

Banner Ad Effectiveness: Lessons from 8,725 Ads

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Abstract

This study reports on the effect of various elements of banner ads on click-through rate using a sample of 10,000 banner ads. The moderating effect of ad context was also tested to assess the differences between consumer-oriented ads and business-oriented ads. Two categories of ad elements were derived: message content and design elements. It was found that incentives, emotional appeals, and color play very different roles in banner ads based on their targeted audience, whereas animation and interactivity were not related to a higher click-through rate.

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Introduction

In 1994, the now ubiquitous banner ad was first introduced. In the seven years since, the Internet advertising industry has exploded. According to the Internet Advertising Bureau (IAB: www.iab.net), Internet advertising in 2001 was a \$7 billion plus industry in the U.S. alone. About 35% of that was accounted for by banner ads (Internet Advertising Bureau 2002). Of course since the first banner ad was placed online, both the technology and the medium have evolved. “Rich-media technology” is now transforming banner ads from static images to highly creative and engaging ads. It is also common for the banner ads to include interactive elements. Higher bandwidth connections and more sophisticated programming techniques have fueled this transformation allowing for high resolution, high color images, and complex animations to be the rule, rather than the exception, of banner advertising (Economist 1999).

Evidence about the effectiveness of this advertising medium has been mostly anecdotal. It is an industry belief that certain ad characteristics increase click-through rate (Li and Bukovac 1999), however this belief is based largely upon anecdotal evidence rather than methodologically rigorous research. Cleland and Carmichael (1997) report the success of a limited number of banner ads, and attribute their success to characteristics such as animation, number of colors, and interactivity. The study presented in this manuscript was performed to identify potential antecedents to banner ad effectiveness, therefore providing empirical support for the industry beliefs.

This research is important and relevant because of its focus on determining the effectiveness of advertising on the internet – a new, quickly growing and rapidly evolving medium for advertisers. While a lot of resources are being spent on Internet banner advertising,

there has been no empirical research that provides guidelines for effective banner advertising. Our research will help media planners use their online ad dollars more effectively. In fact, an online ad company that considers this research very important has already contributed \$10,000 towards this study. In this study we also evaluate if traditional advertising theories apply to this new advertising medium. This will help us to determine if banner ads can be treated the same as ads within other media. If these data do not conform to the well-established models developed with traditional advertising, new theoretical models may be needed to further study this medium.

Another important aspect of this research is that we evaluate both B2B and B2C ads to examine the differences in the effectiveness of banner ads in both these contexts.

Dependent Variable: Click-through Rate (CTR)

While there is no industry standard for measuring the success of a banner ad, one specific behavioral variable that has been used extensively is CTR. According to IAB, click-through is defined as “the action of following a hyperlink within an advertisement or editorial content to another Web site or another page or frame within the Web site.” CTR is the ratio of click-through to impressions, where impressions occur whenever “an ad ... is served to a user’s browser.” Measuring CTR is a task involving the measurement of impressions and number of times an ad is clicked.

Independent Variables: Message Content and Ad Design

In order to determine the ad characteristics that may have an impact on CTR, we selected characteristics from two broad groups measuring ad content and ad design. Based on advertising research in traditional media such as print, broadcast and billboards (c.f. Wells, Burnett, and Mariarty 2000; Lohtia, Johnston and Aab 1995) it is believed that both the content and design of banner ads will impact click-through.

Within each of these groups of variables, we selected variables to represent both cognitive and affective components. While there are competing theories on how ad messages are processed, the combined influence hypothesis has been used as the basis for many studies (Mittal 1990; Miniard, Bhatla and Rose 1990; Mick 1992), and has emerged as the most well accepted theory (Lord, Lee and Sauer 1995). The combined influence hypothesis states that there are two processes involved in message elaboration: cognitive processing, driven by message arguments, and affective processing, driven by peripheral cues (Petty and Cacioppo 1982; Petty, Cacioppo and Schumann 1983). Using this framework, we identified banner ad characteristics for each of four groups: Cognitive content, affective content, cognitive design, and affective design (See Table 1).

Content Elements

Content elements include message, appeal type, offers made, and can involve the viewer at a cognitive or affective level. We look at two message content characteristics, one cognitive and one affective. Message content is often used to deliver a message making some claim and utilizing some appeal type. We chose the use of incentives to measure cognitive message elements. It is thought that, while banner ads are typically more useful for improving brand attitude or recognition, action can be generated if the ad offers an incentive for action (Krishnamurthy 2000). For example, a banner ad could offer a dollars-off coupon in return for clicking on a banner ad. Naturally, these types of incentives should increase CTR. We measure incentives by evaluating the banner ads for the presence or absence of incentives to click.

For the affective message element, we measured the use of emotional appeals. A popular method of gaining attention and generating action from any type of advertising is through the use of an emotional appeal (Holbrook and Batra 1987; Holbrook and Hirschman 1982). Emotional

appeals could take the form of fear, love, happiness, etc. By eliciting an emotional response from an ad, we expect greater CTR through increased involvement with the ad. The literature has conceptualized emotion in different ways (Batra and Ray 1986; Chandy, et al 2001), either treating each emotion as a construct itself, or treating all emotion as a scale from negative through neutral to positive (Bagozzi and Moore 1994). In this research, we followed the latter route, and treat emotion as one construct that can be measured as either negative or non-negative (positive and neutral are combined). We assessed banner ads' use of emotional appeals capturing a range of positive and negative emotions. Some ads use no emotional appeal at all. Therefore we defined emotion as a binary variable to capture the use of emotions or the lack thereof.

Based on the above discussion, we put forth two hypotheses:

H1 (a): Banner ads that offer incentives have higher CTR than banner ads that do not offer incentives.

H1 (b): Banner ads that use emotional appeals have higher CTR than banner ads that use no emotional appeals.

Design Elements

To assess the design characteristics of a banner ad, we selected three criteria: color, animation, and interactivity. While there may be other design elements that could be considered, these three seem to be emerging in the industry as key factors to banner ad success (Krishnamurthy 2000; Cleland and Carmichael 1997). As with the content elements, design elements can be used to elicit either a cognitive response or an affective response. Interactive elements of a banner ad attempt to elicit cognitive response by allowing the viewer to submit searches, enter forms, or simply click to visit the advertiser's website. By allowing interactivity, the advertiser is attempting to increase viewer involvement by creating two-way communication,

instead of the usual one-way most traditional types of advertising accomplish. There is evidence that interactivity of banner ads has a substantial impact on CTR (Mand 1998).

Affective components are intended to elicit some type of emotional or feeling response, usually invisible to the viewer. Typical ways that ads can be used to elicit affective response are through the use of color and animation. The amount of color used in advertising has been shown to affect ad effectiveness in traditional media (Gronhaug et al 1991), and there is no reason to believe that this would not hold true for banner ads as well. However past research suggests that there may not be a direct positive relation between color and effectiveness. Gronhaug (1991) found that low levels of color increased effect, while adding more colors beyond that had no effect at all. This suggests that there may be an optimum level of color in an ad. Perhaps too much color detracts from the message. To assess the impact of color on level of banner ad effectiveness, we evaluated the impact of the number of colors present. Then we collapsed that scale to low, medium, and high color.

The final independent variable is animation. The first banner ads were simply static images, much akin to print ads (Ott 2000). They were static images containing ad content. However, new technologies such as plug-ins, java script, and streaming media have transformed banners in remarkable ways (Wells 2000, p277). Many advertisers have begun to implement loop-animated banners, in order to deliver a “progressive and sequential image.” (Cleland and Carmichael 1997, p26) It is well known that television is one of the most intrusive, involving media forms because of its ability to use moving images. When banners use animation, they also take on the character of television ads, and this may suggest that animated banner ads will attract more attention, and hence be clicked more. We conceptualize animation to be either present or not, and we measure it on a two point scale.

Based on the above discussion, we propose three hypotheses:

H2 (a): Banner ads that have an element of interactivity have higher CTR than banner ads that have no interactive elements.

H2 (b): There is an inverse ‘U’ relation between color level employed in a banner ad and its respective CTR.

H2 (c): Banner ads that are animated have higher CTR than banner ads without animation.

The Moderating Role of Ad Context

It is well established in the literature that, depending on certain environmental, personal, or contextual characteristics, people utilize different information processing approaches (Chaiken, Liberman and Eagly 1989; Petty and Cacioppo 1986; Meyers-Levy and Malaviya 1999). A dual-process model has been accepted as the preeminent model of information processing. As suggested by Petty and Cacioppo (1986), the primary driver of information processing strategy is involvement, resulting in what is known as the dual-process model of information processing. The basic tenet to this model, also known as the Elaboration Likelihood Model, is that people tend to process information differently depending on their level of involvement with the message. For a high involvement situation, people tend to use “central route” processing, meaning that they make a cognitive effort to evaluate statements or attend to claims or other message stimuli. It has been shown that during central route processing, non-essential stimuli, such as colors or sound, are not processed very heavily. Since these “secondary” elements do not convey any specific information, they merely exist as a background to the content that is most important, namely the more cognitive elements of the ad, such as incentives.

On the other hand, in situations of low involvement, people tend to use “peripheral route” processing, meaning that they are engaged in more subconscious processing where they simply

do not make an effort to attend to any specific message elements. Affective components take the lead in this situation, and attitude change is effected through the use of peripheral cues, such as color, animation, or music.

To apply this model to this research, we utilized the context of the banner ads (B2B vs. B2C) as a moderating variable. We determined whether each ad was be targeted to a consumer audience or to a business audience. It is a common belief that business purchase decisions are more often high involvement situations than consumer purchase decisions. Business purchases are never impulse purchases, group decision making is used much more often, purchase cycles are longer, and purchase scales are considerably larger (Russell and Lane 2002). Conversely, consumer purchase decisions are more often low involvement situations. Since Petty and Cacioppo's dual-process model suggests that involvement drives the information processing task, we suggest that viewers will process banner ads differently based upon the ad context. Business-to-business ads should be more cognitive in nature, because in high involvement situations, people tend to use central route processing where cognitions are used heavily. Business-to-consumer ads should be more affective in nature, because low-involvement situations are more conducive to peripheral route information processing.

Looking at our five independent variables (Table 1), Incentives and Interactivity deal more directly with central route processing, i.e. both of these variables deal with active, cognitive thought processes. We suggest that B2B ads are viewed more often in high involvement situations, and certainly are processed through more central route processing. Therefore we suggest the following hypotheses:

H3 (a): If the banner ad context is B2B, the relation between Incentives and CTR is stronger than when the banner ad context is B2C.

H3 (b): If the banner ad context is B2B, the relation between Interactivity and CTR is stronger than when the banner ad context is B2C.

The other three independent variables can be considered peripheral cues. Color, animation, and emotional appeals are usually not actively processed, and therefore are likely to be used more in low-involvement situations. We have suggested that B2C ads are more likely to be viewed in low involvement situations. Based on the above discussion, we present to following hypotheses:

H4 (a): When the ad context is B2B, the relation between color level and CTR is weaker than when the ad context is B2C.

H4 (b): When the ad context is B2B, the relation between animation and CTR is weaker than when the ad context is B2C.

H4 (c): When the ad context is B2B, the relation between use of emotional appeals and CTR is weaker than when the ad context is B2C.

Methodology

The empirical study was conducted at the individual banner ad level. A large online advertising company provided us with 10,000 banner ads that were randomly selected out of an inventory of real world banner ads that were online in the previous months. Five independent judges remotely coded these ads. The judges were Ph. D. candidates that completed a joint training session where they were familiarized with the coding scheme. An online coding tool was developed and each coder had a unique password to the web site where the banners could be viewed and coded.

The judges were instructed to check boxes for the banner advertisement's appeal, number of colors, inclusion of interactive elements, animation, and direct incentives to click. They also were instructed to code the ads' context as either B2B or B2C. To ascertain interjudge reliability, all judges coded a sub sample of 100 randomly selected ads. For all independent variables, we estimated the interjudge reliability coefficient using Rust and Cooil's (1994) proportional

reduction in loss (PRL) reliability measure, which can be evaluated using the same criteria as we evaluate Cronbach's alpha, i.e. 0.70 is acceptable, 0.90 is desirable. The reliability results can be seen in Table 1. All reliabilities are high with the exception of color level.

The actual CTR for each banner ad was provided by the online advertising firm, however not all ads had click data, and for some ads the data was inconsistent with reasonable expectations. Those ads without click data or with outlying click data, were eliminated from the data, leaving a total of 7,421 consumer oriented ads and 1,304 business oriented ads, for a total of 8,725 ads. The banner ads included in the sample represented a wide variety of products and services.

Analysis of variance (ANOVA) was used to test the main effects and to determine the moderating effect of ad context. When necessary, correlations were also ascertained to establish the directionality of relationships. The results of this analysis are discussed in the following section.

Results

The results of the analysis of variance can be seen in Table 3. To support our main effect hypotheses, there should be significant differences in CTR between the ad element measures, for example, between ads with no animation and ads that used animation. To support our hypotheses that ad context moderates these relationships, we need to see a significant difference in CTR between the interaction term measures.

Our first set of hypotheses suggested that content elements (Incentives and Emotional Appeal) of banner ads have a positive impact on CTR. H1(a) suggested that the inclusion of incentives in the ad message would increase click-through. This was not supported by our analysis. While a significant difference was noted between ads with incentives and ads without

incentives, strangely the ads with incentives had lower CTR. The corresponding moderation hypothesis was also supported. Figure 2 demonstrates the dramatic impact of ad context on this relationship.

H1(b) suggested that using emotional appeals in a banner ad will increase click-through. While we did find a significant difference in CTR based on emotional appeal use, no directional support for the main effect was found. However this is clarified by the interaction effect. Figure 3 shows that ad context plays a substantial role in effect of emotional appeal use. For B2B ads, emotional appeals decrease click-through, however for B2C ads, there is an increase in CTR when emotional appeals are used. Therefore our moderating hypothesis is supported.

The second set of hypotheses dealt with design elements, namely color, animation, and interactivity. H2(b) suggests that there is a positive relation between the existence of animation and CTR. While we reject this hypothesis because of lack of directional support, the moderating role of ad context is obvious as illustrated in Figure 5. The interaction effect between context and animation is significant, and is illustrated in Figure 5. We see that animation lowers CTR in B2B ads, but increases CTR in B2C ads.

H2(c) suggests that interactivity increases CTR. While we reject this hypothesis because of lack of directional support, the moderating role of ad context is obvious as illustrated in Figure 6. It appears that interactivity actually lowers CTR, however in B2C ads the losses are far less than those for B2B ads. Additionally, the moderating hypothesis is supported by the ANOVA. Therefore we accept this moderating hypothesis.

To test the effect of color on CTR, we look to the ANOVA and find that color does have an impact on CTR. The difference in CTR between groups is indeed significant. We hypothesized an inverse U relation between color and CTR. Figure 4 shows the average CTR for

the different levels of color, and looking at the combined data (B2B and B2C ads), we do indeed see the inverse U relation that we hypothesized. Therefore we accept H2(a). Additionally, there is a moderating effect of ad context that we did not hypothesize. It is apparent in Figure 4 that color has a much stronger impact on B2B ads than it does on B2C ads. This is further supported by the interaction effect tested in the ANOVA.

Conclusions

After analyzing the click-through rates of a larger sample of banner ads, the main conclusion was that incentives, emotional appeals, and color play very different roles in banner ads based on their targeted audience. Further, animation and interactivity were not related to a higher click-through rate.

It is apparent that many of our main effect hypotheses were rejected because of a lack of directional support. This is a key finding because the hypotheses were developed from literature based largely upon traditional advertising. It is obvious that in many cases, online advertising does not operate in the same way as traditional advertising has. One possible reason for this is the lack of media planning in the online advertising industry. A certain level of sophistication in traditional media planning has been achieved to date. That is to say that it is highly likely that advertisements in traditional media have the benefit of proper placement and timing through the use of highly developed media planning models.

A variety of implications can be drawn from this research and its findings. Not surprisingly, ad context does play a role in both design of a banner ad and in the message content. However certain elements play a more central role than others. Certainly if you are creating banner ads for targeting consumers, the inclusion of incentives to click (coupons, free

trials, etc.) and emotional appeals should increase CTR. Animation, interactivity and color however seem unimportant in this context.

Future studies should look at other measures of banner ad effectiveness. Here we only look at click-through rates. Future studies may investigate the effectiveness of banner ads using experiments. Here we only have secondary data. We were not able to control all elements. Future research should investigate the relationship between the banner ad effectiveness and the website where it is placed. Such efforts will have implications for banner ad media planning.

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Table 1 – Independent Variables (PRL Interjudge Reliabilities)

	Content	Design
Cognitive	Incentives (0.99)	Interactivity (0.98)
Affective	Emotional Appeals (0.85)	Color (0.25) Animation (0.96)

Table 2 – Means of Independent Variables

	Animation	Incentives	Interactivity	Emotional Appeals	Low Color	Moderate Color	High Color
B2B Ad	29%	95%	36%	55%	4%	42%	53%
B2C Ad	27%	92%	37%	54%	5%	37%	58%
significance	p<0.1	p<0.001	ns	ns	p<.01	p<.01	p<.01

Table 3 – Click-through Rates by Independent Variable

<i>Variable</i>	<i>Present</i>		<i>Not-Present</i>
<i>Animation</i>	1.92%		2.10%
<i>Incentives</i>	1.88%		3.79%
<i>Interactive Elements</i>	0.98%		2.69%
<i>Emotional Appeals</i>	1.97%		2.15%
	Low	Moderate	High
<i>Color Level</i>	2.34%	3.27%	1.24%

Table 4 – ANOVA for testing Moderating Effect of Ad Context

Source	F
Incentives x Ad Context	11.196**
Emotional Appeal x Ad Context	19.680**
Color Level x Ad Context	24.642**
Animation x Ad Context	7.524**
Interactivity x Ad Context	33.286**

