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# A Study of the Effects of Online Advertising: A Focus on Pop-Up and In-Line Ads

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## ABSTRACT

Pop-up, pop-under, and in-line ads have been said to be intrusive, and previous findings suggest that they could have important effects on user perception and cognition. Using a 2x2 factorial design, this experimental study examines the effects of those ads. Besides a control group without ads, factors included ad placement (pop-up vs inline) and ad congruence (with the site's content or not). Results indicated that intention to return was impaired by ads; retention of website information was higher when ads were inline or when ads were not congruent with website content; and retention of ad content was higher for inline ads and those that were not congruent to the content of the website. However, contrary to expectations, intentions to return were not affected by ad placement, retention of site content was not affected by the existence of ads, and intrusiveness of ads was not affected by ad congruence.

## Keywords

Electronic commerce, advertising, website design, intentions, retention.

## INTRODUCTION

Several studies have reported that consumers despise advertisements, especially those that pop up or under a site, and sometimes feel “violated” and “molested” by their presence (Wegert, 2002).

Ad intrusiveness has been recognized as a leading cause of annoyance (Bauer & Greyser, 1968). Although Rust and Varki (1999) predicted ads in new media to be less intrusive, Li et al. (2002) report that online consumers are goal-oriented and perceive online ads as even more intrusive than those in other media, leading to negative attitudes, and impairing intentions to return to the site. In this research, we (1) examine the effects of online advertising, (2) investigate whether the particular type of ad affects consumers' levels of retention of website and

ad content and consumers' perceived intrusiveness of the ad, and (3) look at whether the congruence of ad content (with the hosting site) affects these same variables.

## BACKGROUND

Early banner ad studies found them effective in creating brand awareness and positive attitudes (Briggs & Hollis, 1997). However, more recently, internet advertising has been deemed nonsensical, uninformative, forgettable, and ineffective (Bulik, 2000). Jupiter (1999) found that 69% of those surveyed consider pop-up ads annoying and 23% said they would not return to the site because of the ads.

## Theoretical Basis in E-Commerce

The attitude-toward-the-ad theory based in marketing communications and advertising research has an extensive following (e.g., Bruner & Kumar, 2000). Studies have examined online advertising consumer attitudes, behavior, and perceptions, finding that consumers develop such negative attitudes towards the ads that they avoid them when possible. These negative attitudes affect brand perceptions (Mackenzie & Lutz, 1989), and lead to ad avoidance (Abernethy, 1991).

Some researchers expected ads in new media to be less intrusive (Rust & Varki, 1996) or even entertaining (Coyle & Thomson, 2002), but Reed (1999) found on-line ads disturbing to users. Irritation has been studied extensively in traditional media (Greyser, 1973) and can be caused by tactics that consumers perceive as annoying, offensive, or insulting. In addition, interruption was found to negatively affect consumers' attitudes towards the ads (Rettie, 2001). In-line ads to some extent blend into the web pages on which they are displayed, while pop-up ads, on the other hand, are designed to interrupt; perhaps explaining their intrusiveness.

## Theoretical Basis in Psychology Research

The intrusiveness might also be explained by cognitive psychological models of attention and attendant effort required to process additional information, which can account for performance and affective differences. That is, irritation can result from exposure to stimuli not contributing to the task at hand. Perhaps even more interesting and important is the role of congruence of the content of that additional information.

“Dual-process theories” (e.g., Smith & DeCoster, 2000) in Cognitive Psychology suggest that a person recognizes and internalizes general regularities with one process, but requires a second, more conscious and effortful process to form representations of unique or novel events.

Applying a dual-process theory of person-perception to web advertising is the task of this study. While there are fewer opportunities to form stereotypical caricatures of a website as we do of people, we do formulate impressions of a site (Everard, 2003), and have a range of involvement with sites. In applying the dual-process model to web ads, we assume that when a web search task leading to an important goal is performed, the task will be perceived as motivationally relevant, even if for a brief time.

## Behavioral Intentions

From the standpoint of web-advertising research, on-line consumers are goal-oriented and perceive ads to be even more intrusive than when they are viewed in other media (Li et al. 2002). These negative attitudes can affect brand perceptions (MacKenzie & Lutz, 1989) and lead to ad-avoidance (Abernethy, 1991). A dual-process theory would predict that users prefer to avoid more effort-intensive processing caused by additional, peripheral information (Smith & DeCoster, 2000). Thus:

*H1. The presence of ads (of any kind) on a website will result in weaker intentions to revisit the site than websites without ads.*

Recent research (Chan, Dodd & Stevens, 2004) on attitudes about pop-up ads indicates a “strong and intense dislike for pop-up ads, resulting in a negative attitude towards the website itself and the brand owner” (p. 2).

In one study, banner ads were better received than pop-ups, and users felt better about companies using banner ads than pop-ups (Denes, 2001). Interference was an explanation; 84% of respondents stated pop-up ads interfere with their reading or using a Web page, while only 54% said banner ads interfere with their Web usage.

Again, a dual-process model would explain this expectation by focusing on the additional effort imposed by pop-up ads (Smith & DeCoster, 2000), which are peripheral to users’ main tasks. Hence:

*H2. Behavioral Intentions will be more positive when Ads are provided in-line compared to when they are imposed in a Pop-Up format.*

## Retention of Website Content

An important goal of site design is that users will retain the content, to promote subsequent visits and/or referrals to other potential visitors. Ads compete for attention and raise cognitive effort, whether reading or avoiding them, interfering with use of the site and reducing the likelihood of retaining the site’s content. The more mental energy extended to non-website material, the less retention of website content can be expected:

*H3. User retention of website material will be higher for sites without ads than for sites with ads.*

There is a negative impact of interruptions on emotion and well-being, leading to increases in effort (Zijlstra, Leonara & Krediet, 1999). Although any ad can be an interruption, one that requires a user action to remove it, like a pop-up ad, will cause an increased effort expenditure (Chan et al., 2004), reducing retention of website content. Because an in-line ad requires less interruption and mental energy than a pop-up ad, we expect higher website retention levels in those subjects receiving in-line ads as compared to pop-up ads:

*H4. User retention of website material (when Ads are present) will be higher for sites with in-line ads than for sites with pop-up ads.*

It is important to recapitulate the assumption of motivational relevance described above. The person-perception results of Hastie and Kumar (1979) imply that if a site is perceived to lead to an important goal, retention is more likely to occur when advertising material is not congruent with that of the rest of the site than when it is congruent. Interestingly, if the site does not lead to an important goal, retention is more likely when encountering non-congruent material. As described below, in this study we do not address momentary or otherwise superficial browsing, and therefore, hypothesize that non-congruence will be more memorable. Our burden will therefore be to develop an experiment that contains this relevance, in supporting:

*H5. User retention of website material (when Ads are present) will be higher when Ads are non-congruent than when Ads are congruent.*

## Retention of Ad Content

Common sense tells us that ads that are most visible will be remembered. However, deeper consideration reveals that while pop-up ads are more interruptive than in-line ads, requiring a user to act to remove them, they appear on the screen for a shorter time period because users tend

to close them immediately. Because so many users only focus on the “x” in the upper-right corner of the window (Chan et al., 2004), pop-up ads appear for only a brief period of time and in-line ads remain visible for a much longer period, raising the likelihood that users will see them in their peripheral vision, increasing user retention of the ad content. More formally stated,

*H6. User retention of web ad content will be higher with in-line ads than pop-up ads.*

Following the same logic as the site content hypotheses, user retention of ad content is expected to be higher when ads are not congruent with the product content, again assuming that the task is motivationally relevant to users. That is, people will attend to the ads more, trying to reconcile them with the content in some way.

Users are particularly irritated by pop-up ads that are not related to the site (Chan et al., 2004). We consider the irritation and anger to represent more attention (i.e., cognitive processing) by the user, and thus, ads that irritate users further increase the likelihood that non-congruent ads will be more memorable. Therefore:

*H7. User retention of web ad content will be higher when ads are not congruent than when ads are congruent with content in the rest of the site.*

#### **Perceived Intrusiveness of Ads**

Ads that interfere with users’ primary tasks will be intrusive, especially when interference is disturbing (Li et al., 2002). Users are particularly frustrated by ads that obstruct information, like pop-up ads, because they are an unwanted interruption (Chan et al., 2004) and require more attention and effort. Users feel imposed upon because they have no choice but to act in order to remove the ad (Benitez, 2002):

*H8. Pop-up ads will be perceived as more intrusive than in-line ads.*

However, not all ads are viewed with the same level of intrusiveness. Lee & Lumpkin (1992) found that ad avoidance is moderated by the degree to which people view ads as containing useful information. Ads that contain information perceived as useful are less irritating (Pasadeos, 1990). Users are particularly irritated by ads that are not related to the site, as they perceive no real or useful reason for ads to be there (Chan et al., 2004).

This expectation might seem on the surface to fly in the face of previous hypotheses about recall and motivational relevance, however, a closer review will reveal that while the additional effort required will lead to more effective recall of non-congruent information, effort represents an undesirable increased cost of browsing. Thus:

*H9. Website ads that are congruent with site content will be perceived as less intrusive than ads that are not congruent with site content.*

#### **RESEARCH METHODOLOGY**

A 2x2 factorial design was employed, where the factors included ad placement (pop-up or in-line) and congruence.

#### **Operationalization of Variables**

An artificial website was created for the experiment similar to one used in previous research (Galletta, et al 2004). This site contained images, prices, and descriptions of products and product categories. The products were those that would be carried by a “general store,” and included food, health care, and household products.

Six original ads and slogans were created for each of the congruent and non-congruent treatments. Existing ads were avoided to prevent prior experience from contaminating our results. All were presented either in a pop-up window or within the page presented to users.

Congruent ads were displayed during the appropriate search task to appear logical (i.e., congruent) with each task. A non-congruent ad featured an advertised product that had no relationship to the product in the search task. Each ad was placed on one of 6 strategically-chosen pages that were on a path users would follow to reach the goals of their search tasks.

All ads appeared in the same place on the page, toward the right side as found in many high-traffic sites. No text was obscured when a page contained an ad, in the conventional style of in-line ads. In practice, many pop-up ads do obscure text, but we chose to control placement precisely and vary only the existence of the separate window of a pop-up ad.

#### **Dependent Variables**

**Behavioral intentions** were measured using the total of four questions that focus on two related future behaviors: how readily the subject would visit the site again and how likely he or she would recommend that others visit the site (7-point scales) (Alpha = .94).

**Intrusiveness** of the Ad was measured using a 7-item subscale of a larger instrument by Li et al. (2002). The items were asking respondents to indicate how they felt about the ads. The terms used were “distracting,” “disturbing,” “forced,” “interfering,” “intrusive,” “invasive,” and “obtrusive” (Alpha = .96).

**Retention** was measured by asking participants what they remembered from the site and from the ads they saw. True/false and multiple choice questions were used. By measuring recognition rather than recall, we eliminated the need to make judgments about “partial credit.”

For site retention, factual issues collected from the 9 tasks were used, and the score was the total number of facts retained. For ad retention, 18 true/false items asked subjects to check each ad seen. The score was adjusted for accounting for false positives.(maximum score=18).

### Subjects and Procedure

Undergraduate students enrolled in two U.S. universities and one Mexican university were invited to participate in the study, and 417 volunteer undergraduate business students were assigned to conditions at random. Subjects were provided with an incentive to participate. A laboratory tightly controlled the subjects' environments.

The task consisted of searching for information on nine products contained in a store-simulating website. After browsing the site and completing the searches, subjects opened a new browser window for the survey.

### RESULTS

H1 predicted that behavioral intentions would be more positive for subjects who were not exposed to ads of any kind. This hypothesis was supported ( $t=2.35$ ; 534 df;  $p<.009$ ). Note that this and all other p values in this paper were derived from one-tailed tests. All other factors being equal, (controlling for all other effects), subjects who were not exposed to ads were more likely to return or recommend the site to others.

H2 predicted that behavioral intentions would be more positive for participants who were exposed to in-line ads as compared to those who were subjected to pop-up ads, but the means did not differ. H2 was not supported.

H3 predicted that retention of site content would be higher without ads than with ads. H3 was not supported.

According to H4, retention of website material was expected to be higher for participants who were exposed to in-line ads than for those exposed to pop-up ads. H4 was supported; subjects exposed to in-line ads remembered about 3.4% more of the material in the site than those exposed to pop-up ads ( $t=-2.027$ ; 278 df;  $p<.022$ ).

H5 predicted that retention of website material would be higher for subjects exposed to non-congruent ads than for those exposed to congruent ads. The test supported that prediction, and showed that those exposed to non-congruent ads remembered about 3.5% more of the website material than those exposed to congruent ads ( $t=2.61$ ; 413.2 df;  $p<.005$ ).

H6 addresses retention of ad content, and predicted that retention of ad content would be higher for in-line ads than for pop-up ads. Indeed, ad retention was significantly higher for in-line ads ( $t=-2.293$ ; 265.6 df;  $p<.012$ ).

H7 also concerns retention of ad content, predicting that such retention would be higher for participants who were exposed to ads that were not congruent with website content than for those who were exposed to congruent ads. The results supported this hypothesis, favoring non-congruent over congruent ads ( $t=2.08$ ; 415.2 df;  $p<.019$ ).

H8 asserts that pop-up ads are more intrusive than in-line ads. As expected, pop-up ads were significantly more intrusive than in-line ads ( $t=3.478$ ; 277.96 df;  $p<.001$ ).

Finally, H9 posits that ads that are not congruent with site content are more intrusive than ads that are. The means were not significantly different.

### DISCUSSION

Clear support is provided for an assertion that users will adopt more negative behaviors when a site displays ads than when the site does not.

It is clear that ads do seem to interfere with retention of site content, and features of ads also have important effects on retaining both site and ad content. In-line ads permit both site and ad content to be remembered more clearly than pop-up ads, which is most interesting because it suggests that the action of closing the ad window distracts users from the site, and further, it is visible for a shorter time. When ads are markedly different from the content of the site, they theoretically stimulate more effort as users work toward an important goal, and users remember more about both the website and the ad. It is interesting to note that these effects are simultaneously rather small and consistent.

Finally, it is also clear that pop-up ads are considered to be more intrusive than in-line ads. Users seem to prefer not to be interrupted from their searching task, diverting their attention towards closing the pop-up windows containing the ads.

### CONCLUSIONS AND FUTURE RESEARCH

The findings suggest that ads do have significant effects on retention of the on-line experience. The mere existence of ads decreases retention of both site and ad content. Pop-up ads reduce a person's retention of both site and ad content more severely than in-line ads. Also, advertising content that is non-congruent with the site's content seems to lead to greater effort in reconciling the differing content, and ultimately greater memory of both the website and the ad.

Intrusiveness is also important for both website designers and advertisers. Pop-up ads seem to be more intrusive than in-line ads, implying that users should not be interrupted from their online tasks to close the extraneous windows.

Future research is particularly rich in this area. Focusing on other factors, such as trust and attribution, could reveal

interesting findings and explain more thoroughly the findings of this study. In addition, introducing different ad types and locations could demonstrate differential impacts on users. For example, varying the size and location of ads and controlling for all other factors could isolate whether retention can be explained more by size or location. Finally, other cultures can be examined to see if there are systematic differences that apply to other countries.

## REFERENCES

1. Abernethy, Avery M (1991) Differences Between Advertising and Program Exposure for Car Radio Listening, *Journal of Advertising Research*, Apr/May, 31, 2, 33-43.
2. Bauer, R.A., & Greyser, S.A (1968) Advertising in America consumer view. Boston, MA: Harvard University Press.
3. Benitez, Tina (2002) Pop-ups fizzle in a flash, *Incentive*, 176, 11, 14.
4. Briggs, Rex and Nigel Hollis (1997) Advertising on the Web: Is There Response Before Click-Through?, *Journal of Advertising Research*, 37, 2, 33-45.
5. Bruner, G.C. and Kumar, A. (2000) Web commercials and advertising hierarchy-of-effects, *Journal of Advertising Research*, January/April, 35-42.
6. Bulik, B. (2000) Blah, blah, boring, boring, *Business 2.0*, 20 November.
7. Chan, Anne, Dodd, Jon, and Stevens, Robert (2004) The efficacy of pop-ups and the resulting effect on brands, White Paper by Bunnyfoot Universality, Jan 1, [http://www.bunnyfoot.com/bunnyfoot\\_popup.pdf](http://www.bunnyfoot.com/bunnyfoot_popup.pdf).
8. Coyle, J.R., & Thomson, E. (2001) The effects of progressive levels of interactivity and vividness in Web marketing sites, *Journal of Advertising*, 30, 3, 65-77.
9. Denes, Shary (2001) Thumbs down for pop-up ads, *Rural telecommunications*, July/Aug, 20, 4, 9.
10. Everard, A. (2003) The Effect Of Presentation Flaws In On-Line Stores' Web Sites On Perceived Quality And Consumer Trust Of The On-Line Store And Intention To Purchase, unpublished doctoral dissertation, University of Pittsburgh.
11. Galletta, D., Henry, R., McCoy, S. and Polak, P. (2004) The direct and interactive effects of web site speed, familiarity, and breadth on user attitudes, behavioral intentions, and performance, *Working paper*.
12. Greyser, S.A. (1973) Irritation in advertising, *Journal of Advertising Research*, 13, 1, 3-10.
13. Hastie, R., & Kumar, P.A. (1979) Person memory: Personality traits as organizing principles in memory for behaviors, *Journal of Personality and Social Psychology*, 37, 25-38.
14. Jupiter Research (1999) Inside the mind of the online consumer -- increasing advertising effectiveness, by Johnson, M., Slack, M., & Keane, P. *Jupiter Research* at <http://www.jupiter.com>, 18, Aug. 19, 1999.
15. Lee, Seonsu & Lumpkin, James R. (1992) Differences in attitudes toward TV advertising: VCR usage as a moderator, *International Journal of Advertising*, 11, 4, 333-343.
16. Li, Hairong, Edwards, Steven M., and Lee, Joo-Huyn (2002) Measuring the intrusiveness of advertisements: Scale development and validation, *Journal of Advertising*, 31, 2, 37-47.
17. MacKenzie, Scott B & Lutz, Richard J (1989) An Empirical Examination Of The Structural Antecedents Of Attitude Toward the Ad in an Advertising Pretest Context, *Journal of Marketing*, Apr, 53, 2, 48-65.
18. Pasadeos, Y. (1990) Perceived informativeness of and irritation with local advertising, *Journalism Quarterly*, 67, 1, 35-39.
19. Reed, Matthew (1999) Going beyond the banner ad, *Marketing*, April 29, 25-26.
20. Rettie, R. (2001) An exploration of flow during Internet use, *Internet Research: Electronic Networking Applications and Policy*, 11, 2, 103-13.
21. Rust, R.T. & Varki, S. (1996) Rising from the ashes of advertising, *Journal of Business Research*, 37, 3, 173-191.
22. Smith, E.R. and DeCoster, J. (2000) Dual-Process Models in Social and Cognitive Psychology: Conceptual Integration and Links to Underlying Memory Systems, *Personality and Social Psychology Review*, 4, 2, 108-131.
23. Wegert, Tessa (2002) Pop-up Ads, Part 1: Good? Bad? Ugly? 14 March, [http://www.clickz.com/experts/media/media\\_buy/article.php/991121](http://www.clickz.com/experts/media/media_buy/article.php/991121) last accessed 9 July 2004.
24. Zijlstra, Fred, Roe, Robert, Leonora, Anna, and Krediet, Irene (1999) Temporal factors in mental work: Effects of interrupted activities, *Journal of Occupational and Organizational Psychology*, June, 72, 163-185.