Comparing the Recall Inhibition Effects of Affect and Cognition

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Abstract

This paper compares the inhibition effects of affect and cognition on the recall of competing members of a category. The results indicate that the affective component of overall attitudes has a greater ability to inhibit the recall of competing members than the cognitive component. From a methodological viewpoint, the recall inhibition effect is proposed as a relatively unbiased way to study affective and cognitive-driven recall effects, without forcing participants into cognitive recall processes.

Introduction

Memory cues are often used to enhance recall (Unnava, Burnkrant & Erevelles, 1994; Goddard, Pring, & Felmingham, 2005). If a person is presented with a category name, for example, it serves as a cue to recall members of the category (Tulving & Pearlstone 1966). Additional cues may heighten recall for otherwise previously inaccessible members of the category (Lewis, 1971).

A curious phenomena, however, has been noted by some researchers (e.g., Rundus, 1973; Alba & Chattopadhyay, 1985). When a category member or instance is presented as a cue, research has shown that it inhibits the recall of other members in the category. This phenomena is usually referred to as the "recall inhibition effect." For example, a person asked to recall brands of shampoo may recall about ten brands. If however, the person is cued with a brand or a subset of brands from the shampoo category prior to the recall task, he or she would recall significantly fewer brands. This effect has been found to be quite robust, and has been well substantiated in both psychology and marketing literature (e.g., Slamecka, 1968; Rundus, 1973; Nickerson, 1984; Alba & Chattopadhyay, 1985, 1986).

Most studies on the recall inhibition effect have used a subset of cues (e.g., words or brands) to inhibit the recall of other members in the category. No research has examined how attitude towards a cue (e.g., a brand) may affect inhibition of other members in the category. Even more specifically, no research has examined how the components of attitudes (affect and cognition) may influence the inhibition of other members in the category.

Research Objectives

The objectives of this research are (i) to test the relative ability of the affective and cognitive components of overall brand attitudes to inhibit other brands in the category, (ii) to examine the recall inhibition effect as a method to study brand affect without forcing participants to go through a cognitive memory process, and (iii) to shed some light on the accessibility of brand affect

Literature Review

Several theoretical explanations have been suggested to account for the recall inhibition effect (See Nickerson, 1984). Rundus (1973) proposed one explanation, sometimes called the "competition-at-retrieval" hypothesis. The intuition behind this explanation is that the presentation (cueing) of an item of a category or set, strengthens the associations in memory between the item and the category. It thus increases the accessibility of that item relative to the other items in the category. A formulation of this hypothesis is known as the "ratio rule." According to the ratio rule (Rundus, 1973), the probability of retrieving an item from a category is equal to the associative strength between the item and the category, divided by the sum of the associative strengths between all items and the category. When a person is cued with an item from a category; the associative strength between that item and the category increases, thereby reducing the probability of the retrieval of other items in the category (Miniard, Unnava & Bhatla, 1989).

Later, Anderson, Bjork and Bjork (1994) proposed the theory of "retrieval-induced forgetting". They argue that this theory "reflects retrieval based suppression rather than strength dependent competition." Since "strength dependent competition may reflect retrieval-induced forgetting (Anderson et al. 1994)," we need not to consider this theory as contradictory to "competition-at-retrieval" hypothesis.

The generalizability and robustness of the recall inhibition effect has been well documented in psychology and marketing literature. Slamecka (1968) used 30-item word lists and found that participants who were cued with these words recalled a significantly lower proportion of the non-cued items than participants in a control group. Tulving and Pearlstone (1966), Parker and Warren (1974), Roediger (1978), and Dopkins and Ngo (2002) extended these studies using lists of cues from various different categories.

Generally, cued participants were found to recall words from fewer non-cued categories than did control participants. It was also found that the presentation of a subset of category names enhanced recall of the items in that category, but inhibited the recall of items from other categories. Dopkins and Ngo (2002) found that when a noun was recalled as having occurred in a sentence, another later noun was inhibited.

In the marketing literature, Alba and Chattopadyay (1985) studied the effects of cueing participants with a subset of brands from a category, on the recall of other competing brands in the category. They found that depending on the knowledge level of consumers, a subset of brands can either inhibit or enhance recall of brands in a product category. They also showed that even the presentation of only two brands as cues can significantly inhibit the recall of competing brands.

Alba and Chattopadyay (1986) investigated an alternative route to inhibiting recall of competing brands in a category. They studied the effects of an increase in "salience" of a single brand on the recall of other competing brands in the category. Salience refers to the "prominence" or "level of activation" of an item in memory (c.f. Alba & Chattopadyay, 1986). They found that by increasing the salience of a single "cue" brand, the recall of other competing brands in the category are significantly hindered. They demonstrated this effect for several product categories and in different marketing contexts. In all the situations, the recall inhibition effect proved to be remarkably consistent and robust. Alba and Chattopadyay explain these results on the inability of a person to suppress the recall of salient information during memory search. When a brand is made more salient, it repeatedly "comes to mind" and is retrieved during memory search, thus inhibiting the recall of other competing brands in the category.

The recall inhibition effect appears to be an excellent tool to access participants' affective responses without forcing them to go through a cognitive process, thus reducing cognitive bias during retrieval processes, usually inherent in such tasks. It thus could serve as a useful method to compare how affect and cognition affect memory processes.

Hypotheses

To summarize, research has shown that when a category member or instance is presented as a cue, it inhibits the recall of other members in the category. The salience of a member (brand) has also been shown to affect recall inhibition of other members in the category. If a brand is made more salient in memory, it inhibits the recall of other brands in the category. This occurs because it is difficult to suppress the recall of salient information in memory.

The theoretical explanation behind the recall inhibition effect relates to the strength of associations in memory between a category and a cued member of the category. The stronger this association, the more accessible the brand is, relative to other brands in the category. During the retrieval process, the high accessibility of the cued brand decreases the accessibility of other brands in the category. According to the ratio rule, the probability of retrieving an item (brand) from a category is equal to the associative strength between the item and the category, divided by the sum of the associative strengths between all items and the category. Therefore, any factor that enhances the associative strength between an item and a category reduces the probability of retrieval of other items in the category.

The recall inhibition effect appears to be an effective way to elicit participants' affective responses, without forcing them to go through a cognitive retrieval process. In doing so, it could also be tested if affect is more accessible than cognition from memory. If, indeed, the affective component of a brand is more accessible (i.e., salient) in memory than the cognitive component, it should have a greater recall inhibition effect than the cognitive component on other brands in the product category. Since, in addition to the product proposition node, the emotion nodes also contribute to the increase of the salience of brands with strong affective components, these brands would tend to create a larger recall inhibition effect than brands with relatively weaker affective components. The difference in this level of activation or salience will cause different inhibitory effects.

Also, during initial periods of free recall of brands in a category, little conscious effort is expended by the participant. Brands with dominant affective components represented by highly salient emotion nodes, and the direct associations between the emotion nodes and related product and brand proposition nodes will cause substantial recall inhibition of brands represented by relatively less accessible nodes. During later periods of recall however, considerable conscious effort is expended by the participant, and some brands represented even by the relatively less accessible nodes are retrieved. As the focus is primarily on the comparison of affective and cognitive memory processes, there is no reason to expect any gender differences in the scenario presented.

Based on the above discussion, the following hypotheses are proposed:

H1: Brands with a predominant affective component will produce a larger recall inhibition effect for other brands in the product category than brands with a predominant cognitive component.

H2: The recall inhibition effects specified in H1 will be stronger in initial periods of recall than for later periods.

H3: There will be no gender differences for the recall inhibition effects specified in H1 and H2.

Methodology

Pre-tests

During the first stage of pre-testing, focus groups were conducted to elicit a list of ten product categories considered “common repeat purchase products” by the group. Consumers usually follow a “low-involvement” decision process when purchasing such products.

Since a major purpose of this study is to compare the relative accessibility of a predominantly affective brand with

that of a predominantly cognitive brand, a "balanced" common repeat purchase product category (toothpaste) was selected during the second stage of pretests. (A "balanced" product category is one that was determined from pretests, to be a category where consumers consider both affective and cognitive cues in their purchase decisions.)

In the third stage of pre-testing, ten different hypothetical or unknown brand names were tested on the same pool of participants as used in the study. On the first page of the questionnaire, participants were asked if they had previously heard of any of the hypothetical ten brand names listed. On the second page, participants were asked if, in their opinion, each of the brand names was suitable for a new brand of toothpaste. This was done in order to make the manipulation both realistic and plausible. The pre-study showed that familiarity for the name "Jade" was nonexistent. Participants also felt that this brand name would be suitable for the toothpaste category. The name "Jade" was thus chosen for the treatment conditions.

The fourth stage of pre-testing was to determine strong functional attributes to be used in preparing stimulus material for the cognitive treatment condition. In this phase, participants were asked to list the "three top criteria" in purchasing a brand of toothpaste. The most often cited functional attributes were selected as arguments for the cognitive treatment conditions. These attributes were incorporated into the stimulus material for the cognitive treatment condition.

In the fifth stage of pre-testing, the experimental manipulations were tested. Three different conditions were planned for the study: (i) the affective condition (ii) the cognitive condition and (iii) the control condition. The affective and cognitive conditions were manipulated with specially prepared color print advertisements. There were three advertisements for each condition. Each advertisement contained a headline, a color picture and a professionally developed image of the brand. The experimenter, with the help of five participants from the same pool as used in the study, selected pictures for the treatment conditions.

Stimuli

In the affective condition, the headline read: "The Incredibly Exhilarating Feeling of Jade." This was followed by a picture in each ad, each of which was judged to be highly emotional in nature from pretests in another study. It consisted of 3 variations of a "happy couple" situation, with the couples embracing. In the cognitive condition, 3 non-emotional pictures of shopping situations were used. The headline read: "Jade: Now Available in Local Stores," followed by three strong attributes identified in pretests. In the control condition, instead of the target product category, participants were exposed to advertisements for an unrelated product category. Nine other different filler advertisements for three different brands (i.e., three for each brand) were also included in each manipulation condition. The brands in these advertisements were also unfamiliar brands, so as not to draw special attention to the target brands.

Manipulation Check

Sixty-six participants participated in the pretest. A 3 (condition) x 2 (gender) between participants design was used. After the six minutes it took to go through all the advertisements, participants were given a questionnaire that contained Batra and Ahtola's (1990) scale and asked to rate the "Jade" brand on the scale. The scale consisted of eight 7-point semantic differential sets of items used to identify the affective (pleasant/unpleasant, nice/awful, agreeable/ disagreeable, happy/sad) and cognitive (useful/useless, valuable/worthless, beneficial/not beneficial, wise/foolish) dimensions of each brand. An analysis of variance of the data revealed that manipulation was successful.

Main Study

The main study was conducted using a 3 (condition) x 2 (gender) between-subjects design consisting of two treatment conditions (affective, cognitive) and one control condition. Gender was also included as a factor. (Alba and Chattopadyay (1986) had hypothesized that in some product categories, women had a more highly differentiated knowledge than men, and this facilitated their recall of otherwise inaccessible brands)

Participants were undergraduate business students at a major research university. Participants were run individually in a room where all drapes had been drawn to minimize distraction and to facilitate recall inhibition effects. The treatment conditions were rotated from session to session. After being seated, the participants were presented with a folder from the appropriate treatment condition that contained the twelve advertisements. The experimenter prompted the participant to turn to the next ad every thirty seconds. After the participant had gone through all the advertisements, he or she was given "Questionnaire 1." The purpose of "Questionnaire 1" was to clear the advertisements and the brands that the participants had just seen from their short-term memory. This was done so that the relative differences in salience (accessibility) for the affective and cognitive conditions would be accentuated, and measurable. The participant was asked to recall the brand names seen in the advertisements. After this, he or she was asked to read a passage about the Yellowstone National Park, and then answer questions about the passage.

"Questionnaire l" was then collected, and the participant was given "Questionnaire 2." As instructed, the participant listed names of brands from the category (toothpaste). The experimenter rang a bell at the end of 30 seconds, 1 minute, 2 minutes, 3 minutes and 4 minutes. Participants were asked to mark their listing task each time the bell was rung. At the end of four minutes, participants were asked to stop listing brands. Participants were then asked to answer three questions: the first was about their gender, the second question verified if they had heard about the "Jade" brand name in the past, and the final question again asked them to recall the brand names in the advertisements they had seen earlier.

The dependent variable was the number of brands recalled. As stated in the hypotheses, it was expected that recall

inhibition of other brands in the category will be more in the affective condition than in the cognitive condition. Moreover, this effect is expected to be greater in the earlier phases of recall than in the later phases.

Results

Manipulation Check

A manipulation check was conducted for the treatment conditions. The three treatment conditions were: Treatment 1: Affective Manipulation, Treatment 2: Cognitive Manipulation, Treatment 3: Control Condition. The data were analyzed using a 3 (condition) x 2 (gender) ANOVA. The manipulation appeared to be successful. As expected, a strong main effect for condition was obtained for both the affective component ($F=7.52$, $p<.001$) and the cognitive component ($F=9.70$, $p<.0002$). However, no main effect for gender for the affective component ($F=.09$, $p<.7638$) or the cognitive component ($F=.05$, $p<.8312$) was observed. Similarly the interaction for the affective component ($F=.04$, $p<.9635$) or the cognitive component ($F=.12$, $p<.8859$) was not significant.

The affective means for treatments 1, 2 and 3 are 2.3864, 1.3409 and 1.0341 respectively. Preplanned comparisons indicate that the affective mean for treatment 1 is significantly different than the affective mean for treatment 2 ($p<.005$), and the affective mean for the control condition ($p<.0005$). The affective mean for treatment 2 did not significantly differ from the affective mean for the control condition ($p<.43$). The cognitive means for treatments 1, 2 and 3 are 1.6136, 2.4205 and 1.0909 respectively. Preplanned comparisons indicate that the cognitive mean for treatment 2 is significantly different than the cognitive mean for treatment 1 ($p<.01$), and the cognitive mean for the control condition ($p<.0001$). The cognitive mean for treatment 1 did not significantly differ from the cognitive mean for the control condition ($p<.07$). No significant pre-planned comparisons were obtained for gender or for the condition-gender interaction.

Main Study

The dependent variable used is the number of non-cued brands recalled. The three treatment conditions were: Treatment 1: Affective Manipulation, Treatment 2: Cognitive Manipulation, and Treatment 3: Control Condition. The data were analyzed using a 3 (condition) x 2 (gender) ANOVA. This was carried out for non-cued brands recalled at the end of 30 seconds, 1 minute and 4 minutes. A significant main effect for condition was obtained for the 30 second interval ($F=5.89$, $p<.004$), the 1 minute interval ($F=5.25$, $p<.007$) and the 4 minute interval ($F=4.67$, $p<.01$). No main effect for gender was observed for the 30 second interval ($F=.14$, $p<.7058$), the one minute interval ($F=.07$, $p<.7922$) or the 4 minute interval ($F=.04$, $p<.8363$). Similarly no interaction effects for the 30 second ($F=1.59$, $p<.2104$), 1 minute ($F=3.09$, $p<.052$) or 4 minute ($F=1.61$, $p<.2073$) intervals attained significance. Table 1 summarizes the main effects and interactions for the toothpaste category.

Table 1: Recall Inhibition Results
Main Effects and Interactions.

Analysis: 3 (condition) x 2 (gender) ANOVA	
Main Effects:	
Significant main effects for condition:	
30 second interval:	$F=5.89$, $p<.004$
1 minute interval:	$F=5.25$, $p<.007$
4 minute interval:	$F=4.67$, $p<.01$
No main effect for gender for	
30 second interval:	$F=0.14$, $p<.705$
1 minute interval:	$F=0.07$, $p<.792$
4 minute interval:	$F=0.04$, $p<.836$
Interactions:	
No significant interactions for	
30 second interval:	$F=1.59$, $p<.210$
1 minute interval:	$F=3.09$, $p<.052$
4 minute interval:	$F=1.61$, $p<.207$

The mean number of brands recalled during the 30 second interval for treatments 1, 2 and 3 were 3.9615, 4.6923 and 4.9615 respectively. Preplanned comparisons indicate that the number of brands recalled in the affective manipulation condition (3.9615) and the number of brands recalled in the cognitive manipulation condition (4.6923) are significantly different from each other ($p<.01$) in the expected direction. The number of brands recalled in the affective manipulation condition (3.9615) and the number of brands recalled in the control condition (4.9615) were also significantly different from each other ($p<.001$). No significant difference ($p<.40$) was obtained for the number of brands recalled in the cognitive manipulation condition (4.6923) and the number of brands recalled in the control condition (4.9615).

The mean number of brands recalled during the 1 minute interval for treatments 1, 2 and 3 were 4.9615, 5.6538 and 6.0769 respectively. Preplanned comparisons indicate that the number of brands recalled in the affective manipulation condition (4.9615) and the number of brands recalled in the cognitive manipulation condition (5.6538) are significantly different from each other ($p<.03$). The number of brands recalled in the affective manipulation condition (4.9615) and the number of brands recalled in the control condition (6.0769) were also significantly different from each other ($p<.002$). No significant difference ($p<.31$) was obtained for the number of brands recalled in the cognitive manipulation condition (5.6538) and the number of brands recalled in the control condition (6.0769).

Table 2: Recall Inhibition Results
Preplanned Comparisons.

Mean of Number of Brands Recalled			
Treatment	30 Seconds	1 Minute	4 Minutes
1 (Affective)	3.961	4.961	6.076
2 (Cognitive)	4.692	5.653	7.230
3 (Control)	4.961	6.076	7.384
30 Second Interval:			
Treatments 1 and 2: Significantly different ($p<.01$)			
Treatments 1 and 3: Significantly different ($p<.001$)			
Treatments 2 and 3: Not significantly different ($p<.40$)			
1 Minute Interval:			
Treatments 1 and 2: Significantly different ($p<.03$)			
Treatments 1 and 3: Not significantly different ($p<.002$)			
Treatments 2 and 3: Significantly different ($p<.31$)			
4 Minute Interval:			
Treatments 1 and 2: Significantly different ($p<.01$)			
Treatments 1 and 3: Not significantly different ($p<.006$)			
Treatments 2 and 3: Significantly different ($p<.80$)			

The mean number of brands recalled during the 4 minute interval for treatments 1, 2 and 3 were 6 .0769, 7.2308 and 7.3846 respectively. Preplanned comparisons indicate that the number of brands recalled in the affective manipulation condition (6.0769) and the number of brands recalled in the cognitive condition (7.2308) are significantly different from each other ($p< .01$) . The number of brands recalled in the affective manipulation condition (6.0769) and the number of brands recalled in the control condition (7.3846) were also significantly different from each other ($p<.006$). No significant difference ($p<.80$) was obtained for the number of brands recalled in the cognitive manipulation condition (7.2308) and the number of brands recalled in the control condition (7.3846). No significant gender effects were obtained. These results are presented in Tables 3 and 4.

Discussion

The results obtained support the hypotheses proposed. The number of uncued brands recalled was significantly lower in the affective condition than in the cognitive condition. This also implies that brands with dominant affect components are more accessible than brands with dominant cognitive components. Overall, the objectives set at the beginning of the study were fulfilled. The recall inhibition effect appears to be a valid and unobtrusive method to retrieve affective traces, and compare the relative accessibility of the affective and cognitive components of overall brand attitudes. One of the weaknesses of past studies on affect has been that participants were forced to use a cognitive retrieval process to access affective traces. The recall inhibition effect provides an indirect way to test the relative accessibility of inputs in memory without having participants go through a cognitive retrieval process thereby biasing results in favor of cognitive processes. Its application may thus provide insight into issues that were difficult to investigate in the past.

Theoretical Contributions

This research contributes to the existing body of knowledge on affective and cognitive memory processes. The direct theoretical contribution is the fact that the affective component of overall brand attitudes produces greater inhibitory effects on other brands in the category, than the cognitive component. In addition, the findings may indicate that affect is retrieved prior to cognition from memory. Salience is responsible for inhibiting the recall of other brands in the category, because it is difficult to suppress the recall of salient information during memory search. By a similar line of argument, this research raises some serious reservations about past beliefs that cognitive information is more readily accessible from memory, because of the increased elaboration that takes place during the encoding process. The methodologies used in the past studies may have biased the results of those studies in favor of the cognitive component. This research presents a better methodology for assessing affective memory retrieval processes. Finally, this research appears to support the associative network model of Bower (1981). The results provide indications on how affect is stored in relation to brand names and product categories in memory. The results shed some light on past conceptualizations regarding emotion nodes, product proposition nodes and brand proposition nodes.

Managerial Implications

From a managerial perspective, this provides several insights for the management of brands. The results obtained may indicate what advertising strategies may be used when entering highly competitive markets with a number of similar brands. It may also indicate which brands are most susceptible to competitive attack. The findings of this study also suggest that it may be useful to develop a brand's affective component, even for a primarily utilitarian category. This research also demonstrates that enhancing the affective component of a brand may also result in significant inhibition of other brands in the category. If the affective component of a brand is so readily accessible that the recall inhibition effect can be obtained by simple exposure for brands with strong affective components, the managerial implications are substantial. Simple exposure (sight or sound), or even recall of a particular brand could inhibit the recall of other brands in the category. Brand managers should thus pay greater attention to the affective component when developing equity for a new brand, or when reviving a dying brand.

Limitations

One objective of the study was to test the recall inhibition effect as an unobtrusive measure of retrieved affect or cognition. To a large extent, using the recall inhibition affect as a methodological tool to understand the storage of affect in memory, overcomes many of the weaknesses found in past research on affect. The pre-study, however, uses more traditional methods as manipulation checks, and the limitations of these manipulation checks are acknowledged.

Basically, the manipulation checks suffer from the same weaknesses that have been criticized in past studies. The affective responses of participants are measured using a scale (Batra & Ahtola, 1990), that by its very nature, tends to favor cognitive processing in participants. This is a limitation of all paper-and-pencil measures used in the study of affect. This weakness, however, may not be a major source of concern when evaluating the validity of the results. This is because the potential bias caused by the use of this scale, would tend to favor the cognitive component of overall attitudes for all manipulated conditions. Moreover, to the extent that the manipulation check can be considered a confirmatory procedure, the effects of systematic error in the manipulation check is not a major source of concern affecting the validity of the conclusions researched in the main study.

Conclusion

Despite the results discussed above, the usefulness of the recall inhibition effect in affect accessibility studies should not be overstated. It is unclear, for example, how this effect can be adapted to distinguish among various dimensions of emotion (Erevelles, 1998), or for studies in which absolute rather than relative measures of accessibility are needed. Further research is undoubtedly needed to better study inhibitory effects for brands in a category, due to various external influences. It seems to be a fair conclusion, however, to say that the findings of this research and the successful testing of this methodology is a significant initial contribution towards the better understanding of affective retrieval processes, and its role in the inhibition of competing brands.

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