

## THE EFFECTS OF THE MEANINGFULNESS OF SALIENT BRAND AND PRODUCT-RELATED TEXT AND GRAPHICS ON WEB SITE RECOGNITION

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### ABSTRACT

Building on the associative strength of memory theory and previous studies on the effects of brand name suggestiveness on advertising effectiveness, two salient elements in a business web page, pictures (such as logos or graphics) and words (such as brand or product names), were examined in three experiments. Web sites where salient pictures and words had business meaning suggestive of brand or product benefits were found to have the highest recognition, while web sites with salient pictures and words without either business or dictionary meaning were found to have the lowest recognition. These results suggest the importance of using salient brand and product-related names, pictures, and media content in general suggestive of the product benefits to increase web site recognition and the likelihood of a repeat visit.

Keywords: web advertising, corporate web sites, web site recognition, web brand names, web product names.

### 1. Introduction

Web sites are widely deployed throughout industry, education, government, and other institutions (US Department of Commerce, 2002; Vedder, Guynes & Vanecek, 1997), and many have questioned how to measure web site success [Dholakia & Rego 1998; Iwardeen et al. 2004; Liu & Arnett 2000]. A commonly-held measure of success by web advertisers is the extent to which visitors return to the site [Karson & Fischer 2005]. A user might visit a site after using a search engine, but can quickly forget even the sites that were placed high on the list.

The problem of remembering web sites is quite acute given that users have instant, direct access to millions of sites every time they sit at a keyboard. This accessibility is unprecedented in traditional media, where viewers have to wait for a scheduled show to air or readers have to purchase a magazine. Sites can be consumed at any time. While such a situation would be considered on the surface to facilitate the mission of a site, a deeper analysis reveals that switching costs are low compared to those in the offline domain. Switching to a different magazine or seeing a different billboard requires more action on the part of the reader than switching to a different web site. Even switching to a different television channel can be considered to have higher switching costs than the online domain because the TV viewer would need to search, often unsuccessfully, for other suitable content. On the web, there is always a site to visit. The challenge is to remember where to go.

Some sites are more memorable than others, and the goal of this paper is to demonstrate that designers attempting to make their web sites memorable should make careful choices of salient text and graphics used on a site. Text would include, among others, any prominent words on the site, such as brand or product-related names, and pictures would include logos, product-related graphics or other conspicuous artwork. These salient elements are also likely to be extremely important for building positive brand attitudes, which is one of the basic tenets of advertising [Vakratsas & Ambler 1999]. Salient brand and product-related names and graphics in a web site can be based on real people, places, and things, or, alternatively, can just be made up. The choice of a proper brand name or logo has been suggested as an important way to build brand equity for a product [Robertson 1987; Upshaw 1995]. Evidence of the importance of this practice is found in multi-million dollar investments in formulating logos and business names, as well as providing different ways to make web sites flashy and memorable.

Web sites, both during and after the currently-deflated "Internet bubble," have certainly shown us all several interesting examples of creative organization and brand design, and have captured a significant share of peoples' imaginations. There still is significant post-bubble excitement and press coverage of Internet start-ups and activity

of established firms. Gomes [2006] provides an interesting commentary about some of the “casually hip” names of some of the new brands, where names such as “Zoho, Simpy, Skobee, Gravee, and Goowy...all real companies— sound like something you’d hear on a grade-school playground during recess” [p. B1]. Gomes’ discussion emerged from a conference where firms are trying to become noticed. The number of new firms and Web sites vying for our attention far surpasses the common “7 plus or minus 2” guideline [Miller 1956], which provides evidence of severe limitations in human short-term memory. A Web site needs to be noticed in a very crowded field. That is, there is simultaneously much advertising value on line, quite a bit of value in having users remember a brand, and a lot of competition in attempting to do so.

The collapse of the bubble has perhaps distracted many analysts from full appreciation of the importance of the value of a Web site for advertising. While some companies just look for an easy entry into the Internet [Wan & Hackman 2000]; it has been shown that the company web site contributes to the creation of brand awareness and is an important form of marketing communications. In particular, the web site is a useful form of advertising [Cockburn & Wilson 1996; Dreze & Hussherr 2003; Hoffman et al. 1995; Singh & Dalal 1999]. Many forms of advertising can be ignored or avoided; however, following the use of a search engine and visiting or casually browsing a firm’s site, there are many opportunities to make a memorable impression [Singh & Dalal 1999]. As in any form of brand advertising, the salient words and graphics on the site not only attract attention but also can make the site, and associated brand, product, or company, memorable for the visitor.

Graphical meaning has been studied by researchers in a variety of fields; however, Bower et al. [Bower et al. 1975] stated that “there is little empirical work on how to make illustrations effective as a means of transmitting information.” [p. 1]. Nevertheless, several streams of research do address the usefulness of graphic images. Arnheim [1972] promoted “visual language” and “visual thinking” for graphic designers to improve the quality of their images. Lodding et al. [1983] found that a suitable graphical representation is easier to comprehend than one that is poor in quality or ambiguous. Horton [1994] investigated the facilitating mechanisms of graphical icons. Lee [2000] argued that graphics provide powerful “affordances” to users; icons can provide enough meaning to indicate precisely what needs to be done. Norman [1990] found that graphics unrelated to juxtaposed text would create “clutter” and hinder understanding. Rogers [1989] argued that the meaningfulness must match the experiences of the user.

A further area of related research is that of information quality. Shanks and Corbitt [1999] pointed out the need for semantic quality in representing meaning in a data warehousing context. Pirolli and Card [1995] introduced the highly influential notion of information foraging just in time for powerful application to the world-wide web. Their later study [Pirolli et al. 2000] pointed out that menu choices should provide a powerful enough “scent” to a person who is browsing a site, to ensure that the proper choice can be made. Finally, in two separate streams of assessing the quality of web sites, there is similar mention of meaning. Katerattanakul and Siau [1999] discussed representational data quality and Loiacano et al. [2006] discuss ease of understanding and intuitiveness. These studies provide evidence of the importance of meaningfulness in web site content, labels, and titles. It is our assumption that brand name text and images are the most salient materials in a site, and therefore, meaningfulness is most important in such materials.

The above discussion provides the framework to determine the effect of meaningfulness in the salient brand and product-related names and pictures as a way to increase the recognition of a web site. Besides the importance of web sites as a form of advertising described above, visitor prospects are less likely to buy a product if they cannot remember it or its associated benefits. Branding is a tightly-coupled issue, and Wells [2000] has shown that brand recognition is highly correlated with interest and may play an important role as well.

For these reasons, this study will draw from the associative strength theory of memory [Ellis & Hunt 1983], and previous marketing research studies that focused on the effects of brand name suggestiveness on advertising recall [Keller et al. 1998]. The goal of this study is to examine the role of the meaningfulness of salient brand and product-related text and graphics in web site recognition.

## **2. Prior Research**

Cognitive studies have found that humans remember pictures with meaning much more easily than those without meaning [Anderson 1995]. Similarly, it has been shown that we remember meaningful words and sentences much more easily than meaningless ones [Shepard 1967; Wanner 1968]. This is explained on the basis of the associative strength theory of memory [Ellis & Hunt 1983] which states that effectiveness of a retrieval cue depends on how strongly associated it is with target information (i.e. the information to be retrieved). Furthermore, the effectiveness of a cue increases as it shares increasing property with the target [Tulving, & Thompson 1973]. For example, the word “lizard” is easier to remember than an invented word such as “droffy.” The reason is that the

familiarity of the person with the concept of a lizard creates a strong association between the word and the notion of a lizard. For the same reason, a picture depicting a parrot is more memorable (because it is strongly associated with the concept of a parrot) than an abstract picture that can not be associated with any meaningful notion.

This issue of association has important consequences for the construction of commercial web sites. Web site construction can be discussed in terms of either its contents (information) or design (presentation) features or elements [Huizing 2000]. The present study focuses on the role of specific content elements on web pages--salient words and salient pictures--and their effects on web page recognition, an important factor for advertising success of corporate web pages.

Based on the associative strength theory of memory discussed above, it is reasonable to expect that the more strongly the meaning of the salient word (cue) is associated with the target information to retrieve from a corporate web site, it will be easier for the visitor to retrieve the target information; that is, to remember the web site. For example, a salient word such as "Rent-A-Car" associated with the corporate web site of a car rental company will make the site more memorable than a salient word such as "Blue Moon," which has dictionary meaning (but not business-related meaning), or "Tiky's" which is meaningless. The same rationale can be applied to the case of the salient picture in a web page. The stronger the association of the salient picture (cue) in the web page with the corporate site's business, the easier it will be to remember the web site (target information). For example, if the salient picture for a car rental company web site is an automobile, it will be easier to remember the web site than if the salient picture is a building (e.g. corporate headquarters) or an abstract picture. The weakest association occurs between a meaningless abstract picture and the rental car company because the abstract picture does not have any natural meaning that can be used for association purposes.

Commercial web pages are commonly characterized by the presence of both a salient word (e.g. product or brand name) and a salient picture (e.g. corporate logo, product picture). It is possible to find cases where the salient picture can have no meaning (NM), with an abstract logo or artwork. Alternatively, some sites include a logo, background, or other prominent artwork that has dictionary meaning (DM) (e.g. a plant or animal). Finally, a site can include a picture that conveys business-descriptive meaning (BM) of what the company does (e.g. an automobile picture for a car rental agency). Real examples of the three types include abstract art that might be difficult to interpret (NM) such as that used by Nikon or Linksys; unrelated or loosely-related objects (DM) such as the alligator in the Izod logo or the star in the hexagon in the Chrysler logo, and an indication or description of the business (BM) such as the speedy traveler in the Segway logo (conveying the business benefit of speedy traveling using the Segway product) or the luxurious cars that welcome the visitor to the Porsche web site (conveying the business activity of the site). Salient words such as those found in a brand name, company name, title, or URL, can be categorized similarly. Real examples of the three types for a company's name include a nonsense word or an owner's initials (NM), such as "Agfa" (a conglomerate of graphic, healthcare, and other specialty products) "PWC" (Price Waterhouse Coopers), a fruit (DM), such as Apple Records or Apple Computer, or an indication or description of the business type (BM), such as Dish Network or *Computerworld* magazine. In summary, on any given web page, it is possible to have any of nine combinations of these salient pictures and words, as shown in Table 1.

Table 1: Picture/Word Combination Groups

Group / Cell Number	Salient Picture/ Word
1	NM NM
2	NM DM
3	NM BM
4	DM NM
5	DM DM
6	DM BM
7	BM NM
8	BM DM
9	BM BM

The above discussion highlights the importance of studying the meaningfulness of salient words and salient pictures in web pages. It also provides the framework for studying the effect of meaningfulness in salient pictures and words to increase the memorability of the web page. Also, as mentioned earlier brand recognition has been

found to be correlated and a good proxy to measure brand interest [Wells 2000]. For consistency with both prior cognitive and advertising research, the methodology used in these experiments is based on those used in cognitive experiments of memory recognition [Bower et al. 1975; Shepard 1967; Wanner 1968; Wells 2000]. The balance of this paper describes our hypotheses and a set of experiments we conducted to test the effectiveness of the factor of meaningful salient words and graphics in web page recognition.

### 2.1. Research Hypotheses.

Given that we can classify both web page salient pictures and words into three categories: meaningless or No meaning (NM), dictionary meaning (DM) and business-descriptive meaning (BM), the following hypotheses will present our expectations for selected combinations.

Previous research on the associative strength theory of memory has demonstrated that memorability increases with stronger association of the cue and the target information [Bower et al. 1975; Shepard 1967; Wanner 1968]. Based on this, it is argued here that web pages where the combination of both business-descriptive meaning salient words and pictures (BMBM) are present should lead to the most memorable web pages. The reasons for this are: (1), The BM word acts as a strong cue to facilitate memory retrieval of the web page; (2), the BM picture will also act as an additional strong cue to facilitate memory retrieval; and (3), the presence of not one but two strong cues associated with the target web page, and reinforcing each other, should further facilitate web page memory retrieval. By the same token, the least memorable web pages should be those where there is neither a salient picture nor a salient word (NMNM) that has an association with the business's web page. For example, imagine the corporate web page of a hardware brand where the salient picture is the image of a socket wrench (BM) and the salient word is "Craftsman" (BM), forming the BMBM web page category. Compare that with the web page of a hardware brand where the salient picture is an abstract logo (NM) and the salient word is a non-meaningful word such as "Ticky's" (NM), that is, the NMNM web page category. In general terms, we hypothesize that<sup>1</sup>:

H1: Web pages where the salient picture and words have both business-related meaning (BMBM) will be more memorable than those where the two are meaningless (NMNM). In formulaic terms:

$$R(\text{BMBM}) > R(\text{NMNM}), \text{ Where } R \text{ is the recognition success for the specific group.}$$

As previously discussed, experiments to test the associative strength of memory theory have shown that meaningful pictures and words are more memorable than meaningless ones. In the case of web pages with a DMDM combination, both the salient picture and salient words have dictionary meaning. Although neither of these two content elements has a direct association with the business, it is possible that they have an association with each other (e.g. the word 'lizard' and the image of a lizard) in which case a strong association is created between both cues but rather a weak one (or none at all) with the corporate web site. On the other hand, if the two elements are not associated (e.g. the word 'lizard' and the picture of the corporate headquarters), the only possible association is with the imagery corresponding to the meaning of each element (the word 'lizard' would be associated with the image of the animal and the photo would be associated with the meaning 'building'). In both cases, the strong association to the corporate web page is lacking although both the salient picture and word provide mental imagery and meaning to assist in memory retrieval. This is a less desirable situation than the BMBM situation but this is still be a better situation than in the case of the NMNM web page combination where, in addition to lack of association with the web page, it is difficult to associate the meaningless picture (NM) or the word (NM) with any mental concept or image to ease memory retrieval. Therefore, we hypothesize that:

H2: Web pages where the salient picture and words both have dictionary meaning will be more memorable than those where the two are meaningless. In other words,

$$R(\text{DMDM}) > R(\text{NMNM})$$

Using an example of a toy store, even if the web page has a picture of the corporate headquarters as the salient picture (DM) and a salient word such as "BlueRiver" (DM); each of the cues will have a weak association with the store. However, if the salient picture is the image of a child's blocks (BM) and the salient words are "Toys R Us" (BM), each of the cues will be strongly associated with the company business and with each other. In other words, the following associations are present in BMBM web pages: picture-business, word-business, and picture-word. The only possible association in DMDM pages could be picture-word (if they are both related) but there is no association whatsoever to the business web page. In summary, it is proposed here that the associations (picture-

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<sup>1</sup> An important caveat is in order here. Our previous discussion does not discard the possibility of an NM picture or word acquiring either a dictionary or business meaning (e.g. EBay, Pepsi) after a long time of market exposure and advertising effort. What we argue here is that, all things equal, as in the case of new product/brand names, a BMBM picture/word web page salient combination will be more memorable than a NMNM combination. This observation is also valid for the remaining hypotheses.

business, word-business, and picture-word) and their mutual reinforcement in the case of the BMBM combination creates a much stronger association in memory than in the case of the DMDM combination (where only a picture-word association may be present if any). In other words, we hypothesize that:

**H3:** Web pages where the salient picture and words have both business-related meaning, will be more memorable than those where the two have independent dictionary meanings. Stated in a formula,

$$R(\text{BMBM}) > R(\text{DMDM})$$

One caveat is appropriate here. Up to this point, business meaning is expected to convey a meaning that is closer to the actual line of business, that is, a business-descriptive meaning; making an association between the brand name or logo and its work. Interestingly, some research in marketing has shown that conveying some of the benefits of a product or service as part of the brand name results in even higher memorability of the product or service [Keller et al. 1988]. In other words, there are two ways to create business meaning: first, by using a salient word (picture) that is somewhat descriptive of the business (e.g. “Rent-A-Car” or the image of a car) or by using a salient word (or picture) that is somewhat suggestive of the benefits of the business (e.g. “RentAWreck” or an image that suggests savings in renting a car). We hypothesize that in both types of business meaning (business-descriptive and benefit-suggestive), the strength of the cue association created by the BMBM combination will be greater than in either the DMDM or NMNM combination. Based on this, it is possible to summarize the three hypotheses above as follows:

$$R(\text{BMBM}) > R(\text{DMDM}) > R(\text{NMNM}),$$

where BM refers to either ‘business-descriptive’ or ‘business-benefit suggestive’ meaning.

Two experiments were performed. The first experiment used BM salient pictures and words with ‘business descriptive’ meanings and three seconds of exposure to the web page. The second experiment used BM salient pictures and words with ‘benefit suggestive’ business meanings, and eight seconds of exposure to the web page.

### 3. Experiment I: (Business-descriptive BM, 3 second exposure, and 48 hour interval)

#### 3.1. Research Methodology

The key characteristics of this experiment were the use of the business-descriptive BM definition (conveying of business activity) of salient picture/words and three-second exposure to the web pages. Dictionary meaning was operationalized as the presence of either the text or image meaning explanation in a standard dictionary. First, 45 slides, as surrogates for web pages, were created by the researchers with the purpose of having the participants view and later recognize them. In the rest of this paper we will refer to them either as slides, web pages or simply pages. To provide focus on the salient words and pictures, the salient picture and word were pasted on PowerPoint slides without any accompanying content. PowerPoint allowed the control of transition timing. This also allowed for control of alternative, non-hypothesized variables such as response time, additional web content, background color, etc. Each combination group was represented by five web pages. These 45 pages are referenced as “original” pages in the rest of the study. Similarly, 45 additional pages were created following the same distribution of five per group. These additional pages were used as distracters during the recognition phase of the experiment, and we will use the term distracters for those pages throughout this paper. Therefore, the total page count was 90, distributed evenly among the nine possible combination groups—referred to as groups, cells or treatments in this paper—as shown in Table 2 (See Appendix A for a sample of the type of salient graphic and text elements used in these pages):

Table 2: Experimental Group Cells\*

Pictures	Words		
	NM	DM	BM
BM	<u>Cell 7</u> 10	<u>Cell 8</u> 10	<u>Cell 9</u> 10
DM	<u>Cell 4</u> 10	<u>Cell 5</u> 10	<u>Cell 6</u> 10
NM	<u>Cell 1</u> 10	<u>Cell 2</u> 10	<u>Cell 3</u> 10

\*For each cell, 5 original and 5 distracter pages were prepared

Forty-nine students from an undergraduate information systems class were chosen as participants for this experiment. Their reward was a small amount of extra credit for class. To avoid order effects, they were shown in

random order the original 45 pages, each for 3 seconds, to be consistent with other studies of recognition performance with exposure times from 1 to 3 seconds [Gillund & Shiffrin 1984]<sup>2</sup>. Participants were only told to watch the presentation and that instructions would follow. This was done to avoid the participants from engaging in any special memorization efforts and to simulate casual exposure to advertising. Forty eight hours later, they were shown all 90 pages (the 45 original pages plus the 45 distracters; five distracters per combination cell) in random sequence. The participants were asked to indicate for each page whether or not they had seen it as part of the original 45 pages shown before or not, by circling YES or NO next to each slide number.

Recognition success was scored as categorizing correctly both the pages that had been seen as well as the pages that had not been seen before in the original 45. Because the participants were shown 10 pages in each group (5 real ones and 5 distracters ) during the recognition phase, the maximum possible score was 10, achieved by correctly indicating “yes” for all 5 pages from the original set and “no” for all 5 distracters per cell. The worst possible score was zero, achieved by indicating “no” for all 5 pages from the original set and “yes” for all 5 distracters. Therefore, successful recognition, in this study, involves avoidance of two types of error: failing to recognize pages already seen and failing to ignore pages not seen in the first pass. This approach is consistent with the basic tenets of Signal Detection Theory in memory recognition experiments. As applied to our experiments, this theory states the importance of considering false recognition when evaluating the performance scores of participants in memory recognition experiments.

### 3.2. Results

Repeated-measures ANOVA and one-tailed paired t-tests were used to compare group means for hypothesis testing and exploratory analysis. The mean recognition rate for each group is shown in Table 3. Although performance in general was high, recognition scores statistically differed among the cells ( $F = 7.872$ ;  $df = 8$ ;  $p < .000$ ).

Table 4 shows the results of hypothesis testing using repeated measures ANOVA. Wilks’ test [Green et al. 2000] showed statistically significant differences among the groups at the .05 level. There is strong support for both H1 and H2, as shown in the Table. Interestingly, H3 was not supported.

### 3.3. Discussion

As shown in Table 4, the main hypotheses 1 and 2,  $R(\text{BMBM}) > R(\text{NMNM})$  and  $R(\text{DMDM}) > R(\text{NMNM})$  respectively, were found to be statistically supported while hypothesis 3,  $R(\text{BMBM}) > R(\text{DMDM})$ , was not supported.

One interesting result of this experiment is that there is a clear distinction between the recognition score of the NMNM group,  $R(\text{NMNM})$ , and the recognition score of all the other groups. As can be seen in Table 3,  $R(\text{NMNM})$  was the lowest of all cells. Statistical tests showed that  $R(\text{NMNM})$  was significantly lower in six of the eight possible comparisons. Also, as shown in Table 3, the recognition score of the BMBM group,  $R(\text{BMBM})$ , was greater than any other group (except DMDM) and was found significant in three out of the six possible comparisons during exploratory analysis.

Table 3: Mean, Standard Deviation for Each Group (N=49 in each cell)

Group #	Group	Picture	Name	Recognition	Standard Deviation
1	NMNM	No meaning	No meaning	7.78	1.14
2	NMDM	No meaning	Dictionary Meaning	8.14	1.38
3	NMBM	No meaning	Business Meaning	8.06	1.36
4	DMNM	Dictionary Meaning	No meaning	8.14	1.19
5	DMDM	Dictionary Meaning	Dictionary Meaning	9.22	0.77
6	DMBM	Dictionary Meaning	Business Meaning	8.57	1.14
7	BMNM	Business Meaning	No meaning	8.45	1.06
8	BMDM	Business Meaning	Dictionary Meaning	8.69	1.18
9	BMBM	Business Meaning	Business Meaning	8.84	0.90

No significant difference was found between the recognition of DMDM and BMBM groups and therefore, H3 was not supported. The most likely explanation may be that because BMBM groups are also, by definition DMDM

<sup>2</sup> These studies found that an increase in exposure time would also increase the strength of the memory association.

groups, both have semantic meaning and, in spite of the higher BMBM congruence, are comparatively similar to recognize. It is also possible that 48 hours is not a long enough interval to stimulate important recognition performance differences between the DMDM and BMBM group. In fact, it has been found that people have a surprisingly large memory capacity, suffering only a 17% error rate after studying 10,000 pictures [Standing 1973].

Table 4: Results of Hypothesis Testing (with BMBM indicating Business Activity)

Hypothesis	Expectation	Significance
H1	R(BMBM) > R(NMNM)	p < .000*
H2	R(DMDM) > R(NMNM)	p < .000*
H3	R(BMBM) > R(DMDM)	p < .013¥

\* alpha = .05, one tail paired t-tests      ¥ opposite direction

**4. Experiment II (Benefit-Suggestive BM, 8 second exposure, 48 hour interval)**

As indicated earlier, the marketing literature subdivides business meaning into ‘business descriptive’ and ‘benefit suggestive’ meaning. The previous experiment used salient pictures and words that were business descriptive. This second experiment made use of benefit-suggestive salient pictures and words. For convenience, we refer to *business descriptive* as either a salient picture or word in a web page that conveys the idea of the business at hand. For example, a bicycle image or a “Bike Rentals” text in a web page for a bike rental company. In contrast, *benefit suggestive* refers to either a salient picture or word in a web page that conveys the business benefit of the brand, product or company. For example, an image of a speeding race bike or the text “FastBikes” on the web page of a company that sells race bikes.

Research has shown that suggestion of benefits [Keller et al. 1988] will lead to greatest memorability of the words and/or graphics in an advertisement. For example, marketing experiments done by Keller et al [1988] have shown that a brand name explicitly conveying a product benefit (e.g. PicturePerfect televisions) leads to higher advertising recall when compared to a non-suggestive brand name (e.g. Emporium televisions).

These findings and our previous discussion of H3 suggest that if both the business-meaning (BM) related salient pictures and words used in firms’ web pages emphasize the key business benefits or features, their memorability will be even higher due to the added association among the cues and the target information to retrieve (the firm’s web page). For example, the picture of an immaculate, shiny floor would be an example of a benefit-suggestive BM picture for a company that provides cleaning services and the salient word “PerfectCleaners” could be an example of the corresponding benefit-suggestive BM word. In both cases, the key benefit claim, thorough conscientious cleaning, is suggested. This combination of both salient picture and word constitute an example of a BMBM-type web page. We will refer to this definition as the ‘benefit-suggestive’ BM definition of a salient picture or word.

4.1. Experimental Design

For this experiment, some changes were made to strengthen its experimental validity. Two rounds and two separate groups of subjects were used. In the quest to avoid experimenter bias, which might have affected the results in Experiment I, one group of subjects was asked to produce the words and graphics for a second set of subjects engaged in the main experiment. Also, for conveying business benefits in this round, they were asked to produce BMBM salient picture/word combinations that suggested key business benefits for hypothetical firms. The second round involved the experiment, conducted as described earlier.

The process of developing the web pages was as follows:

1. An explanation of the nine different categories of salient picture/word combinations was given to a set of 40 students. This explanation was in terms of the definitions of NM, DM and ‘benefit-suggestive’ BM types. No explanation was given about the experiment or expected results.
2. Participants were asked (for extra credit in the course) to provide a set of 9 slides, each corresponding to one of the nine categories shown in Table 2.
3. Participants were told to prepare slides where the web pages would have the following characteristics:
  - a) Black and White only to maintain simplicity and prevent confounding effects of color.
  - b) Pictures should be of a type that could easily be converted to logos (this allowed certain uniformity in the complexity of the pictures and eliminated complex photos).
  - c) BM text could be formed by combining simpler words (e.g. PerfectPicture, FastBikes, EasyLoans, etc.). This made our research consistent with previous marketing experiments that used this category [Keller et al. 1988]

- d) DM words should be available in a student pocket dictionary (in other words, no exotic words should be used).
- e) Other requirements about picture and word sizes, word lengths, fonts, etc., were provided to ensure, as much as possible, uniformity of all the characteristics other than the ones under study.

Once this group of students turned in their slides, a different group of students categorized the slides. The slides with the highest scores in terms of proper categorization were those used in the experiment. From the remaining ones, ninety slides (10 of each category) were randomly selected for the experiment; 45 were designated as the original stimuli while the other 45 were designated as distracters. The above process ensured that we did not bias the business benefit pages in some unknown way by creating or selecting the particular pages to be used.

Another variation with respect to the previous experiment was that the exposure time; that is, the period of time to show each slide, was increased from three seconds (used in the previous experiments) to eight seconds. The reason for this change was to better simulate the amount of time a person would casually browse a web page. It would provide enough time to see the salient picture and word but not enough to properly read anything else. The previous exposure time of three seconds was reasonable for memory recognition experiments but an eight second exposure to the web page reflected a casual web browsing interval more accurately. Fifty undergraduate business students participated in the experiment.

Also, to improve the external validity of the stimuli, the black and white salient pictures and texts were embedded in a web page template with frames as shown in Appendix A. The web page template had standard blue and gray colors while the background color was white. Also, a brief description of what the company did (to relate to its business benefit) was included in all the web pages. The description was presented in a similar way in all pages. As before, the presentation order of the mock-up web pages was fully randomized. The rest of the experiment was conducted in a similar way to the previous one. This experiment also made use of a 48-hour interval between showing the original slides and the recognition test.

In summary, the key new elements in this experiment were the use of the suggestive BM definition, development of the picture/word pairs by a different group of participants, and a greater exposure time (8 seconds) per slide.

#### 4.2. Results

The mean recognition rate for each group is shown in Table 5. Recognition scores were higher than in the previous experiment probably due to the increase in the stimulus exposure time (8 seconds). Repeated measures ANOVA and one-tailed paired-samples t-tests still showed statistical differences among the cells (Wilk's test produced  $F = 11.75$ ;  $df = 8.00$ ;  $p < .000$ ).

Table 6 shows the results of hypothesis testing using one-tailed paired-samples t-tests. Table 5 shows that BMBM has a dominating trend, and in exploratory analysis, it was found to be significantly higher in five of the six possible comparisons. Similarly, the NMNM group still has a clearly lower recognition score than any other group and was statistically significant in all of the six paired comparisons.

Table 5: Mean, Standard Deviation for Each Group (N=50 in each cell)

<b>Group #</b>	<b>Group</b>	<b>Picture</b>	<b>Name</b>	<b>Recognition</b>	<b>Standard Deviation</b>
1	NMNM	No meaning	No meaning	7.74	1.44
2	NMDM	No meaning	Dictionary Meaning	8.72	1.39
3	NMBM	No meaning	Business Meaning	9.06	1.04
4	DMNM	Dictionary Meaning	No meaning	9.02	0.85
5	DMDM	Dictionary Meaning	Dictionary Meaning	8.64	1.23
6	DMBM	Dictionary Meaning	Business Meaning	8.18	1.17
7	BMNM	Business Meaning	No meaning	9.24	0.82
8	BMDM	Business Meaning	Dictionary Meaning	9.00	1.03
9	BMBM	Business Meaning	Business Meaning	9.36	0.78



Table 6: Results of Hypothesis Testing (with BMBM suggesting Business Benefit)

Hypothesis	Expectation	Significance
H1	R(BMBM) > R(NMNM)	p < .000*
H2	R(DMDM) > R(NMNM)	p < .000*
H3	R(BMBM) > R(DMDM)	p < .000*

\*alpha = .05, one tail paired t-tests

4.3. Discussion

As shown in Table 6, all main hypotheses were found to be statistically supported. This was a clear departure from the previous experiment where hypothesis 3: R(BMBM) > R(DMDM) was not supported. A likely explanation for the change is the use of the business benefit-suggestive definition for the BM category. Clearly when both the salient picture and text suggest the key business benefit or feature, recognition performance tends to be higher than in any of the other cases, as shown in Table 5. Conversely, the worst recognition scores correspond to the NMNM group. This is fully consistent with our hypothesized relationships among the key cells. To summarize, as hypothesized, the three main hypotheses are found to be statistically significant as follows:

$$R(\text{BMBM}) > R(\text{DMDM}) > R(\text{NMNM})$$

Consistent with the previous experiment, there is a clear distinction between the recognition score of the NMNM group, R(NMNM) and the recognition score of all the other groups. In all cases, using exploratory analysis, R(NMNM) was lower and statistically significantly lower in 7 of the total 8 possible comparisons.

5. Conclusions.

Our results strongly suggest that instead of looking blindly for “unusual” or “fancy” salient pictures and words in the design of web pages, firms should instead employ salient picture/word combinations that are not just meaningful but that also suggest the benefits or key features of the business.

These results apply to the choice of any text and graphic elements to be displayed prominently on a web page, when one of the objectives is to obtain high recognition (important to generate repeat visits). In other words, the issue is not merely one of salient product name and logo, which is often chosen quite early in the development of a corporate web site, but extends to all salient text and graphics on a site.

Practitioners should be aware of the strong potential effects we observed. Although the cell means alone might not indicate the power of conveying business benefit in words and pictures, when the mass media is considered, the effects could be quite important. If cell means are multiplied by 10 million exposures each, the results would indicate that making sure business benefits are represented by the salient words and pictures would lead 93 million people to remember them after they are seen for 8 seconds, as opposed to only 78 million when they use only meaningless words and pictures. If the exposure time is decreased, it is likely that the effect will be even stronger. Table 7 provides a summary of the main results across the two experiments.

Table 7: Comparative Results of the Main Hypotheses across the Experiments

	Experiment I	Experiment II
BM Definition (for salient pictures and words)	<i>Business Descriptive</i>	<i>Business Benefit Suggestive</i>
Sample Size	49	50
Interval Time between stimulus and recognition	48 hours	48 hours
Stimulus Duration	<i>3 seconds per slide</i>	<i>8 seconds per slide</i>
H1: R(BMBM) > R(NMNM)	Supported p < .001	Supported p < .001
H2: R(DMDM) > R(NMNM)	Supported p < .001	Supported p < .001
H3: R(BMBM) > R(DMDM)	Ns	Supported p < .001

Based on the set of experiments, it is possible to draw the following conclusions for the choice of salient text and graphics when the objective is high brand/product or web site recognition:

- When the salient picture and word in a web page have meaning (whether simple dictionary meaning or meaning that represents the business), recognition of those elements will be improved.
- When the salient picture and word in a web page have benefit-suggestive business meaning, recognition performance will be enhanced over business-descriptive meaning alone.
- Firms choosing meaningless words and/or pictures face the prospect that recognition will be most difficult for prospective clients or customers, especially while the product or service is relatively obscure and unknown. That is, a new business will face an additional obstacle—a cognitive one—for at least the startup period.

The original goal of this study was to understand the influence of salient pictures and words in advertising effectiveness (measured in terms of recognition performance) of web pages. We tried to understand this influence in the context of casual browsing rather than on a purposeful search because that is the way that advertising effects would work when casually browsing a web page<sup>3</sup>. This meant that the browsing time should be on the order of a few seconds so the visitor would probably have time just to see the salient picture (such as a log or product picture) and read the salient words (such as the brand name) but nothing more. To replicate this situation in a laboratory setting, it was found that the use of mock-up web pages on slides (see Appendix A for samples) simplified controlling exposure times, randomness, etc. Although this may be considered a limitation, we consider it is not a serious one, given the fact that we were exploring the cognitive impact of the semantic content of the salient text and graphic.

Similarly, although the use of students as surrogate of potential customers can always be contentious, the basic cognitive nature of the dependent variable (recognition) makes the results generalizable to the population of corporate web site visitors. Finally, we believe the results of this study may be important even when using richer salient media such as audio, video footage, etc., in web sites. Although these richer media have been found to be highly associated with greatest intent to return to the site [Raney et al. 2003], our results suggest that visitors would find it easier to remember the brand or product and its associated benefits, should the salient media present in the web site create a high association of the brand and business benefits by carefully choosing the meaning of the salient brand/product text, images, audio, and associated video.

A final limitation is the possible subjectivity in the choice of salient words and images. What has business meaning to one person might have dictionary meaning to another person, and could even be meaningless to yet another person. This possible subjectivity was the reason we asked one set of participants to create the words and images and another set to validate them. Without clear membership in the categories, the error terms in our analysis would be quite high. Future research should focus on actual terms and make use of analytical techniques that do not depend so heavily on mechanical partitioning of variance. For example, qualitative techniques can expand the richness of describing various shades of meaningfulness.

The results of studies in recognition and memorability of salient words and images, based on cognitive theory and empirical results in a variety of fields of application, should ultimately be a useful guide both to researchers who try to understand antecedents of future behavior, and to practitioners who wish to boost the level of return visitors to their new product site.

### Acknowledgement

The authors would like to thank Kranti Singh, Katz Graduate Student, whose enthusiasm and hard work to collect, code, and organize the experimental data over a two-year period made this paper possible. We also thank Frederick Winter, Jeffrey Inman, and the anonymous reviewers for their helpful and supportive comments on earlier drafts of this paper.

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<sup>3</sup> The "advertising effect" is intended to reflect the ability of the web page itself to raise awareness and site recognition, and is not intended to address banner and other advertisements.

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Appendix A

Samples of Graphic and Text Stimuli Used in Experiments I and II

