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Short- and Long-term Effects of Online Advertising: Differences between New and Existing Customers

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Abstract

Online advertising has short- and long-term effects. Little is known, however, about which online advertising channel works best to address particular customer groups when short- *and* long-term effects, are taken into account. We look at the sales effect of search engine marketing (SEM), banner advertising, price comparison advertising (PCA) and coupon/loyalty advertising (CLA) on new and existing customers. Our analysis, which uses a sample of 2.8 million purchases, shows that SEM has the longest effect, followed by banners, CLA, and PCA. We find that CLA works better for existing customers than for new customers, whereas PCA works better to attract new customers.

Keywords: Online advertising effectiveness; Customer relationship management; Carryover effect; Time lag; Media selection; Customer segmentation

Introduction

To marketing researchers and practitioners, advertising effectiveness and accountability are topics of continuous interest (e.g., Clark 1999; McDonald 2010; Rust et al. 2004). Many studies have analyzed the parameters of advertising effectiveness by showing which advertisements work when, for which consumer, and under what circumstances (e.g., Shamdasani, Stanaland, and Tan 2001; Tellis et al. 2005). Researchers have shown that traditional advertising media, such as TV, radio and print, have both short-term and long-term effects (Naik and Raman 2003; Vakratsas and Ma 2005) and that long-term effects vary by type of advertising medium and can continue, as in the case of newspapers, for more than a week (Berkowitz, Allaway, and D'Souza 2001a). Moreover, advertising should be target group specific (e.g., in terms of the chosen advertising medium) in order to achieve the highest impact (Iyer, Soverman, and Villas-Boas 2005; Reutterer et al. 2006).

With the advent of the Internet and its growing importance as a place to do business, online advertising has become a topic of increasing interest to academic research (e.g., Ha 2008; Kim and McMillan 2008). In the past decade, Internet advertising has grown beyond simple banner advertising to include new advertising models and online channels (e.g., on-demand advertising such as advertising through search engines and price comparison Web site advertising) that make better use of the Internet's unique potential for interaction between consumer and advertiser (Rappaport 2007).

However, research on the effectiveness of these particular online advertising channels is still rare. Even though online stores are available 24/7 and online stores and online advertisements are only a click apart, it is not clear whether online advertising leads to immediate purchases or has an effect only in the long run. Online advertising is particularly characterized by a higher level of competition because millions of global Web sites compete for success in the same marketing area. Therefore it's necessary to retain existing customers and constantly acquire new customers, but it is unclear which online advertising channels have the strongest impact on each of those groups if long-term effects are taken into account.

Moreover, the online environment affords companies the opportunity to collect extensive information on existing as well as potential customers and there remain many unexplored opportunities to analyze this information in order to increase advertising effectiveness (Arora et al. 2008; Kukar-Kinney and Close 2010; Pazgal and Soberman 2008).

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The analysis of short- and long-term sales effects in combination with a target group-specific marketing mix has been hinted at but has yet to be addressed in academic research (Arora et al. 2008; Ha 2008; Rust et al. 2004). In fact, to the best of our knowledge, no research has taken time lags into account when looking simultaneously at the short- and long-term effectiveness of multiple online advertising channels for different target groups. As a consequence, inefficient allocation of a marketing budget may arise. Without attention to the carryover effects of advertising, the impact of long-term advertising channels (i.e., channels with weak short-term but strong long-term effects) will be systematically underestimated (Herrington and Dempsey 2005). By incorporating the time lags of online advertising into marketing-effectiveness models, researchers and practitioners can improve the timing of the elements of an advertising campaign to ensure that the maximum advertising impact occurs during and/or shortly before the advertised event.

In the present study we therefore address the following questions: What are the long-term and short-term effects of different online advertising channels on sales? How do those effects differ for existing versus new customers? Which advertising channels have the strongest impact on each of those target groups?

We develop hypotheses and test them using an extensive dataset of sales and advertising data obtained from a leading online platform for new, used, and antiquarian books. Books are the most purchased good on the Internet (Nielsen 2010) and numerous research papers have argued that books could yield results with considerable relevance to most industries (e.g., Moe and Yang 2009; Montgomery et al. 2004; Smith and Brynjolfsson 2001). The data span a period of one year, include more than 2.8 million purchases, and stem directly from the controlling systems of the company.

Having outlined the motivation for this article, we describe related literature and types of online advertising, and develop the hypotheses for our empirical research in the next sections. Then we describe the data, the research methodology, present the results of our study, and conclude by outlining the implications of our findings, limitations of the study, and opportunities for further research.

Related Literature

Previous studies have shown that advertising has immediate (short-term) and carryover (long-term) effects on sales (cf. Dekimpe and Hanssens 1995; Herrington and Dempsey 2005; Palda 1965). Bass and Clarke (1972) reveal that advertising's largest impact may not necessarily be in the initial moment but may occur after a certain time lag. Clarke (1976) is the first comprehensive meta-analysis of this literature stream and shows that the data interval between advertising exposures has a powerful influence on the duration of advertising effects with a bias that is smallest if the data interval is short and equals the purchase cycle (i.e., the time between two purchases).

In subsequent years, authors have focused their attention on factors that influence the sizes of time lags and long-term advertising effects. Berkowitz, Allaway, and D'Souza (2001b) find that radio has longer lagged effects than billboards and that billboards have longer lagged effects than newspapers (Berkowitz, Allaway, and D'Souza 2001a). Herrington and Dempsey (2005) show that, in most of the analyzed cases, local advertisements have a longer-lasting effect than national advertisements. Osinga, Leeflang, and Wieringa (2010) demonstrate that advertising can have persistent effects on sales so that marketing models should either accommodate those effects or be applied to mature brands and markets. Breuer, Brettel, and Engelen (2011) is the first study that looks at the long-term effects of several online advertising channels. The authors show that emails have the longest effect, followed by banner and price comparison advertising, but they do not distinguish between different customer groups. More details are available in Table 1.

Over the same period, authors have used ever more advanced econometric approaches to analyze the time series of advertising and sales, starting with autoregressive processes and the Koyck transformation (e.g., Bass and Clarke 1972; Palda 1965), followed by vector autoregressive models (Dekimpe and Hanssens 1995) and Kalman filtering (Naik and Raman 2003). The most recent approaches include direct aggregation techniques and grid searches (Berkowitz, Allaway, and D'Souza 2001a; Herrington and Dempsey 2005) that make it possible to estimate different individual time lags for each advertising channel.

The second literature stream that is important for this study deals with customer segmentation. Previous studies have shown that firms can increase profits by differentiating between various customer groups (e.g., Iyer, Soverman, and Villas-Boas 2005; Reutterer et al. 2006; Zeithaml, Rust, and Lemon 2001). To do so firms use different approaches ranging from segmentation based on purchase volume (Lacey, Suh, and Morgan 2007; Rust and Verhoef 2005) to highly sophisticated customer relationship management (CRM) systems based on IT systems with various customer information (Becker, Greve, and Albers 2009).

One important element of customer segmentation is target group-specific advertising because, as many studies have shown, the application of marketing instruments should depend on the customer's relationship to the company (Bolton, Lemon, and Verhoef 2004; Garbarino and Johnson 1999; Homburg, Droll, and Totzek 2008; Verhoef and Donkers 2005). In practice, most attention has been given to retaining existing customers e.g., by targeted CRM interventions designed to influence segments of the customer base (East, Hammond, and Gendall 2006). One instrument is the use of different marketing instruments for new versus existing customers, although it is a challenge to divide marketing expenditures between the two groups because it is often not clear how much advertising expenditure serves the cause of customer acquisition and how much supports retention (Blattberg and Deighton 1996; Reinartz, Thomas, and Kumar 2005). Moreover, there is only limited knowledge regarding the effectiveness of different marketing tactics upon specific customer groups (Peng and Wang 2006).

In order to improve overall marketing performance it is necessary to understand the target group-specific effectiveness of different advertising channels (Rust and Verhoef 2005; Rust et al. 2004). Combined with the insights of the first half of