The Impact of Add-On Features on Consumer Product Evaluations

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The research presented in this article provides evidence that add-on features sold to enhance a product can be more than just discretionary benefits. We argue that consumers draw inferences from the mere availability of add-ons, which in turn lead to significant changes in the perceived utility of the base good itself. Specifically, we propose that the improvements supplied by add-ons can be classified as either alignable or nonalignable and that they have opposing effects on evaluation. A set of four experiments with different product categories confirms this prediction. In addition, we show that the amount of product information available to consumers and expectations about product composition play important moderating roles. From a practical standpoint, these results highlight the need for firms to be mindful of the behavioral implications of making add-ons readily available in the marketplace.

In many markets, firms customarily sell a product and provide separate "add-on" features at extra cost. Add-ons are discretionary benefits that provide utility only if consumed with the corresponding base good (Guiltinam 1987). For instance, restaurant menus list toppings, condiments, and other ingredients that patrons can add to complement a standard order. Manufacturers of electronic equipment such as digital cameras and laptop computers produce or source a wide range of accessories, including carrying cases and memory cards. Car dealers urge prospective buyers to consider accessory packages and extended warranties when they purchase a new vehicle. Airlines provide meal service, alcoholic beverages, and in-flight entertainment on domestic routes for an additional fee. Fitness centers price amenities

such as locker rentals, towels, and selected group activities separately from basic membership.

As the commercial appeal of add-ons continues to grow, it becomes increasingly important to understand their role in the marketplace. One common view in the literature is that add-ons are an instrument for price discrimination and that the base good and the augmented good (the base good plus the extra features) represent two quality levels that firms sell at different prices (Ellison 2005; Guiltinam 1987). A second view is that firms use add-ons to exploit myopic buyer behavior. According to this claim, firms can charge high markups for add-ons because people generally fail to anticipate a future need for added functionality and, consequently, purchase base goods without taking into account the added cost of extra features (Ellison 2005; Gabaix and Laibson 2006). Finally, from the standpoint of the consumer, marketing research on product assortment suggests that people benefit from the availability of add-ons as long as these provide greater choice and there is sufficient heterogeneity or variety-seeking behavior in the marketplace (Bayus and Putsis 1999; Hoch, Bradlow, and Wansink 1999).

While these varied perspectives certainly touch on important issues, we further argue that add-on features can influence the perceived value of the base good itself. In particular, we suggest that the mere presence of an add-on provides information that consumers who are uncertain about a product's utility use to form or update their preferences. By characterizing the add-on space according to the specific type of improvement supplied by the firm—as "alignable" when the add-on enhances an existing feature

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of the product and as "nonalignable" when the add-on introduces a new capability—we propose two independent effects: alignable add-ons influence evaluation by shifting the reference level of the attributes related to the add-ons, while nonalignable add-ons do so by cueing a general inference about overall product value.

The objective of our experiments is to demonstrate these inferential processes and to specify conditions under which the presence of an add-on is beneficial or, more surprisingly, detrimental to product evaluation. To do this, we contrast situations in which different types of add-ons are either present or absent. The first study shows that offering alignable add-ons can render a base good less appealing, whereas offering nonalignable add-ons has the exact opposite effect. Notably, we also find that, irrespective of type, add-ons have no impact on evaluation when people possess sufficient information to judge a product's value independently. Study 2 replicates the main results of the initial experiment in a different category and tests the moderating role of consumer expectations about product composition. Study 3 focuses on alignable options, exposing participants to either add-ons or "strip-downs" (optional downgrades), in an effort to show that the initial negative effect on evaluation can be reversed. Finally, study 4 manipulates the perceived quality of nonalignable add-ons to similarly try to elicit both positive and negative inferences about product utility. We conclude with the results of a field experiment involving a coffee tasting and a discussion of the theoretical and practical implications of our findings.

ADD-ON ALIGNABILITY AND PRODUCT EVALUATION

The theoretical argument we outline in this section reflects the accepted notion that consumers often use peripheral cues as indicators of product utility (Ariely, Loewenstein, and Prelec 2003; Bettman, Luce, and Payne 1998; Tversky and Simonson 1993). Consistent with this view, we propose that under certain predictable conditions consumers draw conclusions about the value of a base good (the focal object) from a firm's decision to supply one or more add-on features (the contextual cues). More important, we further argue that the exact nature of this inference and its impact on perceived utility vary according to the type of improvement available at the time of evaluation.

To develop formal hypotheses we draw primarily on the attribute-alignability literature (Gentner and Markman 1994; Markman and Medin 1995; Medin, Goldstone, and Markman 1995; but see also Hsee [1996] and Nowlis and Simonson [1997] for related constructs). According to this line of thought, people perceive differences in products as either alignable or nonalignable. An alignable difference relates to some common characteristic of objects, such as when two or more options vary on the level of a shared attribute. In contrast, a nonalignable difference is a property of one object that has no direct correspondents in other objects, such as when one option offers a benefit that com-

peting alternatives do not. In the context of our research, firms supply alignable improvements when add-ons enhance features that base goods already possess. For example, consumers wanting to boost the zoom ratio of a digital camera or the processing speed of a laptop computer might purchase supplementary zoom lenses or processor upgrade cards, respectively. On the other hand, firms supply nonalignable improvements when add-ons introduce new capabilities. For the product categories above, common examples of nonalignable add-ons include tripods, carrying cases, and so on.

The concept of alignability has already received some attention in the marketing literature. For instance, Okada (2006) distinguished between alignable and nonalignable enhancements in her work on product-upgrade decisions, demonstrating that consumers are more likely to buy a next-generation offering when the improvements made to an existing product are predominantly nonalignable. In an earlier article, Gourville and Soman (2005) found that the effect of assortment size on brand choice is moderated by assortment type and that brand share is benefited by greater choice in the case of alignable assortments (i.e., branded variants differing along a single dimension) but harms it in the case of nonalignable assortments (i.e., branded variants offering different benefits). Earlier still, Zhang and Markman (1998) used alignability to explain how consumers learn about new brands and how late entrants in a market can outperform incumbents. The same authors also studied how alignability interacts with involvement to influence consumer preferences (Zhang and Markman 2001). Finally, Zhang and various colleagues looked at the effect of alignable and nonalignable differences on important marketing concepts such as choice satisfaction (Zhang and Fitzsimons 1999) and brand evaluation (Zhang, Kardes, and Cronley 2002).

The distinction between alignable and nonalignable add-ons is important for our research because consumers are likely to use different cognitive processes to assess these two types of improvements. A substantial number of studies show that evaluation shifts from dimensional to holistic processing as the comparability (alignability) of objects decreases (Hogarth 1987; Johnson 1984; Payne 1982; Russo and Dosher 1983; Sanbonmatsu, Kardes, and Gibson 1991; Slovic and MacPhillamy 1974). This pattern is consistent with the idea that decision strategies are governed by trade-offs between cognitive effort and accuracy (Johnson and Payne 1985; Shugan 1980). Dimensional processing is generally preferred by consumers because it places less strain on mental resources (Russo and Dosher 1983). As the overlap between objects decreases, however, direct comparisons become more taxing and ultimately give way to more general, alternative-based judgments.

We build on this basic finding to suggest that alignable add-ons influence evaluation by shifting the reference level of the same features they modify (an attribute-level inference) and that nonalignable add-ons influence evaluation by triggering an overall reassessment of product value (a product-level inference). With respect to the first prediction, the psychological mechanism we have in mind is akin to a range

effect (Parducci 1968; Volkmann 1951). In particular, we believe the presence of an alignable add-on establishes a range of attribute values that consumers then use to judge the performance of the base good. The endpoints of this range are the level initially specified in the product (the lower bound) and the level obtainable by purchasing the add-on (the upper bound). Range theory posits that the attractiveness of any stimulus is inferred by its position within the range of possible values (Janiszewski and Lichtenstein 1999; Parducci 1968; Volkmann 1951; Yeung and Soman 2005), which implies that a product's original attribute level will be judged less favorably when an alignable add-on is available than when no such option exists.

This argument captures the simple intuition that a consumer presented with the opportunity to add, for example, 32 megabytes (MB) of memory to a digital camera might suddenly find the standard 64 MB unsatisfactory because the potential on this dimension (i.e., the upper bound of the range) has increased to 96 MB (64 MB + 32 MB). Importantly, if we assume that the overall utility of a good is some additive function of the utility of each attribute (Keeney and Raiffa 1993), then the value of the product as a whole should also suffer. More formally:

H1: Consumers uncertain about the value of a product will judge it to be less appealing when the firm offers an alignable add-on than when no such option exists.

The inferential process underlying the case of nonalignable add-ons is expected to be different. Here, dimensional processing is no longer an option because the added feature is new to the product. Although consumers now lack a natural frame of reference with which to judge this improvement, its novelty is likely to make cognitions about the add-on salient at the time of evaluation. General attitudes toward a salient object have been found to trigger similar attitudes toward broader, related objects (Beckwith and Lehmann 1975; Holbrook 1983; Kardes, Posavac, and Cronley 2004)—a result commonly referred to as the "halo effect." In the same way, we argue that a consumer's attitudes toward a nonalignable add-on can shape attitudes toward the base good.

Using the same example as above, we argue that a consumer presented on this occasion with the opportunity to buy a nonalignable add-on such as a tripod might transfer beliefs about this object to the digital camera. Since in most situations we expect firms to supply nonalignable add-ons that are viewed favorably by consumers, this will result in a positive halo effect. Therefore, we predict:

H2: Consumers uncertain about the value of a product will judge it to be more appealing when the firm offers a nonalignable add-on than when no such option exists.

Note that both hypotheses 1 and 2 involve consumer uncertainty. As discussed earlier, this is the case because contextual inferences in decision making occur predominantly when people lack sufficient knowledge to assess alternatives with confidence (Bettman et al. 1998; Broniarczyk and Alba 1994; Huber and McCann 1982). Therefore, the implication for our theory is that the predicted effects of add-ons on evaluation should be contingent on the amount of product information available to consumers in the marketplace and that additional information reduces uncertainty and therefore weakens or even cancels out any potential impact. We formalize this possibility in the third hypothesis:

H3: The effects of alignable and nonalignable add-ons on evaluation, as predicted by hypotheses 1 and 2, weaken as consumer uncertainty about the potential value of the product diminishes.

Finally, despite the fact that alignability is defined in terms of the physical properties of objects (e.g., a product's attributes), recent studies suggest that people's perceptions of alignability may in fact be influenced by a variety of dispositional and situational factors (Zhang and Markman 2001). One variable we believe might play a significant role in our research is consumer expectations. Consequently, we are interested in examining what happens to the effect predicted by hypothesis 1 when an add-on enhances a feature consumers are not expecting to find in the base good. Similarly, what happens to the effect predicted by hypothesis 2 when an add-on introduces a feature consumers believe should already be available in the base good?

In practice, these two mismatches are seldom likely to occur because firms and consumers interact constantly in the marketplace—on the one hand, firms rely on consumer input when developing new offerings; on the other, consumers form expectations about products based on the alternatives already available to them. Nonetheless, from a theoretical standpoint it is important that we try to decouple these factors to better understand the limitations of alignability. The likely scenario is that the effects stated in hypotheses 1 and 2 are attenuated: an alignable add-on ceases to raise questions about the attribute it modifies when that attribute is unexpected, while a nonalignable add-on ceases to be a signal of product value when that feature is not in fact novel or distinct. This reasoning leads us to our final hypothesis:

H4a: The effect of alignable add-ons on evaluation predicted by hypothesis 1 is limited to improvements for features consumers expect to find in the product.

H4b: The effect of nonalignable add-ons on evaluation predicted by hypothesis 2 is limited to improvements for features consumers do not expect to find in the product.

STUDY 1

Design and Participants

The objective of our first study was to test hypotheses 1, 2, and 3. In the main experiment, participants ($n = 174$)

read information about a new digital camera and then answered a series of questions related to this product. Respondents were approached in the libraries of three large universities in London and were recruited to fill out a short paper-and-pencil survey in exchange for a candy bar.

The stimulus handed out to participants explained that digital cameras generally differ according to the levels of four key attributes: focus, zoom ratio, memory size, and sensor pixels. Following a brief (one-paragraph) explanation of each feature, participants saw a table listing the specifications of the model in question (table 1).

Note that these features were selected on the basis of a pretest conducted with a separate sample ($n = 67$) to ensure that the product profile used in the experiment matched people's expectations of digital cameras (we manipulated expectations directly in study 2). To achieve this, participants saw a list of nine attributes and evaluated each one on three separate dimensions (Cronbach's $\alpha = .84$): (1) "Do you expect this feature to be included in the product?" ($1 =$ definitely should be sold separately, $10 =$ definitely should be part of the product), (2) "To what extent do you feel this feature is a central component of the product?" ($1 =$ definitely a peripheral feature, $10 =$ definitely a central feature), and (3) "Would you be surprised if this feature is only available as an add-on?" ($1 =$ not at all surprised, $10 =$ very surprised). We picked the four attributes respondents associated most strongly with digital cameras to create the fictional product (focus $M = 9.30$, zoom ratio $M = 9.00$, memory size $M = 8.43$, and sensor pixels $M = 8.26$). We also took note of the two attributes with the lowest aggregate scores (portable photo printer $M = 2.60$ and tripod $M = 2.70$).

The experiment itself used a 3×2 between-subjects factorial design. We manipulated the first factor, add-on type, across three levels. In the control condition there was no mention of optional features. In the treatment conditions, however, two add-ons offered either alignable (a 32 MB memory card and a $1.5\times$ zoom lens) or nonalignable (a tripod and a portable photo printer) improvements to the digital camera. The stimulus clearly stated that these add-ons were offered separately and could only be purchased, if desired, at extra cost. We manipulated the second factor, product information, across two levels: half of the participants received no additional information about the product, while the other half were told that *Consumer Reports*, a magazine that independently reviews many consumer goods,

had recently given this model a quality rating of 8.5 out of 10.

The decision to use different features for each type of add-on was made to ensure that the set of attributes describing the digital camera remained constant—an attribute improvement cannot be both alignable and nonalignable without a corresponding change in the specifications of the base good. While this approach was necessary to make sense of participants' responses, it introduced the possibility that effects (if any) were due to the features themselves rather than to alignability. We believe that because we used different product categories and, therefore, different add-ons in each of our experiments, this scenario is unlikely. Moreover, in study 3 we found direct support for the psychological mechanism we propose, further reducing the likelihood that our findings are due to some artifact of the stimulus we chose.

After reading their version of the scenario, participants evaluated the base good using three 8-point scales: perceived quality ($1 =$ very low quality, $8 =$ very high quality), probability of liking the product ($1 =$ very low, $8 =$ very high), and fit with personal needs ($1 =$ strongly disagree, $8 =$ strongly agree). To check whether the inclusion of additional information about the product reduced uncertainty, we also asked respondents to rate how confident they were in their assessment of the digital camera ($1 =$ not at all confident, $8 =$ very confident).

Results and Discussion

As a first step, we examined the confidence ratings via a 3 (add-on type) $\times$ 2 (product information) between-subjects ANOVA. Consistent with our intention, the quality score from *Consumer Reports* increased the level of self-reported confidence in the evaluation of the digital camera ($M_{CR} = 4.34$ vs. $M_{\text{no info.}} = 3.43$; $F(1, 162) = 10.50$, $p = .001$, $\eta^2 = .06$). Neither the main effect of add-on type ($p = .347$) nor the interaction effect ($p = .903$) proved significant.

Next, a reliability analysis of the three product-evaluation questions indicated that these scales were sufficiently correlated to collapse into one overall assessment of the base good (Cronbach's $\alpha = .77$). We analyzed this aggregate measure using a 3×2 between-subjects ANOVA. We observed a main effect of add-on type ($F(2, 168) = 4.89$, $p = .009$, $\eta^2 = .06$) but no main effect of product information ($p = .556$). More important, we found the anticipated interaction between these two factors ($F(2, 168) = 6.35$, $p = .002$, $\eta^2 = .07$). Mean responses across conditions are displayed in figure 1.

Finally, to test our hypothesis we conducted both trend analyses and planned contrasts. We used one-tailed tests for these and all other contrasts in the article with directional predictions. As is evident from figure 1, as we expected, when participants had no independent information to aid their evaluations, judgments were affected by the availability of alignable and nonalignable add-ons. Importantly, we observed a significant linear trend ($F(1, 82) = 22.90$, $p < .001$) in which the perceived utility of the digital camera was
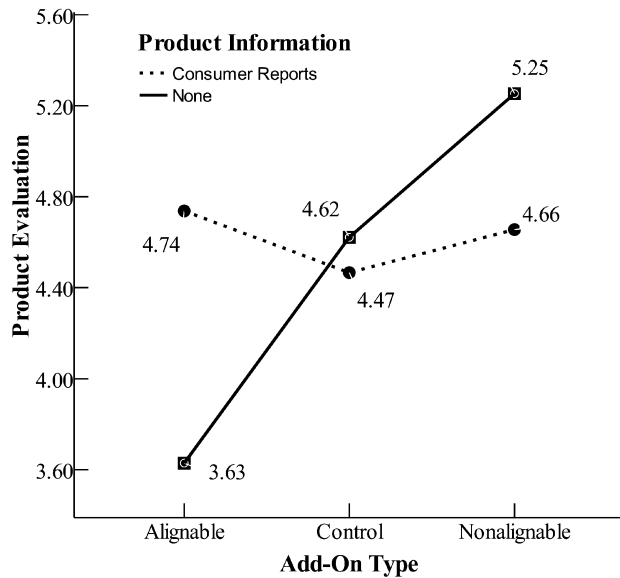
TABLE 1

STUDY 1: DIGITAL CAMERA SPECIFICATIONS

Attribute	Level
Focus	7.4-point auto
Zoom ratio	3.0× digital
Memory size	64 megabytes (MB)
Sensor pixels	4.5 million

FIGURE 1

STUDY 1: PRODUCT EVALUATION AS A FUNCTION OF
ADD-ON TYPE AND PRODUCT INFORMATION

lowest when alignable add-ons were offered ($M = 3.63$), moderate in the control condition ($M = 4.62$), and highest when the add-ons were nonalignable ($M = 5.25$). Planned contrasts pitted the control condition against each treatment condition, confirming that alignable add-ons damaged perceived value ($t(168) = -2.81$, $p = .003$) while nonalignable add-ons improved it ($t(168) = 1.89$, $p = .036$). These two results are consistent with hypothesis 1 and hypothesis 2, respectively.

According to hypothesis 3, additional product information reduces consumer uncertainty, which in turn lessens the impact of add-ons. In line with this prediction, the linear trend originally observed in the data was absent when the stimulus included a quality rating from *Consumer Reports* ($p = .837$). Furthermore, neither the contrast between the control ($M = 4.47$) and alignable add-ons ($M = 4.74$) conditions nor the contrast between the control and the nonalignable add-ons ($M = 4.66$) conditions proved significant ($p = .437$ and $p = .578$, respectively).

Admittedly, the operationalization of uncertainty in this experiment was strong. In particular, the inclusion of the *Consumer Reports* ratings in some conditions might have anchored evaluations of the digital camera to those scores, essentially inducing a demand or salience effect. Although we believe our approach mimics the actual purchase process of consumers, and the results of the manipulation check suggest that we ultimately controlled uncertainty as intended, perhaps a more subtle operationalization would have been to provide every participant with ratings and to vary instead the reliability (variance) of these data—expecting participants with more reliable information to behave in a manner consistent with hypothesis 3.

In sum, the results of study 1 lend initial support to the idea that add-ons can influence people's perceptions of products. From a practical standpoint, the role played by alignable add-ons is certainly more troubling because it suggests situations in which firms may unknowingly act to their detriment. In the remaining studies, we test hypothesis 4 and consider important extensions to hypotheses 1 and 2. We collect a richer set of outcome measures, including willingness to pay (WTP) and likelihood of purchase. We also try to capture the cognitive process of participants during evaluation as well as changes in reference attribute levels.

STUDY 2

The purpose of the second study was to test hypothesis 4. We argued that even though alignability is defined in terms of the physical properties of objects, consumers' expectations about product composition can interfere with the effects observed in study 1. Specifically, we were interested in showing two effects: (1) that an alignable add-on ceases to have a negative impact on evaluation when the targeted attribute is not expected to be part of the product (hypothesis 4a), and (2) that a nonalignable add-on ceases to have a positive impact on evaluation when this new attribute is expected to be part of the product (hypothesis 4b).

Participants

Participants ($n = 258$) were registered members of a subject pool managed by the Computer Lab for Experimental Research at Harvard Business School. At the time of the study, this pool had over 5,000 members and the mean age was 31 years. Approximately 61% of the members were female, and 87% had completed undergraduate education. Participation was voluntary, and respondents received a $5 payment upon completion. The data were collected in one sitting. However, for ease of exposition we report separate analyses for the two alignability options: study 2a examines the case of an alignable add-on, and study 2b examines the case of a nonalignable add-on.

Study 2a: Design, Results, and Discussion

The task required participants to first read background information about vacuuming robots and to then answer questions related to one specific product, the CleanMaster. Importantly, the stimulus included a review from *Consumer Reports* that explained in detail a series of standard features prospective buyers should consider when deciding between different alternatives. The stimulus also provided a lengthy description of the product itself. The physical configuration of the base good was held constant across all conditions and included the key attributes shown in table 2.

The data were analyzed in a 2×2 between-subjects factorial design. We manipulated add-on type, the first factor, across two levels: one group of participants received no information on accessories, while the other was informed of one alignable add-on (a docking station that recharges

TABLE 2

STUDY 2: VACUUMING ROBOT SPECIFICATIONS

Attribute	Level
Suction power	90 Watts
Processor speed	60,000 Hz vibrations
Vacuum duration	90 minutes
Dust collector size	1.1 quart
Battery charger	7.5 hours for a full battery

the battery 80% faster than the existing charger). We manipulated the second factor, attribute expectation, by varying the list of attributes mentioned by *Consumer Reports*. Given the unusual nature of the category, we reasoned that people would anchor their beliefs about product composition to this external information. As a result, for this part of the experiment the review either included or omitted information on the battery charger such that participants either expected or did not expect this feature.

After reading their respective scenario, participants first evaluated the CleanMaster by rating its perceived quality (1 = very low quality, 7 = very high quality) and the probability of liking the product (1 = very low, 7 = very high). They were then asked to estimate their maximum WTP (in U.S. dollars) and likelihood of purchase (1 = very unlikely, 7 = very likely). In terms of process measures, participants indicated whether their judgments were based predominantly on the attribute specifications in the stimulus (dimensional processing) or on an overall feeling or impression (holistic processing). We checked our manipulation of attribute expectation by asking whether they agreed with the statement "I expect vacuuming robots, including this model, to feature a battery charger" (1 = strongly disagree, 7 = strongly agree) and whether they would be surprised to learn that the product did not include a battery charger as standard (1 = not at all surprised, 7 = very surprised). Finally, where appropriate we measured the perceived quality of the docking station by asking participants whether they agreed with the statement "I think the docking station is of a high quality" (1 = strongly disagree, 7 = strongly agree).

First, to verify that we had manipulated the participants' beliefs about the battery charger as intended, we conducted a 2 × 2 between-subjects ANOVA on the averaged scores of the two manipulation-check questions (Cronbach's α = .85). As intended, we observed a main effect of attribute expectation ($M_{\text{exp.}}$ = 6.40 vs. $M_{\text{not exp.}}$ = 5.34; $F(1, 141)$ = 24.70, $p < .001$, η^2 = .15), but no effect of add-on type (p = .454) and no interaction between these two factors (p = .762). In addition, a one-sample t-test using the scale's middle point as a benchmark confirmed that the docking station was perceived to be of a high quality (M = 5.12; $t(73)$ = 7.86, $p < .001$).

Next, we analyzed the perceived utility of the Clean-Master by averaging the two evaluation scales (Cronbach's α = .72) and running a 2 × 2 ANOVA on the composite scores. This analysis returned a main effect of add-on type

($F(1, 141)$ = 6.00, p = .016, η^2 = .04) as well as a significant two-way interaction ($F(1, 141)$ = 3.96, p = .049, η^2 = .03). As suggested by panel A of figure 2, when participants anticipated a battery charger in the base good, we observed the same negative effect of alignable add-ons that we found in study 1 ($M_{\text{align.}}$ = 4.17 vs. M_{none} = 4.99; $t(141)$ = −3.29, $p < .001$). In support of hypothesis 4a, however, participants who did not expect this capability reported comparable evaluations when the docking station was offered (M = 4.79) and when it was not (M = 4.87; p = .755).

This pattern was replicated with the WTP and likelihood-of-purchase estimates. Before analyzing the WTP data we applied a square-root transformation to normalize the responses. A 2 × 2 ANOVA showed no effect of add-on

FIGURE 2

STUDY 2: PRODUCT EVALUATION AS A FUNCTION OF ADD-ON TYPE AND ATTRIBUTE EXPECTATION
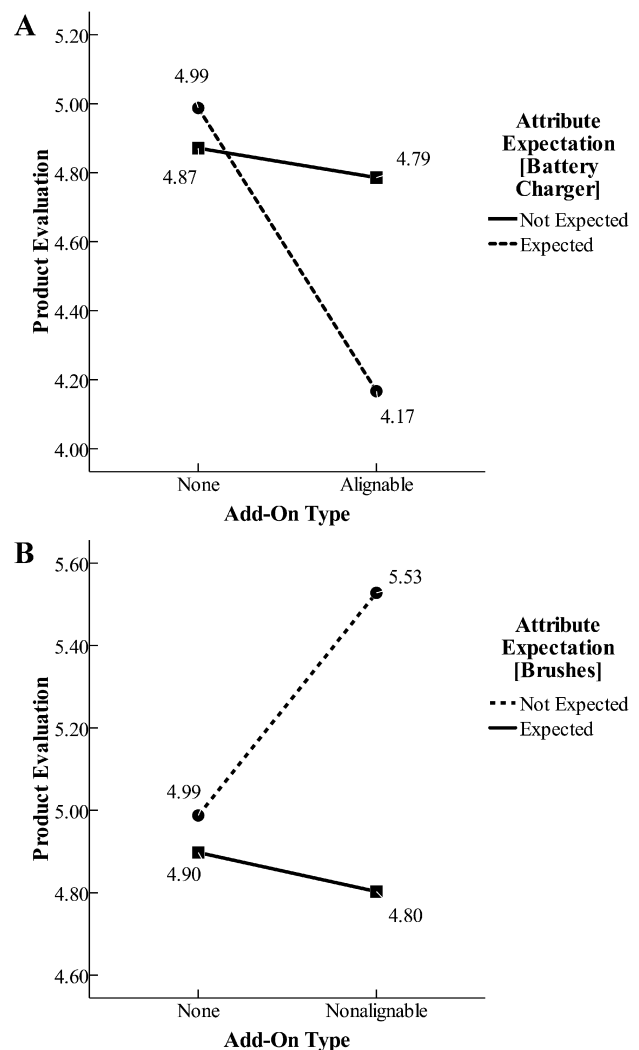
type ($p = .262$) or attribute expectation ($p = .437$), but the interaction term was once again significant ($F(1, 141) = 4.23$, $p = .042$, $\eta^2 = .03$). Similarly, the two-way interaction in an ANOVA with purchase intentions as the dependent variable was the only significant effect ($F(1, 141) = 6.67$, $p = .011$, $\eta^2 = .05$). Consistent with hypothesis 1, participants who expected a battery charger in a vacuuming robot reported a lower WTP ($M = 10.80$) and purchase intention ($M = 3.51$) for the CleanMaster when they were offered the docking station than when no such option existed (WTP $M = 12.50$; $t(141) = -2.36$, $p = .010$; likelihood of purchase $M = 4.53$; $t(141) = -2.68$, $p = .004$). Conversely, irrespective of whether the accessory was offered, participants who had no prior expectation for this attribute reported similar WTP ($M_{align.} = 12.32$ vs. $M_{none} = 11.82$; $p = .530$) and purchase intentions ($M_{align.} = 4.37$ vs. $M_{none} = 3.94$; $p = .294$).

Taken together, these results support hypothesis 4a and the notion that alignability, a physical property of objects, can be affected by people's expectations of those objects. Furthermore, when participants were asked to classify their evaluation process as either dimensional or holistic, the two strategies were selected equally in all conditions but one. Consistent with our intuition, the majority (71.8%) of participants who anticipated a battery charger and who were offered a docking station reported emphasizing attribute-specific information ($\chi^2(1) = 7.41$, $p = .003$). As indicated, this was not the case in the remaining conditions ($p = .857$, $p = .343$, and $p = .398$).

Study 2b: Design, Results, and Discussion

The setup and experimental design of study 2b was identical to that of study 2a except for some necessary changes to the stimulus. First, in the second add-on type condition, participants were offered a brush pack containing bristle, side, and flexible brushes (a nonalignable add-on) rather than the docking station. Second, we continued to manipulate attribute expectation through the *Consumer Reports* review, although the emphasis shifted to brushes. Specifically, we either included or omitted information on brushes to prime participants to expect or not expect this feature, respectively.

A 2 × 2 between-subjects ANOVA that used the averaged scores of the manipulation-check questions (Cronbach's $\alpha = .83$) as the dependent variable confirmed that expectations about brushes varied as intended ($M_{exp.} = 5.96$ vs. $M_{not\ exp.} = 5.46$; $F(1, 148) = 4.80$, $p = .030$, $\eta^2 = .03$). Neither the manipulation of add-on type ($p = .780$) nor the interaction term ($p = .616$) reached significance. In addition, a one-sample t-test confirmed that the brush pack was perceived to be of a high quality ($M = 5.00$; $t(72) = 7.32$, $p < .001$).

To examine participants' evaluations of the CleanMaster we first combined the scores from the two relevant scales (Cronbach's $\alpha = .67$). The ANOVA on this measure resulted in a main effect of attribute expectation ($F(1, 149) = 6.52$, $p = .012$, $\eta^2 = .04$) but no effect of add-on type ($p = .165$). As suggested by panel B of figure 2, we also

observed the expected two-way interaction ($F(1, 149) = 3.96$, $p = .049$, $\eta^2 = .03$). Consistent with hypothesis 4b, a planned contrast revealed that the brush pack, a nonalignable add-on, influenced evaluation only when this capability was not expected to be part of the base good: participants rated the CleanMaster as more appealing when the accessory was offered ($M_{nonalign.} = 5.53$) than when it was not ($M_{none} = 4.99$; $t(149) = 2.38$, $p = .009$). The same contrast in the conditions where brushes were expected failed to reach significance ($M_{nonalign.} = 4.80$ vs. $M_{none} = 4.90$; $p = .674$).

As was the case for the first subset of data, we observed similar results with WTP and purchase intentions. A 2 × 2 ANOVA on the square root of the WTP estimates yielded no main effects ($p_{att.\ exp.} = .126$, $p_{add\ type} = .463$) but a marginally significant interaction ($F(1, 149) = 2.92$, $p = .090$, $\eta^2 = .02$). Similarly, while there was no main effect in the ANOVA for likelihood of purchase ($p_{att.\ exp.} = .189$, $p_{add\ type} = .308$), the two-way interaction did reach significance ($F(1, 149) = 4.21$, $p = .024$, $\eta^2 = .03$). Consistent with hypothesis 2, participants who did not expect the CleanMaster to include brushes as a standard feature reported a higher WTP ($M = 14.25$) and purchase intention ($M = 5.33$) when they were offered the brush pack than when no such option existed (WTP $M = 12.50$; $t(149) = 1.72$, $p = .044$; likelihood of purchase $M = 4.53$; $t(149) = 2.17$, $p = .016$). Conversely, again confirming hypothesis 4b, we observed no difference in the participants' responses when brushes were already expected (WTP $M_{nonalign.} = 11.92$ vs. $M_{none} = 12.62$; $p = .491$; likelihood of purchase $M_{nonalign.} = 4.45$ vs. $M_{none} = 4.72$; $p = .466$).

In sum, we again found support for the argument that alignability is influenced by people's beliefs. Alignable add-ons appear to trigger range effects only when the attributes in question are expected to be in the product to start with. Nonalignable add-ons, on the other hand, appear to trigger halo effects only when the added features are novel and distinct from those that consumers expect to find in the core offering. Direct evidence of this last point is given by the participants' responses to measures reflecting dimensional and holistic processing. Similar to what we reported earlier, the two strategies were selected equally in all conditions but one. The majority (66.7%) of participants who were offered the brush pack and did not expect the CleanMaster to include this feature indicated that their assessment was guided mostly by a general attitude or feeling ($\chi^2(1) = 4.00$, $p = .023$). The same test in the remaining conditions was not significant ($p = .631$, $p = .343$, and $p = .330$).

STUDY 3

Study 3 was conducted with two goals in mind. First, we wanted to extend our understanding of alignable options by also considering situations in which firms supply discretionary downgrades (i.e., strip-downs). We had already demonstrated the negative impact of alignable add-ons on product evaluation, WTP, and likelihood of purchase. We now wanted to show that the mere option of reducing the per-

formance of an attribute is sufficient to trigger a similar inferential process and a similar effect, albeit in the opposite direction: strip-downs are expected to influence evaluation by decreasing (rather than increasing) the reference level of the features they modify. Second, we wanted to provide more direct support for this range-effect argument. To achieve this, we asked participants to specify the level of performance they felt was appropriate for certain attributes of the base good.

Design and Participants

One hundred and forty-eight participants were recruited from the same subject pool and through the same procedure as in study 2. They read information about a new laptop computer and then answered a series of questions related to this product. The first part of the stimulus explained that laptop computers generally differ according to the levels of four key attributes: processor speed, hard drive size, operating system, and disk drive type. These features were selected on the basis of the results of the same pretest described in study 1 (respondents repeated the procedure for two product categories). The mean overall scores in this case were the following (Cronbach's $\alpha = .77$): processor speed $M = 9.81$, hard drive size $M = 9.38$, operating system $M = 9.06$, and disk drive $M = 8.88$. Following a brief (one-paragraph) explanation of each feature, participants saw a table listing the specifications of the model in question (table 3).

The experiment manipulated a single factor, add-on type, across three between-subjects conditions. In the control condition there was no mention of add-ons or strip-downs. In the two treatment conditions, however, respondents were told that the manufacturer supplied either add-ons (a 1.0 GHz processor upgrade card and a 20 GB hard drive expansion pack) or strip-downs (a 1.0 GHz processor downgrade and a 20 GB hard drive reduction). Where applicable, the stimulus clearly stated that the add-ons were offered separately and could only be purchased, if desired, at extra cost. A similar phrase, referring to a discount, was used in the case of strip-downs.

After reading this short scenario, participants first evaluated the base good using three 8-point scales: perceived quality (1 = very low quality, 8 = very high quality), probability of liking the product (1 = very low, 8 = very high), and fit with personal needs (1 = strongly disagree, 8 = strongly agree). Second, they indicated the maximum

TABLE 3

STUDY 3: LAPTOP COMPUTER SPECIFICATIONS

Attribute	Level
Processor speed	2.0 gigahertz (GHz)
Hard drive size	40 gigabytes (GB)
Operating system	Windows XP
Disk drive	CD/DVD combo

price (in U.S. dollars) they would be willing to pay for the product. Third, we elicited numerical values for processor speed (in GHz) and hard drive size (in GB) that participants felt were appropriate for a typical laptop computer.

Results and Discussion

The three evaluation scales were combined into one rating by averaging the individual scores (Cronbach's $\alpha = .84$). A one-way ANOVA using add-on type as the between-subjects factor indicated that people's judgments varied significantly across the three conditions ($F(2, 145) = 10.03$, $p < .001$, $\eta^2 = .12$). The pattern of responses displayed the anticipated linear trend ($F(1, 145) = 19.76, p < .001$). Compared with the control condition ($M = 5.57$), participants rated the same laptop computer less favorably when the firm offered alignable add-ons ($M = 4.90$; $t(145) = -2.72$, $p = .004$) but more favorably when the firm offered alignable strip-downs ($M = 6.00$; $t(145) = 1.68$, $p = .047$). The first result is consistent with hypothesis 1 and replicates what we observed in the two previous studies. The second result is an extension of hypothesis 1 and demonstrates that alignable strip-downs have a similar but opposite effect on evaluation.

For the WTP estimates, we first applied a square-root transformation to the data and then conducted a one-way ANOVA with add-on type as the between-subjects factor. Similar to the overall evaluation, we observed a significant effect of add-on type ($F(2, 145) = 7.81$, $p = .001$, $\eta^2 = .10$) and a significant linear trend ($F(1, 145) = 15.37$, $p < .001$). As suggested by hypothesis 1, participants who were offered alignable add-ons expressed a lower WTP than those in the control condition. This difference was marginally significant ($M = 26.30$ vs. $M = 28.14$; $t(145) = -1.54$, $p = .063$). Meanwhile, participants shown alignable strip-downs reported the highest WTP ($M = 31.04$), a significant increase over the control condition ($t(145) = 2.35$, $p = .010$).

Finally, with respect to participants' estimates of appropriate levels for processor speed and hard drive size, in both cases the reported reference points varied significantly across the add-on type conditions (processor speed $F(2, 145) = 8.81$, $p < .001$, $\eta^2 = .11$; hard drive size $F(2, 145) = 9.15$, $p < .001$, $\eta^2 = .11$). For processor speed we observed a significant linear trend ($F(1, 145) = 17.59$, $p < .001$) in which scores increased in the presence of alignable add-ons ($M = 2.58$ vs. $M = 2.27$; $t(145) = 1.99$, $p = .024$) but decreased in the presence of alignable strip-downs ($M = 1.91$ vs. $M = 2.27$; $t(145) = -2.17$, $p = .016$). The data for hard drive size revealed the same pattern ($F(1, 145) = 18.30$, $p < .001$): the attribute level reported as appropriate in the add-on condition was significantly higher than that reported in the control condition ($M = 54.85$ vs. $M = 47.00$; $t(145) = 2.10$, $p = .019$), but the opposite was true in the case of strip-downs ($M = 38.70$ vs. $M = 47.00$; $t(145) = -2.14$, $p = .017$).

Overall, the purpose of this experiment was to show that a consumer's assessment of a base good could also be affected by the presence of strip-downs. We tested this prop-

osition as a logical extension to the more common case of add-ons. Our findings support the hypothesis that an alignable modification of any kind can influence perceived product utility. We further showed that both add-ons and strip-downs can affect people's beliefs about what constitutes an appropriate attribute level, thereby further demonstrating that dimensional processing underlies the inferences made by participants. In our final study we conducted a similar test, this time focusing on nonalignable add-ons.

STUDY 4

Our last study was conducted in part to delve deeper into the relationship between nonalignable add-ons and product evaluation. When we think about this type of add-on, we typically expect firms to concentrate on features that are viewed favorably by consumers. From a conceptual point of view, however, the literature on halo effects suggests that a transfer of attitudes from one object to another can occur irrespective of the valence of those attitudes (Kardes et al. 2004). For that reason, one objective of this experiment was to test whether changes in the perceived quality of nonalignable add-ons have corresponding effects on the evaluation of a base good.

The other objective of study 4 was to shed some light on an important applied problem. In consumer electronics, as well as in many other product categories, firms typically license part or all of the supply of add-ons to third parties. Given this practice and the resulting concerns that licensors might have about quality control, we wanted to determine whether the effects of nonalignable add-ons persist even when firms other than the manufacturer of the base good provide these features.

Design and Participants

To study these two questions we developed a scenario involving the purchase of a fictional MP3 player called the Insignia Sport Companion. The stimulus contained information about this product along with one image. Specifically, the text reproduced an extract from the manufacturer's Web site that read, "Enjoy clear, crisp, and portable digital music with this 4GB MP3 player featuring a built-in FM tuner for when you want to hear the latest tracks. Features include: (1) 4GB internal flash storage that holds up to 1,000 songs or 4,000 photos, (2) pocket-size design that measures just over 0.5″ thin and weighs only 1.2 ounces, and (3) support for MP3, WMA, WMA-DRM, Audible, and JPEG formats. The Insignia Sport Companion retails for £59.95."

Participants ($n = 83$) were graduate students at the London Business School who completed this and other unrelated tasks as part of an in-class assignment. The experiment manipulated a single factor, add-on type, across three between-subjects conditions. In the control condition, participants evaluated the MP3 player on its own. In both treatment conditions, however, respondents were told that a third-party provider sold a set of portable speakers and an entertainment dock (for wireless connection to a home theater or personal computer) specifically designed for this model. The stimulus clearly stated that these accessories were offered separately and could only be purchased, if desired, at extra cost. In one case the supplier was Bose, a well-known firm described as a "reputable manufacturer of high-performing audio products." In the other case the supplier was Argos, a popular "deep-discount wholesaler" in the United Kingdom.

One potential limitation imposed by this setup is that the perceived quality of the two accessories might have been influenced by the existing reputations of Bose and Argos. We did not control for this possibility in the experiment because we focused more on replicating a situation that occurs frequently in practice. That said, the next section of the article describes an experiment in which we manipulated the perceived quality of add-ons and controlled for other possible associations.

After reading this short scenario, respondents first evaluated the base good on four related dimensions: perceived quality (1 = very low quality, 8 = very high quality), probability of liking the product (1 = very low, 8 = very high), fit with personal needs (1 = strongly disagree, 8 = strongly agree), and perceived deal at the retail price of £59.95 (1 = a very bad deal, 8 = a very good deal). Second, they were asked to rate the perceived quality of the accessories on a 1 (very low quality) to 8 (very high quality) scale.

Results and Discussion

To determine whether we had successfully manipulated the attractiveness of the various accessories, we ran a planned contrast between the two add-on conditions. As intended, this test revealed a significant difference: even though the portable speakers and entertainment dock were identical across conditions, the statement that Bose was the manufacturer led to a higher quality rating ($M = 6.85$) than when Argos was mentioned ($M = 3.33$; $t(54) = 9.10$, $p < .001$).

Next, we analyzed the answers to the four evaluation questions. We averaged the individual scores (Cronbach's $\alpha = .79$) and then conducted a one-way ANOVA using add-on type as the between-subjects factor. The omnibus test indicated that the perceived utility of the Insignia Sport Companion varied significantly across the three experimental conditions ($F(2, 79) = 7.21$, $p = .001$, $\eta^2 = .15$). We observed a linear trend similar to those encountered in studies 1 and 3 ($F(2, 79) = 7.21$, $p = .001$). More important, as compared with the control condition ($M = 4.07$), participants judged the base good to be more appealing when flanked by nonalignable add-ons of high quality ($M = 4.72$; $t(79) = 1.99$, $p = .025$) but less appealing when the perceived quality of these accessories was low ($M = 3.54$; $t(79) = -1.69$, $p = .048$). The first of these results is consistent with hypothesis 2 and replicates our earlier findings. The second result is important because it provides further evidence that holistic processing underlies the inferences participants made.

GENERAL DISCUSSION

Prior research in marketing has shown that consumers often draw inferences about a product's utility on the basis of contextual cues (Bettman et al. 1998; Broniarczyk and Alba 1994; Huber and McCann 1982). The results of our experiments lend further support to this idea and make a compelling case that add-on features can influence consumer behavior beyond what their inherent value would suggest.

The theoretical argument we put forward builds on existing research on attribute alignability. We began by classifying add-ons according to the type of improvement they provide: alignable add-ons enhance existing product features, and nonalignable add-ons introduce new features. Next, we predicted that consumers would process these changes in different ways and that, as a result, add-ons would have different effects on perceived product utility. Specifically, we believe that alignable add-ons affect evaluation by shifting the reference level of the same attributes they modify. Nonalignable add-ons, on the other hand, are expected to have an impact by cueing more general, attitude-based inferences about product value. The main goal of our experiments was to map out these two inferential processes and to demonstrate that, surprisingly, add-ons can have both positive and negative effects on consumers' judgments of products. Two additional objectives were to show that the amount of information available to consumers at the time of evaluation and their expectations about the configuration of a base good could play important moderating roles.

Summary of Findings

We tested the link between add-on type and perceived product utility across four studies. In study 1, we examined a product category, digital cameras, for which alignable and nonalignable improvements are normally sold in order to show both effects on the same base good. On the basis of a pretest, we constructed an offering composed of attributes that consumers expect to find in a typical digital camera. In the experiment, we found that add-ons that introduce new features (e.g., a tripod) led participants to rate this product more favorably. Conversely, add-ons that upgrade existing capabilities (e.g., a zoom lens) affected evaluation negatively. Furthermore, we found that these opposing effects waned when participants received sufficient independent information to judge the digital camera on its own—a common result in studies of context-dependent preferences.

The purpose of the next experiment was to replicate the main findings of study 1 and to test a second potential moderating factor: consumer expectations. Specifically, we predicted that the range effect associated with an alignable add-on would occur only when consumers expected that attribute to be part of the product. Similarly, we also predicted that the halo effect associated with a nonalignable add-on would occur only when consumers did not expect that attribute to be part of the product. The data confirmed our intuition, as the effects of both types of add-ons previously demonstrated vanished when the above conditions were not met. More-over, we observed that participants who were presented with an alignable add-on were more likely to describe their evaluation of the digital camera as dimensional rather than holistic and that the opposite was true of participants presented with a nonalignable add-on.

The two remaining studies were conducted to test extensions of hypotheses 1 and 2 and to collect more evidence of the psychological process we proposed. Study 3, for example, was motivated by the thought that all alignable modifications should affect evaluation irrespective of whether they represent an increase or a decrease in performance. In the experiment, participants evaluated a fictional laptop computer. We were able to replicate the negative effect of alignable add-ons. More important, when participants were presented instead with two strip-downs, this outcome was reversed, and the laptop computer was rated more favorably than in the control condition.

Similarly, in study 4 we tested whether the initial positive effect of nonalignable add-ons could be reversed. This is plausible from a theoretical perspective because halo effects can occur for both positive and negative attitudes. In the experiment, we manipulated the perceived quality of the firm supplying add-ons for an MP3 player to try to elicit this reversal. We created a scenario in which the base good and the add-ons were not manufactured by the same firm because we also wanted to test whether the effects observed in the preceding experiments can occur when third-party vendors are involved. As expected, the experiment showed that nonalignable add-ons sold by an independent firm with a reputation for low-quality offerings hurt the perceived value of the MP3 player and that the opposite was true when this firm had a reputation for high-quality offerings.

Implications and Future Research

The existing research on the impact of added features on consumer behavior focuses predominantly on how firms can differentiate a product by modifying it over time or by marketing a series of branded variants (Bergen, Dutta, and Shugan 1996; Nowlis and Simonson 1996). The phenomenon we studied here is related to these popular product-differentiation strategies, yet it is unique in at least three ways. First, the firm supplying the innovation need not be the same as the manufacturer of the base good. Second, with single-product innovation and branded variants, firms are susceptible to cannibalization. Cannibalization is not an issue in our case because consumers must purchase the base good if they want to benefit from the additional functionality provided by add-ons. Third, because add-ons are optional and separate, there is a clear distinction between what constitutes the base good and what constitutes the set of accessories that complement it. This dissociation allows for significant interactions to occur between different characteristics of add-ons (their type, level, valence, etc.) and the product itself.

That said, we believe there is considerable scope for future research to clarify the different strategies for product differentiation. From a behavioral perspective, one possibility

is to examine the advantages and disadvantages of each approach both in isolation and in a competitive setting. The latter option is particularly interesting if we bear in mind that our own research focused on the psychological consequences of offering add-on features without really considering how competition might affect our findings. For example, is it possible that consumers infer the value of one product from the add-ons sold by a rival for its own offering? Also, how does competition affect people's expectations about product composition? These and other related questions are worth addressing. More broadly, the marketing literature lacks a clear typology of the possible routes to differentiation and their respective impacts on consumer behavior.

Our findings suggest that there are a number of reasons why firms should exercise care when deciding what optional features to offer the buying public. First, we showed effects on four product categories and across multiple dependent measures, indicating that the phenomenon is robust and generalizes to different settings of practical relevance. Second, study 4 provided evidence that add-ons influence evaluation even when the firm supplying them is not the manufacturer of the base good. This is an important point because many firms today license the rights to market add-ons (e.g., Apple and the iPod range). In general, we would expect third-party vendors to offer features that consumers find desirable. However, it remains in a firm's best interest to ensure that controls are in place for selecting appropriate partners as well as for monitoring the quality of their output. Third, this research has clear implications for how firms should manage the presentation of products and add-ons, especially at the retail level. For example, the results of all four experiments suggest that retailing decisions should factor in the physical proximity between add-ons and products and how aggressively salespeople market accessories in an attempt to control the inferences consumers may subsequently make. Similarly, given the moderating impact of product information, it makes sense that firms that want consumers to make independent evaluations provide as much information about their offerings as possible.

One important question we did not address is what happens when consumers are offered alignable and nonalignable add-ons at the same time. The fact that these two types of add-ons exert opposing influences makes it interesting to determine whether the effects ultimately cancel each other out. As discussed, research shows that people emphasize dimensional processing over holistic processing (Russo and Dosher 1983), which suggests that inferences cued by alignable add-ons should have a greater impact on consumers' judgments. Although the magnitude of the effects observed in studies 1–3 support this hypothesis, future research could test this question and potential moderating factors more formally (e.g., the magnitude of the range effect might depend on the relative importance of the attribute in the consumer's utility function).

A separate matter is how the attributes of the base good might affect the evaluation of the add-ons themselves. Once again, there could be a link to the type of add-on provided, its level or valence, and so on. The presence of "reverse" inferences would be important to product manufacturers and to third-party vendors alike because of the potential consequences to consumers' willingness to pay for additional features.

Finally, an issue that is of particular interest to us is whether the impact of add-ons on evaluation generalizes from inferences drawn before consumption of the base good to judgments made after it. On the one hand, if we think of consumption as additional information, then hypothesis 3 suggests weaker effects, if any. However, marketing actions can sometimes alter the perceived efficacy of products after consumption (Shiv, Carmon, and Ariely 2005), which would lead to the opposite prediction. To begin looking into this question, we conducted a field study in which we staged a coffee tasting outside the cafeteria of the Massachusetts Institute of Technology's Sloan School of Management. This experiment was conducted on three separate days and involved 128 participants. A display table was prepared, and students, faculty, and administrative staff were invited to take part in a free tasting and to provide feedback on their experience. On the first day the coffee was presented on its own (the control condition). On the second and third days participants were given the opportunity to add one or more spices to their beverage. We provided six add-on spices in total (cloves, nutmeg, orange peel, anise, sweet paprika, and cardamom), each pretested to be unexpected by coffee drinkers ($n = 77$). We manipulated the perceived quality of these condiments by placing them either in elegant crystal spice holders (the high-quality condition) or in broken Styrofoam cups (the low-quality condition). We used 10-point scales to measure perceptions of enjoyment, quality, and taste of the coffee, in which higher scores indicated more favorable evaluations. Importantly, all evaluations were made after the coffee was consumed.

The overall results (Cronbach's $\alpha = .81$) replicated our previous findings. In particular, compared with the control condition ($M = 6.13$), participants who were offered but did not add "high-quality" spices rated the coffee more favorably ($M = 7.58; t(125) = 4.39, p < .001$). In contrast, those who were offered but did not add "low-quality" spices rated the coffee less favorably ($M = 5.33; t(125) = -2.38, p = .010$). These results provided preliminary support for the notion that the effects of add-ons are strong enough to bias the judgments of consumers after consumption.

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