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How advertising in offline media drives reach of and engagement with brands on Facebook

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ABSTRACT
Research investigating the drivers of consumers' engagement with brands on social media is proliferating. However, little is known about how advertising outside social media drives engagement with brands on social media. This study aims to explore the relation between advertising spend in different offline media (TV, radio, newspapers, magazines, out of home), and reach of and engagement with brand pages on Facebook. The study uses a unique real-life data-set containing information about the Facebook pages of 45 brands for approximately three years combined with Nielsen Advertising Spend data. Results showed that while advertising in offline media influenced organic and viral reach, the number of page likes was directly influenced by advertising on Facebook only. It can be concluded that offline advertising is relevant in driving consumers' online brand engagement; however, there is a unique set of drivers for organic reach, viral reach and likes.

Introduction

Advertisers often aim to drive consumers' online brand engagement on social media. They try to stimulate consumers to engage with branded content not only because they want to reach these consumers, but also because they believe that the content might spread into the consumers' social network (Scheinbaum 2016). In the last few years, an increasing body of academic research has investigated the drivers of consumers' engagement with brands on social media. However, existing studies mainly tried to answer this question from a micro-level perspective. For instance, by studying which content characteristics (e.g. positivity, emotionality, and interactivity) of brand posts are related to consumers' online brand engagement (Berger and Milkman 2010; Araujo, Neijens, and Vliegenthart 2015; Yuki 2015), or by investigating how consumer perceptions of brand pages (e.g. of argument quality or attractiveness) influence consumers' online brand engagement (Chang, Yu, and Lu 2015; Vries and Carlson 2014).

This study takes an entirely different perspective by arguing that the drivers of consumers' engagement with brands on social media should be sought in earlier stages of the

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customer journey outside of social media. As consumers are exposed to a multitude of branded messages daily, it is likely that these brand activities outside of social media affect the way in which consumers engage with brands on social media. Exploring these drivers from a more macro perspective allows us to generate novel insights into how consumers' passive exposure to branded messages across offline media relates to their active engagement with brands online. More specifically, this study aims to explore the relation between advertising activities in different offline media (TV, radio, newspapers, magazines, trade publications, and out-of-home) and engagement with brands and their contents on Facebook at varying levels of activeness (organic reach, viral reach, and page likes, similar to Muntinga, Moorman, and Smit [2011]). The study uses a unique real-life data-set containing information about the Facebook pages of 45 brands for approximately three years combined with Nielsen Advertising Spend data.

This study provides several important contributions to the academic literature. First, it adds a new potential type of driver to the literature regarding consumers' online brand engagement, which has been neglected in the previous research on the topic: advertising activity in different media (Brettel et al. 2015). Second, by investigating novel metrics, such as various types of reach, we can capture the concept of engagement from angles that go beyond the traditional metrics, such as likes and shares. In doing so, we investigate how offline advertising affects not only consumers' likes, but also, how offline advertising influences engagement metrics associated with the consumption of brand content (i.e. reach). Third, this study contributes to a greater understanding of cross-media effectiveness. Cross-media campaign effectiveness has been a key priority in the advertising field for many years, and is still of major importance (Assael 2011; Fulgoni and Lipsman 2014; Neijens and Voorveld 2015). In the academic literature, there is a focus on synergistic effects of combining multiple media in a campaign (e.g. Chang and Thorson 2004; Naik and Peters 2009; Voorveld, Neijens, and Smit 2011; Voorveld and Valkenburg 2015; Vandeberg et al. 2015). However, there is a lack of research investigating 'cross-over' effects of different media especially between offline and online media. This study contributes to this gap in the literature by focusing on the question how advertising activities in a certain medium (e.g. TV) affect consumers' engagement on social media across different levels of activeness (i.e. different types of reach as well as likes). This is important since advertisers not only need to know the synergistic effects that may exist between online and offline media, but also the potential effects of advertisements across different media to actively drive engagement and reach on Facebook.

Background

Earlier research on drivers of social media engagement

We define consumers' brand engagement in line with the work of Hollebeek, Glynn, and Brodie (2014, 154), as 'a consumer's positively valanced brand-related cognitive, emotional and behavioral activity during or related to focal consumer/brand interactions.' Earlier research on the drivers of consumers' online brand engagement on social media can be divided into three streams. The first set of studies investigated the content related to drivers of consumers' online brand engagement. In this stream, factors such as emotions, usefulness, and storytelling (Yuki 2015); vividness and interactivity of brand posts (de Vries,

Gensler, and Leeflang 2012); positivity and emotionality of news stories (Berger and Milkman 2010); or informational and emotional cues of brand posts on Twitter (Araujo, Neijens, and Vliegenthart 2015) have been identified as important content-related drivers of consumers' online brand engagement. The second stream of literature focused on the brand-related drivers of consumers' online brand engagement. In this body of research, factors, such as brand love (Bergkvist and Bech-Larsen 2010), warmth of the brand (Bernritter, Verlegh, and Smit 2016), brand identity (Hollenbeck and Kaikati 2012), and the symbolic value of the brand (Bernritter 2016), have been the important predictors of consumers' online brand engagement. The third stream of research covered the consumer-related drivers of online brand engagement. Here, consumers' online brand identification (Stokburger-Sauer, Ratneshwar, and Sen 2012), motivations (Muntinga, Moorman, and Smit 2011), self-representation (Wallace et al. 2014), cultural mindsets (Bernritter et al. 2017), and identity maintenance and creation (Hollenbeck and Kaikati 2012) have been identified as drivers of consumers' engagement with brands on social media.

The current research complements these streams of research by investigating the issue from a more macro level, exploring cross-media effects driving consumers' engagement with brands on social media. Moreover, we investigate three different Facebook engagement metrics: organic reach, viral reach, and likes.

Earlier research on cross-media effects

The field of cross-media effects is dominated by research on cross-media synergy. Cross-media synergy refers to the idea that the combined effect of marketing activities in multiple media exceeds the sum of the individual effects with the ability to create a super-additive effect (Havlena, Cardarelli, and Montigny 2007; Naik and Peters 2009; Naik and Raman 2003; Taylor et al. 2013; Vandeberg et al. 2015; Kumar, Choi, and Greene 2017; Voorveld, Neijens, and Smit 2011). Earlier empirical research showed that campaigns combining advertising in multiple media can be more effective in terms of cognitive, affective, and behavioural responses than campaigns using only one medium (e.g. Chang and Thorson 2004; Naik and Raman 2003; Naik and Peters 2009; Romaniuk, Beal, and Uncles 2013; Steele et al. 2013; Voorveld, Neijens, and Smit 2011). While research on synergistic effects of social media with advertising in traditional media is still scarce, a body of research on the subject is gradually developing. There are studies showing that combining social and traditional media in one campaign can be more persuasive (Voorveld and Van Noort 2014), or even lead to more sales (Kumar, Choi, and Greene 2017; Srinivasan, Rutz, and Pauwels 2016).

Two recent papers (Neijens and Voorveld 2015; Vandeberg et al. 2015) concisely sum up several theoretical explanations for these effects such as encoding variability (Stammerjohan et al. 2005; Tavassoli 1998; Unnava and Burnkrant 1991), repetition-variation (Gibson 1996; Schumann, Petty, and Clemons 1990; Stammerjohan et al. 2005; Yaveroglu and Donthu 2008), complementarity (Dijkstra 2002), differential attention (MacKenzie 1986; Stammerjohan et al. 2005; Unnava and Burnkrant 1991), forward encoding (Dijkstra 2002; Edell and Keller 1989; Voorveld, Neijens, and Smit 2011), and multiple source credibility (Chang and Thorson 2004; Dijkstra 2002; Laroche et al. 2013; Voorveld, Neijens, and Smit 2011). A careful study of these explanations shows that they are all

based on one underlying explanation of variability; processing information across different types of media causing more variability in the encoding; and retrieval of the information than (repeatedly) processing information within a single medium (Vandeberg et al. 2015).

In conclusion, while earlier empirical studies and theoretical reasoning provided evidence for the value derived from integrating social media with another type of medium (especially TV) in advertising campaigns, they did not yet give insight into the cross-over effects, so to what extent does advertising in one medium affects online reach and engagement on Facebook?

How advertising in different media might influence consumers' online brand engagement

Some studies about related topics can be used to argue that advertising in different media influences consumers' online brand engagement on Facebook. First, we discuss the empirical results of some of these studies, followed by a discussion of the theoretical arguments that may explain these effects, and that can also be used to argue why we expect that advertising in offline media influences reach and engagement with brand pages on Facebook.

Empirical results

Several studies focused on how consumers search online for products or brands. Some of these studies tracked the effects of advertising expenditures in different media on subsequent online search behaviour. For example, the results of Laroche et al. (2013) showed that exposure to advertising in different media outlets increases the likelihood of individual' follow-up search and showed that radio was less effective than TV and online advertising. The authors indicated that this could be due to the TV's 'attention-getting' nature, which stems from its sound and imagery effects (Blackwell, Miniard, and Engel 2001; Chang and Thorson 2004; Rossiter and Bellman 1999), and due to the immediacy effect of the online medium that allowed searches for the brand to occur much more readily than through traditional channels. In the same vein, a relationship between print advertising (Olbrich and Schultz 2014), and TV advertising (Joo et al. 2014) and consumers' online search was shown.

It is important to note here that online search behaviour differs from engagement in several important ways. First, while online search behaviour is private in nature, engagement is generally considered to be public (e.g. Bernritter, Verlegh, and Smit 2016). This has important downstream consequences for brands such as increased perceived social risk of online engagement compared to more private types of behaviour (cf. Eisingerich et al. 2015). Second, online brand engagement has often been associated with consumers' identity signalling (Hollenbeck and Kaikati 2012). Consumers deliberately engage with brands in social media to communicate their identity to others (Wallace et al. 2014), while online search behaviour primarily serves informational purposes. These differences in motivational drivers and audience of the target behaviour are likely to play a role in how offline ads affect online consumer behaviour. Effects of offline ads on consumers' online brand engagement might thus differ from other online activities and should therefore be investigated.

Also, research on 'social TV' can be used to argue that there is a relation between offline advertising and consumers' online brand engagement on social media (e.g. Krämer et al. 2015; Buschow, Schneider, and Ueberheide 2014). Studies in this area have shown that as much as 85% of the prime-time-active Twitter users report habitually tweeting about things they see on TV (Nagy and Midha 2014). This behaviour is triggered further by the general trend towards media multitasking (i.e. engaging in more than one media activity at a time; Voorveld and Van der Goot 2013) and multi-screening (i.e. the simultaneous usage of multiple screens such as a TV, smartphone, laptop, and tablet; Segijn, Voorveld, and Smit 2016). These types of media-use facilitate the opportunity for cross-over effects for traditional and social media because a simultaneous use of multiple media allows engagement with a brand on social media to occur in a more immediate way. Extending the results of these previous studies to our study, we expect that paid advertising activities in offline media such as TV, magazines, and radio might influence consumers' behaviour on Facebook.

Theoretical explanations

Unfortunately, not all earlier empirical studies discuss theoretical explanations for the results. However, some arguments for the existence of cross-over effects can be deducted from the earlier studies, which can be related to the different engagement levels that are distinguished in the current study. To start with, advertising may basically increase consumers' (perceived) knowledge or awareness of product benefits, or the set of brands they can recall and this may influence their search behaviour (Brucks 1985 in Joo et al. 2014; Newman and Staelin 1973; Moorman et al. 2004 in Joo et al. 2014). Consumers might not only use traditional sources of information to satisfy their need to search for information; however, they might use social media as well. This might be further triggered by advertising explicitly referring to social media. For example, by mentioning web addresses in the advertisement (Kanso and Nelson 2004; Olbrich and Schultz 2014), by using #hashtags, call to actions, or by referring to special content on social media (Nagy and Midha 2014). More importantly, simply by consumers being exposed to the brand, advertising in offline media increases the awareness of the brand to the consumer, which may influence the consumer going to Facebook to access more information or to interact with the brand. This action will likely increase the number of people who are exposed to the brand content in their own timelines or by visiting the brand page (i.e. organic reach).

Moreover, without actively searching for it, it is possible for consumers to be exposed to the content from Facebook brand pages. The reason is that an increase in awareness or knowledge of a brand due to advertising in offline media can trigger some consumers to talk about a brand online making them engage with brand-generated content. Media content in general and advertising in specific influences conversation among people (Bronner and Neijens 2006). Particularly, television viewing has always been a partly social activity and the emergence of social media has relocated a portion of these activities to online media (Krämer et al. 2015). Media producers and advertisers also encourage this behaviour by using the same techniques as discussed in the previous paragraph (Krämer et al. 2015; Spotts, Purvis, and Patnaik 2014). Engaging with brand content on Facebook (e.g. by liking, sharing, or commenting) indirectly increases the reach of the brand as more users are exposed to the brand content because their friends on Facebook engaged with

the content (i.e. viral reach), even if the user does not actively search for the brand page itself.

An increase in organic and viral reach might subsequently increase the likelihood of a page to receive additional likes in two different ways. First, as organic reach includes consumers that have visited the brand page actively, it can be expected that a share of these consumers may not yet have liked the brand page, and they might do so when visiting it, especially as the brand may be more salient because of advertising exposure. Second, for viral reach, as consumers get exposed to the brand content because friends engaged with it, it can also be expected that some of these consumers will go ahead and like the brand page. If 'friends' in the network of a consumer like a brand page, this can be seen as an active endorsement towards the brand, and such an endorsement can persuade the consumer who does not yet like the page to like it (Bernritter, Verlegh, and Smit 2016). These endorsements might be very effective for several reasons. For instance, consumers will perceive brand information from other consumers as trustworthy (Bickart and Schindler 2001), and therefore, they might be less resistant to persuasion (Bernritter, Verlegh, and Smit 2016). Otherwise, they may identify the like of a member of their network as a signal for group-membership and like the brand as well making them to affiliate themselves with this group (Escalas and Bettman 2003).

Based on previous studies and theoretical arguments, we can assume that advertising in offline media drives consumers' brand engagement on Facebook; however, it is still hard to make predictions about the exact differences between the effects of different media. Television is regularly credited a powerful role in cross-media synergy and research on consumers' online search behaviour (Pfeiffer and Zinnbauer 2010; Snyder and Garcia-Garcia 2016); however, hardly any explicit comparisons to other media are made. Since media differ from each other on many characteristics (modality, push vs. pull; pacing; interactivity; subjective experience; and trust) (Stewart and Cunningham 2017; Bronner and Neijens 2006; Dijkstra, Buijtels, and Van Raaij 2005; Danaher and Rossiter 2011; Voorveld et al. 2016), it is expected that they do not influence consumers' online brand engagement in the same manner. Therefore, we pose the following exploratory research question:

RQ1: What are the differential effects of spending in TV, radio, newspapers, magazines, and out-of-home on the reach of and engagement with Facebook brand pages?

Method

Sample

We use daily observations of user's activity on Facebook pages of 45 Dutch brands as our sample. These brands cover a wide variety of sectors ranging from FMCG's to consumer electronics, and from car brands to retailers, with 27 (60%) of the brands primarily selling non-durable products, 9 (20%) services, 7 (16%) durable products, and 2 (4%) were large retailers. These 45 brands, all active in the Dutch market, were present in a larger data-set obtained in collaboration with a media agency responsible for managing the Facebook advertisement and social activities of these brands. To be in this sample, the brands had to (a) focus primarily on the consumer market, (b) have its advertisement activities reported in Nielsen, and (c) be active on Facebook during the period of the study. The Nielsen and

Facebook page data were reconciled at page level (i.e. the activities of a brand, or sub-brand in Nielsen were associated with a specific Facebook page). When more than one Facebook page was available for the same brand/sub-brand reported by Nielsen, only the largest brand page was considered. It is important to note that data from multiple brands are included because this might help to control potential biases from brand-specific effects (Klapdor et al. 2015). The sample includes activity on the brand pages between 2012 and 2015, covering a period of approximately three years ($M_{\text{days per brand page}}$ = 800.18, SD = 276.03).

Independent variables

All data are provided through a cooperation with a media agency, and collected directly from Nielsen (advertising data) or Facebook Insights (reach and likes). The data include the measures described below:

Advertising spend per medium

Since expenditures are the acceptable measures for advertising directed to consumers (Laroche et al. 2013), Nielsen advertising data were used for the same period as Facebook Insights data. The main independent variables of the study, offline spending, were provided on a daily basis, and separately for each of the following media: magazines (M = 1415.68, SD = 9073.63), radio (M = 3431.65, SD = 11,800.87), out-of-home (M = 2234.36, SD = 11761.66), newspapers (M = 1503.56, SD = 13089.37), trade publications (M = 31.83, SD = 539.04), and television (M = 16582.69, SD = 32801.48). We also included Internet advertising (M = 930.64, SD = 27,692.24) spend from each company as measured by Nielsen as a control variable. This measure includes the spend with display advertising in the largest Dutch websites for the brands in the sample.

Paid reach

Following Facebook's (2017) definitions, paid reach was defined as the total number of unique users who were reached by the page's advertising on Facebook. It is important to note that paid reach was considered an independent variable for this study, as this type of reach was a direct consequence of online advertising by the (brand) pages on Facebook; thus, it could serve as a proxy for the amount of online advertising by the brand on Facebook.

Dependent variables

Organic reach

Organic reach is defined as the total number of unique users who see any content of a page 'through unpaid distribution,' that is excluding users who see content from the page based on the advert from the brand (Facebook 2017; $M_{\text{by page/day}}$ = 5654.16, SD = 11,395.86).

Viral reach

Viral reach is defined as the total number of unique users who see any specific content of the page because one or more of their friends engage with the content before; so the number of people who have seen a page post in a report of a friend (2017; $M_{\text{by page/day}}$ =

3191.46, SD = 11,699.82). Although Facebook recently stopped to report viral reach, we believe it is still a relevant measure to include in our research because of its practical importance for advertisers.

Page likes

Page likes are defined as the total number of likes that the brand page has in a day and is collected from Facebook daily. Unlike viral reach, it is important to note that page likes are a cumulative metric, i.e. the number of likes of the previous day is a starting point for the following day[1] ($M_{\text{by page/day}}$ = 70,968.34, SD = 66,286.65).

In this study, these three measures were used as dependent variables: for each of the three dependent variables, we created three models to explore cross-over effects by including the following independent variables: total advertising spend per medium and paid reach. Because our dependent variables (organic reach, viral reach, and page likes) are related, we controlled for the other dependent variables when conducting the analysis for one of the dependent variables. We also controlled for spending on online advertising.

Controlling for Facebook changes

Facebook itself is not a static platform, and via its algorithms, it often changes the priority it gives to the content shown to its users, and more importantly, under which conditions users can be reached or find content from others (Bucher 2012). We expect these changes to influence the effect advertising has on users' engagement on Facebook. We control the year of the measurement, which roughly matched relevant changes on Facebook's algorithms for brand pages reach according to practitioner's blogs and reports at an aggregate level (e.g. Peterson 2014).

Analytical strategy

Our data-set has a nested structure with daily observations nested in brands. This panel structure of the data comes with several statistical challenges. First, we expect the presence of strong autocorrelation, i.e. the value of the dependent variable to be strongly affected by the previous values. The second challenge is heterogeneity (i.e. structural differences in the values of the dependent variable across brands that cannot be captured by the independent variables, which is included in our model) that is likely to be present. Therefore, we rely on pooled-time series fixed-effects models while including a lagged dependent variable. The independent variables are expected to have an immediate impact on the dependent variables.[2] Because the levels of the dependent variable can differ across brands in ways that cannot be predicted by the independent variables in our model (unit-level heterogeneity), we ran fixed-effects models with a unique intercept for every brand. By including fixed effects, all inter-unit variances (i.e. variance across different brands/industries/Facebook pages) are removed and the modelling focuses on intra-unit, over-time variance (Wilson and Butler 2007). We think it is more valid to use a fixed-effects model than to include a control variable for variables like type of brand, brand size, etc., because categorizing the 45 brands into certain categories is always rather arbitrary and brands differ on many characteristics at the same time. Mathematically, such a model including a single independent variable x is written as follows:

$$y_{it} = \alpha_i + \beta y_{i,t-1} + \delta x_{it} + \varepsilon_{it} \qquad (1)$$

and can be considered a variant of an infinite distributed lag model and specifically a Koyck lag. In this situation, various independent variables have a direct impact on the dependent variable as an indirect, delayed one through the effect of the previous value of y_{it} (De Boef and Keele 2008). The total long-term effect of x on y (long-term multiplier) is similar to

$$LRM = \delta/(1 - \beta) \qquad (2)$$

We log-transformed all variables (except for the algorithm changes) given their high skewness levels. We conducted the Fisher unit-root test to assess whether our dependent variables are stationary. Results suggest that series are stationary (chi-squared (90) for organic reach is 2805.73, $p < .001$; for viral reach 2371.58, $p < .001$; and 868.22, $p < .001$ for page likes – in all instances rejecting the null hypothesis of non-stationarity) and need not to be differenced before conducting the analysis.

Results

The trends of reach and likes

The results showed a declining trend of reach of brand pages over the years that were included in our sample. When compared to the period prior to the first large algorithm change by Facebook by the end of 2013, subsequent periods between 2014 and 2015 showed a statistically significant drop in organic and viral reach. This declining trend is in line with Facebook changes to its algorithm that determines which content is shown to the user. In contrast, there is an increase in likes over the years.

Cross-over effects of offline advertising on Facebook reach and engagement

Results in Table 1 show that advertising spend in different media differentially affects different forms of reach and engagement. We discuss the three metrics below.

Organic reach
Organic reach is influenced by advertising spend in different offline media. Advertising spend on TV, newspapers, and out-of-home leads to a higher organic reach on Facebook. Thus, if more money is spent on advertising in these media, the total number of unique users who view any content of the page either in their time lines, or by visiting the brand page, is higher. Remarkably, there is a negative relationship for magazines, if more money is spent on advertising, organic reach on Facebook decreases. Paid reach on Facebook and the number of brand page likes were the strongest driver of organic reach on Facebook; thus, the higher the amount of money spent on advertising on Facebook, the higher the number of likes a certain brand page, the higher the organic reach of a brand page on Facebook. The spend on Internet advertising, included as a control variable in this study, has a negative relationship with organic reach, suggesting that display advertisements on

Table 1. Time-series analysis for the influence of offline media on organic reach, viral reach, and page likes.

	Organic reach	Viral reach	Page likes
Dependent variable (lag 1)	0.471 (0.005)***	0.696 (0.004)***	0.975 (0.001)***
Offline advertising			
Television	0.004 (0.002)*	0.004 (0.001)***	−0.00001 (0.00011)
Radio	0.004 (0.003)	0.002 (0.001)	0.0001 (0.0002)
Newspapers	0.021 (0.005)***	0.004 (0.003)	−0.0003 (0.0003)
Out-of-home	0.008 (0.003)*	0.002 (0.002)	−0.0001 (0.0002)
Trade publications (7-day average lag)	0.027 (0.03)	−0.003 (0.015)	0.0004 (0.0019)
Magazines (7-day average lag)[4]	−0.017 (0.008)*	0.006 (0.004)	0.0006 (0.0005)
Facebook			
Paid reach (advertising)	0.061 (0.002)***	0.044 (0.001)***	0.0003 (0.0001)***
Page likes	0.517 (0.016)***	0.136 (0.008)***	
Organic reach			0.001 (0.0003)*
Viral reach			0.004 (0.001)***
Period [a]			
2013 *(reference period)*			
2014	−0.659 (0.023)***	−0.261 (0.012)***	0.019 (0.001)***
2015	−1.354 (0.029)***	−0.333 (0.014)***	0.026 (0.002)***
Internet advertising	−0.061 (0.008)***	−0.025 (0.004)***	−0.0001 (0.0005)
Intercept	−1.704 (0.151)***	0.513 (0.075)***	0.215 (0.009)***
Intra-class correlation	0.1309	0.0910	0.1095
Overall R^2	0.6725	0.8428	0.9963

[a]Due to an important algorithm change on Facebook in December 2013, we used the reference period Jan–Nov/2013 (2013), Dec/13 to Nov/14 (2014), and Dec/14 to end of 2015 (2015) as controls.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

other websites (outside of Facebook) do not tend to generate higher activity within Facebook, or even a lower activity, unlike paid reach on Facebook itself which has a positive influence.

Given the lack of empirical research in this topic, we decided to use straightforward models investigating linear effects. However, to begin illustrating the potential for long-term effects, we have added figures that show the immediate and, through the lag-dependent variable in our model, also the long-term effects. Figure 1 shows the change in log-transformed organic reach due to a one unit increase in the log-transformed expenditures at time 0 (only significant results are shown). The effect at $t = 0$ equals the regression coefficient in the equation, the subsequent days illustrate the cumulative effect, due to indirect effects via the autoregressive component in the models, more specifically the lagged dependent variable.

Viral reach

While organic reach is influenced by advertising spend in several different offline media, viral reach is only influenced by advertising on TV. Yet, it is again clear that the number of page likes and the amount of advertising on Facebook itself are the strongest drivers for the total number of unique users who view the content of the page because one or more
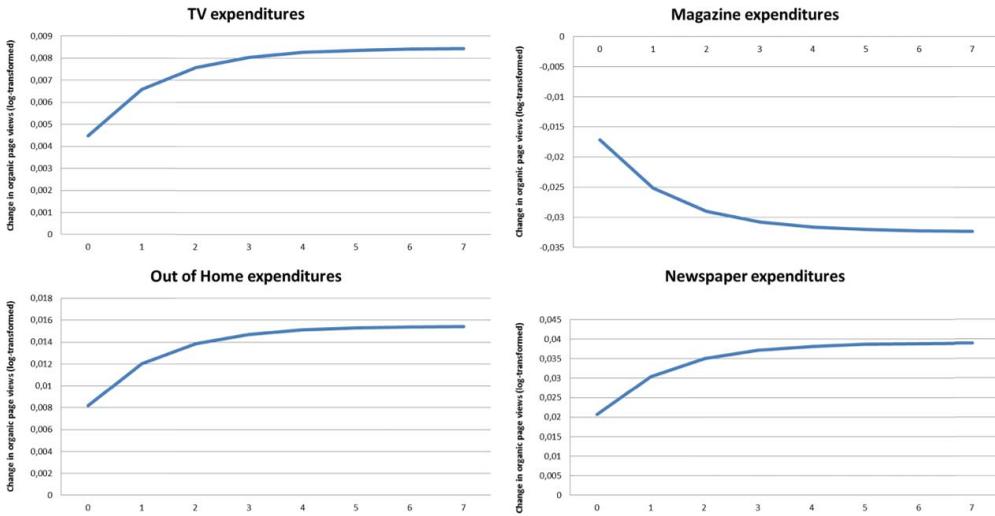
Figure 1. Illustration of the immediate and the long-term effects of offline media expenditures on organic reach.

of their friends engage with the content. Just as for organic reach, Internet advertising in general has a negative relationship with viral reach.

Again, Figure 2 shows the change in log-transformed viral reach due to a one unit increase in the log-transformed expenditures for TV at time 0 (TV is the only medium with a significant impact). The effect at $t = 0$ equals the regression coefficient in the equation; the subsequent days illustrate the cumulative indirect effects via the lagged dependent variable.
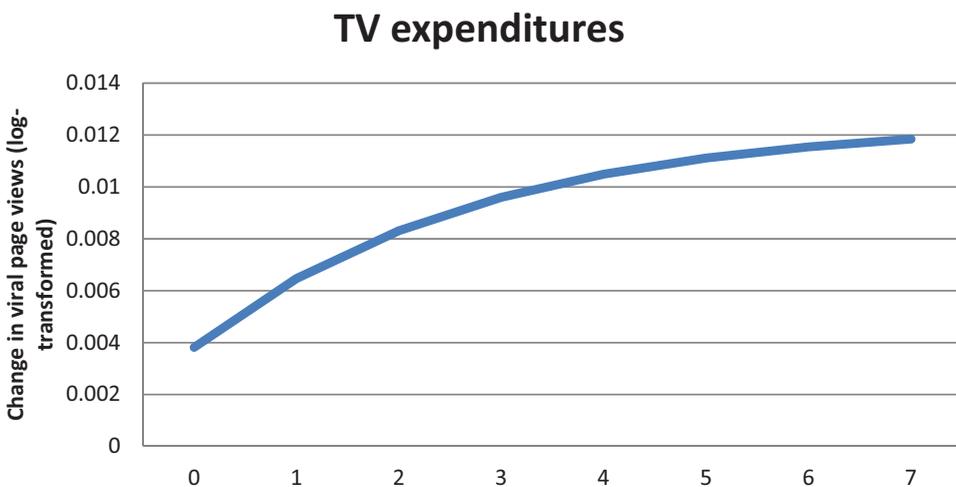

Figure 2. Illustration of the immediate and the long-term effects of offline media expenditures on viral reach.

Page likes

Table 1 shows that only predictors directly related to Facebook, i.e. the total number of unique users who have been reached via advertising on Facebook (paid reach), organic reach, and viral research are significantly related to the number of page likes. While advertising in offline media could influence organic reach and to a lesser extent viral reach, the number of page likes was only directly influenced by advertising on Facebook itself.

Conclusion

This study is the first to explore the relationship between advertising spend in different media (TV, radio, newspapers, magazines, trade publications, and out-of-home) and reach of and engagement with brand pages on Facebook. It can be concluded that advertising spends in different offline media influence different forms of consumers' online brand engagement in different ways. A unique pattern was detected for the different engagement metrics such as organic reach, viral reach, and likes.

When it comes to organic reach, different media (TV, newspapers, and out-of-home) have a positive influence, thus, providing evidence to the notion that cross-over effects are relevant for influencing the number of unique users who view any content of the page either in their own timelines, or by visiting the brand page. Magazines seem to have a negative effect on organic reach. Furthermore, advertising on Facebook turned out to be the driver of organic reach on Facebook. When looking at the coefficients, it can be concluded that effects are generally small. Whereas, cross-over effects play a critical role in influencing organic reach on Facebook, advertising on Facebook itself seems to be the strongest driver of organic reach of Facebook brand pages.

For viral reach, cross-over effects seem to be less relevant, and TV is the only offline medium that is a driver of viral reach, next to advertising on Facebook (paid reach). For likes, no cross-over effects could be detected and only advertising on Facebook could influence the number of likes a brand page received from consumers. However, organic and viral reach are also important drivers of the number of likes, so there is a probability of an indirect influence of advertising spend on TV, newspapers, and out-of-home media.

Analysis of secondary data typically does not allow discerning the underlying processes that can explain the different results found for the different indicators of consumers' online brand engagement; however, we can share some possible explanations based on earlier literature. Television turned out to play a prominent role for both organic and viral reach. This is in line with the powerful role of TV in driving cross-media synergy and in line with earlier research that shows that TV is especially effective in terms of upper-funnel metrics (Pfeifer and Zinnbauer 2010; Briggs, Krishnan, and Borin 2005). This result might be explained by the characteristics of the medium. Television is a typical broadcasting medium, an internally paced delivery medium: consumers have a low level of control over the speed and timing of information transfer (Dijkstra, Buijtels, and Van Raaij 2005). Moreover, TV is often applauded for its attention-getting capabilities due to its sound and imagery effects (Blackwell, Miniard, and Engel 2001; Chang and Thorson 2004; Rossiter and Bellman 1999). These characteristics make TV a medium that can be particularly useful for pushing messages to consumers, and it is effective in building awareness, which is important in early stages of the consumer journey. Television is also experienced as a medium that gives people a subject of conversations (Bronner and Neijens 2006). When

people talk about brands advertised on TV, this further boosts organic and viral reach as being discussed previously.

Remarkably, magazines had a negative impact on organic reach (not on viral reach and likes). Again, this result might be explained by the characteristics of the medium. Magazines are typically described as a lean-back medium that people read in a rather passive way. People describe reading a magazine as giving them enjoyment, making them forget everything for a moment; a treat, a reward for doing other things, an escape, and suitable for filling an empty moment (Malthouse, Calder, and Tamhane 2007; Bronner and Neijens 2006). The nature of magazines may make it less likely that people go to Facebook to visit a brand page after they saw an ad for a certain brand in a magazine. In contrast, the way people experience newspapers makes this behaviour much more likely. People experience newspapers as informative, and provide them with subjects for conversation (BronnerandNeijens 2006). This might explain the positive impact of newspaper expenditures but negative impact of magazine expenditures on organic reach of Facebook brand pages.

Across all types of engagement investigated in the current study, advertising on Facebook has a positive impact on consumers' online brand engagement on Facebook. Moreover, when comparing the coefficients of advertising on Facebook with advertising spend in offline media, it can be concluded that the effects of advertising on Facebook are more consistent as they encompass all types of engagement behaviour studied. Earlier research comparing effects of online and offline advertising on online search behaviour already suggested that the immediacy effects of the Internet allow searches for the brand to occur much more readily than through offline media (Laroche et al. 2013), which might also partly explain the differences in the current study. More importantly, online advertising on Facebook might not only drive engagement with brands on Facebook due to its immediacy, but also due to its proximity. As advertising on Facebook and engagement with brands take place on the same device and even the same platform, this might induce less switching costs for consumers (Yeykelis, Cummings, and Reeves 2014) than switching between different devices or media. Therefore, it is much more convenient for consumers to engage with brands on Facebook if they are exposed to the ads of that brand on Facebook than in other media such as TV and radio.

Whereas Facebook advertising has a strong positive impact on all types of engagement with Facebook, the pattern found for the control variable, online display advertising on websites other than Facebook, was much more counterintuitive. Results showed that the spending on online display advertising (outside Facebook) exerts a negative significant relationship on organic and viral reach. A potential explanation[3] may be that visits to the brand's actual website may be the missing link between offline/online ad spend and social media engagement metrics. It would be possible consumers may forgo visiting a brand's social media pages and directly search and visit a brand's actual website, once they become exposed to any form of that brand's advertising. This is even more likely the case with online display advertising since the majority of banner ads link consumers to the brand website rather than its social media site because brand websites are often where the main online sales takes place, rather than social media brand pages.

Results also showed that organic reach is more strongly affected by advertising in offline media than viral reach. The reason might be that organic reach is independent of consumers' personal network and the engagement behaviour of their peers. It can be driven

by various exogenous factors such as previous knowledge of a brand, personal interest, or exposure to advertising in other media. Contrarily, viral reach is dependent on the behaviour of other peers and how they interact with branded content. Here, different social motivations, which can often be found in the domain of self-representation and impression management (e.g. Wallace et al. 2014), might explain a huge portion of the variance of viral reach, while these social factors should play no role in organic reach.

The absence of significant cross-over effects from offline media to likes could possibly be explained by the nature of this metric. Liking a brand page that deals with consumers' explicit affective responses to online messages is in ways that are visible to others (Alhabash et al. 2015). Moreover, it has been shown that consumers have the tendency to like brands on Facebook to signal their identity (e.g. Hollenbeck and Kaikati 2012; Wallace et al. 2014). However, it could impose a higher risk to consumers than merely visiting a brand page or viewing a brand post in one owns timeline (cf. Eisingerich, Auh, and Merlo 2014). Thus, liking brands require an active, rather risky behaviour of consumers, while organic and viral reach is more about passively consuming a brands' content without any risk. Another explanation for the absence of significant cross-over effects from offline media on likes might be that whereas reach can be seen as a metric representing an earlier stage of the purchase funnel or consumer journey, liking can be seen as a more attitudinal measure (Srinivasan, Rutz, and Pauwels 2016; Spotts, Purvis, and Patnaik 2014) and as an indicator of later stages of the purchase funnel or consumer journey. It can be argued that advertising spends in a particular medium might have a rather straightforward influence on early stages of the consumer journey, actually liking a brand page might be more dependent on other factors. Some of these factors are under the control of the advertiser, such as the actual content, however, probably go beyond the amount of money spent on advertising in a typical offline medium (ARF 2003).

Limitations and future research

Although the study has a unique approach by using a real-life data-set, it also has some limitations. The first limitation is that we studied consumers' online engagement from a macro level, by using aggregate ad spend on medium level (e.g. magazines, TV), rather than on medium vehicle level (specific magazines or TV programmes). However, we miss data on a more micro level, for example, about the specific campaigns during those periods and on the exact ad characteristics Therefore, we do not know whether the brands are involved in any other type of activity besides advertising, such as PR events, during these periods which could influence the results, and whether ads with specific characteristics (e.g. an explicit referral to the brands Facebook page), would have a stronger impact on consumers' online brand engagement on Facebook. Future research could try to answer these questions with additional real-life data, or with experimental studies in which ad characteristics are manipulated.

Second, as discussed earlier, analyses of secondary data typically do not allow discerning the underlying processes that can explain the different results. The nature of our data does not allow us to ask questions to consumers about why they chose to visit a Facebook page, and why they liked a brand on Facebook. Surveys among consumers or experimental studies might be able to give more insight into the underlying mechanisms that can explain the results found in the current study.

The third limitation is that the study was based on time-series analyses and was not based on a single-source panel in which advertising exposure and social media behaviour were observed within a single consumer.

We do believe that the findings are generalizable to other brands and countries, because our data covered a wide variety of brands, ranging from FMCGs to consumer electronics, from car brands to retailers, and both national as international brands. We believe this might help to control for potential biases from brand-specific effects (Klapdor et al. 2015).

It is unsure whether the results or the current study are generalizable to other social media platforms. Although social media are often regarded as an umbrella concept, many variations and types of social media exist. Facebook (a social network), Snapchat (an instant photo messaging application), Instagram (a photo sharing application), Twitter (a microblogging application), and Pinterest (a 'catalogue of ideas' or photo sharing website) all have different functionalities and other characteristics (Voorveld et al. 2018). They differ for example with regards to nature of the connection: (profile-based versus content-based), level of customization of messages (the degree to which a service is customized to satisfy an individual's particular preferences) (Zhu and Chen 2015), modality (Waterloo et al. forthcoming), private vs. public access to content (Lapinski and Rimal 2005), following mechanism (reciprocal vs. non-reciprocal, Davenport et al. 2014), privacy parameters, type of connections (friends/colleagues), and longevity of content accessibility. Recent research also showed that these different functionalities and characteristics translate into different consumer experiences. While Facebook, Instagram, and Snapchat are experienced as suitable for social interaction; YouTube and Pinterest are not. While Facebook and Instagram are used to fill an empty moment, others such as Snapchat, Pinterest, and Twitter are used to a much lesser extent as pastime. Of course, there are also similarities. Except for YouTube and Pinterest, all social media platforms are experienced as a way to remain up to date (Voorveld et al. 2018).

The current study focuses on Facebook because advertisers generally spend the largest part of their social media budgets on Facebook (Kollewe 2017), and consumers most often encounter advertising on Facebook in comparison to other platforms (Voorveld et al. 2018). Therefore, Facebook is a leading platform with respect to social media advertising and consumers' online brand engagement. Future research should test whether the results of the current study are comparable when other social media platforms than Facebook are studied.

Given the lack of empirical research in this topic, this study uses straightforward models investigating linear effects. Future research could also test more specific models, taking into account, for example, content of the advertisements and specific campaign characteristics, or could include additional variables like brand website visits, online sales, and offline sales to give a more complete picture of the purchase funnel. Future research could also try to formulate specific hypotheses of nonlinear effects, but at this moment, we could not find enough theoretical reasons for nonlinearity.

Implications for practitioners

For practitioners, the study has important implications. The social media strategy is often still a separated and isolated chapter in the media strategy with its own objectives and

KPIs. The results of the study plead for a more holistic approach in which the role and added value of each medium are defined and strategically integrated into the media plan. This would facilitate the use of offline media as a driver for the social media activities and could ultimately make these more efficient and effective.

When making decisions about which offline media to incorporate in a media plan, it is important to be aware that the influence of offline media on consumers' online brand engagement is heterogeneous across the consumer journey or purchase funnel. The model does support a direct link between offline media expenditures and organic reach, and to a lesser extent viral reach of brand pages on Facebook. However, a direct link between offline media expenditures and likes could not be established. This implies that offline media might be most suitable to drive consumers into the consumer journey or purchase funnel, by driving them to search for brands on social media. It seems less likely that offline media can directly drive consumers to later stages of the purchase funnel, such as the stage in which consumers evaluate brands. Thus, whether advertising in offline media should be used a driver for consumers' brand engagement on Facebook heavily depends on the specific campaign objectives.

If advertisers decide to use advertising in offline media to try to influence engagement with brands on Facebook, this study implies that they could best increase their spendings on television, newspapers, and out-of-home media. Furthermore, also spending a part of their budget on advertising on Facebook itself seems a good idea as paid advertising on Facebook has a direct influence across all types of reach and engagement. Given the existence of cross-over effects between offline and online media, the findings also emphasize the importance of consistency of message content across different advertising media (Voorveldand Valkenburg 2015). More specifically, a good coordination of the content on TV, in newspapers, out-of-home (the significant drivers of organic and viral reach) and Facebook might be of crucial importance to make optimal use of the advertising budget. This might not be surprising news for most advertisers; however, it is not evident that it is been practised.

Notes

1. Whenever the data were not available for a given day because of missing values in the database, we averaged the previous and the following day. When either the previous or the following day was also missing, we set the day as a missing value.
2. The literature did not give any indications for the best time lag to be used in our models. We have tested models that also include additional lags for each of the independent variables that showed results largely aligning with the simpler, yet more robust models reported in the paper.
3. We would like to thank reviewer 3 for this excellent explanation.
4. Data on magazines and trade publications were aggregated on a weekly basis, because magazines are usually published on a weekly, rather than daily basis and can be read at any time after the date of publication (Olbrich and Schultz 2014). We also ran our model without the seven-day average lag to see whether the results changed, but the results seem to be robust.

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No potential conflict of interest was reported by the authors.

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