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THE EFFECTS OF "ADD-ON" FEATURES ON PERCEIVED PRODUCT VALUE

Abstract

The research presented in this paper provides evidence that "add-on" features offered to enhance a core offering can be more than just optional benefits. We argue that consumers draw inferences based on the mere availability of an add-on and that these inferences lead to significant changes in the perceived utility of the product itself. We further argue that the enhancements supplied by add-ons can be classified as either alignable or nonalignable, with opposing effects on evaluation. A set of four studies supports this prediction. We also show that the amount of product information available to consumers and their expectations about the composition of the core offering play important moderating roles. From a managerial standpoint, our findings highlight the need for marketers to be mindful of how their firm or any third-party provider handles add-ons as part of product policy.

In many markets it has become customary for firms to sell a product and provide complementary "add-on" features at extra cost. For instance, restaurant menus often include toppings, condiments, or other special ingredients patrons can add to a standard order. In consumer electronics, manufacturers of digital cameras, laptop computers, and MP3 players encourage buyers to purchase accessories such as plug-in modules, expansion packs, or carrying cases. Similarly, car dealerships typically offer accessory packages and extended warranties with a vehicle purchase, most airlines now provide meal service and in-flight entertainment for an additional fee, fitness centers charge separately for locker rental and towel service, and so on across many different sectors.[1]

Given the widespread commercial prevalence of add-ons, it is becoming increasingly important to understand their role in the marketplace. One common argument is that firms use add-ons as a method of price discrimination, with the base product and the augmented product representing two quality levels sold at different prices (Ellison 2005). A second argument is that add-on markets are attractive because they are less competitive. According to this view, the high profitability of add-on sales lies in the lock-in created when consumers purchase products with restricted "upgradeability" (Ellison 2005) or in the firm's ability to exploit buyers who naively fail to anticipate a future need for added functionality (Gabaix and Laibson 2006). Finally, research on product assortment suggests that consumers benefit from the availability of add-on features as long as these provide greater customization in choice

[1] The marketing literature defines add-ons as complementary goods that consumers have the option to avoid and provide utility only in conjunction with the core offering (Guiltinam 1987). The growing popularity of add-ons is the subject of a number of articles in the press, among them: Musgrove, Mike (2006), "Small Firms Try to Hook Gamers with Add-ons," *The Washington Post*, January 19; Tedeschi, Bob (2005), "New Capabilities Breed New Accessories," *The New York Times*, May 4; Caplan, Jeremy (2005), "Game On, Hold the Pepperoni," *Time*, April 11; and Burrows, Peter (2005), "iPod Add-ons: The Craze That Lasts," *BusinessWeek*, January 27.

and there is sufficient heterogeneity in individual preferences or variety-seeking behavior in the marketplace (Bayus and Putsis 1999; Hoch, Bradlow, and Wansink 1999).

While these perspectives certainly touch on important issues, the current paper develops the additional argument that add-on features can actually influence the perceived value of the base product itself. The basic premise of our research is that the mere availability of add-ons provides information that consumers uncertain about product utilities use to form their preferences. In particular, by characterizing the add-on space according to the type of improvement supplied by the firm – *alignable* when the add-on upgrades an existing feature, *nonalignable* when the add-on introduces a new feature – we propose two independent effects: "alignable add-ons" influence evaluation by shifting the reference level of the attributes they modify (a range effect), while "nonalignable add-ons" do so by cueing a general inference about overall product quality (a halo effect).

The objective of our experiments is to map out these processes and specify conditions under which the presence of an add-on is beneficial or, more surprisingly, detrimental to product evaluation. The first study shows that add-ons providing feature upgrades make a product seem less appealing while add-ons that introduce novel features yield the opposite outcome. Notably, both effects disappeared when participants received sufficient information to make independent assessments of the core offering. In study 2, we replicate this result, provide evidence of the psychological process underlying each type of inference, and examine the possibility that the effects of add-ons are driven by the expected (rather than actual) composition of a product. In study 3, we focus on alignable enhancements and test whether providing "strip-downs" rather than add-ons can reverse the initial outcome. We also collect more direct evidence that a feature upgrade (or downgrade) changes the reference level of the targeted attribute. Finally, in study 4 we turn our attention to nonalignable add-ons and manipulate their perceived quality to try and elicit both positive and negative halo effects. We

conclude with the results of a field experiment and a discussion of the theoretical and practical implications of our findings.

ADD-ON TYPES AND PRODUCT EVALUATION

The starting point of our research is the idea that consumers often use peripheral cues as indicators of product utility (Ariely, Loewenstein, and Prelec 2003; Bettman, Luce, and Payne 1998; Dhar, Nowlis, and Sherman 1999; Wernerfelt 1995). Consistent with this view, we propose that under certain predictable conditions consumers rely on add-ons to assess the value of an offering. We further argue that there are two distinct inferences that may take place, one about the performance of specific attributes and the other about overall product quality. As we discuss below, the exact nature of these inferences and their impact on perceived utility depends on the type of add-on available at the time of evaluation.

To map out our theory, we draw on the structural alignment literature (Markman and Medin 1995; Medin, Goldstone, and Markman 1995) to distinguish between add-ons that improve products on a corresponding (alignable) dimension, such as when firms sell add-ons that upgrade existing features, and those that do so on a unique (nonalignable) dimension, such as when firms sell add-ons that introduce new features. Everyday examples of alignable add-ons include RAM memory cards for laptop computers and zoom lenses for digital cameras. Examples of nonalignable add-ons in these same categories would be portable speakers and tripods, respectively. Structural alignment has been studied in a number of marketing contexts (Gourville and Soman 2005; Okada 2006; Zhang and Markman 2001), Notwithstanding, our objective is different in that we seek to establish a link between add-on type and the inferences consumers make about product utility.

To that end, we begin by pointing out that there is evidence in the literature that alignable differences encourage dimensional processing (Markman and Medin 1995; Slovic and MacPhillamy 1974). Similarly, the fact that an alignable add-on upgrades an existing feature suggests that consumers face a natural frame of reference to better evaluate the performance of the product on that particular dimension. Specifically, we propose that an alignable add-on creates a range of possible attribute values whose endpoints are the level specified in the product itself (the lower bound) and the level obtainable with the add-on (the upper bound). The attractiveness of any given level is then inferred by its relative position within this range (Janiszewski and Lichtenstein 1999; Volkman 1951; Yeung and Soman 2005), which implies that the performance of the product on that dimension should be judged less favourably when an alignable add-on is available than when no such option exists. Furthermore, if we assume that a consumer's overall utility from a product is some additive function of the utility of each attribute (Green and Srinivasan 1978; Keeney and Raiffa 1993), then we would expect the value of the product as a whole to suffer as well. This prediction is captured by our first hypothesis:

H1: The evaluation of a product is lower when a firm offers an alignable add-on than when the product is sold by itself.

A different inferential process is expected when nonalignable add-ons are offered. In this case, the optional benefit adds a new dimension to the core offering. Although consumers now lack a frame of reference with which to assess this feature, the novelty or distinctiveness of the option is likely to make cognitions about the add-on salient at the time of evaluation. Prior research has shown that highlighting general attitudes toward a specific object can 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." We predict a similar holistic inference when firms supply nonalignable add-ons. Formally:

H2: The evaluation of a product is higher when a firm offers a nonalignable add-on than when the product is sold by itself.

Moving on, an important characteristic of contextual inferences in consumer behavior is that they should only occur when buyers lack sufficient knowledge to assess products with confidence (Bettman et al. 1998; Broniarczyk and Alba 1994). This observation suggests that the effects of add-ons on evaluation should be contingent on the amount of product information available in the marketplace, with additional information reducing uncertainty and therefore weakening their potential impact:

H3: The effects of alignable and nonalignable add-ons on evaluation predicted by hypotheses 1 and 2 diminish when consumers are less uncertain about the potential value of the product.

Finally, the literature on structural alignment points out that alignability is a psychological construct driven primarily by people's beliefs and expectations (Zhang and Markman 2001). In practice, the actual and anticipated configurations of most products are correlated (i.e., the features offered in the product are the ones consumers expect to find) because firms rely on market research to develop new offerings and consumers form expectations based on the alternatives available to them. That said; it is important from a theoretical standpoint that we try to decouple these factors. When people process an add-on,

correspondence is determined by what they believe the product should be rather than what it actually is. As a result, an alignable add-on should not elicit inferences about the range of attribute levels relevant for evaluating a product if that feature is not actually expected to be included. Similarly, the availability of a nonalignable add-on should not make cognitions about that attribute salient if the feature is in fact expected to be part of the core offering. We formalize these intuitions with our final hypothesis:

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

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

STUDY 1

Design, Procedure, and Participants

Study 1 was designed to test hypotheses 1, 2, and 3. Participants (n = 174) were approached in the libraries of three urban universities in the U.K. and recruited to fill out a short paper and pencil survey in exchange for a candy bar. They were shown a single purchase scenario in which they were asked to read information about a new digital camera and then evaluate that product. The text explained that alternatives on the market differed according to the levels of four key attributes: focus, zoom ratio, memory size, and sensor

pixels.[2] After a brief explanation of each feature, participants saw the following table listing the attribute levels of the model in question:

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

The experiment was a 3×2 between-subjects factorial design. We manipulated the first factor, Add-On Type, across three levels. In the control condition participants evaluated the digital camera on its own. In the two treatment conditions participants were informed that the manufacturer also offered add-ons. It was made clear to participants that these optional features were offered separately and could be purchased, if desired, at extra cost. Depending on the condition, the add-ons provided either alignable (a 32 MB memory card and a 1.5× zoom lens) or nonalignable (a portable photo printer and a tripod) improvements. The second factor, Product Information, was manipulated across two levels: one half of the participants received no additional information about the potential value of the digital camera, while the

[2] Note that in this study we want the attributes that exist in the product to match the participants' expectations and the nonalignable add-ons to not be expected as part of the core offering (we manipulate expectations in study 2). A pre-test helped us identify attributes that consumers generally expect to find (or not) in a digital camera. We presented 67 participants with a list of nine attributes and asked them to evaluate each one on three 10-point scales (Cronbach's $\alpha = .84$): (1) "Do you expect this particular feature to be included in the product?" (1 = definitely should be sold separately, to 10 = definitely should be part of the product), (2) "To what extent do you feel this particular feature is a central component of the product?" (1 = definitely a peripheral feature, to 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, to 10 = very surprised). From the initial list, we selected four attributes that participants clearly associated with a digital camera (focus ($M = 9.30$), zoom ratio ($M = 9.00$), memory size ($M = 8.43$), and sensor pixels ($M = 8.26$)) and two more that were not (portable photo printer ($M = 2.60$) and tripod ($M = 2.70$)).

other half was told that *Consumer Reports*, an agency that carries out independent reviews for many consumer products, recently gave this product a quality rating of 8.5 out of 10.

The digital camera was evaluated on three dimensions: perceived quality (1 = very low quality, to 8 = very high quality), probability of liking the product (1 = very low, to 8 = very high), and fit with personal needs (1 = strongly disagree, to 8 = strongly agree). To check whether the inclusion of additional information about the product reduced uncertainty, we also asked participants to rate how confident they were in their assessment of the camera (1 = not at all confident, to 8 = very confident).

Results

To determine whether we successfully manipulated the amount of uncertainty surrounding the evaluation task, we ran a 3 (Add-On Type) × 2 (Product Information) between-subjects analysis of variance (ANOVA) with participants' confidence ratings as the dependent measure. Consistent with our intention, the rating by *Consumer Reports* increased the level of confidence reported by participants (M_{CR} = 4.34 vs. $M_{\text{no information}}$ = 3.43, $F(1, 162) = 10.50$, $p = .001$, $\eta^2 = .06$), but neither the main effect of Add-On Type ($p = .347$) nor the interaction effect ($p = .903$) proved significant.

Turning to the main analysis, a preliminary test indicated that the three scales were sufficiently correlated to collapse into one general assessment of the digital camera (Cronbach's $\alpha = .77$). We analyzed this composite 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.

For hypothesis testing we conducted both trend analyses and planned contrasts. We used one-tailed tests for these and all other contrasts in the paper with directional predictions. As evident from figure 1, when participants had no independent information to aid evaluation, their responses were affected by the presence of either type of add-on. Specifically, we observed a significant linear trend ($F(1, 82) = 22.90$, $p < .001$) whereby the perceived value of the digital camera was low when alignable add-ons were offered ($M = 3.63$), moderate in the control condition ($M = 4.62$), and high in the presence of nonalignable add-ons ($M = 5.25$). 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.

Insert figure 1 about here

According to hypothesis 3, the observed effects of add-ons on product evaluation should have diminished when participants saw the *Consumer Reports*' rating of the digital camera. As predicted, the inclusion of additional information canceled out the linear trend reported above ($p = .837$). In addition, neither the contrast between the control condition ($M = 4.47$) and the alignable add-ons condition ($M = 4.74$), nor the one between the control condition and the non-alignable add-ons condition ($M = 4.66$) proved significant ($p = .437$ and $p = .578$, respectively). Across the two information conditions, therefore, we also found support for hypothesis 3.

In sum, the results of this first study lend support to the idea that add-ons trigger inferences that consumers uncertain about product utility use to assess the value of an

offering. As expected, the effects of alignable and nonalignable add-ons are independent and, more important, lead to opposite outcomes. Our remaining experiments build on these findings in three important ways. First, we test the robustness of our results by trying to replicate the effects across multiple product categories. Second, we collect a richer set of outcome and process measures including willingness to pay (WTP), purchase intentions, thought processes, and reference attribute levels. Third, we conduct a test of hypothesis 4 and also consider important extensions to hypotheses 1 and 2.

STUDY 2

The main objective of the second study was to test hypothesis 4. 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 one that consumers would not necessarily expect to find in the product (hypothesis 4a), and (2) that a nonalignable add-on ceases to have a positive impact on evaluation when this new feature is one that consumers would already expect to find in the product (hypothesis 4b). We tested these predictions using separate factorial designs.[3] Next, we describe the general setup of the experiments and report the respective results.

General Procedure and Participants

All participants were shown a purchase scenario in which they were asked to read general information about vacuuming robots and then evaluate one alternative available in the marketplace. Specifically, the first part of the stimulus included a brief explanation of what

[3] These experiments were run simultaneously. To limit the total number of participants required, we decided to leverage the same data for the one condition that was identical across the two designs.

vacuuming robots do and a review from *Consumer Reports* advising prospective buyers to pay particular attention to certain standard features when comparing different alternatives. The second part described a fictional product called *CleanMaster*. This description included the following table of attribute levels:

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

We wish to stress that the physical configuration of this vacuuming robot, which constituted the core offering, was identical across all conditions. However, we manipulated the attributes expected to be included in the appliance by varying the list of features mentioned by *Consumer Reports* (more on this below). Furthermore, we also manipulated the type of accessory supplied by the manufacturer such that some participants were offered no optional feature while others saw an add-on that was either alignable (the *Rapid Charger* docking station, which recharges the battery 80% faster) or nonalignable (the *Brush Pack*, containing special side and flexible brushes).

Participants were 258 registered members of a subject pool managed by a large U.S. business school. At the time of the study, this pool had over 5,000 members and the mean age was 31. Approximately 61% of the members were female and 87% had completed undergraduate education. Participation was voluntary, with a $5 payment upon completion.

After reading their respective scenario, participants first evaluated the *CleanMaster* by rating its perceived quality (1 = very low quality, to 7 = very high quality) and the probability of liking the product (1 = very low, to 7 = very high). They were then asked to estimate their maximum willingness to pay (in U.S. dollars) and likelihood of purchase (1 = very unlikely,

to 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 an overall feeling or impression (holistic processing). We checked our manipulation of the participants' expectations for different attributes by asking whether they agreed with the statement "I expect vacuuming robots, including this model, to feature __" (1 = strongly disagree, to 7 = strongly agree), and whether they would be surprised to learn that the product did not include __ as standard (1 = not at all surprised, to 7 = very surprised). Finally, in the appropriate conditions we measured the perceived quality of the *Battery Charger* or *Brush Pack* by asking participants whether they agreed with the statement: "I think __ is of a high quality" (1 = strongly disagree, to 7 = strongly agree).

Study 2a: Design and Results

The first design of study 2 was a 2 (Attribute Expectation [battery charger]: expected to be in the product, not expected to be in the product) × 2 (Add-On Type: none, alignable) between-subjects factorial design. This particular setup provided our test of hypothesis 4a: by making participants believe that a vacuuming robot should/should not normally feature a built-in battery charger (a capability that was always included in the description of the *CleanMaster*), we were able to check whether the negative effect of an alignable add-on weakens when that feature is no longer expected.

To verify that we manipulated the participants' beliefs about the built-in charger as intended we conducted a 2 x 2 between-subjects ANOVA on the averaged scores of the manipulation check questions (Cronbach's $\alpha = .85$). As intended, we observed a main effect of Attribute Expectation ($M_{\text{expected}} = 6.40$ vs. $M_{\text{not expected}} = 5.34$, $F(1, 141) = 24.70$, $p < .001$, $\eta^2 = .15$), but no effect of Add-On Type ($p = .454$) and no interaction between the two factors

(p = .762). In addition, a one-sample t-test using the scale's middle point as benchmark confirmed that the *Battery Charger* was perceived to be of a high quality (M = 5.12, t(73) = 7.86, p < .001).

Next, we analyzed the perceived value of the *CleanMaster* by averaging the two relevant scales (Cronbach's α = .72) and running a 2 x 2 ANOVA on the aggregate 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 the top panel of figure 2, when participants anticipated a built-in battery charger we observed the same negative effect of alignable add-ons that we found in study 1 ($M_{\text{alignable}}$ = 4.17 vs. M_{none} = 4.99, t(141) = -3.29, p < .001). In support of hypothesis 4a, however, participants that did not expect this capability to be included in the product reported comparable evaluations when the *Rapid Charger* was offered (M = 4.79) and when it was not (M = 4.87, p = .755).

Insert figure 2 about here

This pattern of results was replicated with WTP and likelihood of purchase measures. Before analyzing the WTP data we applied a square-root transformation to normalize the participants' responses. A 2 x 2 ANOVA showed no effect of Add-On Type (p = .262) or Attribute Expectation (p = .437), but the interaction term was once again significant (F(1, 141) = 4.23, p = .042, η^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, η^2 = .05). Consistent with hypothesis 1, participants that expected a built-in battery charger to be part of the core offering reported a lower WTP (M = 10.80) and

purchase intention (M = 3.51) for the *CleanMaster* when they were offered the *Rapid Charger* than when no such accessory was mentioned (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 an add-on was offered or not, participants that had no prior expectation for this attribute reported similar WTP ($M_{alignable}$ = 12.32 vs. M_{none} = 11.82, p = .530) and purchase intentions ($M_{alignable}$ = 4.37 vs. M_{none} = 3.94, p = .294).

Taken together, these results lend support to hypothesis 4a and the notion that alignability is a function of the expected (rather than actual) composition of products. 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 anticipating a built-in charger and offered an add-on for that same feature 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 and Results

The second design of study 2 was a 2 (Attribute Expectation [brushes]: expected to be in the product, not expected to be in the product) × 2 (Add-On Type: none, nonalignable) between-subjects factorial design. This particular setup provided our test of hypothesis 4b: by making participants believe that a vacuuming robot should/should not normally feature brushes (a capability that was never included in the description of the *CleanMaster*), we were able to check whether the positive effect of a nonalignable add-on weakens when that feature is expected.

A 2 x 2 between-subjects ANOVA using the averaged scores of the manipulation check questions (Cronbach's $\alpha = .83$) as the dependent variable confirmed that expectations about the brushes varied as intended ($M_{\text{expected}} = 5.96$ vs. $M_{\text{not expected}} = 5.46$, $F(1, 148) = 4.80$, $p = .030$, $\eta^2 = .03$). This was the only result in the analysis, as neither the manipulation of Add-On Type ($p = .780$) nor the interaction term ($p = .616$) reached significance. In addition, a one-sample t-test with 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 vacuuming robot we first combined the scores from the two relevant scales (Cronbach's $\alpha = .67$). The ANOVA on this measure led to 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 the bottom panel 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 a nonalignable add-on impacted evaluation only when this feature was not expected: participants rated the *CleanMaster* as more appealing when the *Brush Pack* was offered ($M_{\text{nonalignable}} = 5.53$) than when it was not ($M_{\text{none}} = 4.99$, $t(149) = 2.38$, $p = .009$). The same contrast in the conditions where brushes were expected to come standard failed to reach significance ($M_{\text{nonalignable}} = 4.80$ vs. $M_{\text{none}} = 4.90$, $p = .674$).

As was the case for the first set of data, we observed similar results with WTP and purchase intentions. A 2 x 2 ANOVA on the square root of the WTP estimates yielded no main effects ($p_{\text{attr. exp.}} = .126$, $p_{\text{add-on type}} = .463$) 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 ($p_{\text{attr. exp.}} = .189$, $p_{\text{add-on type}} = .308$), the two-way interaction did reach significance ($F(1, 149) = 4.21$, $p = .024$, $\eta^2 = .03$). Consistent with hypothesis 2, participants that did not anticipate 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 add-on existed (WTP: M = 12.50, $t(149) = 1.72$, $p = .044$; likelihood of purchase: M = 4.53, $t(149) = 2.17$, $p = .016$). Conversely, which again confirms hypothesis 4b, we observed no difference in the participants' responses when this feature was already expected (WTP: $M_{nonalignable}$ = 11.92 vs. M_{none} = 12.62, $p = .491$; likelihood of purchase: $M_{nonalignable}$ = 4.45 vs. M_{none} = 4.72, $p = .466$).

The outcome of these analyses is consistent with what we predicted under hypothesis 4b. In sum, we again found support for the argument that alignability is a psychological construct, a function of 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 feature is novel and distinct from the ones 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 that were offered the Brush Pack and did not expect the *CleanMaster* to include this feature indicated their assessment was mostly guided 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

In study 3 we had two goals. First, we were interested in extending our analysis of alignable add-ons to include situations where firms provide optional "strip-downs." We have already shown the negative impact of alignable add-ons on product utility, WTP, and

purchase intentions. Similarly, we expect that offering the opportunity to reduce the performance of an attribute should trigger a similar range effect, but in the opposite direction: the level specified in the product should now look more appealing as it constitutes the upper bound of the evoked range, which in turn makes the overall assessment of the product more favorable. Second, we wanted to provide more direct process evidence of this range effect. There are various ways to do this. Here we decided to test whether the ranges evoked by alignable add-ons and strip-downs influence people's perceptions of what constitutes an appropriate attribute level. As compared to the control condition, we expected participants to report a higher (lower) benchmark when add-ons (strip-downs) are offered.

Design, Procedure, and Participants

The experiment manipulated a single factor, Add-On Type, across three between-subjects conditions. One hundred and forty-eight participants were recruited from the same subject pool and following the same procedure as in study 2. They were shown a purchase scenario involving a laptop computer and then asked to answer a set of questions. The stimulus explained that laptop computers typically vary according to the levels of four key attributes: processor speed, hard drive size, operating system, and disk drive.[4] Each of these attributes was briefly explained. Participants then saw the following table listing the relevant attribute levels for the product:

[4] These features were selected on the basis of a pre-test similar to the one conducted for study 1. We presented 67 participants with a list of nine attributes and asked them to evaluate each one on the same three 10-point scales (Cronbach's $\alpha = .77$). The mean scores of the top four attributes were: processor speed, $M = 9.81$; hard drive size, $M = 9.38$; operating system, $M = 9.06$; and disk drive, $M = 8.88$.

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

In the control condition, participants evaluated the laptop computer on its own. In the two treatment conditions, they were told that the manufacturer also offered add-ons (a 1.0 GHz upgrade in processor speed and a 20 GB hard drive expansion) or strip-downs (a 1.0 GHz downgrade in processor speed and a 20 GB hard drive reduction), respectively. It was made clear to participants that these modifications were optional and separate from the product itself.

After reading this short scenario, participants were asked to answer a series of questions. First, they evaluated the laptop computer on three dimensions: perceived quality (1 = very low quality, to 8 = very high quality), probability of liking the product (1 = very low, to 8 = very high), and fit with personal needs (1 = strongly disagree, to 8 = strongly agree). Second, they indicated the maximum price (in U.S. dollars) they would be willing to pay for the laptop computer. Third, we elicited numerical values on processor speed (in GHz) and hard drive size (in GB) that participants felt were "appropriate" for a typical laptop computer.

Results

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 ($F(2, 145) = 10.03$, $p < .001$, $\eta^2 = .12$). As shown in figure 3, the pattern of responses displayed the expected linear trend ($F(1, 145) = 19.76$, $p < .001$). Compared to the

control condition (M = 5.57), participants rated the laptop computer less favourably when the firm offered alignable add-ons (M = 4.90, t(145) = -2.72, p = .004), but more favourably 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, demonstrating that alignable strip-downs have a similar (but opposite) effect on evaluation.

With respect to WTP, 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, η^2 = .10) and a significant linear trend (F(1, 145) = 15.37, p < .001). As suggested by hypothesis 1, participants that were offered alignable add-ons expressed a lower WTP than those in the control condition (figure 3). This difference, however, was only 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).

Insert figure 3 about here

Turning now to the participants' estimates of appropriate levels for processor speed and hard drive size, the reported reference levels for both the first (F(2, 145) = 8.81, p < .001, η^2 = .11) and second attribute (F(2, 145) = 9.15, p < .001, η^2 = .11) varied significantly across the Add-On Type conditions. In the case of processor speed, we observed a significant linear trend (F(1, 145) = 17.59, p < .001), with scores increasing in the presence of alignable add-ons (M = 2.58 vs. M = 2.27, t(145) = 1.99, p = .024) and decreasing in the presence of

alignable strip-downs (M = 1.91 vs. M = 2.27, $t(145) = -2.17$, $p = .016$). We observed a similar pattern in the data for hard drive size ($F(1, 145) = 18.30$, $p < .001$): the attribute level reported as appropriate in the add-ons condition was significantly higher than the one reported in the control condition (M = 54.85 vs. M = 47.00, $t(145) = 2.10$, $p = .019$), but the opposite was true for the strip-downs condition (M = 38.70 vs. M = 47.00, $t(145) = -2.14$, $p = .017$).

Overall, the purpose of our third experiment was to show that a consumer's assessment of a product could also be affected by the presence of strip-downs. We tested this proposition as a logical extension to the more common case of add-ons. Our findings lend support to the hypothesis that an optional alignable change of any kind can impact evaluation. We further showed that both add-ons and strip-downs can affect people's beliefs about what constitutes an appropriate attribute level, thereby lending additional support to the notion that dimensional processing underlies the participants' inferences. In our last study we conducted a similar test, this time focusing on optional features of the nonalignable kind.

STUDY 4

The purpose of our final experiment was two-fold. First, we wanted to study the relationship between nonalignable add-ons and product evaluation in greater depth. In studies 1 and 2 we naturally focused on add-ons that consumers find appealing. However, we would expect halo effects to occur independent of the attractiveness of the new features, in which case the positive effects observed thus far should reverse if add-ons are deemed undesirable or of a low quality. Second, we were interested in finding out whether consumers draw inferences from add-ons even when the firm supplying them is not the same as the one producing the core offering. It is reasonable that we observe a halo effect when the firm marketing the product and the add-ons is one and the same. If this inference persists even

when a third-party provider is involved, however, then issues of licensing and quality control become important to factor in.

Design, Procedure, and Participants

To investigate these questions we showed participants a scenario involving the hypothetical purchase of an MP3 player. The stimulus showed images and reported information on one specific option. An extract from the manufacturer's website read: "Enjoy clear, crisp, and portable digital music with this 4GB MP3 player that features a built-in FM tuner for when you want to hear some newer releases. 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 a large U.K. business school that 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, participants were told that a third-party provider sold two accessories specifically for this product: a set of portable speakers and an entertainment dock for wireless connection to a home theater or PC. 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 U.K. It was made clear to participants that these accessories were separate from the product itself and could only be purchased, if desired, at extra cost.

At the end of this stimulus we included a set of questions. First, participants evaluated the MP3 player on four dimensions: perceived quality (1 = very low quality, to 8 = very high quality), probability of liking the product (1 = very low, to 8 = very high), fit with personal needs (1 = strongly disagree, to 8 = strongly agree), and perceived deal at the retail price of £59.95 (1 = a very bad deal, to 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

To determine whether we 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: despite the fact that the portable speakers and the entertainment dock were identical across conditions, stating 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 by first averaging the individual scores into one overall rating (Cronbach's $\alpha = .79$). A one-way ANOVA with Add-On Type as the between-subjects factor then indicated that the perceived value of the *Insignia Sport Companion* varied significantly across the three experimental conditions ($F(2, 79) = 7.21$, $p = .001$, $\eta^2 = .15$). Figure 4 shows a linear trend similar to those encountered in studies 1 and 3 ($F(2, 79) = 7.21$, $p = .001$). More importantly, as compared to the control condition ($M = 4.07$), participants judged the MP3 player as being 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 ($M = 3.54$, $t(79) = -1.69$, $p = .048$). Therefore, the first effect is clearly consistent with hypothesis 2 and replicates our earlier

results. Taking into account the second effect as well, the overall pattern provides additional evidence that a halo effect underlies the inferences made by participants when nonalignable options are present. Furthermore, we were able to show that these inferences take place irrespective of whether the product's manufacturer is also supplying the add-ons.

Insert figure 4 about here

GENERAL DISCUSSION

Prior research in marketing has shown that consumers often make inferences or guesses about a product's value based on contextual cues (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 indicate.

In particular, we began by drawing a distinction between optional enhancements that are alignable, such as when firms offer upgrades on existing dimensions, and those that are nonalignable, such as when firms offer unique new features. We then predicted these different types of enhancements would trigger different inferential processes: alignable add-ons affect the perceived utility of a product by shifting the reference level of the attributes they modify, while nonalignable add-ons do so by cueing general, attitude-based inferences about product quality. The main goal of our experiments was to map out these independent processes and demonstrate that, surprisingly, add-ons can have both positive and negative effects on perceived product value, purchase intentions, and willingness to pay. A related objective was to show that the amount of information available to consumers at the time of evaluation and

their expectations about product configuration play important roles in moderating these main effects.

Summary of Findings

We examined the link between add-on type and product evaluation over four studies. In study 1, we chose a category for which alignable and nonalignable improvements are possible in order to show both effects on the same product. Based on a pre-test, we constructed a product profile that was comprised of attributes consumers expected to find in the offering. In the experiment, we found that add-ons introducing new features (e.g., a tripod) led participants to rate a digital camera more favorably. Conversely, add-ons that upgraded existing capabilities (e.g., a zoom lens) had a negative impact on perceived product value. Furthermore, we found evidence that these opposing effects waned when participants received sufficient independent information to judge the camera on its own – a common result in studies of context-dependent preferences.

The purpose of study 2 was to replicate the main results of the previous experiment and test a second potential moderating variable: consumers' expectations about product composition. We started by noting that in reality people's beliefs about product configurations are highly correlated with what firms actually supply. However, it was important for us to separate these two factors in order to substantiate existing findings in structural alignment. Specifically, we predicted that the range effect associated with any alignable add-on would only occur when consumers expect that attribute to be part of the core offering. Similarly, we also predicted that the halo effect associated with any nonalignable add-on would only occur when consumers fail to expect that attribute to be part of the product. In both cases the data confirmed our intuition, as the previously demonstrated effects of add-ons vanished when the

above conditions were not met. Moreover, we observed that participants offered an alignable add-on were more likely to characterize their evaluation process as dimensional rather than holistic, while the opposite was true of participants offered a nonalignable add-on.

The remaining experiments were conducted to test extensions of hypotheses 1 and 2, respectively. For example, study 3 was motivated by the idea that any kind of alignable modification should impact evaluation, irrespective of whether that modification represents an increase (add-on) or a decrease (strip-down) in performance. This is exactly what we found: in analogy to the negative effect of alignable add-ons shown in studies 1 and 2, we observed a range effect in the opposite direction when participants were offered the option to reduce the processing speed and hard drive size of a laptop computer. Moreover, in this experiment we were also able to document the inferential process by recording the participants' reference levels for the attributes targeted by these modifications. As expected, these benchmarks significantly increased when add-ons were offered but decreased in the case of strip-downs.

Finally, in study 4 we wanted to check whether we could also reverse the initial effect of a nonalignable add-on. From a theoretical perspective, this is something that should be possible because halo effects can occur for both positive and negative attitudes. In the experiment, therefore, we manipulated the perceived quality of the firm supplying add-ons to try and induce a reversal in the evaluation of an MP3 player. An additional reason for using this particular manipulation was that we could test whether add-on effects are observed when the vendors of the core offering and of the add-ons are not the same firm. As expected, the experiment showed that optional new features sold by a third party provider with a reputation for low-quality offerings hurt the perceived value of the product, whereas features sold by a high-quality provider improved it.

Implications and Future Research

Most of the existing research on the impact of added features on preference and choice has focused on how firms can differentiate an initial offering by modifying the product over time or by creating a series of branded variants (Bergen, Dutta, and Shugan 1996; Nowlis and Simonson 1996). The marketplace phenomenon studied in this paper 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 core offering. Second, with single-product innovation and with branded variants firms are susceptible to cannibalization. Cannibalization is not an issue in the case of add-ons because consumers obviously have to purchase the core offering if they want to benefit from the additional functionality. Third, because add-ons are optional and separate, there is a clear distinction between what constitutes the core offering and the set of accessories that complement it. This disassociation allows for 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, especially if we bear in mind that our own research focused on the psychological consequences of offering add-on features without really considering how market experiences might affect our findings. For example, is it possible that consumers infer the value of one product from the add-ons made available for rival offerings? Also, how does competition affect people's expectations regarding 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 consumers.

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 various settings of practical relevance. Second, study 4 provided evidence that add-ons influence evaluation even when the firm supplying the accessories is not the same as the original vendor. This is an important point because many firms today license the rights to market add-ons. In general, we would expect third-party providers to offer features consumers find desirable. However, it remains in a firm's best interest to ensure controls are in place for selecting appropriate partners as well as 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 sales people market accessories, both in an attempt to control the inferences consumers may subsequently make. Similarly, given the moderating impact of product information it makes sense that firms wanting consumers to make independent evaluations provide as much information about their offerings as possible.

One important question we did not address in this research is what happens when consumers are offered alignable and nonalignable add-ons at the same time. The fact that these types of add-ons have opposing influences on evaluation makes it interesting to figure out whether the effects cancel out so that there is no net impact. The decision-making literature provides some guidance on this issue. A number of studies have shown that, when available, people tend to place greater emphasis on dimensional information than holistic

information (Johnson 1989; Russo and Dosher 1983). Based on these findings, the implication would be that inferences cued by alignable add-ons have a greater impact on consumers' judgments. We note that the magnitude of the planned contrasts in our first three experiments suggest this may be the case. However, future research could test this prediction and potential moderating effects more formally (for example, the magnitude of the range effect might depend on the relative importance of the attribute in the consumer's utility function).

A separate question is how the attributes of the product 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. Irrespective, the presence of "reverse" inferences would be important to product manufacturers and third-party providers 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 effects of add-ons generalize from inferences drawn before consumption to judgments made after it. On the one hand, it is possible that the effects dissipate because consumption is equivalent to additional information (in a similar vein to hypothesis 3). However, recent research has pointed out that marketing actions can sometimes alter the efficacy of products post 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 a large U.S. university and presented some participants with six add-on spices pre-tested (n = 77) to be unexpected by coffee drinkers: cloves, nutmeg, orange peel, anise, sweet paprika, and cardamom. This field study was conducted on three separate days and involved 128 participants. On each occasion, a display table was prepared and students, faculty, and administrative staff were invited to take part in a free tasting and provide feedback on their experience. On the first day the coffee was presented on its own. On the

second and third days participants were given the opportunity to add one or more spices to their beverage. The perceived quality of these condiments was manipulated by placing them in elegant crystal spice holders (to signal high quality) or broken Styrofoam cups (to signal low quality). We used 10-point scales to measure perceptions of enjoyment, quality, and taste of the coffee – where higher scores indicated more favorable evaluations. Importantly, all the evaluations were made after the coffee was consumed.

The overall results (Cronbach's $\alpha = .81$) replicated our previous findings. In particular, compared to the control condition ($M = 6.13$), participants that were offered but did not use "high-quality" spices rated the coffee more favorably ($M = 7.58$, $t(125) = 4.39$, $p < .001$). In contrast, those that were offered but did not use "low-quality" spices rated the coffee less favorably ($M = 5.33$, $t(125) = -2.38$, $p = .010$).[5] These results provided preliminary support for the notion that the effects of add-ons are strong enough to bias the post-consumption judgments of consumers.

[5] The results are unchanged if we include the 25% of participants that added spices to their coffee. Additional details regarding this study and the statistical tests are available from the authors upon request.

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FIGURE 1

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

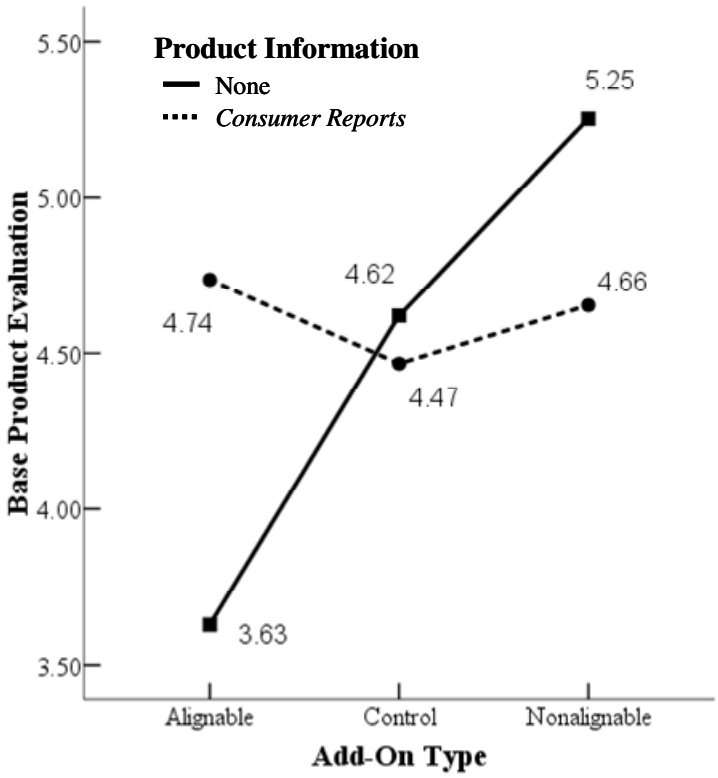
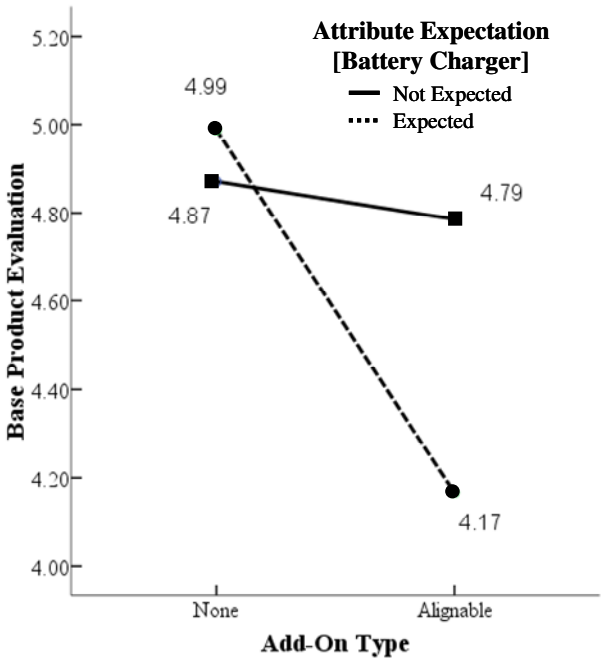


FIGURE 2

STUDY 2: BASE PRODUCT EVALUATION AS A FUNCTION OF ADD-ON TYPE AND ATTRIBUTE EXPECTATION.

Results for Study 2a.



Results for Study 2b.

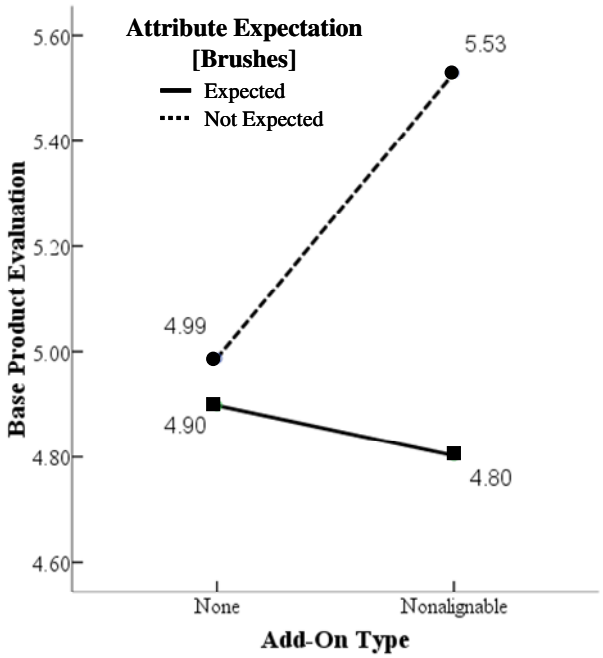


FIGURE 3

STUDY 3: BASE PRODUCT EVALUATION WHEN ALIGNABLE ADD-ONS OR STRIP-DOWNS ARE OFFERED.

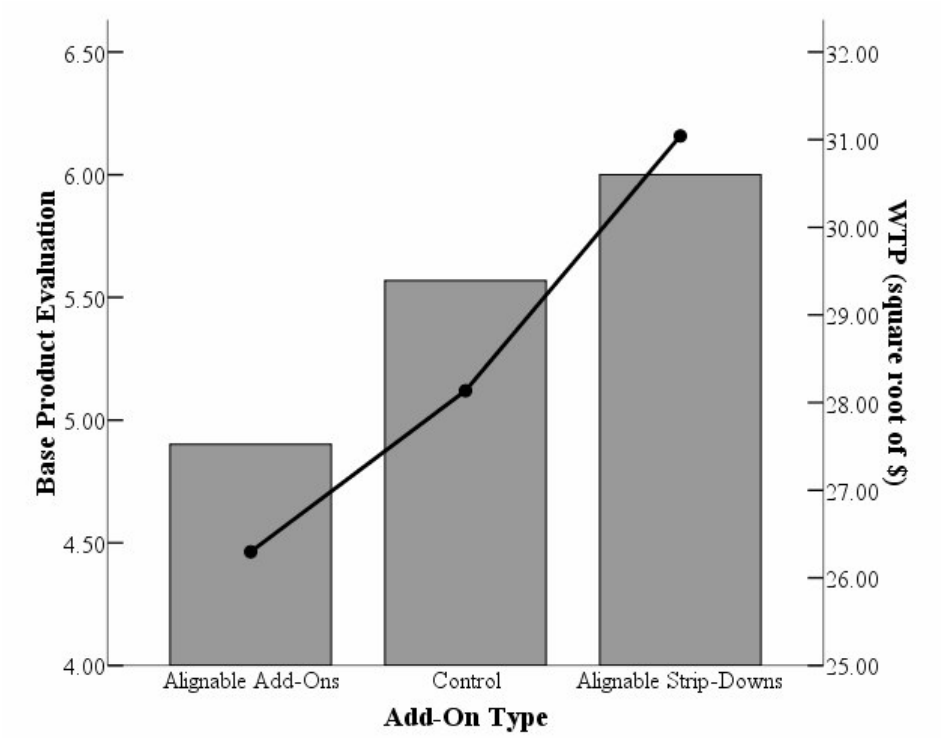


FIGURE 4

STUDY 4: BASE PRODUCT EVALUATION WHEN NONALIGNABLE ADD-ONS OF LOW OR HIGH QUALITY ARE OFFERED.