

THE ORGANIZATION OF MEMORY:
ITS EFFECT ON THE RECALL OF ADVERTISEMENTS

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Abstract

The authors are attempting to explore the relationship between organization of attributes within an advertisement and the ability to recall the advertisement. The study applies memory theory to marketing with an experimental design manipulating the number of categories or chunks in the organization of an advertisement. Results confirm the earlier list learning experiments in the organization and memory literature.

Introduction

What makes us remember a particular advertisement? Recall of information from advertisements is a popular means of evaluating advertising effectiveness. There are many characteristics of an advertisement which may affect recall of information from the ad (Engel, Blackwell and Miniard 1986). This paper examines one such characteristic, the organization of information within the ad, and its effect on organization in memory. Before presenting hypotheses regarding the effects of organization on memory for an advertisement, the theoretical basis underlying these hypotheses is discussed.

One important aspect of the use of stored information is the accessibility of the stored or remembered pieces of information in memory. Craik and Lockhart (1972) introduced the notion of levels of processing. In this framework, an individual's ability to recall information from memory is in part dependent on how the information was acquired and initially processed. A "deeper" level of semantic processing results in better retention and better recall than "shallower" levels of processing. Craik and Tulving (1975) broadened the levels of processing framework to include elaboration, or "spread" of processing, finding that once semantic processing has occurred, greater degrees of elaboration produce greater levels of recall.

The levels of processing framework was further expanded by Bellezza and his associates (Bellezza, Richards and Geiselman 1976, Bellezza, Cheesman and Reddy 1977). Bellezza et al. (1976) proposed that optimal performance on recall tests results from a two stage processing system. The first stage is semantic processing, allowing the to be remembered material to be processed to the point of comprehension. Further processing, including simple elaboration, has a relatively small effect on improving recall. The second stage is organization, which relates the to be remembered items to one another using some subjective organization or mnemonic device. Under this formulation, semantic processing is viewed as a necessary but not sufficient condition for optimal

recall performance. Beyond semantic processing, organization is a critical variable in increasing levels of recall.

The concept of organization as discussed and supported by Bellezza et al. (1976, 1977), Einstein and Hunt (1980), Bower (1972) and others is based upon Mandler's earlier work. Mandler (1967, 1968) performed a classic series of experiments in which he instructed subjects to organize a list of words into a varying number of categories or chunks (e.g. 2, 4, 6, or 8 chunks). Subjects were asked to sort cards containing the list words into a prespecified number of categories. The procedure was repeated until the subject sorted the words into identical categories on two successive trials. Subjects were then asked to recall as many of the words from the list as they could remember. The results of the study demonstrated Mandler's now classic category - recall function. Recall increased linearly up to about seven categories.

Subsequent research has generally supported the view that stimulus organization greatly affects retention (Bower, Clark, Lesgold and Winzeng 1969, Tulving and Donaldson 1972). Specifically, Bellezza et al. (1976) report evidence in support of their two stage processing system. In three experiments they demonstrated that organization improves memory performance above semantic processing alone in both immediate recall tests and delayed (24 hours) recall tests. Bellezza et al. (1977) and Einstein and Hunt (1980) replicate these findings, and also conclude that increased organization of information into categories led to better recall performance. And, when faced with a large number of categories, subjects apparently organize these into superordinate "categories of categories," thereby enhancing recall.

Based on the available literature in human memory, a consumer's mental organization of material from an advertisement would be dependent on two major factors:

- (a) the organization of material in the ad itself, and
- (b) the internal structure of consumers' memories (schema).

The current theoretical view of the interaction of these two factors (Tulving and Thompson 1973, Olson 1978, and Tulving 1972) is that the internal structure of memory defines the available set of organizational schemata which a person could use to organize the material, but only schemata which are activated during presentation of the material are important for later recall of the material (Jacoby 1974, Mathews 1977). Characteristics of the ad itself may determine which memory schemata get activated, and consequently influence a consumer's organization and subsequent recall of the material. Knowledge of variables relating to organization of material

within an ad and its influence on consumers' organization and recall of the material is of importance to marketing.

Hypotheses

The first hypothesis is based on the findings of Bellezza et al. (1976, 1977) Einstein and Hunt (1980) and Mandler (1967, 1969) which suggest that given the existence of semantic processing, increased organization of information into categories will result in increased recall.

H₁: Recall of the total number of attributes within an ad should continue to increase linearly up to 7 - 8 categories, and then decrease.

In addition, Bellezza et al. (1976) found that this effect held for both immediate recall and for delayed recall using a 24 hour delay. Since day after recall is often used in advertising research, this is a potentially important implication of memory research. Bellezza et al.'s (1976) finding provides the rationale for the second hypothesis.

H₂: Recall of the total number of attributes within an ad should continue to increase linearly up to 7 - 8 categories, then decrease, after a 24 hour delay.

Recall on these experiments is analyzed in terms of two component processes: category recall and recall of items within categories (Tulving and Pearlston 1966). Category recall corresponds to memory access to higher order chunks, and recall of items within categories reflects the amount of information retrieved within chunks of information. Usually the number of categories has opposite effects on the two memory processes. Given this to be true, there should be an optimal pattern for recall.

Variables that influence memory do so primarily by determining the number of items within a category that can be recalled (Cohen 1966; Patterson 1972; Tulving and Psotka 1971). The result of this is that individuals tend to forget entire brands before they forget attributes within a brand. Once a person recalls a category then he/she is likely to recall some or most of the attributes within the category. Hence, the literature suggests the following hypotheses:

- H₃: The percent of categories recalled within an advertisement will decrease as the number of categories increases.
- H₄: The percent of attributes recalled within a category will increase as the number of categories increases.
- H₅: The recall patterns suggested in H₃ and H₄ will not change with twenty-four hour recall.

Methodology

Experimental Stimulus

The overall logic of the experiment was to examine incidental memory for information in an ad after subjects read the ad and rated it on a number of semantic dimensions (e.g., persuasiveness, readability). The number of

organizational categories (1, 4, 8, or 16) served as the independent variable. The particular ad used in this experiment was a bogus ad for an automobile (The AMB Meteor). It should be noted that the ad was based on a real ad found in a consumer magazine. The copy, however, was changed for purposes key to this experiment.

In the one category ad, all 64 attributes were listed in random order in two columns across the page. In the 4, 8, and 16 category ads, the attributes were grouped in corresponding numbers of categories with an appropriate category label printed above the attributes belonging to each category (see Appendix 1 for an example of the 16 category format).

Experimental booklets were formed by inserting one version of the Meteor ad between two actual one page ads selected from magazines. The two real ads were included in the methodology to increase the ecological validity of the study. That is, a person would rarely read an ad by itself; thus, it was assumed more realistic memory data would be obtained if the experimental ad was presented in the context of other ads. A booklet also contained rating sheets following each ad in which subjects rated each ad on five semantic differential scales labeled with the following adjectives: informative-noninformative, persuasive-nonpersuasive, not helpful-helpful, readable-unreadable, and trustworthy-untrustworthy. These adjectives were chosen for the purpose of stimulating the subjects to read the ad, thereby engaging in semantic processing. Subjects were asked to "rate" the ads as well as to disguise the purpose of the study. Each booklet also contained an initial page with instructions and an example showing how to use the rating scales, and a final page requesting demographic data.

Procedure

Each treatment was randomly assigned to the subjects. Subjects were given an experimental booklet and were asked to read the instructions printed on the booklet. Once the subjects understood the instructions, they were allowed to complete the booklet (read and rate all three ads) at their own pace. The respondents were told to raise their hand when they completed their booklet. At that time the booklet was taken up and subjects were given a blank recall sheet containing the following instructions: "Now we are interested in seeing how much you can remember about the Meteor ad. In the spaces below, please write as many items as you can remember about the ad. Try to write the items as closely as possible to the way they were worded in the Meteor ad." When subjects indicated that they had completed their recall sheets, the sheets were collected and the subjects were asked to return at the same time the following day. Upon returning the subjects completed a second recall sheet.

Subjects

The subjects for the experiment were 113 undergraduates at a large state university who

participated in the experiment for extra credit in an introductory psychology course. The selection of students as subjects was sound from the standpoint of external validity given the objective of theory application (Calder, Phillips and Tybout 1981).

Scoring and Dependent Measures

The recall data were stored using a keyword method (Mathews 1977). One or more keywords were selected from each phrase (attribute) in the Meteor ad (e.g., the keywords "regular gas" were selected for the phrase "runs on regular gas"). Subjects were given credit for recall of an attribute only if their recall sheet contained the keywords for a particular attribute. That is, recall did not have to be verbatim, but the subject's response did have to contain the keywords (e.g., the response "uses regular gas" would be acceptable but "uses regular" would not).

Three recall measures are reported. Attribute recall is simply the total number of attributes from the ad which were recalled using the scoring procedures described above. Total recall was also divided into the two component measures, category recall and recall of attributes within categories, corresponding to the two memory processes associated with recall of organized lists. Category recall is scored by giving a subject credit for recall of each category from the ad that he/she recalls at least one attribute (Tulving and Pearlstone 1966). Category recall is assumed to reflect memory access to the overall memory structure (higher order unit) containing information about a given subset of attributes. The second measure, recall of attributes within categories, is derived by dividing the total number of attributes recalled by the number of categories a particular subject recalled. It is thus a measure of the average amount of information within a category a subject retrieves, once access to the category is made.

Results

The three recall measures are shown in Table 1 as a function of the number of categories used to present the attributes in the advertisement. Total number of attributes recalled increased linearly with the number of categories used in the ad (see Table 1) up to eight categories, then dropped from eight to sixteen categories, exactly as predicted by Mandler's category recall function (Mandler 1967, 1969). The twenty-four hour recall shows the same pattern with the optimum category being the eight chunk category. Figure 1 graphs the recall patterns of the same day recall and day after recall.

Analysis of variance adjusted for unequal cell sizes was used to test for differences in the recall measures due to the number of categories in the advertisement. The analysis of the total number of words recalled reveals no significant differences between treatments at the .05 level (see Table I). However, by looking at the data it is obvious that there is a linear increase in

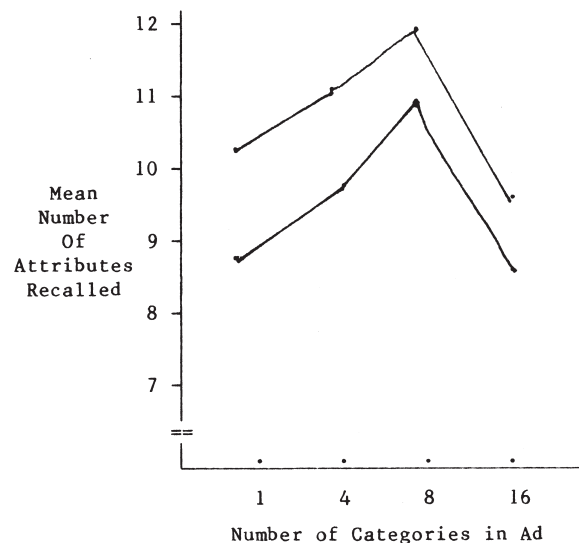
the total number of words recalled up to eight categories. It is also possible that the total number of words recalled increases well beyond eight categories, with the peak number of words recalled falling between eight and sixteen categories. The same pattern also holds up for the day-after recall measure. The data, however, do not support H₁ and H₂.

TABLE 1
THE EFFECT OF NUMBER OF CATEGORIES
ON RECALL OF ADVERTISEMENTS

Recall Test	Number of Categories			
	1	4	8	16
<u>Immediate</u>				
Sample size	28	28	28	29
Attribute recall	10.3	10.9	11.9	9.5
Category recall	N/A	.79	.63	.37
Attributes-within-categories recall	.16	.20	.29	.39
<u>Day after recall</u>				
Sample size	27	22	27	25
Attribute recall	8.9	9.6	10.7	8.5
Category recall	1.0	.81	.61	.34
Attributes-within-categories recall	.14	.17	.27	.38

Category recall decreased as the number of categories increased while the third recall measure attributes-within-categories recalled increased as the number of categories increased. The last two measures are critical in that they correspond to the two components of human memory.

FIGURE 1
ORGANIZATION OF MEMORY ADVERTISING RECALL



— = Immediate Recall, - - - = Day-after-Recall

This graphic presentation of the data clearly supports Tulving and Pearlstone's (1966) proposition that category recall and recall within a category are independent. Furthermore, Mandler (1967) agrees that category recall and recall within categories are independent processes but suggests that they may follow the same size-recall function. That is, both measures follow a linear pattern as the number of categories increases. The data from this study clearly corroborate this hypothesis.

The analysis for the two recall measures corresponding to the components of the human memory reveal highly significant effects (see Table 1). That is, the analysis of the category recall data is significant ($F(3, 105) = 59.79, P > .0001$). Similarly, the analysis conducted on the attributes-within-category data reveals a significant effect on the number of categories ($F(3, 104) = 31.37, P > .0001$). This finding substantiates Cohen's (1966) notion that once a category has been recalled, "performance on the recalled categories appears to be invariant." On the other hand, Cohen (1966) indicated that if subjects do not discover or remember a category, then recall from that category will not follow the general mechanism apparent in category recall. This recall pattern appears to hold true in advertising suggesting the importance of a good headline or subheadline in activating a reader's memory. Therefore, the data support $H_3 - H_5$.

One interesting result was the significant differences found on the effect of sex on the dependent variable with $F(2, 105) = 3.54, P > .06$ (see Table 2). Similarly, the analysis conducted on the attributes-within-category data

TABLE 2
MEAN RECALL SCORES BY SEX

Recall Measures	Sex	
	Male	Female
Attribute recall	11.79	8.12
Category recall	.72	.66
Attributes-within-categories recall	.27	.22
<u>Immediate</u>		
Attribute recall	12.54	8.52
Category recall	.72	.66
Attributes-within-categories recall	.29	.23
<u>Day After</u>		
Attribute recall	10.96	7.66
Category recall	.71	.66
Attributes-within-categories recall	.25	.21

reveals a significant difference by sex, $F(1, 104) = 5.39, P > .02$. For all three recall measures there was a significant difference between males and females (see Table 2). The significant difference may be attributed to the nature of the ad itself. That is, the content of an automobile ad may be more familiar to males than females resulting in higher recall scores. It was also interesting to note that the pattern of recall depending on the ad seen did not vary by sex. The variance in recall by sex was only on total number of attributes.

There were no significant differences between immediate recall and day-after recall. Also, none of the interactions were significant at the .05 level. Thus, the effects of ad organization on recall can be seen more clearly when analyzing the two component measures of recall.

Discussion

The findings from this study have several important implications for marketing communicators. First, the psychological literature on organization and memory can be applied to an advertising situation. In general, this literature suggests that the recall of organized material depends on (Mandler 1967): (1) the number of categories used, which determines the number of categories that will be recalled, and (2) the size of the recalled categories, which determines the amount to be recalled from each category. Therefore, when planning marketing communications it is important to realize that when the number of categories is small, a large proportion of the categories will be recalled and, when there are many categories, a relatively large amount per category will be recalled because of subcategorizing, thus increasing total recall (Mandler 1967).

The most important conclusion to be drawn from this experiment is that the organization of product attributes in an ad does effect recall, as in list learning experiments (Mandler 1967). The number of categories used to present the attributes in the ad had opposite effects on the two components of recall. As number of categories increased, the proportion of categories accessible in recall decreased. However, the proportion of information (attributes) retrieved from accessible categories increased as total number of categories increased (and, consequently, the number of attributes within each category decreased). Total number of attributes recalled, which is the result of the two component recall processes, increased from one up to eight categories in an ad; and was highest with eight categories.

Thus these results indicate that the category effect does occur in advertisements. Furthermore, these results show that this effect is obtained with meaningful materials (ads) in incidental memory tasks where subjects read the ads in a realistic way. As in list learning experiments, total recall was maximized with eight categories used in the ad copy.

Given that purchasing decisions probably depend more on what information one remembers about a product rather than total recall, the pooling effects of number of categories on the two components of recall could be very important for marketing. In devising a marketing strategy the following factors should be considered:

- (a) Is it more important that a person has ready access to general information about the product in memory (category recall) or that specific product attributes are retrieved (recall of attributes within categories given recall of the category)?
- (b) What cues will be available to facilitate retrieval at time of purchase decision? If a large number of cues are likely to be available (e.g., as when the decision is made "in store"), then one might wish to use ads containing large numbers of categories with relatively few attributes per category.

The results of this study may prove to be useful in the application of its research in learning and memory to marketing communications. The authors agree with Bettman (1979) that before such applications are made, experiments such as the present one are necessary to test whether previous findings from list learning experiments successfully transfer to tasks more similar to marketing conditions. This study found that eight chunks were optimal with recall decreasing somewhere between eight and sixteen chunks. Future studies may want to vary the number of chunks contained in an experiment, to confirm the true optimal recall level. Future research might also want to examine a chunking strategy with varying products. In this present experiment an automobile was used and sex differences were found that may have occurred because of the product chosen. Finally, it can be seen that the study of factors affecting the two component processes of recall and, especially, the relation of the two components of recall to purchasing decisions are important areas for additional marketing research.

Appendix

Attributes Arranged in the 16 Chunk Format

INTERIOR

...Deluxe AM radio...climate control air conditioning...tilt steering wheel...cruise control

BODY CHASSIS

...steel belted radial tires...swingup rear hatch...tinted windows...intermittent windshield wipers

COCKPIT

...vinyl upholstery...cut pile carpeting...deluxe instrument panel...form-fitting bucket seats

EXTERIOR

...twin sport mirrors...two-tone sport striping...landau top...chrome wire wheels

GAS MILEAGE

...39 mpg highway...28 MPG city...highest MPG in class...700 mile cruising range per tank full

FUEL

...runs on regular gas...low price per gallon...no knocking engine...no catalytic convertor

EASE OF SELF MAINTENANCE

...easy to follow owner's manual...simplicity of maintenance...easy to tune engine...quick and easy oil change

LONG RECOMMENDED SERVICE INTERVALS

...50,000 mile air filter...oil change needed only every 6 months...replace oil filter every 15,000 miles...lube every 6 months

OPTIONAL V-6

...a more powerful engine...dual exhaust...transverse-mount engine...refined coolant recovery

STANDARD ENGINE

...standard 4 cylinder engine...1.6 liter engine...overhead cams...vari-jet 2 barrel carburetor

HANDLING

...rack and pinion steering...smooth quiet ride...MacPherson struts...standard front stabilizer bar

EASE AND FUN OF DRIVING

...compact turning diameter...smooth shifting 5 speed...quick acceleration...4 wheel disc brakes

AMERICAN MADE

...easy obtainable parts...over 3000 available dealers...9 out of 10 still on the road...proven transmission

WARRANTY

...24 month/24,000 mile warranty...50,000 miles on engine block...rust proof body...Delco Freedom lifetime battery

PASSENGER

...automatic seat belt retractor...padded dashboard...energy absorbing steering column...optional air-bag cushion

AUTO BODY SAFETY

...energy absorbing bumpers...brake failure warning system...collision proof gas tank...puncture proof tires

References

References are available upon request.