our theory, we observed that the health care professionals chose more snack-sized sandwiches (average serving size > 2) when choosing from an assortment of incompletely shaped sandwiches (half sandwiches) compared with people choosing from a selection of completely shaped sandwiches (full sandwiches), even though the actual food quantity in each unit was the same (Study 1).

We then report the results from a series of lab experiments to show that size misperception is the underlying process that drives this behavior and that the definition of completeness is dependent on prior expectations. In Study 2, we asked people to choose between incomplete and complete sandwiches of equal size (half vs. whole) or between bottles of shampoo (bottles with an aperture in their package vs. without) and to provide verbal protocols explaining their choices, with the objective of exploring the mechanism underlying the effect. Study 3 uses a between-subjects design to demonstrate that size perceptions mediate the increased preference for completely versus incompletely shaped items. Study 4 uses a between-subjects design to show that the definition of a "complete" item is subject to people's expectations about a product category and is not necessarily related to a specific shape.

Because we could not record how many of the sandwiches were actually consumed in our field study, we ran a final laboratory experiment (Study 5), in which we could measure actual consumption. We distributed cups of chocolate pieces that contained either completely (full squares) or incompletely (half squares cut diagonally) shaped items and found that participants who were told to eat as much chocolate as they wanted ate more pieces of the product when they were incomplete versus those in the complete condition, even though the incompletely shaped pieces were slightly larger. In all our studies, the incomplete items always had a larger primary dimension, demonstrating that shape completeness is a stronger determinant of enhanced size perceptions than the larger primary dimension heuristic (e.g., Krider, Raghubir, and Krishna 2001; Raghubir and Krishna 1999).

Our results contribute to the product design and consumption literature streams and show that consumers can be influenced by the relative perceived completeness of the product shape. These findings suggest that well-intended efforts to curb overeating by recommending half sandwiches or other fractional units may backfire and result in more consumption because the incomplete servings may give consumers license to eat with less awareness of quan-

tity. Similarly, consumers themselves may erroneously use the fact that the product is incompletely shaped as an excuse to eat more. Further research could explore ways to help debias these errors, perhaps by giving half portions complete shapes, explicitly showing comparable quantity estimates, or promoting clear, visual serving-size information on the front of food packaging. Our research also suggests that consumption norms that emphasize absolute portion sizes (e.g., a serving of meat should be the size of a deck of cards) are probably more effective than relative rules.

THEORETICAL BACKGROUND

Previous Research on Completeness

Previous research has shown that people desire completeness (Hull 1932; Kivetz, Urminsky, and Zheng 2006; Nunes and Drèze 2006) and the sense that a life experience is finished (Beike, Adams, and Wirth-Beaumont 2007; Beike and Wirth-Beaumont 2005; Ritchie et al. 2006; Skitka, Bauman, and Mullen 2004). If they do not believe that an experience is complete, they tend to feel psychologically unfinished or unresolved (Beike, Adams, and Wirth-Beaumont 2007; Beike and Wirth-Beaumont 2005; Savitsky, Medvec, and Gilovich 1997). Research on aesthetics and product design has also established that people enjoy stimuli that are complete (Arnheim 1974) and whose designs denote unity and prototypicality (Veryzer and Hutchinson 1998).

Although the aforementioned research suggests that consumers may prefer complete stimuli, there is evidence that this is not always the case. Peracchio and Meyers-Levy (1994) find that cropping images in an ad can enhance product evaluations. This is due to the positive affect consumers experience when they are able to resolve ambiguity and reach closure regarding the incompleteness of the ad. Consistent with this notion, Sengupta and Gorn (2002) demonstrate that omitting expected elements in an ad can also improve product recall and subsequent evaluations. More recently, Hagtvedt (2011) shows that incomplete typeface logos may have a favorable influence on perceptions of firms that aim to be perceived as creative and interesting (e.g., Apple).

Role of Completeness with Regard to Product Shape

We believe that when evaluating physical products, the concept of "completeness" is most germane to the actual shape of the product. Furthermore, we know from prior research that product shapes relate to perceptions about quantity and serving sizes (Krider, Raghubir, and Krishna 2001; Raghubir and Krishna 1999), amounts poured (Raghubir and Krishna 1999; Wansink and Van Ittersum 2003), and amounts consumed (Raghubir and Krishna 1999). Thus, we argue that in the context of choice among products, completeness has an effect similar to the way the numerosity heuristic operates.

The numerosity heuristic suggests that people rely to a great extent on the number of units into which a stimulus is divided and tend to underestimate other important aspects, such as the size of each item (Pelham, Sumarta, and Myaskovsky 1994). In our case, as opposed to comparing assortments composed of multiple numbers of units, we suggest that a completely shaped object equals one unit and an incompletely shaped one corresponds to less than one unit. Consistent with the numerosity heuristic, we posit that people believe that a completely shaped item has more quantity, and thus, they are more likely to choose it over an incompletely shaped item. However, if they are in a situation in which they may consume more than a single unit, consistent with Wansink and Van Ittersum (2003), we hypothesize that they will consume fewer complete items (whose shapes appear to contain more quantity) than they would from an assortment of incomplete items (whose form makes them appear smaller). This notion is supported by research showing that satiety is dependent not only on the actual amount consumed but also on people's subjective assessment of how much they have eaten (Redden and Galak 2013). Therefore, we hypothesize the following:

H_1: People perceive that a completely shaped item contains more quantity than an incompletely shaped one of equal size.

H_2: As a result of quantity estimation bias, people are more likely to choose and express greater purchase likelihood for a completely shaped item than for an incompletely shaped one.

Influences of Expectations

Previous research has shown that consumer expectations play a central role in customer satisfaction (e.g., Anderson and Sullivan 1993) because people judge the quality of a service by comparing their expectations with their actual experience (Parasuraman, Zeithaml, and Berry 1994). We hypothesize that, similarly, previous expectations will influence whether the shape of an item is considered complete. If the standard shape for a specific product category contains missing elements or is not convex, consumers will consider this shape complete only within its category because it is consistent with their expectations. They will consider the same shape incomplete in the absence of a specific product category expectation. For example, people will consider a roll with a hole in the middle of it incomplete for the roll category but will deem it complete if its designated product category is bagels. We hypothesize that expectations moderate whether a product is considered complete, which in turn affects product quantity estimations.

H_3: Product category expectations moderate which shapes people consider complete or incomplete. Relative to product category expectations, people estimate incompletely shaped products to contain less quantity than completely shaped items of equal size.

Finally, we predict that when assortments offer the opportunity to consume more than one unit, consumers will feel more satisfied with complete units that they believe offer more quantity than with incomplete ones. Therefore, they will consume more of the incomplete items than they would if the same-sized units were completely shaped.

H_4: Holding actual unit size constant, people choose and consume fewer items from serving assortments that contain complete units than from serving assortments that contain incomplete units.

STUDY 1: FIELD EXPERIMENT

We conducted a field study to provide support for our general prediction that well-meaning diet rules can backfire

and that people are likely to choose more items to consume from an assortment that contains incompletely shaped items than from an assortment with completely shaped items of the same size. We had the opportunity to test this hypothesis during a lunchtime buffet served in separate locations to two sections of a health care executive education class. The participants were physicians and other professional health care practitioners. We assigned one section to the complete condition and the other to the incomplete one. Both groups were offered trays of mini sandwiches that differed only in the degree to which their shape was complete or incomplete. The sandwiches were designed so that a normal portion size would be more than one mini sandwich; thus, we avoided a "take one" consumption norm that might have biased our results. The completely shaped sandwiches were circular, and the incomplete ones were semicircular in shape because they were made from a bread loaf that was twice as large and was subsequently cut in half. Despite the differences in their shapes, both types of sandwiches were of the same weight and composition. The incompletely shaped sandwiches were also longer (3.5 inches in diameter vs. the 2-inch diameter of the completely shaped ones). We predicted that participants would take more sandwiches in the incomplete condition.

Method

Forty-six people participated in this field study. Participants were from a Health Sector Management and Policy Executive Masters of Business Administration class, in which the average age was 40 years. Thirty-one percent worked in clinical health care, and 69% worked in the nonclinical health sector. Participants had an average income of $183,000. Each serving station was equipped with 120 sandwiches, of which 60% were made with wheat bread and 40% were made with white bread. Half the sandwiches were filled with turkey, one-third were filled with roast beef, and the remaining one-sixth were vegetarian. All sandwiches across the two conditions contained the same amount of turkey, roast beef, or vegetables, and all had equal servings of lettuce, tomatoes, and mustard. In addition to the 120 sandwiches, each food table offered 50 cookies and a bowl with salad.

Two of our assistants sat nearby and pretended to be students working on their laptops while covertly tracking the participants' gender and total amount of food they took. The buffet tables were located in hallways where the presence of other students was common. Furthermore, debriefing after the experiment revealed that participants had no idea that their lunch choices were being monitored. Lunch was served simultaneously from noon to 1 P.M. on the same day for both conditions.

Results

We knew a priori that one of the classes had more male students than the other, and we hypothesized that men would eat more than women in general. Given this assumption, we assigned the class with more male students to the complete shape condition, presenting a conservative test of our hypothesis because we predicted that people would eat fewer sandwiches in the "complete shape" condition. There were 24 participants (70.8% male) in the complete shape condition and 22 in the incomplete shape condition (50% male). As we hypothesized, across both conditions men ($M = 3.04$) took significantly more sandwiches than did women ($M = 2.39$; $t(44) = 2.63$, $p < .05$). However, despite this result, we found significant support for our prediction: participants on average took more sandwiches in the incomplete shape condition than in the complete one ($M_{incomplete} = 3.23$ vs. $M_{complete} = 2.38$; $t(44) = 3.80$, $p < .0001$). There was no significant interaction between completeness and gender ($F(1, 42) = .46$, $p > .50$), which rules out the alternative explanation that the effect may be due to a gender difference (i.e., that women are more influenced by the completeness of the shapes than men).

To test whether participants in the complete shape condition might have compensated for their reduced selection of sandwiches by choosing more cookies and salad, we compared choice patterns for those categories and found no significant differences across conditions. Participants took an average of 1.27 cookies in the incomplete condition versus an average of 1.08 cookies in the complete group, and this difference was not significant ($t(44) = .83$, $p > .45$). We could not accurately measure how much salad each participant took, but we examined the serving salad bowls after lunch ended and observed no significant differences between the amounts of salad left in the two containers.

Discussion

This study provides support for our general proposition that, holding the size of an item constant, people choose more products to consume if the assortment contains incomplete versus complete units. Our theory holds even among health care practitioners in a naturalistic setting. Although there is evidence that there is a positive correlation between the quantity served on a person's plate and the quantity of food consumed (e.g., Wansink 2004), we did not explicitly measure consumption in this experiment. However, we keep track of intake in Study 5 with the objective of addressing this limitation and provide further support for H_4.

STUDY 2: VERBAL PROTOCOL STUDY

We designed Study 2's experiment to provide support for H_1, which predicts that people perceive a completely shaped item to contain more quantity than an incompletely shaped one of equal size, and for H_2, which proposes that this volume estimation bias will lead people to be more likely to choose the completely shaped item. In this experiment, we asked participants to look at images of equally sized complete and incomplete versions of sandwiches or shampoo bottles and to report which of the two forms of the product they would rather buy and why. As in Study 1, we used the sandwich product category, but we also added a nonfood product category, shampoo bottles. We manipulated shampoo container completeness differently, that is, by including a stylistic aperture within the convex shape instead of by cutting a traditionally shaped product in half. The product images employed in this experiment corresponded to actual products.

Method

One hundred twenty-four people participated in this computer-based study in exchange for course credit. We observed two product categories between-subjects: sandwiches and shampoo bottles. We manipulated the complete-

ness variable within-subject because each stimulus was shown on a separate screen, with order of presentation randomized. Presentation order did not play a role in the results.

The incomplete sandwich was made from two conventional bread slices cut in half diagonally, whereas the complete sandwich was the uncut, whole version. The size of the sandwich was kept constant regardless of the shape of the bread. The shampoo bottles were the same size across conditions and differed only in the completeness of their shape. The incomplete shampoo bottle had a hole in one of its sides (intended to be a handle; see Figure 1, Panel A), whereas the complete bottle did not (see Figure 1, Panel B). Both these shampoo bottle images reflected real-life packaging shapes. The incomplete shampoo bottle had a larger perimeter to make up for the aperture in its surface. To guarantee that the two stimuli were the same size, we ensured that the incomplete version always had a larger primary dimension.

On a separate sample, we ran checks to ensure that the respondents accepted our manipulation of completeness. Using a sample of 190 participants (who also evaluated the experimental stimuli in our subsequent studies), 78.0% of the participants believed that the complete sandwich was complete, whereas in the incomplete condition, only 18.2% thought the sandwich was complete (Wald $\chi^2(1) = 58.18$, $p < .0001$). For the shampoo bottle, in the complete condition, 76.8% of the participants believed that the shampoo bottle was complete, whereas in the incomplete condition, 45.1% thought it was complete (Wald $\chi^2(1) = 10.00$, $p < .005$).

Figure 1
SHAMPOO CONTAINERS (STUDY 2)

A: Completely Shaped Container

B: Incompletely Shaped Container

At the beginning of the study, we told participants to imagine that they were at the supermarket shopping for shampoo (sandwiches) and that the following two images (complete and incomplete, with randomized order) corresponded to the two options from which they had to choose. The two images were subsequently presented; after participants viewed them, they were asked, (1) "Which of these two products would you rather buy?" and (2) "Briefly describe what motivated you to pick the product you chose. What criteria made you pick it over the other item? Please explain."

Results

Purchase likelihood. We found support for H_2; participants were more likely to select completely shaped items. In total, 64.5% of participants chose the complete product, and 35.5% chose the incomplete one ($\chi^2 = 10.45$, $p < .005$). There was a marginally significant influence of product ($\chi^2 = 3.55$, $p < .10$) because the effect was stronger in the sandwich condition (72.6%) than in the shampoo bottle condition (56.5%); however, the results held across both product categories.

Explanation for choice. Two independent coders classified the reasons participants indicated for their choices. The coders reconciled disputes through discussion. We found that 62.9% of the explanations were coded as related to "size or quantity," 28.2% were classified as driven by the "aesthetics or design of the product," 7.3% were associated with other reasons (e.g., "I like it"), and 1.6% of participants provided no clear explanation for their choice. We compared size perceptions with the other reasons combined and found a significant effect ($\chi^2 = 8.25$, $p < .005$), indicating support for H_1 (i.e., that perceived quantity motivated their choices).

The explanation for choice differed depending on whether respondents chose the complete or incomplete alternative. We split the participants into two groups according to whether they chose the complete or incomplete product. Of the participants who selected the complete product, 70.0% said they picked the product because of its size/quantity, 17.5% did so because of its design, 10.0% gave other answers, and 2.5% did not respond; again, quantity perceptions played a more important role than the rest of the criteria combined ($\chi^2 = 12.81$, $p < .0001$), in support of H_1. Of those who picked the incomplete unit, 50.0% indicated that they picked the product because of its size/quantity, whereas design was important for 47.7% of them, and 2.3% offered another reason. Here, size/quantity reasons were not more prominent than the rest of the other criteria combined ($\chi^2 = 0$, $p < 1$). Of those who chose the incomplete option, there seemed to be several reasons for that choice.

Moreover, seven of the participants explicitly indicated that they were consciously choosing the smaller item. Of these participants, one of them picked the complete sandwich, four selected the incomplete one, and two chose the incomplete shampoo bottle. Although this result was not what we hypothesized, because we expected that consumers would choose the perceived larger item, the logic for six of the seven respondents is in keeping with H_1; that is, they perceived the completely shaped item to contain more quantity.

Discussion

In Study 2, we used verbal protocols to understand the underlying reasons why participants tended to prefer the completely shaped items to the incompletely shaped ones. We found that the majority of participants chose the complete version; of these, the majority indicated that they did so because it contained more quantity, thus lending support to H_1 and H_2. This experiment also extended the generalizability of the effect to a nonfood product (i.e., shampoo) as well as to incomplete shapes that do not involve a product cut in half (i.e., a bottle with a hole in its surface). In the next study, we use a more rigorous design to provide further support for H_1 and H_2.

STUDY 3: MEDIATION STUDY

We designed Study 3's computer-based experiment to provide additional support for H_1 (i.e., that people perceive a completely shaped item to contain more quantity) and H_2 (i.e., that consumers are more likely to purchase completely shaped products). Here, we demonstrate that increased size perceptions act as a mediator for participants' greater likelihood to buy completely shaped (vs. incompletely shaped) products. To do so, we exposed participants to complete or incomplete versions of equally sized products and asked them to estimate the number of servings each item contains and to indicate how likely they would be to buy this product. The number of servings question served as our measure of perceived quantity.

In this case, the products we used were a cheese slice and a piece of bread. The complete version of the cheese was a typical slice, and the incomplete one had indentions in its surface such as those in Swiss cheese. For the bread, the complete version was a full roll, and the incomplete version had a hole in the middle (see Figure 2, Panels A and B). Using the same external sample of 190 participants described in Study 2's manipulation checks, we found support for Study 3's interventions. Participants in the complete condition considered the cheese slice complete 74.2% of the time, whereas those in the incomplete condition thought the slice was complete 38.7% of the time. These proportions are significantly different (Wald $\chi^2(1) = 23.21$, $p < .0001$). For the bread, participants in the complete condition thought that the bread was complete 81.4% of the time, whereas those in the incomplete group thought the bread was complete 44.2% of the time. These proportions are significantly different (Wald $\chi^2(1) = 9.13$, $p < .005$).

Method

This study was a 2 (completeness: complete vs. incomplete) × 2 (product: bread vs. cheese) between-subjects design. One hundred twenty people participated in this computer-based study in exchange for course credit. For this experiment, participants were told that they would be asked to look at an image of a product and to answer some questions. Each participant was exposed to one of the four potential stimuli combinations. After viewing their corresponding image, participants were asked, "Please estimate how many servings of the product there are in this picture," and "Please indicate how likely you would be to buy the product shown" (1 = "not at all," and 9 = "very much so").

Figure 2
BREAD ROLLS (STUDIES 3 AND 4)

A: Incompletely Shaped Bread Roll

B: Completely Shaped Bread Roll

Results

Size perceptions. As we expected, a between-subjects analysis of variance (ANOVA) showed a significant effect of completeness ($M_{complete} = 2.18$ vs. $M_{incomplete} = 1.18$; $F(1, 116) = 20.12$, $p < .0001$) and a nonsignificant role of product type ($M_{cheese} = 1.60$ vs. $M_{bread} = 1.77$; $F(1, 116) = .56$, $p > .45$) on number of servings estimated in the product. This result provides strong support for H_1, which posits that people will believe that the complete-shaped items contained more quantity than their incomplete-shaped counterparts.

Likelihood of buying. Again, as we expected, a between-subjects ANOVA showed a significant effect of completeness ($M_{complete} = 5.55$ vs. $M_{incomplete} = 4.16$; $F(1, 116) = 8.56$, $p < .005$) on likelihood of buying. Moreover, there was a significant role of product type: in general, participants expressed greater intentions to buy the bread than the cheese slice ($M_{cheese} = 3.70$ vs. $M_{bread} = 6.01$; $F(1, 116) = 23.54$, $p < .0001$). However, the effect was directionally consistent between both product categories. Overall, this finding provides support for H_2—specifically, that con-

sumers express a greater likelihood to purchase completely shaped items than incompletely shaped ones. To provide further support for H_2 (i.e., to determine whether quantity estimation drove this increased likelihood), we ran a mediation analysis.

Mediation. We expected that the estimated number of servings would mediate likelihood of buying. We formally tested mediation using the procedure recommended by Preacher and Hayes (2008) and Zhao, Lynch, and Chen (2010). We first found that completeness predicted the number of servings that participants estimated a product to have ($\beta = 1.00$, $t(116) = 4.49$, $p < .0001$) and that number of servings subsequently influenced likelihood of buying ($\beta = .44$, $t(116) = 2.08$, $p < .05$). Finally, the factor for the completeness condition had a significant indirect effect on likelihood of buying through the serving estimation pathway ($\beta = .43$; 95% confidence interval: –.04, –.93). This pattern of results indicates that serving estimations mediate the effect of shape completeness on likelihood of buying, thus indicating support for H_2.

Discussion

This study provides further support for our hypotheses that completely shaped products generate greater purchase intentions than incompletely shaped ones because they are perceived to contain more quantity. This experiment, combined with Study 2, provides a more fine-grained picture of how consumers judge completely versus incompletely shaped items. Although Study 2's thought protocol study hinted at a relationship between perceived quantity and purchase intentions, this type of design is, despite its informative nature, often subject to biases (Nisbett and Wilson 1977). Given this limitation, the current design strengthened our evidence by proving that increased size perceptions motivate consumers' greater purchase intentions for completely (vs. incompletely) shaped items. Together, these two studies also suggest that participants may have chosen and (potentially eaten) more incompletely shaped sandwiches in Study 1 because they believed that they were acquiring and consuming less quantity, which may have subsequently diminished their experienced satisfaction. In addition to finding support for H_1 and H_2 in three types of studies (field, laboratory, and open ended), at this point we have also tested our effect across several product categories.

In our next experiment, we reveal the moderating influence of product category expectations on perceptions of completeness and their subsequent influence on size estimations. We propose that the completeness effect is not specific to a particular shape and that a form that is considered incomplete in a given product category or context can be viewed as complete in another one.

STUDY 4: THE MODERATING ROLE OF EXPECTATIONS

We designed Study 4's computer-based study to test H_3 and show that prior expectations moderate consumers' concepts of shape (in)completeness. This experiment also includes a cognitive load manipulation that we used to investigate whether there were differences in our results due to the amount of cognitive processing that participants allocated to the task. The study used a 2 (product shape: complete vs. incomplete) × 2 (label category: general vs. specific) × 2 (cognitive load: high vs. low) between-subjects design.

We also had a repeated-subjects factor: product class (bread rolls or cheese slices). As in Study 3, for the complete conditions, we showed bread rolls as convex circular solid rolls, and the cheese images displayed full slices of yellow cheese. For the incomplete conditions, the bread rolls had a hole in the middle, and the cheese slices had indentations in their surface. The overall circumferences of the open-shaped items were a little larger than the closed-shape units so that we could keep actual amount of product constant; thus, the primary dimension of the incomplete options was larger. For the labeling conditions, the products were labeled with either a generic category (bread rolls or cheese slices) or a specific name, in which the incomplete version would be the expectation of a complete product (i.e., bagel or Swiss cheese). The stimuli employed in this design also included a new component that helped address a potential concern associated with the difficulty of estimating an object's dimension in the absence of a constant reference item: so that the participants could more easily ascertain the size of the stimuli, we kept an anchor image constant in both conditions across product categories. For example, as Figure 3 shows, we displayed grapes of equal size next to each of the slices of cheese. Finally, we manipulated cognitive load by asking participants to memorize a two-digit number (low load) or a seven-digit number (high load) (Shiv and Fedorikhin 1999).

Method

Two hundred sixty-two people participated in this computer-based study in exchange for course credit. Participants were told that they would be asked to look at some product images on the computer and to answer some questions about them. Before viewing the computer images, par-

Figure 3
CHEESE SLICES (STUDY 4)

A: Completely Shaped Cheese Slice

B: Incompletely Shaped Cheese Slice

ticipants were given the cognitive load manipulation. They were told that they would be asked to type this number on the screen at a later point in the experiment. Each participant saw a total of four images, two of bread and two of cheese. We randomized order of product class, but it did not influence the results.

After viewing each image, participants estimated how many servings they thought were represented by the graphic images on the screen. We designed this question to measure product quantity because we believed this was a unit the participants could understand. We did not believe that they could estimate actual weight or volume measures, because that is not how most people typically judge food quantities. The software allowed them to answer with both whole and fractional numbers (e.g., 1.25). The first and third images of the sequence contained three units of the product, and the second and fourth images contained one. The target images for the study were 2 and 4, and images 1 and 3 were included as fillers with the intention of disguising the objective of the study and providing participants the opportunity to familiarize themselves with the task. After completing the evaluations, participants were asked to type the number they had memorized.

Results

A mixed ANOVA using completeness, label, and cognitive load as between-subjects variables and product as a within-subject factor revealed a significant interaction between completeness and label ($F(1, 254) = 13.40$, $p < .0001$). This interaction was qualified by a main effect of label ($F(1, 254) = 10.64$, $p < .005$). The effect of completeness was nonsignificant ($F(1, 254) = .17$, $p > .65$) because it was dependent on label. There were also nonsignificant effects of product ($F(1, 254) = 3.89$, $p < .10$), cognitive load ($F(1, 254) = .37$, $p > .50$), and all interactions with load. Because we did not find an effect of cognitive load, we report results collapsed across those conditions. We ran a separate study for this experiment without the cognitive load manipulations and found a similar significant interaction between label and completeness. For full disclosure, we report the results of the cognitive load study.

As we expected, participants in the incomplete-general ("rolls," "cheese") condition perceived the items to contain fewer servings (M = 1.11) than did those in the complete-general group (M = 1.32; $t(254) = 2.36$, $p < .05$), but this difference disappeared when labels modified product expectations. This result supports H_3. Moreover, participants in the incomplete-specific ("bagels," "Swiss cheese") condition actually estimated the products to contain *more* servings (M = 1.56) than did those in the complete-specific condition (M = 1.29; $t(254) = 3.12$, $p < .005$). Although we did not specifically predict this reversal in our hypothesis, this result is consistent with the primary dimension findings (Krider, Raghubir, and Krishna 2001; Raghubir and Krishna 1999). When the expectations of the holes in the bread and the cheese did not connote an incomplete product and this fact was made salient, participants then seemed to rely on the primary dimension heuristic (the primary dimension was necessarily larger for the incompletely shaped items to keep actual size constant between the completeness conditions). Participants in the incomplete-specific group (M = 1.56) estimated those products to contain more servings than did those in any other condition, including participants assigned to the complete-general group (M = 1.32; $t(254) = 2.36$, $p < .05$) (see Figure 4).

Discussion

Study 4 provides further support for H_1. These results are consistent with those obtained in Study 1 (i.e., participants consumed more mini sandwiches when they were assigned to the incomplete vs. complete condition). Because participants who ate incomplete sandwiches thought they contained less quantity, they perceived that they were eating less, which led them to eat more units than those in the complete sandwich condition. Moreover, we show that this effect can be reversed by making salient an expectation that the lack of shape completeness is normal for a specific product category. Although we did not find a significant effect for our cognitive load manipulation, our evidence also seems to suggest that the phenomenon will hold even in cases when mental processing is limited. In our final study, we specifically test the implications of the completeness heuristic on actual consumption behavior to further support our conjecture that when consumers are given the opportunity to choose more than one unit, or to mindlessly eat, they will consume more of incompletely shaped options than completely shaped ones.

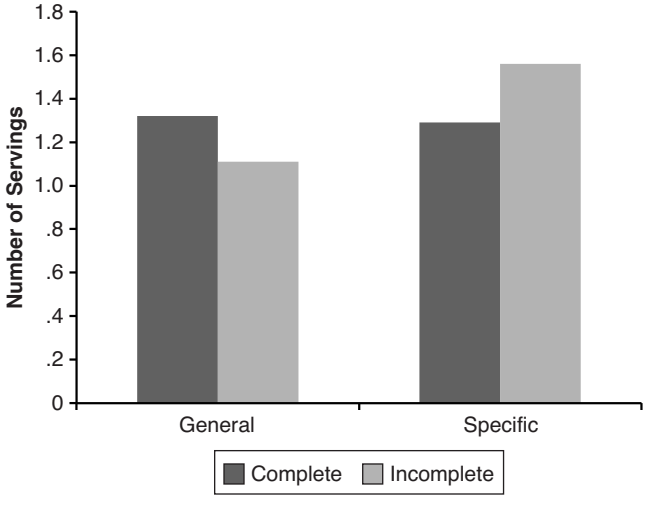
STUDY 5: MEASURING ACTUAL CONSUMPTION

To demonstrate that shapes' completeness influences consumption (H_4), in Study 5, we ran a laboratory experiment in which we asked participants to eat as many chocolate pieces as they wanted from a serving container. After the experiment ended, we counted the remaining number of chocolates to provide an accurate measure of consumed quantity.

Method

One hundred twenty-two students participated in this computer-based experiment in exchange for course credit. In this between-subjects design, we compared how many

Figure 4
THE ROLE OF LABELING ON SIZE PERCEPTIONS (STUDY 4)



chocolate pieces participants actually ate. Upon arriving at the lab, they were asked to eat as much chocolate as they wanted and to answer some questions associated with the experience. Each participant was given a cup with 15 pieces of chocolate weighing a total of 75 grams (complete condition) or 80.63 grams (incomplete condition). The chocolates in the complete condition were small chocolate squares weighing 5 grams each, whereas those used in the incomplete treatment were larger, weighing 10.75 grams each. These units were diagonally cut in half, which generated the incompletely shaped pieces used in the experiment; these halves weighed 5.375 grams each. That the incomplete pieces were slightly larger represents a conservative test of H_4, because we predicted that participants in the incomplete shape condition would consume more units overall. The 15 pieces of chocolate corresponded to approximately two full servings of the product, so we did not anticipate participants finishing the whole cup and wanting more. The chocolates used across both conditions were the same and only differed in shape. As in all our previous experiments, the incomplete stimuli had a larger primary dimension.

After participants finished consuming the chocolates, they moved to the next screen to answer some questions. The first two questions were (1) "How good was the taste of the chocolate you ate in this study?" (0 = "extremely bad," and 10 = "extremely good") and (2) "How attractive was the appearance of the chocolates you ate in this study?" (0 = "not attractive at all," and 10 = "very attractive"). We included these questions to rule out alternative explanations for the effect. We also provided a manipulation check measure in which we asked participants, (3) "How would you best describe the shape of the chocolates you ate in this experiment: Complete or Incomplete?" A final question asked participants to write in the two-digit code placed at the bottom of their cup (unseen by them until this point). This unique code enabled us to tie participants' computer responses to their cup and the amount of chocolates they consumed. After they finished the study, we removed the chocolate cups from the participants' cubicles and proceeded to measure how much chocolate each of them consumed.

Results

As expected, we found that participants in the completely shaped condition were significantly more likely to believe that the form of the chocolate they consumed was complete compared with those assigned to the incompletely shaped treatment ($M_{complete}$ = 98.4% vs. $M_{incomplete}$ = 16.4%; χ^2 = 27.56, $p < .0001$). None of the participants ate all of the chocolates in their cup, as we anticipated. Moreover, we found further support for H_4 because participants in the incompletely shaped condition ate significantly more chocolate pieces than those in the completely shaped group ($M_{incomplete}$ = 4.25 vs. $M_{complete}$ = 3.36; t(120) = 2.13, $p < .05$). We also ruled out alternative explanations that the effect was due to better perceived taste ($M_{incomplete}$ = 8.28 vs. $M_{complete}$ = 7.69; t(120) = 1.52, $p > .20$) or greater attractiveness of the incompletely shaped items ($M_{incomplete}$ = 6.62 vs. $M_{complete}$ = 6.93; t(120) = .74, $p > .45$).

Discussion

Study 5 provides broad support for our hypothesis that people will consume more incompletely shaped items than completely shaped items of equal size, thus indicating strong support for our central thesis. This finding illustrates the potential downside of providing "diet rules" based on product shape completeness (e.g., eating half of a sandwich is better than eating a whole one). This study also rules out potential alternative explanations for the effect such as taste perceptions and product appearance.

GENERAL DISCUSSION

Through a series of five studies, we demonstrate that, keeping size constant, consumers believe that a product has more quantity when it is represented by its complete shape than by its incomplete form. We define completeness as a full unit of a product and acknowledge that what constitutes a "full item" is subject to product class expectations. We show that people prefer completely shaped items because they perceive them to have more quantity than incompletely formed items of equal size, thus evoking a greater likelihood of purchase. Furthermore, when participants are faced with an assortment of food products that they may consume freely, they will choose and ingest more if the products are incompletely shaped than if they are completely shaped. We reveal that this increased consumption is due to our finding that people perceive incompletely shaped items to have less quantity.

We demonstrate the robustness and generalizability of the effect by providing results of a field study and a series of laboratory experiments using between-subjects and within-subject designs, edible and nonedible product categories, and packaged and unpackaged products. We conducted our field study among physicians and other health care professionals and found that participants chose more mini sandwiches from a serving station when they were incompletely (vs. completely) shaped, even though the quantity of food in each was held constant. In this experiment, we were careful to ensure that the size of each sandwich was smaller than a single serving so that participants needed to estimate how many to take (i.e., they would not just take one). That our participant pool in Study 1 consisted of health care professionals—who should be more savvy and mindful about healthy eating practices than the general population—serves to reinforce the strength of this phenomenon. Consistent with this finding, we also showed that participants ate more chocolate in a laboratory setting when the product was incompletely (vs. completely) shaped and that perceived taste or product attractiveness did not explain the results. A series of laboratory studies using real product images (i.e., bagels, cheese, sandwiches, and shampoo) suggests that this difference in prospective or actual consumption took place because people perceive incompletely shaped products to contain less quantity than their equally sized, completely shaped counterparts. This perceptual error leads them to consume "incomplete" products in larger quantities to become satisfied.

Previous research on the numerosity heuristic has shown that people rely to a great extent on the number of units into which a stimulus is divided and tend to ignore other important aspects, such as the size of each unit (Pelham, Sumarta, and Myaskovsky 1994). We found that consumers suffered from a similar bias when they compared sizes of completely and incompletely shaped items. Specifically, we found that they perceived a completely shaped object to contain more

quantity than an incomplete one. This discrepancy in size perceptions subsequently generated greater preference for the completely shaped items. We found evidence for this effect using verbal protocols asking participants to tell us why they tended to choose completely shaped products over incomplete ones. Consistent with this finding, we observed that perceived serving sizes significantly mediated participants' increased likelihood to buy completely shaped items over incompletely shaped ones.

We also demonstrate that people's concept of item completeness depends on product category expectations. We presented participants with images of bread and cheese with and without holes and labeled these photographs as either bagel/Swiss cheese or bread roll/cheese. To hold quantity constant, the images with the holes had a larger perimeter than the images without the holes. We found that when the images were prominently labeled with the more specific name (bagel/Swiss cheese) for which the hole is expected, participants perceived the incomplete versions to contain more quantity than the images without the holes. This finding is consistent with previous research that shows that a "primary dimension" with insufficient adjustment for other secondary considerations (in this case, the hole) serves as a cue for product quantity (Krider, Raghubir, and Krishna 2001; Raghubir and Krishna 1999). Our manipulation of making salient the notion that shape incompleteness may be normal in a given product category deactivated the completeness heuristic and enabled the primary dimension effect to emerge, as extant work has shown. However, in conflict with this previous research and in support of our hypothesis that completeness is a stronger effect than primary dimension, when the products had the generic label, we observed the reverse findings, and participants viewed the images without the holes as having more quantity, despite their smaller primary dimension.

Together, this set of studies demonstrates the external validity and robustness of the completeness of a product's shape as a cue for estimations of perceived quantity, purchase intent, and consumption. Because we know that consumers do not typically expend a great deal of effort to read the information presented on a product's package and instead simply infer serving sizes from their visual size perceptions (Cole and Balasubramanian 1993; Dickson and Sawyer 1990; Folkes and Matta 2004), this factor significantly influences consumption amounts (as our field study and chocolate consumption laboratory study confirm). Thus, our work adds to the increasing body of literature on consumption behaviors that should inform both constructive marketing actions and public policy regulations that involve the obesity crisis.

Implications for Research

Our results contribute to the literature on how package or product shape influences quantity perceptions and subsequent choice and consumption. As we showed in Study 4, when completeness of the stimuli was not a salient issue, participants reverted to using the primary dimension as a cue for quantity estimation, consistent with previous research. However, when the two effects are pitted against each other, free of further intervention, the effect of completeness is stronger. It is worthwhile to conjecture why this might be. We speculate that because people tend to have a strong desire or need for completeness (e.g., Zeigarnik 1927), it makes sense that this factor plays a stronger role in quantity estimations than other heuristics such as primary dimension, which operates only through cognitive errors in calculation and not through psychological or physiological motivations (see, e.g., Hull 1932).

In addition, although space constraints prevented us from discussing this in our studies, our results suggest that the completeness heuristic is also stronger than the attention attraction phenomenon identified by Folkes and Matta (2004). These authors demonstrate that Raghubir and Krishna (1999) and Krider, Raghubir, and Krishna's (2001) findings were moderated by a product's ability to attract attention. They show that people perceive products that demand more attention to contain more volume. This effect was so robust that it persisted even in cases in which the most "attention attracting" product had a shorter or less salient primary dimension. Our results suggest that this attention effect will also be moderated by product completeness. Previous research has shown that incomplete products attract more attention (Sengupta and Gorn 2002), but our results consistently demonstrate that people perceive incomplete stimuli to contain less quantity despite also being considered more attention attracting.

Our results provide a notable contrast to empirical findings that examine the use of predetermined portion sizes as consumption rules (e.g., Wansink 2004) when deciding how much to choose to eat. Similar to the idea that people should clean their plates or identify a convenient "stopping point" (Cheema and Soman 2008), Geier, Rozin, and Dhoros (2006) find that people use a unit bias heuristic to determine how many units to choose. In contrast to our findings, they show that when managers in an upscale apartment building left a bowl of free Philadelphia-style pretzels for tenants to take, people ended up taking more when the pretzels were served whole (3 ounces) versus when they were cut in half (1.5 ounces). The authors argue that this result is due to a unit bias rule that provided a convenient mechanism for how much to take: the norm was to select one regardless of its size. However, their context was very different from ours in several ways. We either specifically examined situations in which the norm was not to take only one or asked consumers to choose between a completely shaped item and an incompletely shaped item of equal size (and not half its size, as in Geier, Rozin, and Dhoros's [2006] studies). In our research, the unit heuristic would have generated null results; the different consumption amounts in their studies were due to the variances in size between their complete and incomplete stimuli rather than to a differential number of units selected and consumed, as in our experiments. Their results show that in cases in which a "unit" norm is operating, incomplete items may result in lesser amounts consumed, which serves as a possible boundary condition to our effects. However, in our research, we either kept absolute quantity and number of pieces constant and altered the degree of completeness of the shape or asked consumers to judge how many units to choose/consume as a function of shape estimations (vs. a unit heuristic rule). Our underlying process of consumption, then, is not determined by a consumption norm per se (as it is in Geier, Rozin, and Dhoros [2006]) but rather by misperception of quantity as a result of reduced size estimations. However, our results and theirs

clearly suggest that the way people decide how much to consume is a complicated process and depends on decision contexts and various consumption norms.

Managerial Implications

The stimuli we used in this research are everyday products that people see and buy on a regular basis. Despite this familiarity and the ubiquity of incompletely shaped items in the marketplace (e.g., cheeses, sandwiches, breads, fruits), our findings demonstrate that consumers are susceptible to size estimation biases caused by the degree of product shape completeness. Some marketers seem to be aware of this effect at some level. For example, Baskin Robbins sells ice cream cake in three presentations. The first is a full large cake, the second a full small cake, and the third is a large half-cake similar in size to the second option. Perhaps the version that is cut in half is offered for calorie-conscious consumers who want more cake but know that they should not be eating the whole decadent dessert. A half-cake offers as much cake as a small whole cake but without the guilt. This research informs consumers about this potential bias so that they can take it into account when they make their purchase decisions.

More generally, our findings suggest that well-meaning diet rules can be misapplied and lead to overconsumption. In the end, if consumers want to rationalize their behavior, using an "eat only half" rule can be viewed as license to let their guard down and mindlessly eat. Although the examples provided at the beginning of this article are reasonable, consumers should note the caveat that such rules should only be used in context (i.e., compared with eating the whole portion) and not used when comparisons are not evident.

Most of the stimuli we employed in our experiments were edible products, and indeed, it seems likely that our results are most relevant to food consumption. However, any product choice that requires a consumption decision that is affected by product shape could be sensitive to this miscalculation. For example, we might predict that consumers deciding how many specific cleaning or personal hygiene packages to buy or use would purchase more units if the product shape were incomplete (vs. complete). We anticipate a similar effect when predicting usage amount, specifically, that consumers would apply relatively more of the incompletely shaped item because they would perceive it as being smaller.

Further Research

Our findings suggest several avenues for further research. First, researchers should explore whether explicit packaging labeling can reduce this preference for completeness that results in inaccurate perceptions of relative serving sizes. We believe that this may be a persistent bias that is difficult to correct because we have preliminary evidence that the error exists even when actual quantity amounts are clearly marked. The finding that the effect holds under cognitive load is consistent with this prediction and also suggests that the effect is likely to take place in the often mentally taxing retail environment.

In addition, we hypothesize that other aspects of a product's shape, such as asymmetry or imperfection, may also affect size estimations in a similar way as the completeness effect we document in this research. For example, we believe that consumers may react in a similar manner to two completely shaped donuts of equal size when one is perfectly round and the other is asymmetrical or imperfect in shape because they may view the latter as offering less quantity. Finally, further research should investigate additional ways in which the completeness effect could affect perceptions other than size estimations. For example, preliminary pretest data we collected suggest that people may perceive a product with an incomplete shape (due to the presence of a hole) to be not only smaller but also healthier.

REFERENCES

Anderson, Eugene W. and Mary W. Sullivan (1993), "The Antecedents and Consequences of Customer Satisfaction for Firms," *Marketing Science*, 12 (2), 125–43.

Arnheim, Rudolf (1974), *Art and Visual Perception: A Psychology of the Creative Eye*. Berkeley: University of California Press.

Barsalou, Lawrence W. (1985), "Ideals, Central Tendency, and Frequency of Instantiation as Determinants of Graded Structure in Categories," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 11 (4), 629–54.

Beike, Denise R., Laura P. Adams, and Erin T. Wirth-Beaumont (2007), "Incomplete Inhibition of Emotion in Specific Autobiographical Memories," *Memory*, 15 (4), 375–89.

——— and Erin T. Wirth-Beaumont (2005), "Psychological Closure as a Memory Phenomenon," *Memory*, 13 (6), 574–93.

Cheema, Amar and Dilip Soman (2008), "The Effect of Partitions on Controlling Consumption," *Journal of Marketing Research*, 45 (December), 665–75.

ChooseMyPlate.gov (2012), "Getting Started with MyPlate," (August), (accessed October 21, 2013), [available at http://www.choosemyplate.gov/downloads/GettingStartedWithMyPlate.pdf].

Cole, Catherine and Siva K. Balasubramanian (1993), "Age Differences in Consumers' Search for Information: Public Policy Implications," *Journal of Consumer Research*, 20 (2), 157–69.

Dickson, Peter and Alan G. Sawyer (1990), "The Price Knowledge and Search of Supermarket Shoppers," *Journal of Marketing*, 54 (July), 42–53.

Folkes, Valerie and Shashi Matta (2004), "The Effect of Package Shape on Consumers' Judgments of Product Volume: Attention as a Mental Contaminant," *Journal of Consumer Research*, 31 (2), 390–401.

Geier, Andrew B., Paul Rozin, and Gheorghe Doros (2006), "Unit Bias: A New Heuristic That Helps Explain the Effect of Portion Size on Food Intake," *Psychological Science*, 17 (6), 521–25.

Hagtvedt, Henrik (2011), "The Impact of Incomplete Typeface Logos on Perceptions of the Firm," *Journal of Marketing*, 75 (July), 86–93.

Hull, Clark L. (1932), "The Goal-Gradient Hypothesis and Maze Learning," *Psychological Review*, 39 (1), 25–43.

Kahn, Barbara E. and Brian Wansink (2004), "The Influence of Assortment Structure on Perceived Variety and Consumption Quantities," *Journal of Consumer Research*, 30 (4), 519–33.

Katz, David L. (2009), "Top 10 Rules for Eating Right," *O, The Oprah Magazine*, (August), (accessed October 18, 2013), [available at http://www.oprah.com/health/Dr-Katzs-Rules-for-Healthy-Eating-Maintain-a-Healthy-Weight/].

Kivetz, Ran, Oleg Urminsky, and Yuhuang Zheng (2006), "The Goal-Gradient Hypothesis Resurrected: Purchase Acceleration, Illusionary Goal Progress, and Customer Retention," *Journal of Marketing Research*, 43 (February), 39–58.

Krider, Robert E., Priya Raghubir, and Aradhna Krishna (2001), "Pizzas: π or Square? Psychophysical Biases in Area Comparisons," *Marketing Science*, 20 (4), 405–425.

Men's Health (2013), "14 Restaurant Survival Strategies," (accessed October 18, 2013), [available at http://eatthis.menshealth.com/slideshow/print-list/77711].

Nisbett, Richard E. and Timothy D. Wilson (1977), "Telling More Than We Can Know: Verbal Reports on Mental Processes," *Psychological Review*, 84 (3), 231–59.

Nunes, Joseph C. and Xavier Drèze (2006), "The Endowed Progress Effect: How Artificial Advancement Increases Effort," *Journal of Consumer Research*, 32 (4), 504–512.

Parasuraman, A., Valerie A. Zeithaml, and Leonard L. Berry (1994), "Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Further Research," *Journal of Marketing*, 58 (January), 111–24.

Pelham, B.W., Tin T. Sumarta, and Laura Myaskovsky (1994), "The Easy Path from Many to Much: The Numerosity Heuristic," *Cognitive Psychology*, 26 (2), 103–133.

Peracchio, Laura A. and Joan Meyers-Levy (1994), "How Ambiguous Cropped Objects in Ad Photos Can Affect Product Evaluations," *Journal of Consumer Research*, 21 (2), 190–204.

Preacher, Kristopher J. and Andrew F. Hayes (2008), "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models," *Behavior Research Methods*, 40 (3), 879–91.

Raghubir, Priya and Aradna Krishna (1999), "Vital Dimensions in Volume Perception: Can the Eye Fool the Stomach?" *Journal of Marketing Research*, 36 (November), 313–26.

Redden, Joseph P. and Jeff Galak (2013), "The Subjective Sense of Feeling Satiated," *Journal of Experimental Psychology: General*, 142 (1), 209–217.

Ritchie, Timothy D., John J. Skowronski, Sarah E. Wood, W. Richard Walker, Richard J. Vogl, and Jeffrey A. Gibbons (2006), "Event Self-Importance, Event Rehearsal, and the Fading Affect Bias in Autobiographical Memory," *Self and Identity*, 5 (2), 172–95.

Savitsky, Kenneth, Victoria H. Medvec, and Thomas Gilovich (1997), "Remembering and Regretting: The Zeigarnik Effect and the Cognitive Availability of Regrettable Actions and Inactions," *Personality and Social Psychology Bulletin*, 23 (3), 248–57.

Sengupta, Jaideep and Gerald J. Gorn (2002), "Absence Makes the Mind Grow Sharper: The Effect of Element Omission on Subsequent Recall," *Journal of Marketing Research*, 39 (May), 186–201.

Shiv, Baba and Alexander Fedorikhin (1999), "Heart and Mind in Conflict: The Interplay of Affect and Cognition in Consumer Decision Making," *Journal of Consumer Research*, 26 (3), 278–92.

Skitka, Linda J., Christopher W. Bauman, and Elizabeth E. Mullen (2004), "Political Tolerance and Coming to Psychological Closure Following September 11, 2001: An Integrative Approach," *Personality and Social Psychology Bulletin*, 30 (6), 743–56.

Veryzer, Robert W. and J. Wesley Hutchinson (1998), "The Influence of Unity and Prototypicality on Aesthetic Responses to New Product Design," *Journal of Consumer Research*, 24 (4), 374–85.

Wansink, Brian (2004), "Environmental Factors That Increase the Food Intake and Consumption Volume of Unknowing Consumers," *Annual Review of Nutrition*, 24 (1), 455–79.

——— (2006), *Mindless Eating: Why We Eat More Than We Think*. New York: Bantam-Dell.

——— and Koert Van Ittersum (2003), "Bottoms up! The Influence of Elongation on Pouring and Consumption Volume," *Journal of Consumer Research*, 30 (3), 455–63.

Zeigarnik, Bluma W. (1927), "Studies Concerning Action and Affect Psychology, III. The Retaining of Completed and Uncompleted Actions," *Pyschologische Forschung*, 9 (1), 1–85.

Zhao, Xinshu, John G. Lynch Jr., and Qimei Chen (2010), "Reconsidering Baron and Kenny: Myths and Truths About Mediation Analysis," *Journal of Consumer Research*, 37 (4), 197–206.