A RATIONAL CHOICE THEORY APPROACH TOWARDS A CAUSAL MODEL OF ONLINE ADVERTISING INTRUSIVENESS AND IRRITATION

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Abstract

Internet advertising has grown substantially, and represents the second-largest destination of advertising dollars in the USA. While those data are more difficult to find in other countries, it is expected that the future is similarly bright for the online advertising industry world-wide. This study proposed and tested a causal model that predicts (1) both intentions to return to the host site and recommend the site to others and (2) performance in successfully completing information retrieval tasks on a website. Those two ultimate dependent variables are, in turn, predicted by a user’s feelings of irritation and ad intrusiveness, which are, in turn, predicted by attitude toward the ad and repeated exposure of the ad. In a study involving 420 students, six of the eleven hypothesized relationships were supported: attitude toward the ad predicted intrusiveness; intrusiveness predicted irritation, intentions, and task performance; and both irritation and performance predicted intentions. The model explains 50% of the variance in irritation, 5% of the variance in intrusiveness, 1% of the variance in performance, and 21% of the variance in intentions, providing mixed support for the model.

Keywords: Rational Choice Theory, e-commerce, advertisements, irritation, intrusiveness, website quality.
1 Introduction

In 2011, internet advertising revenues in the United States (where statistics are most readily available) rose an annualized 23% to $14.9 billion (iAB, 2011). This follows a growth rate of 15% to $26 billion for all of 2010. Not only was growth in 2011 strong, but it follows many years of quite consistent year-over-year increases in spending since internet advertising began. eMarketer (2011a) estimates that growth will continue to increase substantially through 2015, where it will reach $49.5 billion. Further, statistics from eMarketer (2011b) show that it is also striking that as of 2010, internet advertising is the second-largest category in overall advertising expenditures, expected to reach $68 billion in 2015. Online advertising already exceeds ad spending in newspapers, radio, and magazines, and is expected to be within $4 billion of those three categories combined in 2015. The promising growth rates and positive performance of interactive advertising are strong indicators that online advertising is perceived to deliver tangible results to those who invest in it.

It is important, however, to recognize that online advertising is still in its infancy, only beginning its ascent in the mid- to late-1990s (iAB, 2011), while advertising in other media has decades of seniority over internet advertising. Over the years, there have been complaints about television advertisements, but they have persisted, and even increased, over the years. Simmons (2010) reports that more television ads per hour are being broadcast than ever before. He reported that television shows filled 51 minutes per hour in the 1960s, while today the shows fill only 42 minutes per hour. The rest of the minutes are filled with advertisements.

Previous research (reviewed in McCoy et al., 2008) discussed the unique nature of advertising online compared to advertising in other media. One of the most enlightening early studies by Li, Edwards, and Lee (2002) reported that internet users are “goal-directed” and find advertisements to stand in the way of those goals. Whether the goal is for shopping, education, or entertainment, a user must navigate to reach that goal and encounters advertising along the way. Li et al. concluded that anything blocking or slowing progress to the goal is likely to cause strong feelings of intrusiveness.

Most people see advertisements several times even during a single online session. Striking in its absence in the online advertising literature is the amount of repeated exposure that is often encountered. Belch and Belch (1984) found that, averaging across different TV ad types, both irritation and memory of the ad message grew significantly when the number of ad repeats increased from 1 to 3 to 5. We do not have a similar study in the area of online advertising.

This study builds on previous studies in online advertising by raising a similar question about how repetition affects outcomes in an online environment. Does repeated exposure affect attitudes towards an on-line ad? Does repeated exposure lead to feelings of intrusiveness? Does it lead to higher performance in remembering the ad? Do the effects of repeated exposure and attitudes pass through intrusiveness, through irritation, to user intentions and higher performance in remembering the ad?

The next section reviews the relevant literature as well as develops the model that we test; the third and fourth sections outline the methodology used in this research and the analysis conducted, respectively. The penultimate section includes the discussion of our analysis and results, and the sixth and final section provides some conclusions and potential future research avenues for this stream of research.

2 Literature Review and Model Development

Because this study does not take the single perspective of the advertiser or the web host site, our aim is two-fold: to propose and test a causal model that predicts both intentions to return to the host site and
performance in completing information-seeking tasks on websites. Those two ultimate dependent variables are in turn predicted by irritation and intrusiveness, which are in turn predicted by attitude toward the ad and repeated exposure of the ad. The model is portrayed in Figure 1.

Some relationships in this model have been covered in previous studies (Li et al., 2002; McCoy et al., 2008), and the theory behind those relationships has been established. In this paper, newly proposed theory is now the focus.

Figure 1. Theoretical Model.

2.1 Theoretical Basis in Rational Choice Theory

Rational choice theory, a framework for understanding social and economic behavior, figures prominently in microeconomics models and analysis of human decision-making. The term ‘rational’ in rational choice theory is defined as an individual’s decision to act as if balancing costs against benefits to maximize personal advantage. This differs somewhat from the more common use of the term to mean ‘sane’ or ‘in a thoughtful clear-headed manner.’ The rationality of organizational decision-making processes also figures extensively in organization theory (Eisenhardt and Zbaracki, 1992; March, 1978). Former studies using this theory explored the effects of external and internal variables on the espousal of decision-making processes (Eisenhardt and Bourgeois III, 1988).

2.2 Model Development

From the perspective of the advertiser, the purpose of online advertisements is to attract the attention of web users (Ha, 1996). Even though perhaps distracted from the editorial content of the website, users may nonetheless exhibit positive feelings towards the online advertisement. This may occur because an ad is attractive, it provides a welcome diversion, or it offers a brief reprieve. In such cases, the positive attitude toward the ad will translate into a lesser perceived sense of intrusiveness than an ad that is considered purely a negative interruption.

Typically, users negatively perceive ads that interrupt their train of thought. In such cases, users expend additional effort processing the ad information (Bailey et al., 2001; Treisman, 1988); thus their attention is removed from their goal of understanding the editorial content. This can be explained by utility theory in that the user will perceive the ad to be intrusive if the marginal utility of viewing the ad is less than the distraction the ad affords. Therefore, we propose the following hypothesis:

\[ H1: \text{As user attitude towards an ad becomes more negative, perceived intrusiveness increases.} \]
The number of times that a user is exposed to an ad is another factor that may affect the perceived intrusiveness of the ad. An online ad is designed to distract the user and captivate his or her attention. The more often that a user’s attention is taken away from the primary tasks at hand, the more intrusive the ad will be perceived by the user. Repeated exposure to a particular advertisement will add little to no benefit at increased cost (interruption). Hence:

**H2a:** As the frequency of exposure to the ad increases, perceived ad intrusiveness increases.

As a competing hypothesis, we posit that by being repeatedly exposed to an ad, it becomes more familiar. The mere exposure effect poses that more familiar attitude objects are more liked than less familiar ones (Zajonc, 1968), which has been extended to the online environment for brands (Lowry et al., 2008). We would thus expect that increased exposure to an ad would increase its familiarity and thereby make it more favorable than other ads that are less familiar to the website user.

**H2b:** As the frequency of exposure to the ad increases, the attitude towards the ad increases.

The following two hypotheses deal with the moderating effect of ad exposure on relationships of attitude towards the ad with both perceived ad intrusiveness and perceived user irritation. Given the user attitude toward the ad, the level of exposure (or number of times a user is exposed to an ad) is expected to amplify the perceived intrusiveness of the ad. Similarly, the level of exposure of the ad is expected to amplify the degree of user irritation, given the user’s attitude towards the ad. In other words, repeating a disliked ad will amplify the irritation (H5) and intrusiveness (H6) felt by a user.

**H3:** Keeping the attitude towards the ad constant, the more exposure to the ad by the user, the more perceived ad intrusiveness.

There has been documented evidence of a relationship between perceived ad intrusiveness and user irritation (Li et al., 2002; McCoy et al., 2008). Even in traditional media, research has shown that when ads are perceived as intrusive, users feel a sense of irritation (Krugman, 1983, Soldow and Principce, 1981). The main reason that users feel irritation is because of the sense of interruption (Aaker and Bruzzone, 1985).

**H4:** There will be a direct positive relationship between perceived ad intrusiveness and user irritation.

**Behavioral intentions** in this study capture how readily the user would visit the site again and how likely the user would recommend that others visit the site. Using rational choice theory, one would postulate that the cost of irritation when exposed to the ads is less than the benefit derived from visiting the site. Therefore, based on an increased level of irritation felt by the user, we hypothesize that the user will not likely revisit the site and the less likely users will recommend the site to others. Based on the rational choice theory:

**H5a:** There will be a direct positive relationship between ad intrusiveness and behavioral intentions.

**Performance** in this study is defined as the extent to which subjects were able to recall website content. The presence of ads on a website interferes with a user’s goal of completing tasks and takes the user’s attention away from the website content. Even if the user ignores the ad, the user’s cognitive effort is increased, and the likelihood that the user will remember the website content is diminished (Petty et al., 1983). The more mental energy that a user expends on viewing non-website content, the less one can expect the user to recall the website content. This may even be more pronounced the more the user finds the ad intrusive since it will then require even more mental energy to focus on website content. Thus,

**H5b:** Higher levels of perceived ad intrusiveness will be associated with negative user performance.

Users who experience irritation with an online advertisement will trigger negative user behavioral intentions. For example, users who exhibit increased irritation will be less likely to revisit the site and
will be less likely to recommend the site to others. This can be supported by rational choice theory because the cost of visiting the site and being exposed to the online advertisement hence being irritated by the exposure to the ad is greater than the benefit accrued from visiting the site. Therefore, an increased level of user irritation will lead to negative behavioral intentions.

**H6a: There will be a direct negative relationship between user irritation and behavioral intentions.**

A user’s irritation due to the presence of an ad is often associated with the user’s sense of being interrupted. User emotions and well-being may be negatively impacted (Zijlstra, Leonara and Krediet, 1999) and henceforth may require an increase in effort to focus on website content. We postulate that a user’s feelings of irritation and anger translate into higher required levels of cognitive processing and, as a result, users are less likely to remember the website content.

**H6b: Higher levels of perceived user irritation will be associated with negative user performance.**

Again, building on utility theory, and the work of Li et al. (2002), we posit that increased exposures to an ad will serve as impediments to the website users’ goals, and will thus be perceived as high cost and low utility. Further, because users tend to ignore advertisements, we expect that the users will only see the ads as an obstacle rather than an object to read. In fact, many of our subjects in a previous study stated that they did not even look at the ads at all. We thus expect that the performance of the website user will be decreased as some cognitive resources become distracted by the continued stimuli presented through the advertisement (Petty et al., 1983).

**H7: As the frequency of the exposure to the ad increases, successful information retrieval (i.e., performance) decreases.**

Finally, higher performance in remembering ads is expected to lead to higher intention to return to the site. It is postulated that users who attend to detail when seeing the ads will also attend to detail when reviewing the site itself. Greater attention to detail in the site itself will reveal with greater salience the features of the site, increasing intentions to return. Greater recognition of what is offered by the site will increase marginal benefits in returning to the site, thus increasing its utility. Hence, our final hypothesis postulates:

**H8: Higher levels of performance in remembering advertisements will be associated with greater intentions to return to the site itself.**

### 3 Methodology

The study was conducted in an experimental setting to control the location and frequency of the advertisements, as well as to allow measurement of all of the outcome variables. The use of a real website and ads with real products were intended to make the experiment as realistic as possible.

Twelve advertisements designed by the researchers were created using actual products and inserted into specific locations within the website structure. Original ads on the familiar products needed to be created to fit a standard size and style. The ad type chosen was an in-line ad. Each ad appeared at the same location, at the top of the page, for all subjects. No text was obscured when a page contained an ad, which is conventional for in-line display ads (McCoy et al., 2008). The location of the ads in the website was chosen so that each participant who successfully completed the experimental tasks was guaranteed to be exposed to all twelve ads. Only one ad was placed along the path for each of the selected tasks to minimize interference of ads with each other. Two computer store websites were used, mirrored on local servers and modified to deliver each treatment.

Of the the two independent variables used in this study, one was manipulated and one was collected from subjects. The frequency of individual ad displayed (four levels: 1, 4, 8, 12) was manipulated. Attitude towards the ad was collected from the subjects at the end of the data collection portion of the experiment, after subjects were shown ads they had viewed during the experiment, on a scale of 1 to 7.
The dependent variables (intrusiveness, irritation, and behavioral intention) were used as they have appeared in previous research. Performance was measured by retention of website content, using factual references from the search tasks completed by the subjects during the experiment. All measures were taken from established sources without any modification. The full list of measures used in assessing dependent variables can be found in Appendices A and B. Here, we briefly summarize their main characteristics.

**Behavioral Intentions.** Behavioral intentions were measured using four questions that focus on two related future behaviors (Galletta et al., 2006): 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).

**Intrusiveness of the Ads.** Intrusiveness of the ads was measured using a 7-item subscale of a larger instrument by Li et al. (2002). The 7-point Likert scale items captured subjects’ negative attitudes towards the ads.

**Irritation of Users.** Irritation felt by the subjects because of the advertisements was measured by five 7-point Likert items. The instrument was adapted by Li et al. (2002) from an original study by Wells et al. (1971).

**Performance.** Performance was determined by the extent to which subjects recalled website content. During the experiment, subjects were asked to complete a list of 12 search tasks. These search tasks involved searching the website for products characteristics like price, shipping weight, etc. At the end of the experiment, after answering questions related to the other dependent variables, subjects completed a list of multiple choice questions related to the site content they viewed during the search tasks.

The experiment was conducted in Chile, a focus country for several reasons. First, Latin America is one of the fastest growing areas in advertising. Second, Chile has one of the highest Internet penetration rates at over 50% (InternetWorldStats, 2010). Undergraduate students enrolled at one large Chilean university were invited to participate. Four hundred and twenty volunteer students performed several search tasks under conditions chosen for them at random. An incentive to participate was given in the form of a random drawing for MP3 players and gift cards. The experiment was conducted in two closed rooms in the campus computer lab with each room containing 40 identical computers.

### 4 Analysis

Prior to testing our model, we conducted data validation according to the latest standards to test factorial validity, multicollinearity, common-method bias, and construct reliabilities. We found evidence of factorial validity and high construct validities of the instruments through both convergent and discriminant validities. We also found that multicollinearity and common-method bias were not problems.

In summary, the results of our validation procedures show that our model data meets or exceeds the rigorous validation standards expected in IS research (Cenfetelli and Bassellier, 2009; Diamantopoulos and Siguaw, 2006; Gefen and Straub, 2005; Straub et al., 2004).

We used partial least squares (PLS) regression, using WarpPLS version 2.0 for model analysis because PLS, as a components-based SEM technique, is more appropriate for theory development than covariance-based techniques. (Chin, 1998; Chin, 2000; Chin et al., 2003; Gefen and Straub, 2005; Reinartz et al., 2009). Additionally, an analysis of the regression residuals revealed that several pathways exhibited curvilinear regression lines against the residuals within the model. WarpPLS is the only SEM tool that is able to use a fitted curvilinear regression line. We generated a bootstrap with 500 resamples. Table A2.5 provide the detail for the tested paths in our model. Our final model is shown in Figure 2.
5 Discussion

Although the two dependent variables have significant paths leading to them, the amount of explained variance differs greatly between them. While 21% of the variance in intention is explained by the model, only 1% of the variance in performance is explained by the model.

Six of the eleven hypotheses (each representing a predicted path) were supported by the sample. Table 1 summarizes the findings.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Prediction</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attitude towards the ad -&gt; Intrusiveness</td>
<td>Unexpected direction</td>
</tr>
<tr>
<td>2a</td>
<td>Repeated exposure -&gt; Intrusiveness</td>
<td>NS</td>
</tr>
<tr>
<td>2b</td>
<td>Repeated exposure -&gt; Attitude towards the ad</td>
<td>Supported</td>
</tr>
<tr>
<td>3</td>
<td>Repeated exposure moderates: Attitude towards the ad -&gt; Intrusiveness</td>
<td>NS</td>
</tr>
<tr>
<td>4</td>
<td>Intrusiveness -&gt; Irritation</td>
<td>Supported</td>
</tr>
<tr>
<td>5a</td>
<td>Intrusiveness -&gt; Intentions</td>
<td>Supported</td>
</tr>
<tr>
<td>5b</td>
<td>Intrusiveness -&gt; Performance</td>
<td>Supported</td>
</tr>
<tr>
<td>6a</td>
<td>Irritation -&gt; Intention</td>
<td>Supported</td>
</tr>
<tr>
<td>6b</td>
<td>Irritation -&gt; Performance</td>
<td>NS</td>
</tr>
<tr>
<td>7</td>
<td>Repeated exposure -&gt; Performance</td>
<td>NS</td>
</tr>
<tr>
<td>8</td>
<td>Performance -&gt; Intention</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Table 1. Summary of Findings

Surprisingly, the repeated exposures construct was not helpful in explaining any of the variables, with the exception of the attitude towards the treatment ad. This is unusual because the number of repeats was seen as a very likely source of intrusiveness, especially for ads that were seen in a negative light, but this hypothesis (H3) was not supported. It is interesting to note that although previous work (Belch and Belch, 1984) found that repeated ad exposure increased the likelihood of intrusiveness, it is possible that this finding may not hold for pop-up ads due to the ability of web-users to ignore such ads. Given that these ads often appear in the same locations, and in similar fashion, extant work on online ads does support this idea and indicates that website users eyes often skip over the areas that are
most likely to be favoured by ads (Pirolli et al., 2001). Attitude towards the ad significantly predicted intrusiveness, although only 5% of the variance in intrusiveness was accounted for.

At the other extreme, intrusiveness significantly contributed to irritation, intentions, and performance. Irritation predicts intention, and performance predicts intentions. Explained variance is quite diverse among the dependent variables. The model accounts for 50% of the variance in irritation and, as discussed above, 21% of the variance in intention and 1% of the variance in performance.

5.1 Contributions to Theory

The study demonstrates that rational choice theory can serve as a single theoretical base for several constructs in a causal model of online advertising intentions and performance.

The study fails, however, to demonstrate that repetition of online advertisements adds to the understanding of irritation or intrusiveness. It is likely that in an online context, users not only expect online repeated ads, but are able to successfully ignore the in-line ads entirely by “marking off” as neglected territory the location on the page that the in-line ads were displayed. The low explained variance in performance in remembering the ads seems to demonstrate that people at nearly all levels of irritation, intrusion, or feelings about the ads, equally remembered or forgot the ads. While there does not seem to be much of a cognitive effect, the behavioral effects of in-line ads seems to be quite striking, as they work through the affective parts of the model (attitudes, intrusiveness, and irritation).

A future study could more thoroughly test repetition by employing ads that obscure the page content or force users to wait until an ad is completed before they can see the desired page content. Such a study would determine if users can easily ignore inline ads. At the same time, performance in remembering the ads could be tracked to see if such ads would be more easily remembered.

5.2 Contributions to Practice

Practitioners should note that inline ads are so pervasive that they are nearly universally ignored, in spite of repetition. The good news for advertisers and web hosts is that they seem to have little effect on user irritation and intrusiveness—as long as they are displayed as inline ads. Other ad types might not have the same effects.

What is clear is that ads themselves should be designed to be “likeable” by viewers. While this study does not provide methods by which ad designers can assure favorable attitudes, this study does lead us to conclude that thorough testing of an ad before it is used can be valuable in reducing negative affective outcomes of the ads, and ultimately to raise the possibility that users will return to a site. While returning to a site is primarily a concern of the host itself, an advertiser will find a limited life on the site if users complain and do not return. An advertiser will also lose the base of viewers if their intentions never to return ultimately convert into actual avoidance behavior.

5.3 Future Research and Limitations

There are several limitations of this study. First, the subjects represent only one culture and might not be representative of users worldwide. Fortunately, the Chilean sample provides a welcome perspective beyond North America. Future research should expand the sample into other countries.

Also, as noted above, the inline ads might have been too easily ignored. A future study should vary the obtrusiveness of the advertisements to tease out their affective and behavioral effects.

The study was performed using a single method throughout most of the model. One construct, however, was an experimental manipulation, which lowers the worry of mono-method bias. Fortunately, that bias was tested and found not to be significant.
Finally, the study stopped at intention without measuring actual behavior in returning to the site or recommending it to others. This limitation is similar to that in many studies, and in our case it would be particularly difficult to couple an experiment with such behavior that would normally take place over a long period of time. Once the potency of the advertisement is calibrated to be more impactful in the model, a future study could perhaps collaborate with a host site, and track actual behavior using “cookies” to measure if users actually return to that site.

6 Conclusions

This study proposed and tested a causal model that predicts user intentions and performance in remembering ads that had been seen in the study by 420 Chilean student participants. The two ultimate dependent variables are in turn predicted by a user’s feelings of irritation and ad intrusiveness, which are in turn predicted by attitude toward the ad and repeated exposure of the ad. Seven of the fourteen hypothesized relationships were supported: the attitude toward the ad predicted intrusiveness; intrusiveness predicted irritation, intentions, and task performance; and irritation and performance both predicted intentions. The model explains 50% of the variance in irritation, 5% of the variance in intrusiveness, 1% of the variance in performance, and 21% of the variance in intentions, providing mixed support for the model.

Researchers can make use of this theoretical model based on utility and rational choice theories, and also develop new models using those perspectives. Practitioners should cease worrying about ill affective effects of inline ads, even if repeated, and instead find some way to develop ads that stimulate positive attitudes. Future research should focus on repeating more intrusive ads, replicating the study in other countries, and collaborate with a host site to induce such manipulations then assess affective outcomes along with actual behaviors.

References