J PROD INNOV MANAG 2012;••(••):••–••

DOI: 10.1111/j.1540-5885.2012.00951.x

Imagination Difficulty and New Product Evaluation

Min Zhao, Steve Hoeffler, and Darren W. Dahl

This research examines the role of imagination difficulty on the evaluation of really new products (RNPs) in comparison with incrementally new products (INPs). We extend past research on accessibility utilizing an anticipatory approach where consumers look forward and generate mental images for future product usage. We found that the role of imagination changes based on the newness of the product. Specifically, for RNPs, imagination difficulty is perceived to be diagnostic in product assessment, and thus, higher imagination difficulty leads to lower product evaluations. However, for INPs, which are shown to be less susceptible to context effects, imagination difficulty has a limited impact on product evaluations. In addition, we show that the effect of imagination difficulty on the evaluation of RNPs is moderated by the level of involvement of the consumer. Research and managerial implications are discussed.

The use of mental imagery is a well-established approach to help consumers understand the benefits associated with new products and to reduce uncertainty about how to achieve those benefits (Feiereisen, Wong, and Broderick, 2008; Ziamou, 2002). Indeed, advertisements often ask consumers to "Imagine yourself . . ." or "Picture yourself . . ." completing some type of activity with a new product. While the evoked images can have a powerful impact in increasing product evaluation (e.g., Escalas and Luce, 2004), research has also shown that ease of retrieving the experience (or images) can often be more diagnostic than the content (e.g., Schwarz, 1998, 2004). That is, people rely more on the ease of retrieval rather than the content of retrieval when they make judgments or product evaluations. For example, retrieving one reason to purchase a specific car leads to a higher evaluation of the car compared with retrieving 10 reasons to purchase the car because the former is easier (Wanke, Bohner, and Jurkowitsch, 1997). This stream of research has typically had participants take a retrospective view by asking them to look back and recall things from their past memory (Schwarz, 2004). In the new product domain where mental imagery has become an important cognitive tool for consumers to learn about the benefits of really new products (RNPs), visualization often goes beyond the traditional retrospective view and takes an anticipatory perspective (i.e., encouraging consumers to look forward and create mental images about future new uses). However, unlike research in retrospective imagery, very little attention has been directed toward understanding how ease or difficulty of imagination (i.e., mentally simulating new uses) impacts product evaluation.

In this paper, we seek to fill this gap and examine how the degree of imagination difficulty impacts the evaluation of RNPs in comparison with incrementally new products (INPs). Our research takes an anticipatory perspective and investigates the role of information accessibility in forward-looking visualization (i.e., imagination). Specifically, our research objective is to examine the moderating effect of product newness (i.e., INP versus RNP) on the effect of imagination difficulty in product evaluation. To do so, we draw on research in new product learning, information accessibility, and involvement. We demonstrate that the level of difficulty of imagination is perceived as more diagnostic than the content of imagination for RNPs (i.e., higher levels of difficulty decrease the evaluation of an RNP). However, the difficulty of imagination has little impact on the evaluation of an INP because of the fact that consumers have more prior knowledge related to the product, and thus, their evaluations are less susceptible to contextual influences. Further, in the case of an RNP, we show that the effect of imagination difficulty on product evaluation is strongest under high consumer involvement and weaker under low involvement because consumers are more motivated to infer meaning from contextual information when highly involved in the situation (Swinyard, 1993).

We conducted four studies to test our ideas. In Study 1, we manipulate the level of imagination difficulty by providing people with either eight visualization aids or one aid (i.e., potential new uses) and demonstrate that receiving fewer aids makes visualization more difficult and decreases the evaluation of an RNP (while having a minimal impact on an INP). In Study 2, we replicate the results of Study 1 using a more traditional manipulation

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of ease of imagination; namely, we ask participants to envision and describe either eight activities or one activity that they could do with the product. Study 3 extends the findings to show that even if participants are able to envision more new activities for an RNP, they still evaluate it lower. In study 4, we manipulate product involvement and identify its moderating role in the effect of imagination difficulty on the evaluation of RNPs.

Together, these results suggest that the level of difficulty of an imaginative exercise is a more diagnostic cue for the evaluation of an RNP than an INP and that this effect is strongest in situations under high involvement. These findings extend research on information accessibility by examining an anticipatory view and proposing product newness as an important moderator. They also add to the involvement literature by examining its interplay with information accessibility. Further, our studies contribute to both the new product literature and managerial practice by proposing new ways to enhance the evaluation of RNPs. Below we review relevant literature on visualization, information accessibility, new product evaluation, and involvement to develop our theoretical framework. We then report the results from four studies designed to test our hypotheses. Finally, we conclude with a general discussion, offer directions for future research, and discuss managerial implications.

Visualization and Information Accessibility

Visualization is a form of cognitive processing in which visual information is represented in working memory (MacInnis and Price, 1987). While its basic function is related to information acceleration (e.g., the use of a virtual information environment to approximate a potential future information environment; Urban et al., 1997), visualization is a much simpler process that involves the generation, interpretation, and manipulation of information through mental representation. Visualization has been examined in several marketing contexts. For example, past research has studied how explicitly instructing people to form a mental picture of product information led to more positive product attitudes than not encouraging such mental imagery, especially when the product information was presented in a verbal format (Kiselius and Sternthal, 1984). Further, Phillips, Olson, and Baumgartner (1995) have examined how consumption visions (i.e., visual images of certain product-related behaviors) help consumers anticipate and make better plans to navigate an uncertain future with the products. In their review paper on imagery, MacInnis and Price (1990) proposed that imagery can affect consumers' decision rules, enhance their purchase intention, and lead to higher levels of consumer satisfaction. In a more recent work, Shiv and Huber (2000) examined the role of anticipated satisfaction on consumer choice and found that anticipation evokes higher levels of mental imagery, which leads to a stronger preference toward products with vivid attributes. Finally, in the new product design domain, research has shown that imagination-focused visualization leads to more creative product designs than memory-focused visualization (Dahl, Chattopadhyay, and Gorn, 1999). Thus, the use of mental simulation as a cognitive tool to help consumers evaluate new products has been well established (MacInnis and Price, 1990; Phillips, 1996).

Within the domain of RNPs, visualization has been used to enhance the accuracy of preference measurement for RNPs (Hoeffler, 2003) and to influence the evaluation of RNPs and INPs (Dahl and Hoeffler, 2004; Zhao, Hoeffler, and Dahl, 2009; Zhao, Hoeffler, and Zauberman, 2011; Ziamou, 2002). Further, recent research on the evaluation of RNPs has shown that outcome-focused visualization leads to higher evaluations for the distant future whereas process-focused visualization leads to higher evaluations for the near future (Castano, Sujan, Kacker, and Sujan, 2008; Zhao et al., 2011). While the existing new product visualization literature has focused on how the content of visualization impacts product evaluation, little attention has been directed toward the role of information accessibility (i.e., the ease with which information can be retrieved from memory) in this context. This is surprising as a large amount of research in psychology and marketing examines the role of information accessibility in decision making (Anand-Keller and McGill, 1994; Garbarino and Edell, 1997; Menon and Raghubir, 2003; Sanna and Schwarz, 2004; Schwarz, 1998, 2004; Schwarz et al., 1991; Wanke et al., 1997). For example, Garbarino and Edell (1997) find that alternatives that required more cognitive effort to evaluate led decision makers to choose that alternative less frequently

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than an alternative that required less effort to evaluate. Indeed, recent research on the accessibility of experiences hints at the potential for the difficulty of the visualization exercise to affect evaluations as people simply perceive mere accessibility as diagnosticity (Menon and Raghubir, 2003). Notably, Schwarz (1998, 2004; see also Sanna and Schwarz, 2004) finds that people rely more on the accessibility of experiences (i.e., ease of retrieval) than the accessibility of content. For example, participants who recalled only 4 childhood events believed that they remembered their childhood better than those who recalled 12 events because the former was easier (Winkielman, Schwarz, and Belli, 1998). In a marketing context, Wanke et al. (1997) find further evidence of the impact of information accessibility. They demonstrate that when participants named 10 reasons for choosing a BMW car, the difficulty of information retrieval was perceived to be more diagnostic than the content of retrieval and people's evaluations were lower compared with when they named only one reason.

To date, very little research has been done in the new product domain in terms of how information accessibility influences new product evaluation. Thus, the question remains as to whether information accessibility effects also apply when consumers visualize new product usage. Interestingly, previous research on the accessibility of experience has either taken a retrospective view by asking people to look back into their memories and recall something (Schwarz, 1998), or simply asked people to list reasons for choosing a product (Tybout, Sternthal, Malaviya, Bakamitsos, and Park, 2005; Wanke et al., 1997). However, in the new product learning domain, a common approach using mental imagery is to ask people to look forward (with their imagination) and create images around new usage opportunities to learn about the new benefits provided by RNPs (Feiereisen et al., 2008; Ziamou, 2002). Our research goes beyond the traditional retrospective paradigm of information accessibility and examines the effect of imagination difficulty on new product evaluation from a prospective view. Thus, we examine whether the difficulty of *creation* will differ from the difficulty of *retrieval*. A recent research finding suggests that when applied to the new product domain, difficulty of information processing could lead to higher perceived innovativeness of the product and higher product evaluation, as people might think "If this is difficult to process, it must be new and good" (Cho and Schwarz, 2006). On the other hand, another work has shown that imagining oneself using a new product led to lower product evaluation compared with imagining other people using the product because the former was more difficult (Dahl and Hoeffler, 2004). A closer look at these two seemingly conflicting findings suggests that in Cho and Schwarz (2006), difficulty of processing was manipulated by using a difficult or easy-to-interpret text font for the product descriptions. In contrast, in Dahl and Hoeffler (2004), the processing difficulty resulted from the derivation of product usage scenarios. Because our framework also focuses on the difficulty resulting from product usage, we believe that consistent with Dahl and Hoeffler (2004), higher levels of difficulty will lower perceived usefulness of the product and ultimately product evaluation. Further, because INPs and RNPs should naturally be associated with differing degrees of prospective imagery difficulty, we examine whether product newness moderates the effect of information accessibility. However, we extend Dahl and Hoeffler (2004) by connecting the effect of imagination difficulty to the accessibility literature (e.g., Schwarz, 1998, 2004), and more importantly, by comparing the effect of imagination difficulty directly against imagination content.

Product Newness and the Effect of Information Accessibility

Past research has identified several potential moderators of the information accessibility effect (e.g., perceived diagnosticity of the accessible experiences; Schwarz, 1998; Schwarz et al., 1991). Most relevant to the context of new product evaluation, existing research has investigated how one's prior knowledge in a certain domain moderates the impact of retrieval experience. Past research (Grayson and Schwarz, 1999; Rothman and Schwarz, 1998) has demonstrated that when people have knowledge in the domain in question, judgments will be based on the content of what is retrieved rather than ease of retrieval. For example, Rothman and Schwarz (1998) showed that when participants were asked to list either three or eight behaviors that they performed to reduce the risk of heart disease, those without a family history of heart disease showed a retrieval ease effect, whereas those with such a family history indicated a content effect.

Similarly, Tybout et al. (2005) discussed how one's knowledge about a product (e.g., car) influences the perception of how diagnostic retrieval ease would be. In this research, the authors differentiated between products using three levels of brand knowledge—extremely high knowledge level (e.g., BMW after a BMW priming task), moderate knowledge level (e.g., BMW), and extremely low knowledge level (e.g., Hyundai)—and asked participants to generate reasons for driving the target product. They showed that for a brand that people are extremely

familiar or extremely unfamiliar with, because people are consciously aware that it is very easy or very difficult to retrieve information, they do not perceive ease of retrieval as a diagnostic cue. As a result, the task (i.e., thinking about 1 versus 10 reasons) did not impact perceived difficulty of information processing in these situations. It was the actual number of reasons (i.e., content of processing) rather than the difficulty of processing that affected evaluations. However, for a moderately familiar brand (such as a BMW), people are uncertain about the ease with which they can retrieve the information and thus ease of retrieval becomes more diagnostic. As a result, thinking about 10 reasons was perceived to be more difficult than thinking about 1 reason, leading to lower product evaluations. While an RNP might seem to fit the extremely unfamiliar criteria and thus be less susceptible to the impact of the difficulty of imagining uses, we conjecture that for RNPs, subjects are not as well calibrated (as with familiar categories) and thus will not anticipate the difficulty of the imagination exercise (thus making difficulty of imagination more diagnostic).

Given the moderating effect of brand familiarity as demonstrated in Tybout et al. (2005), how will product newness moderate the effect of experienced difficulty of visualization on the evaluation of RNPs and INPs? Compared with INPs that build on established products and allow consumers to draw self-related experiences (Robertson, 1971), RNPs represent entirely new product categories and enable consumers to do something they have never been able to do before (Lehmann, 1997). For RNPs, consumers have low prior knowledge and are often uncertain about the consumption utility associated with new benefits (Hoeffler, 2003). Past research has identified a key difference between evaluating an RNP and evaluating an INP, namely the amount of preference construction that is believed to occur when a person evaluates the product (Bettman, Luce, and Payne, 1998). For RNPs, with which consumers have little prior experience or knowledge, individuals are more sensitive to the context effects and are more likely to use contextual factors as diagnostic cues, whereas for INPs, for which consumers have more prior experience and knowledge in the domain, preferences will be less biased by subtle context effects (e.g., experienced difficulty during the visualization exercise).

This difference in terms of the amount of preference construction required by INPs and RNPs suggests that information accessibility would impact the evaluation of an RNP with which people have relatively low prior knowledge, but have little impact on the evaluation of an INP for which people have very high prior knowledge. More direct support for this prediction comes from Dahl and Hoeffler (2004), who examined the ease or difficulty of visualizing in a slightly different context (self versus others). This study showed that visualizing oneself using an RNP was more difficult than visualizing others using the product, and this greater perceived difficulty of visualization led to lower product evaluations. However, for an INP, perceived difficulty did not directly impact evaluation. Thus, we believe that imagination difficulty will be moderated by product newness such that higher levels of imagination difficulty will negatively impact RNP evaluations. However, for an INP, even if people perceive more difficulty in one scenario over another, they are less likely to use this as a diagnostic cue, and thus, difficulty of imagination will not have an impact on evaluation. We formally hypothesize that:

H1: The diagnosticity of imagination difficulty is moderated by product newness such that imagination difficulty lowers the evaluation for RNPs and has no impact on INPs.

Involvement and the Effect of Information Accessibility

The Elaboration Likelihood Model (ELM) argues that under high involvement, people rely more on a central route to persuasion such that argument strength plays a more significant role, whereas under low involvement, people rely more on a peripheral route such that the attractiveness of the message source is a key persuasion influence (Petty and Cacioppo, 1981; Petty, Cacioppo, and Schumann, 1983). Consistent with this view, additional research has argued that highly involved individuals are more active processors of information about a product or situation and that they produce more elaborate meanings and inferences about information in a given situation (Celsi and Olson, 1988). This information does not have to be necessarily related to product arguments; instead, it can be any issue-relevant information in the context at hand. For example, research has demonstrated that highly involved people will infer more meanings from their current mood in a product evaluation scenario compared with people with low involvement who are not motivated to construe information beyond the product itself (Swinyard, 1993).

We adopt these findings to predict that people under high involvement are more motivated to infer meanings from contextual information than those under low involvement. Specifically, under high involvement, people are more likely to use information accessibility as

an issue-relevant cue when they evaluate RNPs whereas under low involvement, people will not process this information. Formally, we hypothesize that:

H2: The effect of imagination difficulty on the evaluation of RNPs is moderated by involvement such that the influence of imagination difficulty is increased under high involvement and is attenuated under low involvement.

Four studies are conducted to test these hypotheses. In Studies 1–3, we manipulate the level of imagination difficulty with different operationalizations and demonstrate that perceived imagination difficulty has no impact on the evaluation of INPs but leads to decreased evaluations of RNPs (H1). In Study 4, we manipulate both imagination difficulty and involvement for an RNP and confirm that diagnosticity of imagination difficulty for the evaluation of an RNP is stronger under high involvement and attenuated under low involvement (H2). These findings extend research on information accessibility by investigating anticipatory visualization, proposing product newness as an important moderator, and identifying the interplay between information accessibility and involvement.

Study 1

In the consumer learning literature, Dahl et al. (1999) demonstrated that providing people with visualization training helps product design. Moreover, research in product design has shown that when people are given one external example of a product design, the example activates a mental representation of the product that may prevent the construction of other product representations (Dahl and Moreau, 2002). Thus, we expect that giving people only one example of a product activity will make the visualization task difficult. Conversely, giving participants abundant examples should increase visualization ease and thus aid consumers' visualization of new product activities. Therefore, to manipulate difficulty of imagination in Study 1, we give participants different numbers of activities to which they could refer when imagining new uses of a product. We predict that when participants receive only one example of an activity, their imaginative visualization will be difficult, leading to lower evaluations of the RNP (compared with those who receive more examples). However, difficulty of imagination should not impact the evaluation of the INP.

Method

Eighty-three students at a major southeastern university were recruited to complete the study and were paid $5 as compensation. The study was a 2 (product newness: INP, RNP) × 2 (imagination difficulty: providing one activity versus eight activities as visualization aids) between-subjects design.

Procedure. The study consisted of three stages: In the first stage, participants were given two minutes to read the general instructions and to examine the product information. In the second stage, they were instructed to visualize using the product. In the final stage, they responded to the dependent measures.

Product Stimuli and Pretest. In all conditions, participants evaluated a mock advertisement for a product that was labeled as XI-100. However, the product pictures and descriptions were different across the conditions. In the INP conditions, the mock ad included a picture of the latest version of the IBM ThinkPad. In the RNP conditions, the mock ad included a picture of a product called an AudioPC. We took the picture of the AudioPC from a product under development by Sony that has a vertical-screen orientation with a smaller inlaid keyboard on the bottom of the product. We removed the company logo from each product and eliminated all brand identification information. Both product information sheets had four components: the headline, the picture, a short description of the product underneath the picture, and a set of product features. The headline stated, "The XI-100 is the mobile product for people on the go." The short description underneath the picture paralleled the headline "The XI-100 ultra-portable notebook gives users outstanding performance in a small and light notebook." After the short description, each product included a list of eight features (four were common features and four were distinctive features; see the Appendix). Note that we used the same product stimuli for the INP and the RNP in Studies 2 and 3.

We conducted a pretest to test the innovativeness of ThinkPad (INP) and AudioPC (RNP). Ninety-five students at the same university viewed either the mock advertisement for ThinkPad or the advertisement for AudioPC and answered three questions about the innovativeness of the product, anchored by 1 ("not very innovative, not very novel, not very original") and 9 ("very innovative, very novel, very original"). Then, we aggregated the three measures into an innovation index ($\alpha = .91$). The results showed that participants rated the AudioPC ($M = 5.67$) as significantly more innovative than the ThinkPad ($M = 4.37$), $F(1, 93) = 14.90$, $p < .001$).

Difficulty of Visualization. After participants read the product information, they were told to turn to the next page to read the visualization instructions. In all conditions, participants read the following instructions: "When thinking about whether to buy new products, many consumers find that using imagination to form visual images (pictures in the mind) of potential uses of the product can help them evaluate it. Please push yourself to use your imagination and envision new activities that you have never been able to do with computers before, but will be able to do with the XI-100." We further provided them with a list of either one activity or eight activities to aid their visualization. We took the activities from the written protocols of participants in a previous product evaluation study based on the frequency of being mentioned.

In the one-activity condition, participants read the following example:

- Taking notes in class that you can paste directly into handouts (e.g., PowerPoint).

In the eight-activity condition, participants read the following examples:

- Carrying the lightweight computer with you all over campus.
- Taking notes in class that you can paste directly into handouts (e.g., PowerPoint).
- Bringing to a sporting event to capture and dictate audio and writing a blog of what is happening.
- Writing directly on a PDF and reading my notes on the handouts.
- Typing and working in the dark with a lighted keyboard.
- Audio-recording a professor's lecture and replaying portions of the lecture when reviewing and studying for a test.
- Watching an entire movie on an airplane without the battery dying.
- Signing electronic documents and transfer with computer signature.

After all participants read the instructions and example activities, the facilitator asked participants to close their eyes to imagine using the product for two minutes. Participants were then given two minutes to describe the activities they envisioned before moving on to the dependent measures. The facilitator timed participants' visualization and activity description.

Measures. We used multiple items to capture the overall evaluation of the product and to perform the requisite manipulation checks. Participants were asked to indicate their overall evaluation of the XI-100 and how they would rate the XI-100 on a 9-point scale, anchored by 1 ("bad, poor") and 9 ("good, excellent"). As manipulation checks for the level of the product's newness, participants rated the innovativeness of the XI-100 from 1 ("not very innovative, not very novel, not very original") to 9 ("very innovative, very novel, very original"). Participants also indicated how easy or difficult they found the visualization task from 1 ("very easy") to 9 ("very difficult").

Results

Manipulation Checks. We aggregated the three product newness-related questions into an innovativeness index ($\alpha = .93$). As we anticipated, participants rated the AudioPC as significantly more innovative than the ThinkPad ($M = 6.07$ versus 4.94) ($F(1, 79) = 8.41$, $p < .005$). Regarding difficulty of imagination, participants believed that imagining after receiving only one example was more difficult than imagining after receiving eight examples ($M = 5.02$ versus 4.26) ($F(1, 79) = 2.79$, $p < .05$, one tailed).

Product Evaluation. We aggregated the two product evaluation-related questions into an evaluation measure ($r = .91$, $p < .001$). A two-way ANOVA indicated a nonsignificant main effect of product ($F(1, 79) = .18$, $p = .67$) and a significant effect for imagination difficulty (i.e., number of examples given) ($F(1, 79) = 11.08$, $p < .005$). However, this main effect of imagination difficulty was driven primarily by the RNP (AudioPC), as indicated by the significant interaction between product and visualization difficulty ($F(1, 79) = 5.67$, $p < .05$, $\omega^2 = .06$ [Keren and Lewis, 1979]). For the RNP (AudioPC), participants' evaluations after receiving only one example were significantly lower compared with the condition in which participants received eight examples ($M = 5.55$ versus 7.47) ($F(1, 39) = 18.91$, $p < .001$, $\omega^2 = .30$). Conversely, for the INP (ThinkPad), there was no significant impact associated with receiving one example versus eight examples ($M = 6.20$ versus 6.53) ($F(1, 40) = .40$, $p = .53$; see Figure 1). These results support H1.

Cognitive Responses. To investigate the impact of different numbers of examples on the actual number and type of participants' thoughts, we asked two independent coders who were blind to the hypotheses to code the written protocols. For each participant, the coders counted (1) the total number of activities that were mentioned; (2) the number of activities that were related to

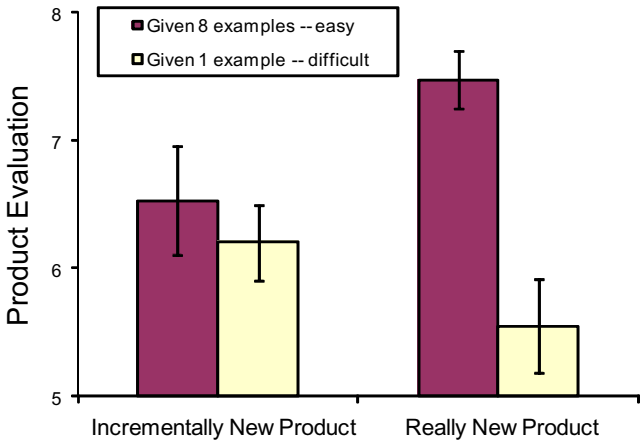

Figure 1. Study 1 Results. Imagination Difficulty Decreases Evaluation for Really New Product
Note: All error bars in the figures indicate standard errors of the means.

the product features that were described in the ad; and (3) the number of activities that were related to the specific example activities that participants received. The overall intercoder reliability was .80, and we aggregated the coding results from both coders.

We found that when people were given only one example, they tended to focus on the product features and therefore produced a greater number of activities based on the features than participants who received eight examples ($M = 1.97$ versus 1.19) ($F(1, 76) = 11.01$, $p = .001$). Comparatively, participants who received one example envisioned fewer activities related to the example given than participants who received eight examples ($M = .44$ versus 1.31) ($F(1, 76) = 43.55$, $p < .001$). Interestingly, in terms of the total number of activities, the coding results showed that participants envisioned more activities when they received one example than when they received eight examples ($M = 2.47$ versus 1.97) ($F(1, 76) = 4.93$, $p < .05$). Yet participants who were able to envision more activities after receiving one example than after receiving eight examples still had a lower evaluation of the RNP. Thus, we conjecture that it was the perceived difficulty of imagining activities, not the content of the thoughts, that affected the evaluations of the RNP.

Discussion

Overall, Study 1 indicated that when people imagine usages of a new product, the difficulty of imagination plays a role for RNPs but not for INPs. Specifically, for RNPs, having only one example as an aid makes visualization more difficult and decreases the overall evaluation. We also found that when people received more examples, their imagination was constrained so that they mostly envisioned activities that were related to the examples given, and the overall number of activities they came up with was lower than that of participants who were provided with only one example. However, this actual number or type of activity did not affect evaluations of the RNP. Rather, it was the perceived difficulty of imagining new activities that directly affected evaluations.

Study 2

In Study 1, we found that providing consumers with limited examples of what they could do with an RNP made the imagination exercise more difficult and led to a lower evaluation. Further, providing more example activities for an INP did not impact product evaluations. However, one could argue that by receiving one example (versus eight examples), participants not only experienced more imagery difficulty but also received less benefit-related information about the product. Further, the specific eight examples provided could be more applicable to the RNP than to the INP, and thus, it might be these specific additional activities that increased the evaluation of the RNP. To address these concerns, we conducted Study 2, which manipulated difficulty of imagination in line with classic prior approaches (Schwarz, 1998; Wanke et al., 1997) by asking people to imagine eight (versus one) truly new activities for a new product. We expected that imagining eight new uses for a product would be more difficult than imagining one new use. We predicted that the difficulty of imagining these activities would, in turn, have a greater impact on the product evaluations of an RNP than on those of an INP.

Method

Eighty-four students at the same university were recruited to complete the study and were paid $5 as compensation. The study was a 2 (product newness: INP, RNP) × 2 (difficulty of imagination: producing one activity, producing eight activities) between-subjects design.

Procedure. We used the same mock advertisements as in Study 1 as a manipulation of product newness (INP and RNP). The imagination instructions were similar to the general instructions in Study 1, except that participants did not receive example activities and were simply asked

to envision either one or eight new activities they had never been able to do with computers but would be able to do with the XI-100. Participants' visualization and activity description were each timed for two minutes.

Measures. The same measures as in Study 1 were used in Study 2.

Results

Manipulation Checks. As in Study 1, we aggregated the product newness-related questions into an innovativeness index ($\alpha = .90$). The results showed that participants rated the AudioPC as more innovative than ThinkPad ($M = 5.73$ versus 5.04) ($F(1, 80) = 3.39$, $p < .05$, one-tailed). In terms of ease of imagination, participants believed that thinking about eight new activities was more difficult than thinking about one activity ($M = 5.32$ versus 3.84), $F(1, 80) = 11.45$, $p < .001$).

Product Evaluation. We aggregated the two product evaluation-related questions into an overall evaluation measure ($r = .91$, $p < .001$). There was a significant interaction between product and visualization strategy on the evaluation measure ($F(1, 80) = 3.76$, $p = .05$, $\omega^2 = .04$), but there was no main effect of product ($F(1, 80) = 1.80$, $p = .18$) or number of examples required ($F(1, 80) = 1.87$, $p = .18$). When imagining only one new activity for the RNP (AudioPC), participants increased their evaluations compared with imagining eight new activities ($M = 6.90$ versus 5.83; $F(1, 41) = 4.68$, $p < .05$, $\omega^2 = .11$). However, there was no difference in evaluation when participants tried to produce one versus eight new activities for the INP (ThinkPad) ($M = 6.71$ versus 6.90) ($F(1, 39) = .20$, $p = .66$; see Figure 2). These results further support H1.

Cognitive Responses. For insight into the impact of the manipulation on the actual thoughts used in visualization, we had the written protocols analyzed to determine the number of activities that were reported. If participants were able to visualize more activities successfully, the impact of the difficulty of the visualization exercise might be attenuated. Indeed, this occurred, but only for the INP, as the following analyses illustrate.

We asked two independent coders who were blind to the hypotheses to count the number of activities that were related to the product features provided for each participant. The intercoder reliability was .94, and the coding results were aggregated. A 2×2 ANOVA indicated a marginally significant effect of product ($F(1, 80) = 2.98$, $p < .10$), number of thoughts required to produce ($F(1, 80) = 3.24$, $p < .10$), and the interaction between them ($F(1, 80) = 2.77$, $p < .10$). In particular, participants were able to generate significantly more thoughts related to the INP in the eight-activity condition than in the one-activity condition ($M = 3.15$ versus 1.98) ($F(1, 39) = 4.50$, $p < .05$), but they generated a similar amount of thoughts related to the RNP in both the eight-activity and the one-activity conditions ($M = 2.00$ versus 1.95) ($F(1, 41) = .013$, $p = .91$).

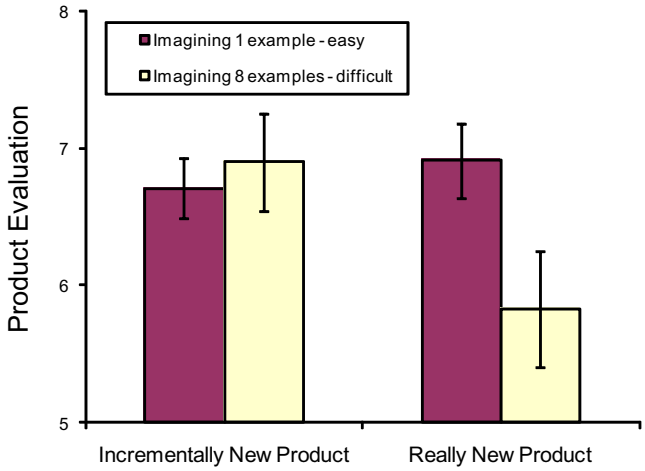

Figure 2. Study 2 Results. Imagination Difficulty Decreases Evaluation for Really New Product

Given that participants believed that it was more difficult to produce eight activities than one activity for both products, the coding results implied that for the RNP, people relied on retrieval ease rather than retrieval content because they lowered their evaluations in the eight-activity condition but not in the one-activity condition (even though the number of activities envisioned was similar in both visualization conditions). In contrast, for the INP, participants appeared to rely more on retrieval content; that is, they did not lower their evaluations of the INP in the eight-example condition even though it was more difficult.

Discussion

The results of Study 2 indicate that when people think about new uses for new products, the difficulty of visualization matters when the product is really new but not when the product is only incrementally new. Specifically, for the RNP, participants believed that envisioning eight new activities was more difficult than envisioning only one new activity, and they used this perceived difficulty as a diagnostic cue, leading to a decreased evaluation. For

the INP, participants also believed that imagining eight activities was more difficult than imagining one activity, but that did not affect their evaluation of the product.

Relating these findings to Study 1, it is interesting to note that when the ease of imagination is facilitated by receiving many examples, the evaluation of the RNP was directionally higher than that of the INP (Study 1). However, when the ease of imagination is manipulated by generating only one example activity, the evaluation of the INP and the RNP did not differ (Study 2). Although our main interest in this research is to assess the effect of different levels of imagination difficulty on the same product rather than to compare across products (and across studies), how information accessibility relates to receiving usage information versus generating usage information could be an interesting future research question.

Study 3

Study 2 indicated that for the RNP, ease of imagination impacted product evaluation whereas content of imagination had no influence. However, one could argue that for the RNP in this study, because of the two-minute time constraint, participants generated a similar amount of thoughts in conditions where they were asked to generate one or eight activities. Had people been given more time to generate eight activities in the eight-activity conditions, would difficulty of imagination still decrease the evaluation of RNP? In Study 3, we address this question by giving participants unlimited time to list imagined activities. Since the RNP was the product that we consistently found to be impacted by ease of imagination (whereas the INP indicated null effects), we only focused on the RNP in this study.

Method

Fifty-five students at a southern university were recruited to complete the study for additional course credit. The study was a two-level, single-factor, between-subjects design (imagining one versus eight activities).

Stimuli and Procedure. Again, the stimuli for the RNP that was used in Study 2 was used in Study 3. The procedure was also similar to Study 2, except that participants were no longer timed and instead were asked to complete the task at their own pace. Further, participants were explicitly instructed to describe either *one* new activity or *eight* new activities during the thought listing. They were asked to try their best and take as much time as they needed.

Measures. After participants finished describing the required activity (activities), they answered the same set of questions that were used in prior studies. In addition, to test whether having to imagine eight activities leads to more frustration, which might impact product evaluation, we also asked participants to rate their feelings based on three 1- (not at all frustrated, not at all annoyed, and not at all irritated) to 9- (very frustrated, very annoyed, and very irritated) point scales.

Results and Discussion

Our manipulation checks indicated that participants rated imagining eight new activities as more difficult than imagining one activity ($M = 5.07$ versus 3.89) ($F(1, 53) = 4.98$, $p < .01$). Regarding the number of activities generated, participants described significantly more activities when asked to imagine eight new activities compared with when they were asked to imagine one new activity ($M = 6.50$ versus 1) ($F(1, 53) = 154.11$, $p < .001$). Further, participants did not feel more frustrated ($\alpha = .91$) after generating eight activities versus generating one activity ($M = 2.67$ versus 2.53) ($F(1, 53) = .11$, $p = .74$).

In terms of the main dependent variable of interest, we aggregated the two product evaluation-related questions into an overall evaluation measure ($r = .71$, $p < .001$). The results showed that participants in the one-activity condition evaluated the RNP significantly higher than those in the eight-activity condition ($M = 6.87$ versus 6.25) ($F(1, 53) = 4.48$, $p < .05$, $\omega^2 = .03$; see Figure 3), providing additional support to H1.

Study 3 complemented Study 2 by showing that even if participants were able to imagine more activities and

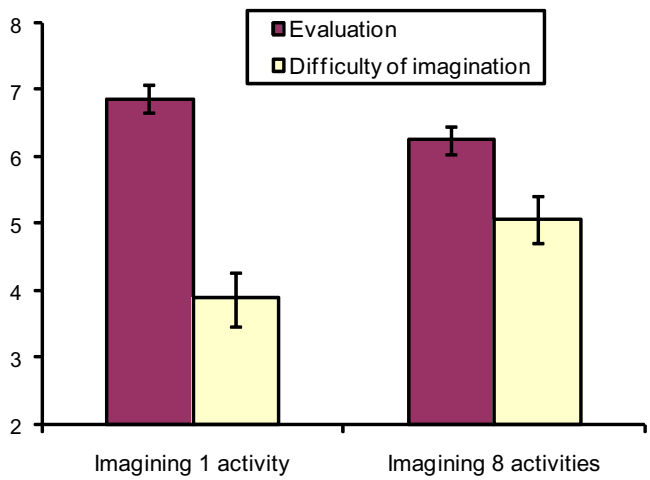

Figure 3. Study 3 Results. Imagination Difficulty Decreases Evaluation for Really New Product

benefits of an RNP, the increased activities visualized did not increase their evaluation. Rather, the difficulty associated with imagining lots of activities decreased the evaluation of the RNP. In other words, for the evaluation of the RNP, ease of imagination dominated the role of the content of what was imagined.

Study 4

Thus far, we have shown that while imagination difficulty is less of a diagnostic cue for the evaluation of INPs, perceived difficulty of imagination leads to lower evaluation for RNPs. In Study 4, we seek to test H2 and address the interaction between imagination difficulty and level of involvement on the evaluation of RNPs.

Method

One hundred thirteen students at a major northeastern university were recruited to complete the study and were paid $5 as compensation for their participation. The study was a 2 (difficulty of imagination: producing one activity, producing eight activities) × 2 (involvement: high versus low) between-subjects design. In all conditions, participants evaluated an RNP.

Product Stimuli. To increase the generalizability of our findings, we used a different RNP stimulus. Participants evaluated a mock advertisement that included a picture and information concerning an RNP that facilitated language translation labeled as the Z-500. The ad had four components: the headline, the picture, a short description of the product underneath the picture, and a set of product features. The headline stated, "The Z-500 offers a revolutionary new way to have a conversation in a foreign language." The short description underneath the picture paralleled the headline "The Z-500 is a wearable optical device that interprets foreign languages and projects a real-time translation directly onto the user's retina." After the short description, the product included a list of seven features (see Appendix). A separate pretest ($N = 27$) based on the same ad asked participants to answer three questions about the innovativeness of the product ($\alpha = .82$), anchored by 1 ("not very innovative, not very novel, not very original") and 9 ("very innovative, very novel, very original"). The results showed the translation glasses were rated as highly innovative ($M = 7.32$, $t(26) = 7.86$, $p < .001$, compared with the scale midpoint).

Procedure. The procedure was similar to Study 3, except that we manipulated an additional factor—involvement—by adopting the basic approach utilized in Petty et al. (1983). In all conditions, participants read that they would be asked to evaluate a new product: the Z-500. In the high-involvement conditions, we told participants that this product will be test-marketed among young people in their city in the near future; thus, their opinion is critical to the researchers. We further told them that to thank them for their participation, we will randomly select five participants of this study to receive this new product or an Amazon gift certificate of equivalent value (their choice) as a free gift after this study is complete. In the low-involvement conditions, we told participants that this product will be test-marketed among senior consumers in a city on the west coast. Although they are not the target market, we told them that we would still get their opinion because we have extra time in this study session. The manipulation of imagination difficulty (similar to Studies 2 and 3) asked participants to generate either one or eight new activities that they have never been able to do before but will be able to do with the Z-500.

Measures. We used multiple items to capture the overall product evaluation and to perform the requisite manipulation checks. To measure overall product evaluation, participants were asked to indicate their overall evaluation of the Z-500, how they would rate the Z-500, whether they think Z-500 is an excellent product, their attitude toward the Z-500, how interested they would be in purchasing the Z-500, how seriously they would consider the Z-500, and what the likelihood is that they would buy the Z-500. As manipulation checks for involvement, participants answered how motivated they were to evaluate the Z-500 and how much they visualized to evaluate the Z-500. To measure imagination difficulty, we asked participants to indicate how easy or difficult and how effortful they found the visualization exercise to be. Further, participants also rated their frustration based on the same three questions we used in Study 3 (how frustrated, annoyed, and irritated they felt toward the Z-500). All questions were based on 9-point scales. Finally, we asked participants to make a choice between the Z-500 and an Amazon gift certificate of equivalent value if they were selected to receive a free gift.

Results

Manipulation Checks. We aggregated the two involvement-related questions into an involvement index ($r = .44$, $p < .001$). The results showed that participants

were significantly more involved in the task in the high-involvement conditions than in the low-involvement conditions ($M = 6.07$ versus 5.45; $F(1, 109) = 4.30$, $p < .05$). In terms of imagination difficulty, we combined the two difficulty-related measures ($r = .48$, $p < .001$), and the results indicated that participants believed that thinking about eight new activities was more difficult than thinking about one activity ($M = 5.57$ versus 4.92), $F(1, 109) = 3.83$, $p = .05$). Further, participants did not feel more frustrated ($\alpha = .93$) after generating eight activities versus generating one activity ($M = 2.60$ versus 2.24; $F(1, 108) = 1.66$, $p = .20$) or after being assigned to the high- versus low-involvement conditions ($M = 2.32$ versus 2.52; $F(1, 108) = .49$, $p = .49$).

Product Evaluation. We aggregated the seven product evaluation-related questions into an overall product evaluation measure ($\alpha = .94$). The results showed a significant main effect of imagination difficulty ($F(1, 109) = 4.52$, $p < .05$), no main effect of involvement ($F(1, 109) = 1.17$, $p = .28$), and the expected significant interaction between imagination difficulty and involvement on the evaluation measure ($F(1, 109) = 5.03$, $p < .05$, $\omega^2 = .04$). When participants had higher involvement in the evaluation task, they indicated much higher product evaluations when the imagination task was perceived to be easier (i.e., imagining one new activity) than when it was difficult (i.e., imagining eight new activities) ($M = 6.68$ versus 5.40; $F(1, 53) = 10.23$, $p < .005$, $\omega^2 = .16$). However, ease/difficulty of imagination did not cause any difference in evaluation when participants had lower involvement in the task ($M = 5.74$ versus 5.70) ($F(1, 56) = .01$, $p = .94$; Figure 4A). These results confirm H2.

Choice. A binary regression based on participants' choice between the Z-500 and the Amazon gift certificate showed a marginally significant interaction between imagination difficulty and involvement (*Wald* (1) = 3.45, $p = .06$). Consistent with the product evaluation, when participants had higher involvement, a significantly higher percentage of people chose the Z-500 when the imagination task involved imagining one activity compared with when the imagination task involved eight activities ($M = 44\%$ versus 18%; $\chi^2(1) = 4.55$, $p < .05$). However, when the involvement was lower, there was no difference in terms of their choice after imagining one or eight activities ($M = 29\%$ versus 34%; $\chi^2(1) = .23$, $p = .63$; see Figure 4B).

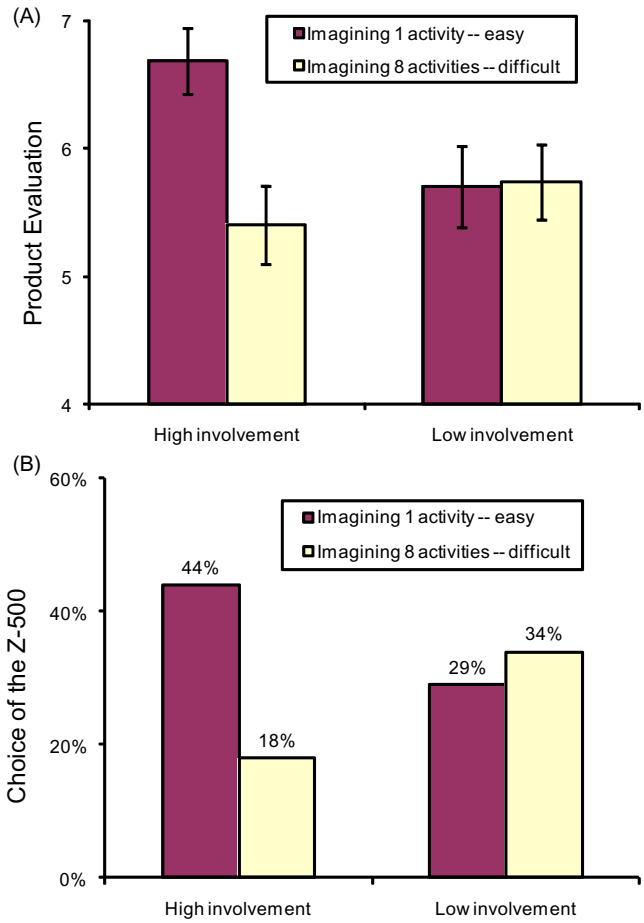

Figure 4. Study 4 Results. (A) Involvement Moderates the Effect of Imagination Difficulty on Really New Product Evaluation. (B) Involvement Moderates the Effect of Imagination Difficulty on Lottery Choice

Discussion

The results of Study 4 demonstrated continued diagnosticity of imagination difficulty under high involvement. Indeed, under high involvement, imagination difficulty decreased the evaluation and choice of an RNP whereas ease of imagination increased the evaluation and choice of an RNP. However, this effect was attenuated when participants' involvement was low and thus were not motivated to derive meaning from contextual information.

Discussion

Taken together, our findings confirmed our hypotheses that product newness and involvement moderate the effect of imagination difficulty on product evaluation. Specifically, for RNPs, difficulty of imagination plays a

more dominant role over content of imagination as higher levels of difficulty lower product evaluation. For INPs, imagination difficulty was shown to play a minimal role. We conjecture that RNP preference construction is impacted more by context effects, and thus, participants' perceived imagination accessibility is used as a diagnostic cue. However, for the INP, even if people realize that one visualization task is more difficult than the other, they do not perceive the level of difficulty of the imaginative task as a diagnostic cue, and thus, imagination difficulty does not impact product evaluations. In four studies, we manipulated difficulty of imagination by either providing participants with different numbers of imagination aids (Study 1) or asking them to imagine a different number of new activities with the product (Studies 2–4) and obtained strong support to our predictions across different new product stimuli. Even after we gave participants time and an opportunity to imagine a significantly higher number of product activities (Study 3), the benefits associated with the additional product activities visualized were still dominated by the diagnosticity associated with the difficulty of imagining them (for the RNP). Further, we manipulated involvement in Study 4 and showed that the diagnosticity of imagination difficulty remained under high involvement, whereas participants who were not involved did not bother to use this information as a cue, leading to an attenuation of the effect.

Contributions

Our research contributes to the accessibility literature by demonstrating the role of imagination difficulty on new product evaluation from anticipatory visualization. Existing research on the impact of information accessibility is mostly based on the ease of *recalling* events from prior memories (Schwarz, 1998; Schwarz et al., 1991) or *retrieving* reasons for using a product (Tybout et al., 2005; Wanke et al., 1997). In a departure from these retrospective perspectives, we took an anticipatory view and manipulated the difficulty of *imagining* new activities in the domain of new product learning. We showed that counter to a recent finding that states that a higher level of processing difficulty will enhance the evaluation of a new product (Cho and Schwarz, 2006), the difficulty that is related with the process of imagining new product use decreased product evaluations of an RNP. Note that this suggests that the consequences of processing difficulty (i.e., reading about a product in a more difficult-to-read font) differ from the consequences of trying to imagine product uses in the domain we study.

At the same time, we also demonstrated that imagination difficulty produces a differential pattern on evaluations of an INP compared with an RNP. To our knowledge, our work is the first in the accessibility literature to test directly the differentiated role of difficulty of imagining on the evaluation of RNPs and INPs. Our work also adds to the new product evaluation literature by showing that it is not just the content of visualization that has an impact on product evaluation (e.g., process- versus outcome-focused visualization in Castano et al., 2008; Zhao et al., 2011, or visualizing new usage scenarios versus existing usage scenarios in Zhao et al., 2009). We demonstrate that sometimes difficulty in imagination can play a crucial role in the evaluation of products with differing degrees of newness. Our findings extend research in Dahl and Hoeffler (2004) by comparing imagination difficulty directly against imagination content and examining the moderating role of involvement. Further, our results complement the results of Tybout et al. (2005) where ease of retrieval was considered nondiagnostic for extremely high or low familiarity brands. Instead, we found that ease of imagination was considered diagnostic for RNPs. Our findings suggest that product newness might be different from brand familiarity, and we deem it as an interesting future research question to explore the underlying mechanism behind the difference between product newness and brand familiarity.

In addition, our findings add to research on involvement and the ELM (Petty et al., 1983). The ELM proposed that people under high involvement process central product information whereas people under low involvement process peripheral information. While ease of information accessibility has not been categorized as a central or peripheral cue in the literature, one might intuitively predict that it is peripheral information. However, consistent with existing work that addresses the greater effect of mood under high involvement (Swinyard, 1993), we identify another instance where high involvement produces greater motivation to process and infer meanings from contextual cues, rather than limit the impact of high involvement to product-related information only. Specifically, we demonstrate that when evaluating RNPs, people under high involvement take imagination difficulty as a meaningful cue and evaluate the product lower when the level of imagination difficulty is high, whereas this piece of information (i.e., imagination difficulty) does not matter for people under low involvement.

Directions for Future Research

This research suggests a number of future research directions. First, our research manipulated imagination

difficulty by asking participants to come up with usage scenarios, and we found that higher difficulty in doing so lowers evaluation of RNPs. Prior work (Cho and Schwarz, 2006) manipulated processing difficulty by using a visually difficult text font and found that higher difficulty in reading the product ad led to higher evaluation of an RNP because people related difficulty with higher innovativeness. Further research should continue to examine how differences in cognitive versus visual context cues produce discrepant outcomes. Another interesting question is whether affect has an impact on product evaluation. When people receive more examples about product usage to aid visualization, do they have a more positive affective response? Research on narrative self-referencing shows that when consumers put themselves into specific situations in which they interact with a product, positive affect is increased, and they pay less attention to the cognitive content of their information processing, which ultimately leads to higher product evaluation (Escalas, 2004; West, Huber, and Min, 2004). Future work is needed to understand how this affective focus, relative to the argument focus, relates to people's reliance on perceived ease of imagination over the content of what is imagined.

Managerial Implications

The results provide caution to managers who are trying to introduce new products into the marketplace. When marketing RNPs, managers should encourage customers to focus on the new benefits or the new uses they have never experienced before. However, counter to the current practice of providing one or two key benefits to consumers, this research implies that providing multiple examples of an RNP's new benefits may lead to higher evaluations and faster adoption in the marketplace because it will make people's imagination experience less difficult. However, encouraging consumers to imagine multiple uses of an RNP without providing specific examples may lead to lower evaluations because of the difficulty of imagination in this instance. For example, think about the RNP Segway Human Transporter, which is a battery-powered personal transportation device that mimics the human body's ability to maintain its balance and is designed for local transportation at a speed of up to 12.5 miles per hour (Kemper, 2003). Our results suggest that while convincing consumers of the novel product benefits, marketers should reduce the difficulty of imagining new uses by focusing consumers only on generating one example, thus making the imagination experience easier. Further, marketers could provide consumers with abundant concrete examples with specific, new usage scenarios in order to facilitate evaluation and adoption. This can be done through interaction with sales people, in TV commercials or printed advertisements, or even through product descriptions on the product. Our findings also point to the importance of effectively involving the customer in new product introductions when imagination ease can be facilitated. While somewhat intuitive, it is clear that by capturing the attention and purpose of consumers when introducing an RNP to the marketplace, marketers will realize the benefits of positive subtler context cues that enable effective persuasion. However, when a new product involves high levels of imagination difficulty, lowering customers' involvement might be a more strategic approach. In addition, the general visualization approach in our work also offers managerial insights to new product concept testing (e.g., Dahan and Srinivasan, 2000) such that marketers can simply encourage consumers to mentally visualize new product usage scenarios rather than creating real usage scenarios for them.

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Appendix

INP Stimuli in Studies 1–2

"The XI-100 is the mobile product **for** people on the go!"

The XI-100 ultra-portable notebook gives users outstanding performance in a small and light notebook

- Keyboard light to illuminate the keyboard in low-light.
- Titanium Cover provides extra-light and enhanced durability.
- Extended life battery allows up to 4 hours computing.

- Optimized for connectivity with flexible connection options
- Lightweight (weighs about 4.5 pounds)
- 14" TFT screen
- Intel® Pentium® M processor at 1.73GHz
- 3 year limited warranty

RNP Stimuli in Studies 1–3

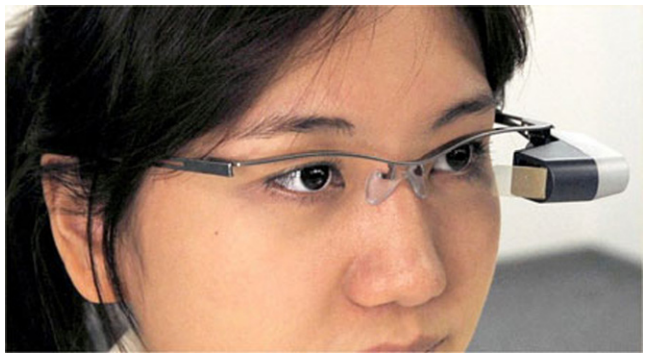
"The XI-100 is the mobile product **for** people on the go!"

The XI-100 ultra-portable notebook gives users outstanding performance in a small and light notebook

- Biometric smart pen recognizes, stores, and converts handwritten text
- Chip based audio recorder synchronizes with handwritten notes
- PDF file enhancer allows for onscreen annotation
- Wearable computer attachment has eye glass mounted LCD display
- Lightweight (weighs about 4.5 pounds)
- 14" TFT screen
- Intel® Pentium® M processor at 1.73GHz
- 3 year limited warranty

RNP Stimuli in Study 4

"The Z-500 offers a revolutionary new way to have a conversation in a foreign language"



The Z-500 is a wearable optical device that interprets foreign languages and projects a real-time translation directly onto the user's retina.

- Automatic translation of spoken words and phrases
- Glasses that feature a compact microphone and camera, which picks up the foreign-language conversation
- Audio recording relayed to a remote server which translates the words from speech to text, and transmits it back to the glasses
- Translated phrases appear on a tiny retinal display
- Retinal display projects the text in the wearer's peripheral vision, enabling the user to maintain eye contact with whoever they're speaking to
- Can be used for hours on end without eye strain
- Compact and lightweight