

THE NOVELTY OF 3D PRODUCT PRESENTATIONS ONLINE

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Abstract: The current research sought to understand the contribution of novelty to the positive outcomes that have been reported in the research on 3D interactions online and in e-commerce. The novelty of 3D product presentations was manipulated and examined along with the presentation of additional forms of information to determine if novelty is related to positive feelings associated with 3D products. Additional information was most compelling in product attitude formation, whereas novelty played a key role in shaping purchase intention. Novelty and information both impacted attitudes toward Web sites using 3D products. Directions for future research are suggested.

Estimates indicate rapid growth in e-tailing sales and total online spending in the US. According to David J. Roddy, chief telecommunications economist at Deloitte Research, Internet revenues will surpass \$1.1 trillion by 2002, more than 70 percent of large companies will start using the Web as a sales medium, and time and distance will no longer be an obstacle between buyers and sellers. This 24-hour global purchase option is something that is going to drastically change the way people shop and spend. Jupiter Communications (1999) estimates U.S. e-tailing sales to exceed \$41.1 billion in 2002. Although various researchers and organizations differ in their estimates, they all agree on the fact that e-commerce is a rapidly developing field and that the world is to witness major changes in the way people communicate and trade over the Internet.

With the increase in online traffic and sales, many e-commerce merchants are turning to 3D product presentations to stand out in such a competitive environment and to provide consumers with greater sensory experience (Nash 2000). This makes it important to understand the impact of virtual experiences. To date, researchers have examined the relative advantages of 3D presentations over direct and indirect media as well as consumer learning in 3D environments (Li, Daugherty and Biocca 2001a, Li, Daugherty and Biocca 2001b). Other research has gone on to measure the effectiveness of interactive advertising by measuring attitudes, behaviors and cognitive and affective responses (Pavlou and Stewart 2000). However, the novelty of interacting in these environments has been overlooked. The excitement of novel stimuli may result in positive attitude formation, but what happens when interacting in a 3 dimensional space is no longer novel? The proposed research seeks to understand the contribution of novelty to the positive outcomes that have been reported in early research on 3D interactions online and in e-commerce.

What We Now Know

The Internet is fundamentally different from traditional media in that it provides for two-way interactivity unlike print, TV and other traditional media (Cho 1999; Hoffman and Novak 1996). Meeker (1997) described the Internet as the only medium that allows consumers to see products, investigate further details and immediately make purchases. Plus, a relatively early study found that the Internet increases brand awareness and brand image as effectively as traditional media (Briggs and Hollis 1997). However, the Internet is not just an efficient channel for advertising, marketing and product distribution, but the interactivity and multimedia displays can create a sense of enjoyment which may result in a loss of self-consciousness (Hoffman and Novak 1996). This loss of self-consciousness creates a compelling online experience that mirrors reality and can enhance consumer learning (Novak, Hoffman and Yung 2000). Interaction with 3D products online is one way to enhance online experiences and may add to what is known in e-commerce lingo as 'virtual experience.'

Conceptually, 'virtual experience' has been defined as "psychological and emotional states that consumers undergo while interacting with products in a 3D environment" (Li, Daugherty, and Biocca 2001b). Virtual experience may have advantages that have previously been associated with both direct and indirect product experiences. Direct experience has been defined as "an experience that stems out of an unmediated interaction between the consumer and the product, with a person's full sensory capacity, including visual, auditory, taste-smell, haptic and orienting" (Gibson 1966) and is thought to cause consumers to have greater confidence in their product choices (Hoch and Deighton 1989). In contrast, indirect experience stems from symbolic representations of the world experienced through communications with others and mediated representations of the world presented in books, magazines, and television. Indirect experience is believed to

result in less affective responses and thus be less effective in changing attitudes than direct experience (Millar and Millar 1996). However, providing consumers indirect experiences through media have traditionally been one of the easiest and cheapest ways to persuade large audiences with commercial messages. Virtual experience is beneficial because it has the common factor of interactivity (Hoch and Deighton 1989) yet it is a mediated experience (Heeter 2000) that can be provided to large audiences. Hence, virtual experience may be able to enjoy the advantages of both direct and indirect experiences (Li, Daugherty and Biocca 2001a). In fact, Li, Daugherty and Biocca (2001b) found that virtual experience created by 3D environments was much better than indirect experience created by traditional media in facilitating learning.

Given the above findings, it seems evident that 3D product presentations may be superior to other mediated forms of experience for facilitating information processing. The research currently being conducted seems to be bolstering these results. However, one aspect of interacting in 3D environments that has yet to be examined is the novelty of product presentations. People who have not been exposed to 3D representations of products online may simply be more curious than if the information was presented in another medium or format. Thus, it is possible that favorable attitudes could result from the *novelty* of interacting with 3D products, and not from the 3D products themselves.

Novelty

Novel stimuli have been found to stimulate vigorous and active information processing, resulting in better recall and recognition than when non-novel stimuli were used (Fahy, Riches and Brown 1993; Li, Miller and Desimone 1993; Riches, Wilson and Brown 1991; Wilson and Rolls 1993). Pfau, Parrott and Lindquist (1992) described positive effects of novelty, even when the novelty was associated with negative political attack ads. One of the means by which novelty aids information processing is through attention (*Kover and James 1993*). Attention is thought to be on a continuum from inward to outward focus. According to Carver and Scheier (1981), novelty distracts an individual's self focus away from an internal state. This decrease in the attention to self results in increased attention to the environment. Increased attention is the first step needed to process information. In fact, Steenkamp and Baumgartner (1992) identified purposeful information seeking and curiosity seeking as two motives that underlie information seeking. A novel 3D product presentation may enhance information seeking behavior and

elicit increased curiosity. Therefore, novelty may be a necessary step leading to further processing of information.

Novel stimuli are also thought to elicit and enhance a person's exploratory behavior (Spielberger and Starr 1994). Exploratory behaviors are defined by curiosity, variety seeking, and risk taking (Raju 1980). Curiosity represents a tendency to seek stimulation from a variety of sources that are novel, often as a reaction to boredom. Novelty feeds the need for change, thereby alleviating a state of boredom (Steenkamp and Baumgartner 1992). Therefore, when faced with novel stimuli online, one may be more inclined to pay attention, seek out more information, and possibly engage in impulse purchasing.

Deci (1992) also claimed that novelty is one of seven dimensions that represent situational interest. According to Reeve (1996, p.170), "situational interest is a person-activity interactive construct and flows from a person's relationship with a particular activity." The more interest a person has in an activity, the more enjoyment he/she garners from the situation. When people experience situational interest, it often stems from a somewhat challenging environment, which demands high attention and an intention to explore. Instant enjoyment usually results during the person-environment interaction (Chen and Darst 2001). Novelty increases situational interest and thereby increases the degree to which people should find a novel activity enjoyable. To the degree that people enjoy an experience, they should also form a positive attitude in response. Therefore, we propose that the novelty of 3D products heightens situational interest, increases involvement, and results in a favorable attitude toward the experience.

While 3D product experiences may be inherently more interesting than product presented in 2D, novelty could serve as an alternative explanation for the increased interest and effectiveness of these new presentation formats. If novelty is playing a role in the formation of consumer attitudes with 3D products online, then two aspects of the presentation must be considered when attempting to explain a novelty effect: 1) the novelty of 3D product presentations, and 2) other sources of information. First, as the novelty of the presentation method decreases, consumers should be more likely to focus on the product attributes. Cox and Locander (1987) found that consumers were focused on affective reactions when faced with novel stimuli instead of product relevant information. Fitzgerald (1999) found that highly novel analogies used in advertisements were perceived to be too complex for thorough processing of the product message, indicating that consumers

focused on decoding the message but did not have the capacity to fully integrate the information. A more moderate level of novelty produced a more complete understanding of the product information. Therefore, it appears that novelty distracts from actively processing and questioning product claims in advertising.

Tellis (1997) reviewed the literature on effective frequency in advertising and described two consumer responses to novel stimuli that are repeated overtime. Tellis (1997) claims that novel ads lead to uncertainty and tension, but as viewers become familiar and comfortable with ads they develop positive attitudes through a process called habituation. However, as the number of exposures increases and viewers become bored with ads, they develop negative attitudes through a process called tedium. Figure 1 shows the relationship between habituation and tedium. Over time, habituation shows positive effects that peak and then decline, whereas tedium occurs later but simply declines. The relative weight of the two effects may help to explain positive outcomes associated with novel stimuli and why consumers may become increasingly critical of advertising messages as novelty wanes.

Haugtvedt, Schumann, Schneier, and Warren (1994) examined advertising repetition and differing methods of varying ads. They distinguished between cosmetic variation and substantive variation, which was contrasted with repeated exposure and exposure to a single ad. Cosmetic variation uses differing peripheral cues (e.g., endorsers, colors, type faces, etc.) to maintain novelty, whereas substantive variation occurs when product relevant messages are changed (e.g., lower price versus more cleaning power). Haugtvedt et al. (1994) concluded that substantive variation encourages product-related thoughts, whereas cosmetic variation encourages processing of the ad as a whole. Both forms of novelty resulted in equally positive attitudes toward the ad. However, subjects who were exposed to substantive variation showed more positive attitudes toward the product and recalled a greater number of product attributes. Subjects who were exposed to the cosmetic variation recalled more features of the advertisement itself. Similar to cosmetic variation, 3D product presentations are likely to create a short-lived novelty effect that focuses consumers' attention on the experience and not product relevant information. Over time, substantive variation of product attribute information may be needed to maintain positive attitudes as the novelty effect of the 3D presentations fade.

Oliver, Robertson and Mitchell (1993) examined how consumers' elaborate on information when faced with novel stimuli in general. They described two responses to advertising which include: imagery and analysis. Imagery (imagining the use of a product) was found to be more prevalent in response to novel ads and was positively related to purchase intention. Analysis was characterized as semantic and verbal, and was negatively related to the affective reaction toward the ads. Novel stimuli were processed differently than familiar stimuli. Cues in advertisements or the experience of an ad as a whole may be the "information" processed in imagery responses to novel stimuli, while product attribute information is the focus of analysis responses to non-novel stimuli. Similarly, as 3D product presentations become more common, consumers may rely less on the "sizzle" and more on the steak. In light of the literature presented and all other conditions remaining exactly the same, we propose that:

H1: As the level of familiarity with 3D presentations increases, positive attitudes toward a product presented in 3D will decrease.

H2: As the level of familiarity with 3D presentations increases, favorable purchase intention of products presented in a 3D environment will decrease.

H3: As the level of familiarity with 3D presentations increases, positive attitudes toward websites containing 3D product presentations will decrease.

However, when all other conditions are not the same, the proposed novelty effect may cease to exist. For instance, when 3D product presentations are used in conjunction with copy or product attribute descriptions, the additional information may be perceived as more relevant than the novelty of the method of presentation, particularly when a decision is pending. When asked to make a decision, consumers tend to focus on product relevant attributes (Bettman, Johnson and Payne 1991), as consumers are generally motivated toward a desirable goal (Jolibert and Baumgartner 1997). Given the motivation, ability and opportunity to do so, consumers generally seek out information that is most relevant and increase their level of information processing (MacInnis, Moorman and Jaworski 1991). MacInnis et al. summarize findings showing that higher processing levels enhance memory for brand information, result in more stable attitudes, and impact purchase intentions. According to MacInnis and Jaworski (1989), the more motivated a consumer is by a utilitarian need, the more attention is focused on product attribute information. The more motivated a consumer is by

an expressive need, the more attention is focused on cues of the advertisement itself. Therefore, when a purchase decision must be made and product attribute information is available, it is expected that consumers will be likely to use such information when forming attitudes and making a decision. However, we would expect that when product information is presented with a novel 3D product presentation, it is likely that the novelty will distract consumers from processing the information conveyed in the copy (Cox and Locander 1987). In other words, in non-novel situations product information is more likely to influence attitudes and purchase decisions than when product information is presented with a novel stimulus. Therefore, it is expected that:

H4: Information will have a greater effect on attitude towards the product, purchase intention, and attitudes toward Web sites with 3D product presentations when the experience is not novel, more so than when novel.

Finally, one other possible confound that impacts the effectiveness of computer-mediated communication is believability. Research has shown the importance of presenting situations that mirror reality to enhance communication effectiveness (Aaker and Stayman 1989, Beltramini 1982, Hoffman 1986). Edwards and La Ferle (2001) found that believability influenced the degree to which people experienced role-taking in response to 3D virtual reality environments. To the degree that a product presentation is not true to life, consumers are likely to question the believability of the product represented. If not deemed believable, the information will be discounted and may be less likely to be used in making the purchase decision. Therefore:

H5: Purchase intention should be positively related to the perceived believability of the product presentation.

the possible importance of novelty in explaining the effectiveness of 3D e-commerce presentations, the research will examine changes in attitude formation as the novelty of 3D presentations decreases. If novelty results in increased interest, then perhaps 3D presentations will become less effective over time. If so, then it is necessary to understand the interaction of novelty, interest, and the processing of commercial experiences to facilitate effective planning of 3D commercial environments over time.

METHOD

At a Midwestern university, 138 students were recruited and pretested as to their exposure to 3D product presentations and virtual reality experiences. Subjects were then randomly

assigned to one of four experimental conditions in which they were exposed to 3D products presented online. A 2 x 2 design was used in which novelty and level of information were manipulated. To manipulate novelty, subjects either viewed a single Web site at which a small computer desk was depicted in 3D, or they viewed four 3D products and then the small computer desk in 3D. The five exposures to 3D product presentations occurred in a short period of time which Tellis (1997, p. 78) predicted would lead, "to tedium, lower interest and attention without much increase in habituation." Level of information was manipulated by exposing subjects to 3D products with no other information, or 3D products that were accompanied by copy describing product attribute information (i.e., price, material, color, size, etc.). Subjects were told that they could spend as much time as they wished with each depicted product.

Once finished, subjects were asked to fill out a questionnaire that assessed: 1) attitude toward the computer desk, 2) likelihood of purchase, 3) attitude toward Websites using such presentations in general, and 4) intention to view 3D product presentations in the future. Intention to view 3D product presentations in the future was measured to determine the degree to which subjects would like to view 3D products again. All measures were created from pre-existing scales. Attitude toward the computer desk was assessed using five semantic differential pairs including: good-bad, appealing-not appealing, unpleasant-pleasant, attractive-unattractive, and boring-interesting. The scale was found to be reliable ($\alpha=.91$). Purchase intent was measured as the agreement or disagreement with seven items dealing with the purchase decision and was also found to be reliable ($\alpha=.86$). Attitude toward Web sites using 3D product presentations was measured using the same attitude scale used for the desk, however subjects were asked to consider how they felt about Web sites using 3D product representations. Finally, subjects were asked to rate their agreement or disagreement with two statements about future intentions to view 3D products if available. These items were also measured on a seven-point scale.

Before the hypotheses could be tested, several checks of the data were performed to address potential confounds to the study. Given that the variable of interest was novelty, subjects' prior experiences with 3D product presentations and virtual reality in general were assessed. A person was classified as having significant experience with 3D product presentations if their mean score on the items assessed in the pretest were 5 or greater (on a 7 point scale). A t-test between those with

significant experience ($x = 5.94$) and those with little experience ($x = 3.09$) revealed them to be significantly different, $t_{(15)}=16.46$, $p<.001$. The 39 subjects reporting significant experience with 3D experiences were excluded from further data analysis.

RESULTS

A series of ANCOVAs was used to examine the relationship between the degree of novelty, the presence of attribute information, and the dependent variables of interest: Attitude toward the product, purchase intent, attitude toward Web sites using 3D product representations, and future intention to view 3D product presentations (Means are presented in Table 1). Believability was specified as covariate for each of the analyses to examine its relationship to the dependent variables. The first hypothesis concerned *attitudes toward products* presented in a 3D environment. It was believed that the novelty of 3D product presentations would be positively related to attitudes toward those experiences. Results from the first ANCOVA failed to show a significant interaction between novelty and information, nor a main effect for those for whom the 3D desk was a novel experience ($x = 5.13$) and those for whom the 3D desk was not novel ($x = 4.94$), $p>.05$. However, there was a significant difference between the attitude toward the product when information was present ($x = 5.29$) or not ($x = 4.77$), $F_{(1,94)}=5.71$, $p<.05$. Believability was also significantly related to subjects attitudes about the desk, $F_{(1,94)}=19.91$, $p<.001$.

Table 1. Novelty and Attribute Information on Attitude Toward the Desk

Dependent Measure	Novel	Not Novel
Attitude Toward the Desk		
No Attribute Information	5.45	5.13
Attribute Information	4.80	4.74
Purchase Intention		
No Attribute Information	4.63	4.18
Attribute Information	4.89	4.33
Attitude Toward Web Sites with 3D Products		
No Attribute Information	6.35	6.09
Attribute Information	5.81	6.37
Intention to View 3D Products		
No Attribute Information	6.36	6.13
Attribute Information	6.02	6.30

The second hypothesis was similar to the first, but examined subjects' *purchase intentions* when faced with 3D product presentations. It was believed that the novelty of 3D product presentations would be positively related to intentions to purchase the product. Results from the second ANCOVA also failed to show a significant interaction between novelty and information, nor a main effect for the presence of attribute information with the 3D product presentation. However, the purchase intention of those for whom the desk was a novel presentation ($x = 4.76$) was greater than for those who had been exposed to multiple 3D product presentations ($x = 4.26$), $F_{(1,94)}=5.48$, $p<.05$. Believability was again significantly related to subjects' willingness to purchase the desk, $F_{(1,94)}=4.11$, $p<.05$.

The third hypothesis concerned *attitudes towards Web sites* that provide 3D product presentations. An inverse relationship was expected between the novelty of a 3D product presentation and subjects' attitudes toward Web sites' using such a tactic. ANCOVA was again conducted, revealing a significant interaction between novelty and the presence of attribute information on attitudes toward Web sites that present 3D products, $F_{(1,94)}=5.61$, $p<.05$. Figure 2 shows that subjects who are familiar with 3D product presentations and are also given attribute information ($x = 6.37$), and subjects who are not familiar with 3D product presentations and are not given attribute information ($x = 6.35$) have more positive attitudes than those for whom 3D product presentations are novel ($x = 5.81$). Again, believability was significant in the model ($F_{(1,94)}=18.98$, $p<.05$), suggesting that 3D product presentations are only effective to the extent that they are true to life.

The last analysis examined the extent to which subjects were likely to view 3D product presentations in the future. A final ANCOVA showed no significant interaction or main effects. All conditions reported that further viewing of 3D product presentations was extremely likely ($x = 6.20$). Only the degree to which the product was believable was significant in the model, $F_{(1,94)}=5.25$, $p<.05$.

DISCUSSION

The current study provides mixed results concerning the relationship between novelty and the effectiveness of 3D product presentations. First, no effect of novelty was seen in product attitude formation. That is, subjects reported similar positive attitudes toward the desk after a single exposure to 3D product presentations or after five exposures. However, the enjoyment of the experience as reflected in the attitude toward

the computer desk seems to have been reduced by the presence of attribute information. When copy provided additional information, the subjects reported a significantly less positive attitude toward the desk, than when the product was presented alone. This at first may seem counter-intuitive, however the literature on information overload may provide some insight. As the number stimuli demanding attention increases, each individual source has less impact on attitude formation (Baron 1986, March 1994). This finding highlights the experiential nature of 3D product presentations and suggests that subjects may have enjoyed the experience to a greater degree when they were not reminded of the need to consider utilitarian features of the product.

In contrast, subjects reported attribute information as equally important when thinking about a purchase. Here only novelty was a key determinant in whether or not consumers intended on purchasing the computer desk. When 3D product presentations were novel, subjects were more likely to purchase than when the presentations were not novel. This finding provides evidence for the existence of a novelty effect concerning purchase intention. However, the data was particularly surprising given the well documented research showing that purchase intentions are derived from attitudes (*Brown and Stayman 1992*). Further research is needed to explore this finding and determine why novelty impacted intention to purchase, but not attitude formation in this study.

Further evidence for the novelty effect was shown when examining the data on presenting product attribute information and attitudes toward Web sites using 3D product presentations in general. Subjects for whom the 3D product presentations were not novel had more positive attitudes towards Web sites using 3D than those for whom 3D presentations were novel, but only when given accompanying product information.. Along with the previous findings, this result indicates that the focus of the subjects shifted depending upon whether they were familiar with the 3D product presentations or not. When familiar, subjects prefer the 3D representation along with attribute information to aid in decision making. In contrast, when novel, subjects' attitudes toward Web sites with 3D products was attenuated by the utilitarian reminder of product information. Or as Cox and Locander (1987) found, it could be possible that the novel nature if the stimulus overcame or blocked the motivation to process attribute information.

Regardless, all subjects reported that in the future they were likely to view products in 3D if available. This finding

indicates that they enjoyed the experience equally well. Therefore, novelty may not pose a great risk to companies using these technologies. If consumers are attracted to viewing 3D products, then both companies and consumers will benefit. However, as the use of 3D product presentations becomes more common, it will become increasingly important for online stores to develop the believability of the product presentations. The results of the study found believability to co-vary with each dependent measure. Therefore, as consumers adopt 3D technologies, they will look at the product features with increased scrutiny, and will demand more realistic visuals and images.

LIMITATIONS AND FUTURE RESEARCH

In this paper, we investigated a tactic that is currently being tested for its usefulness as a sales tool in online environments. Companies such as Office Depot, Sony, Lands' End, and The Sharper Image Stores are exploring this technology for its impact on sales. To the degree that consumers are persuaded by rotating and virtually experiencing new products, these product displays may eventually be incorporated into the ubiquitous banner ad. However, as the effectiveness of 3D product presentations are tested, it must be realized that a portion of the benefit derived from their use can be explained by a novelty effect. Therefore, caution must be taken in attributing changes in traditional measures of advertising effectiveness to consumers' interactions with 3D products. Some of the effects appear to be due to novelty, but the findings are equivocal and must be further examined.

The conceptualization of novelty in terms of the number of exposures to 3D product presentations in one moment in time could have led to the mixed results. One limitation of this study therefore, is in not considering the effect of time. Conceptualization of familiarity with 3D product presentations based on length of time may lead to a deeper understanding of novelty. This is particularly true as the novelty effect and its wearing out should be a continuous phenomenon that occurs over a longer period of time. Given the present discrepant findings, novelty could be examined over a greater number of experiences and a longer period of time. In fact, it would be interesting to identify the point at which habituation and tedium occur in response to 3D products online.

Future research should also examine the degree to which highly experiential 3D product simulations decrease the level of information processing. To the degree that consumers are enjoying the product experience, they should form positive

attitudes under conditions of low involvement. However given the directed nature of most product searches, product interactions online are likely to be highly cognitive experiences where consumers are likely to make rational purchase decisions. It would be valuable to understand the relationships of involvement, novelty and attitude formation.

A third area worthy of examination is the impact of experiential product selling on impulse purchasing online. To the degree that 3D product presentations create enjoyable experiences for consumers, they may be more willing to engage in impulse purchases. Virtual product trial may help consumers reduce feelings of perceived risk and limit the formation of counter-arguments when 3D product presentations are novel. If consumers focus on the experiential aspects of the product display, they may be willing to buy on impulse. When confronted with a non-novel situation, the experience may not be enough to encourage immediate purchase.

CONCLUSION

Novelty and virtual product experiences online are ripe areas for further research. From the current study, it is apparent that 3D product presentations can be beneficial for consumers and advertisers. However to the extent that effectiveness can be explained by novelty, online retailers must be ready to provide repeat consumers with the necessary information to make their decisions. 3D product presentations provide a unique form of information as virtual experience. Copy provides additional product attribute information. The combined effect of both types of information should help consumers make better decisions. However, even if waning novelty signals less effective 3D product presentations, these presentations should remain another tool that consumers use to help make their decisions. However, it will still fall to advertisers to vary the presentations of their messages to attract attention and maintain interest, beyond the novelty of interacting with 3D product presentations online.

Figure 1. Schematic Diagram of the Habituation-Tedium Theory (Tellis 1997)

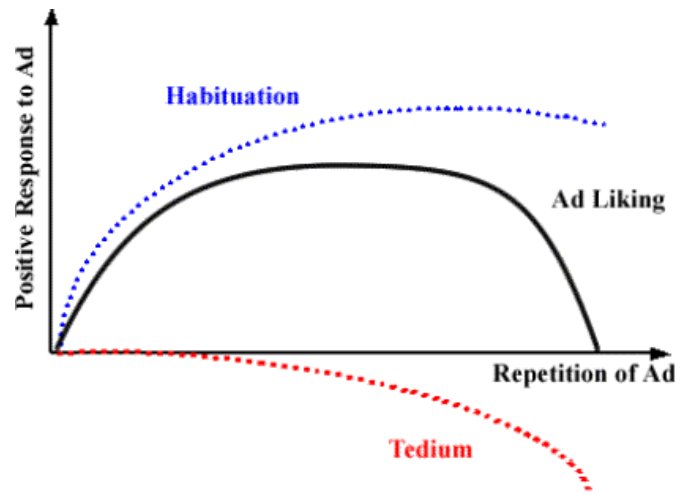
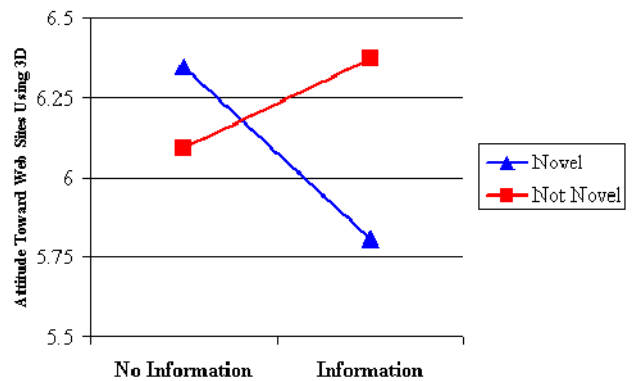


Figure 2. Interaction of Novelty and Level of Information



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