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How does interactivity of online media hamper ad effectiveness

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Abstract

The development of the Internet has increasingly led to advertisements presented on rich and interactive websites offering users a high level of control over the contents they are exposed to—sometimes to the extent of allowing them to skip "unwanted" ads preceding the desired content. While previous studies have shown that such interactivity and control can positively impact users' subjective experience and attitude toward the advertisements, the present study examined their impact on users' attention to the ad (using eye-tracking) and actual ad effectiveness (ad memory). It relied on an experimental design allowing for comparing the effectiveness of similar ads that were presented by realistic interfaces simulating common types of online media (in addition to "traditional television" as a form of passive baseline comparison condition). The interfaces consisted of a news website (including many stimuli surrounding the ads and an "ad countdown timer," that might detract users' attention from the ads) and YouTube (also including the "skip ad" option). Ad memory correlated positively (negatively) with gaze direction to the ad area (outside the ad area) and was particularly low when users had the opportunity to stop the ad after a few seconds. These results emphasize the scale of ad effectiveness decrease that may occur when the media interfaces offer users easy ways of avoiding video ads by gazing toward surrounding stimuli and by skipping the ads. The implications of these findings for advertisers are addressed, and it is suggested that future studies on the topic should include other measures of ad effectiveness and other distracting factors that might further detract users from online ad video content in real-life contexts.

Keywords

ad effectiveness, attention, eye-tracking, interactivity, online media

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Introduction

Evolution and interactivity of online media

The Internet has profoundly changed the daily lives of hundreds of millions of people. It has increasingly provided users with virtually unlimited and rich content, as well as interactivity that offers users a high degree of control in their processing of this content (what information they see, for how long, how many times, and in what order; Nysveen & Breivik, 2005; Sterne, 2002). On the advertisers' side, the Internet has been increasingly considered as an attractive alternative to traditional media and obviously transformed the overall media space. Recent data even show that digital is overtaking TV ad spending for the first time (at least in U.S. ad spending; eMarketer, 2016). The evolution of digital marketing has also spurred a series of academic studies about online ad effectiveness. Some recent studies have focused on specific media such as social media (e.g., Facebook, LinkedIn, YouTube; Dehghani, Niaki, Ramezani, & Sali, 2016; Dehghani & Tumer, 2015; Lee, Hosanagar, & Nair, 2018; Logan, Bright, & Gangadharbatla, 2012; Taylor, Lewin, & Strutton, 2011). Others have focused on specific ad formats such as online videos, and have addressed the impact of various factors including arousal (Belanche, Flavián, & Pérez-Rueda, 2017), ad length (Krishnan & Sitaraman, 2013; Li & Lo, 2015), ad position with regard to the video program (Krishnan & Sitaraman, 2013; Li & Lo, 2015), length of the video program in which the ad is placed (Krishnan & Sitaraman, 2013), or congruency of content between the ad and the media vehicle (Belanche et al., 2017; Li & Lo, 2015).

However, the dramatic development of online advertising has raised the major issue (for both academics and practitioners) of attracting consumers' attention in the context of web interfaces. It has also pointed to the comparison of advertising impact between interactive online media and noninteractive, "traditional" media (interactivity being regarded by researchers as a central characteristic distinguishing the Internet from other traditional media). For instance, some studies aimed at comparing ad effectiveness between online media and traditional media relied on various methods to examine cross-media ad effectiveness. Some researchers have used data sets from advertising campaigns and an online panel that was exposed to various Internet or TV ads to examine subsequent brand recall (Draganska, Hartmann, & Stanglein, 2014). Others have carried out an online survey to compare consumers' self-reported perceptions (e.g., entertainment, informativeness, etc.) toward advertisements on different social media (Facebook, Linkedin, Twitter, and YouTube; Natarajan, Balakrishnan, Balasubramanian, & Manickavasagam, 2014) or on Facebook versus Television (Logan et al., 2012). Finally, a couple of experimental lab studies have also been conducted. Some researchers examined consumers' attitude resulting from exposure to advertisements presented via Internet pop-ups, print or radio advertisements (Nysveen and Breivik, 2005), and via Internet or television (Kaid, 2002). Others have analyzed attitudes, recall, and decision-making resulting from exposure to a promotional brochure presented either in print or on the web (Gallagher, Foster, & Parsons, 2001). Overall, these previous studies have shown few differences in ad effectiveness between the different media. In any event, their reliability might be affected by major methodological issues pertaining to potential confounding between the effects of the media and the ad content (not identical across the media), to unrealistic use of the characteristics offered by the different media (ad stimuli not reflecting the real world), to lack of control associated with self-reported measures through online surveys, or to using convenience samples from online panels or Amazon's MTurk.

Interestingly, research has also provided evidence that interactivity may have some positive effects on users' experience and attitudes. It has been shown that this interactivity activates users' relationship with the advertisement and makes the Internet more suited to holding customers'

attention on the advertisement (Nysveen and Breivik, 2005; Sterne, 2002). It has further been argued that the level of control users perceive themselves to have over their exposure to an advertisement has a significant impact on users' interest in and tolerance of the advertisement (Fortin & Dholakia, 2005; Huang, Lurie, & Mitra, 2009; Logan et al., 2012; Raney, Arpan, Pashupati, & Brill, 2003). Also, a study by Google (Pashkevich, Dorai-Raj, Kellar, & Zigmond, 2012) has suggested that allowing users to stop the advertisement and skip directly to the desired content after 5 s of viewing ("skip ad" option offered by major online media such as YouTube) proves especially effective for increasing users' satisfaction and ad acceptance. Yet, while previous studies have shown that such interactivity can have a positive impact on users' feelings and attitude toward advertisements, a major issue relates to its impacts when it comes to real users' attention to the ad and actual ad effectiveness.

Attention, memory, and ad effectiveness

The challenge of attracting consumers' attention in the context of web interfaces brings to the link between attention to the ad, memory of the ad, and ad effectiveness. The link between ad memory and ad effectiveness has been largely emphasized in the marketing literature. It is well documented that ad memorability has a key role in advertising effectiveness, and that analyzing ad memory is thus a reliable way of examining ad effectiveness (e.g., Drèze & Hussherr, 2003; Geuens & De Pelsmacker, 2017; Li & Lo, 2015).

However, drawing on cognitive psychology, it has long been accepted that being exposed to an advertisement does not necessarily result in storing and being able to retrieve its content (Lang, Bolls, Potter, & Kawahara, 1999). The cognitive processing of an advertisement involves encoding the content in short-term memory and storing it in long-term memory to make it available for the future. These cognitively demanding tasks are further complicated by the well-documented cognitive limits of individuals to process and store information in memory (Allport, 1980; Baddeley, 1986).

This brings up to the issue of attracting consumers' attention to the ads. The upstream role of attention in ad memory (and ad effectiveness) has been largely addressed in previous research, which has stressed the importance of attracting and preferably holding viewers' attention for an advertised message to be perceived and memorized (e.g., Lee & Ahn, 2012). It has further been stated that advertisements that fail to gain and retain consumers' attention cannot be effective (Wedel & Pieters, 2000). The role of attention in memory is clearly supported by recent advances in the field of cognitive neuroscience, which shed new light on how attention modulates the encoding and storing of information in memory in the context of information-rich environments. Using high-resolution neuroimaging to investigate processing at the neural level, they show that attention during encoding affects both subsequent memory (Chun & Turk-Browne, 2007) and the extent to which activity levels in the brain predict memory formation (e.g., Carr, Engel, & Knowlton, 2013; Uncapher & Rugg, 2009). Specifically, it has been shown that attention alters the state of a key brain structure for memory, the hippocampus, and that the extent to which this occurs predicts whether the attended information gets stored in memory (e.g., Aly and Turk-Browne, 2016). These developments support the role of attention as a means of prioritizing information in the environment that is most relevant to individuals' goals (Aly and Turk-Browne, 2016). According to theories that emphasize that stimuli compete for attention (Chun, Golomb, & Turk-Browne, 2011; Desimone & Duncan, 1995), stimuli that are unrelated to an individuals' goal are less robustly represented in sensory systems (and are thus overshadowed by relevant stimuli). Recent research in neuroscience has also highlighted the neural circuits involved in the relationship between attention and memory for dynamic stimuli such as videos (Oren et al., 2016). Using fMRI, Oren and

colleagues (2016) provided evidence that reducing participants' attention to videos (by requiring them to perform a secondary task during the videos) impaired memory for those videos. As a result, advances in cognitive (neuro)science show that advertisers' huge efforts to attract consumers' attention is justified.

However, even before the dramatic development of the Internet and online advertising, practitioners and researchers already agreed that attracting and maintaining consumers' attention in the cluttered media environment was becoming increasingly difficult (e.g., Wedel & Pieters, 2000). Needless to say, the complexity of the media environment has further increased with the development of the Internet, and so has the "attention-grabbing challenge" (e.g., Breuer & Brettel, 2012). This issue is especially relevant in online advertising where ads are usually presented surrounded by other stimuli, and are usually unwanted and unrelated to consumers' current goals (so arguably, in light of abovementioned developments in neuroscience, likely to suffer from not being prioritized by attention and robustly represented in sensory system). Consistent with this, research on ad avoidance (i.e., efforts to reduce exposure to advertising; Speck & Elliott, 1997) has shown how avoidance attitudes and behaviors may be caused by an online ad being unintended and contrary to consumers' goal (which are directed to primary content such as news articles or videos; e.g., Bang, Kim, & Choi, 2018; Drèze & Hussherr, 2003).

Purpose of the study

The purpose of the current study is to empirically examine the impact that interactivity can have on users' attention to the ad (and surrounding stimuli) and ad effectiveness. More specifically, this study aimed at comparing the effectiveness of video ads presented in two common types of online media (i.e., a popular news website and YouTube) that may include two specific features offering users easy ways of ad avoidance. The first feature relates to displaying the ad videos alongside an abundance of stimuli such as various suggested contents and a countdown timer. These surrounding stimuli may detract users' attention from the ad area (i.e., "distractibility") and may thus impair ad effectiveness. The second feature is the additional possibility for users to skip the video ads after a few seconds (i.e., "control").

To the best of our knowledge, no study has addressed this issue by using similar ads across the media and reliable measures of both consumers' attention (gaze direction) to the ad and memory of the ad. The present study assessed users' attention toward online ads using eye-tracking, because it is considered as an accurate indicator of the level of attention that results from an ad exposure (e.g., Lee & Ahn, 2012; Wedel & Pieters, 2000, 2008). Despite this, laboratory-based eye-tracking studies of media incorporating advertising are rarely reported. As for ad effectiveness, it was measured in terms of ad recall and recognition tasks, which is considered as a reliable way of examining ad effectiveness (e.g., Drèze & Hussherr, 2003; Geuens & De Pelsmacker, 2017; Lo and Lo, 2015; Percy & Rossiter, 1997; Soni, 2017).

In keeping with research in cognitive (neuro)science on the link between attention and memory (e.g., Aly and Turk-Browne, 2016; Oren et al., 2016), the following hypotheses were used:

H1. Gaze direction toward the ad area correlates positively with ad memory (for both online media).

H2. Gaze direction toward the countdown area correlates negatively with ad memory (for both online media).

H3. Ad memory is higher in the news website condition compared with the YouTube condition (as the skip ad option reduces the duration of gaze direction toward the ad).

As the study included the "traditional" television medium as a form of control condition (displaying the ads on a full screen without any surrounding distracters or skip ad option), it was also stated:

H4. Overall, ad memory is higher in the television condition compared with the two online conditions.

Finally, other results were expected with regard to participants' feeling of ad frustration:

H5. Ad frustration correlates negatively with gaze direction toward the ad area (for both online media) and with ad memory.

This study also aimed at striking the fundamental balance between control and realism (which can prove quite difficult to achieve in advertising research). The lab setting used allowed for an optimal control of the environment and for avoiding lower control associated with self-report online surveys with convenience samples from online panels or Amazon's MTurk, for instance. More important, the study used a well-controlled experimental design in which three different media showed exactly the same video ad across participants. As stressed by several researchers, ensuring that the ad content and major parts of the presentation format are similar across media is critical for examining the intrinsic, direct impact of the media, as it avoids confounding the impact of the media with the impact of the ad content (Gallagher et al., 2001; Nysveen and Breivik, 2005). However, this approach might lead to unrealistic use of the characteristics offered by the different media (e.g., using a web version of an ad with about the same minimal level of control and interactivity as the print version it is compared with) and thus to differences in quality across the media. Yet, as emphasized in a recent overview of basic guidelines for conducting experimental advertising research (Geuens & De Pelsmacker, 2017), stimulus and context realism become increasingly important due to the constant evolution of advertising and contexts. Experimental advertising research should use high-quality, professionally made stimuli that look like real advertisements and media. In line with such guidelines, the materials used in the present study were designed to allow for a realistic use of the media (i.e., high-quality, realistic stimuli that reflect the real world and incorporate the true characteristics of the differences in each media). This study was thus designed to combine internal validity (i.e., analysis of the effectiveness of identical ads, in a well-controlled environment, on a quality sample of participants) with a reasonable degree of ecological validity.

Method

Participants and introductory phase

A total of 42 females (65%) and 23 males (35%), aged 19–59 years (with a median age of 27 years) took part in the study. All participants were French-speaking and familiar with using a computer and the Internet. They were recruited by phone and face-to-face contacts, and received €15 at the end of the study in consideration for their participation. This recruiting method overcomes other methods largely used for convenience and cost reasons, such as student samples (which are quite different from "ordinary" consumers and are usually invited to participate annually in many experiments) and samples drawn from online panels and crowdsourcing websites (e.g., Amazon's MTurk), which raises major concerns (e.g., quasi-professional respondents with excessive

experience, or respondents interested only in maximizing their pay rate; see Deetlefs, Chylinski, & Ortmann, 2015; Geuens & De Pelsmacker, 2017).

Participants were greeted individually in a first room by an experimenter. They were informed about ethical issues and the overall procedure of the experiment, using a cover story to prevent participants' awareness of the real purpose of the experiment (participants were told that they were taking part in a "pretest" designed to examine how they perceive a couple of topical videos, to select some of them for the purpose of a future study). Before entering the lab and starting the experiment, they were also asked to turn off and set aside their smartphones (or other digital devices).

The design of the study included the three media as a three-level within-participants factor. It is generally agreed that within-participants designs have obvious advantages with regard to internal validity (e.g., avoiding biases relating, for example, to individual differences between groups assigned to the different experimental conditions) provided rigorous randomization and counterbalancing procedures are implemented (which was clearly the case in the present study) and to efficient use of resources and participants (see, for example, De Houwer, Thomas, & Baeyens, 2001).

Use of the three media

Following this preliminary phase, participants moved to an adjacent room where they were successively presented with the three media: television, YouTube, and the news website (from a well-known medium in participants' country). The order of the three media was systematically counterbalanced across participants (and defined for each participant before starting the experiment) to achieve a balanced distribution of the six possible orders across the whole sample (also taking into account participants' age and gender).

Regarding the online media YouTube and news website, participants rested their heads on an eye-tracker device (head movements were prevented by using a chin and forehead stabilizer), at a 28-inch distance from a 21-inch computer screen and the eye-tracker camera. Eye movements are eminent indicators of visual attention. The EyeLink® 1000 eye-tracker was used, which has high accuracy and reliability (SR Research, Canada; sampling rate of 1000 Hz; average accuracy range 0.25°–0.5°, gaze tracking range of 32° horizontally and 25° vertically; additional specifications can be found on the following webpage: http://www.sr-research.com/EL_1000.html). An initial calibration process for the eye-tracking was conducted for each participant. As for the television medium, participants were settled in a separate part of the room that looked like a TV lounge (to reinforce the ecological validity of the study). They sat on a couch at a 70-inch distance from a 31-inch TV screen, with a small lounge table placed in front (on which the remote control was placed), between the couch and the screen. No eye-tracker was used for the television medium (as the ad was displayed over the entire screen), but a camera located above the TV screen allowed us to verify that participants actually looked at the screen. Whatever the experimental condition, participants' attention was never explicitly oriented toward an experimental feature of the design. For instance, no instruction related to the countdown timer or the skip ad option in the online media conditions, nor to the remote control in the baseline TV condition.

All the media interfaces were fictitious and had been specifically created for the purpose of the study, in such a way as to fully control their content (i.e., the topical videos that participants could choose to watch, the ads previously presented, and any surrounding stimuli regarding the two online media). The YouTube and news website interfaces had been created by a web design company to mimic the real websites (see Images 1[a], (b) and 2(a), (b)).

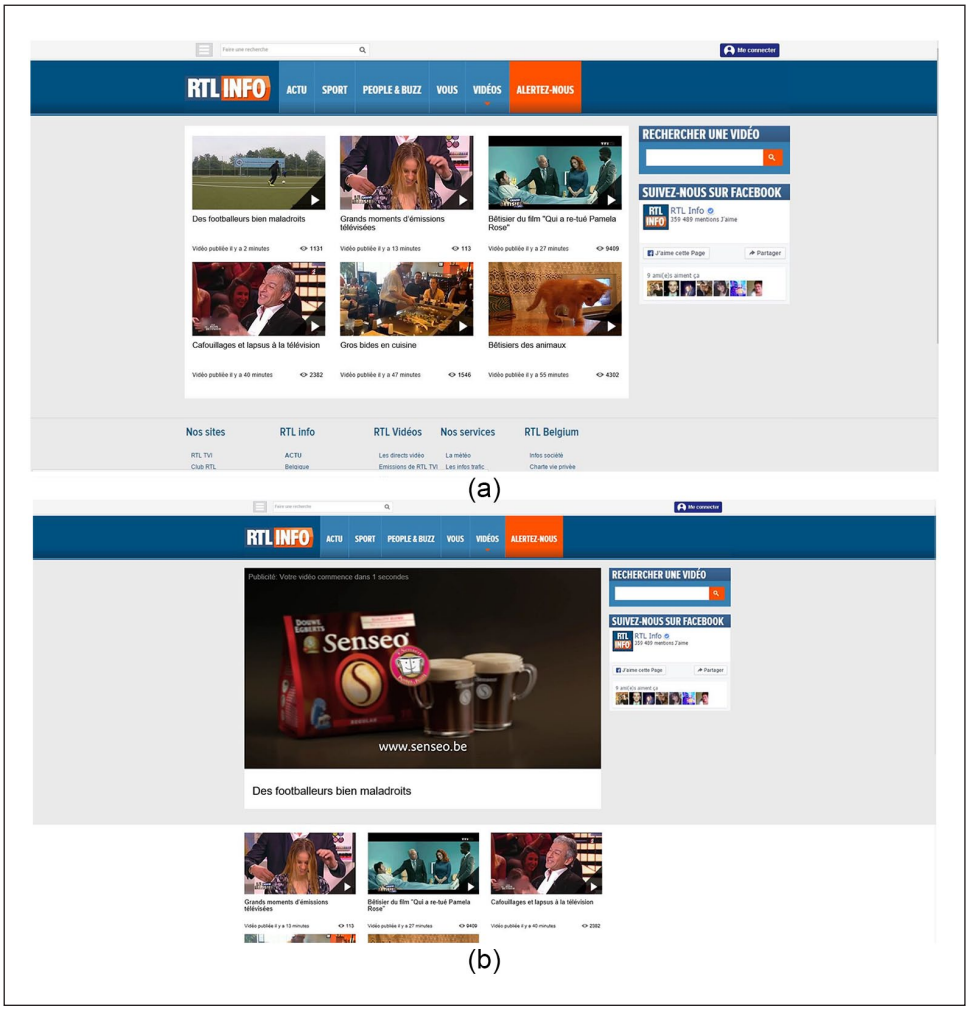

Image 1. (a) Screenshot of the news website medium used—Topical video options, (b) Screenshot of the news website medium used—Prior advertise.

For each of the three media, participants were invited to freely select a topical video from six options. Each video lasted for 60 s and consisted of a series of "blooper" videos pertaining to a specific topic (e.g., pets, cooking, sport, etc.) so that every participant might be interested in watching some of the videos. These six topical videos had been selected from a pretest (among other videos) to ensure that they were associated with some interest but not with high emotional arousal.

Once participants selected a topical video with the remote control (television) or the mouse (YouTube and news website), an unwanted 20-s ad video started. These ads had also been selected from a pretest to meet basic criteria (e.g., unknown ads, equivalent likeability and familiarity of the brands, product categories associated with a relatively low perceived importance; further details are included in the Appendix 1). These three ads were respectively aimed at females (a blender by *Braun*), at males (a razor by *Philips*), and at both females and males (coffee pads by *Senseo*). In all three ads, the brand was already displayed within the first 5 s (and more prominently at the end, as

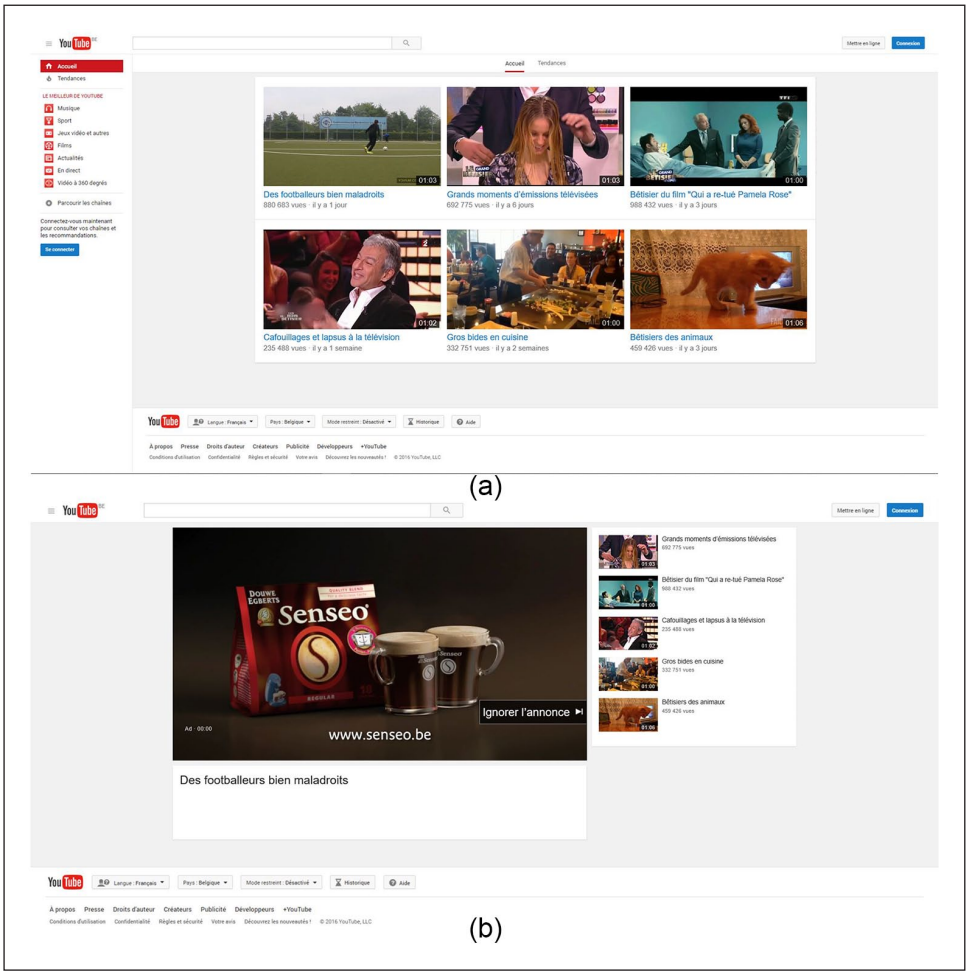

Image 2. (a) Screenshot of the YouTube medium used—Topical video option, (b) Screenshot of the YouTube medium used—Prior advertisement.

is often the case in video advertisements). In keeping with real websites, the YouTube medium gave participants the opportunity to skip the ad after 5 s (which was not the case regarding the other two media), while the news website just displayed the remaining duration of the ad (in the upper left corner of the ad frame). It is important to specify that all participants were exposed to the same three ads, but that the ad-medium pairings (i.e., which ad was presented by which medium) varied across participants to ensure that overall, each ad was presented an equal number of times by the three media.

Two eye-tracking measures were performed while participants were exposed to the ads presented by YouTube and the news website. First, the duration of gaze direction was measured, to examine the actual percentages of time, respectively, directed toward the ad area, as well as toward the area marked by the "Skip ad" sign (YouTube) or the countdown timer (news website; see images 3 and 4). Regarding the television medium, it can be reasonably assumed that participants' gaze was directed toward the ad area for virtually 100% of the ad duration time, as

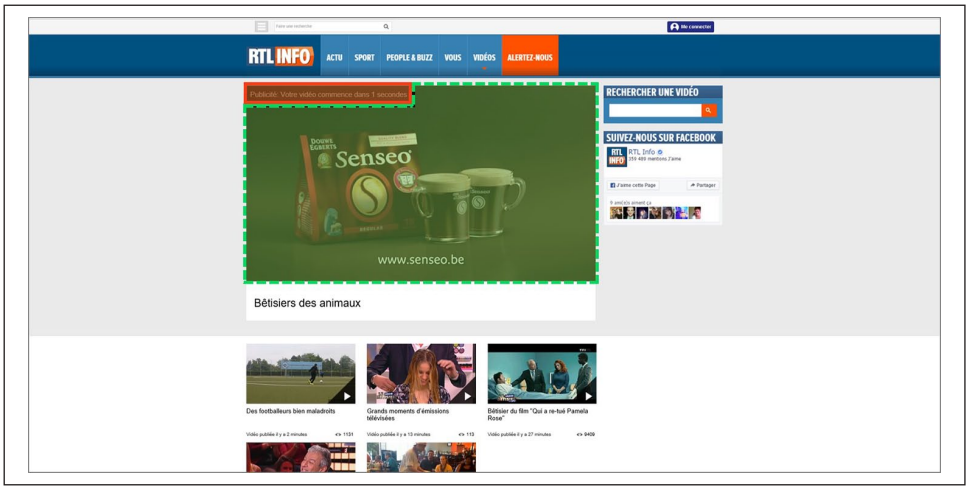

Image 3. Ad area and countdown timer area—News website.

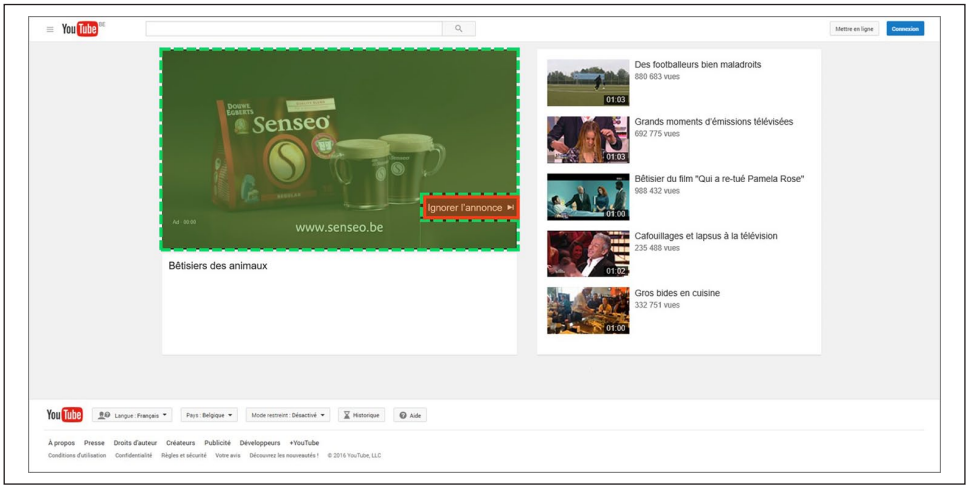

Image 4. Ad area and skip ad area—YouTube.

the ad was displayed over the entire screen (which was corroborated by means of the camera located above the TV screen). Second, the actual ad duration was also examined, regarding the YouTube medium (allowing participants to skip the ad after 5 s). Examples of eye-tracker output videos (regarding the news website and YouTube media) can be found using the following links: https://youtu.be/qxjTIo0EZhg and https://youtu.be/sw8lQBbsjwo

Post-exposure measures

Once participants had been exposed to the three media, they moved to the adjacent room where some basic measures were performed to examine the respective impact of the ads/media according to various criteria:

Memory. The main set of measures pertained to the impact on memory, which was examined with both a free recall task and a recognition task. The recall task consisted of asking participants to try remembering the three ads which they had been exposed to, prior the start of the three videos they selected on the three media. They were invited to provide any information they could remember regarding the brands, the product categories, or the design elements (e.g., people, scenery, or visuals featured in the videos). For both brand recall and product category recall, a score of "0" or "1" was given depending on whether participants were able (i.e., "1") or unable (i.e., "0") to provide the information; while for the design elements, a score of "0," '0.5' or "1" was given according to whether participants were able to recall no design element, one single design element, or several design elements, respectively. In the following recognition task, participants were randomly presented with nine ads on separate sheets of paper, each sheet with three representative screenshots per ad. These ads consisted of the three ads previously presented in the experiment, three ads of other brands featuring similar products (e.g., a razor by Gillette), and finally three ads of other brands featuring slightly different products (e.g., a facial care device other than a razor, in this case an electric toothbrush, by Oral-B. Participants were asked to indicate the ads that they had been previously presented.

Ad frustration. The next measure aimed at examining ad frustration. Participants were successively presented with the three ads (each of which was represented by three representative screenshots) and the item as follows: "It annoyed/frustrated me that this ad was presented before the video." This item was associated with a 7-point Likert-type scale ranging from "strongly disagree" ("–3") to "strongly agree" ("+3")

Media and ad familiarity. Participants were also asked to specify how often they watch videos on television, on YouTube, on the specific news website used in the study, and on news websites in general. For each of these four items, participants provided an answer among the following options: "never," "hardly ever (less than once a month)," "occasionally (one or two times a month)," "Regularly (one or several times a week)." Participants were finally asked whether they already saw the three ads before the study (to control for potential pre-exposure/familiarity). None of the participants reported to have been exposed to the ads before.

Closure of the study

At the end of the experimental procedure, participants were thanked and received €15 in appreciation for their involvement in the study.

Statistical analyses

Data were submitted to a series of distinct repeated measures analyses of variance examining gaze direction (eye-tracking) and memory performance (free recall and cued recognition) depending on different factors (media and screen area). With regard to eye-tracking, the within-subjects factors included two media (news website and YouTube) and two screen areas (ad area versus skip ad/countdown timer area). Eye-tracking data were not collected in the television condition. For ecological purposes, no chin and forehead stabilizer were used while participants were comfortably installed on the couch. Instead, a high-resolution camera was located on the top of the screen to check whether participants' gaze was directed toward the screen (on which the ads were fully displayed). In this television condition, it turned out that participants' gaze was directed toward the screen for 99% of the actual ad duration (the recorded images showed that only one participant diverted his gaze from the screen for 7 s). With regard to memory data (recall and recognition), the

Table 1. Gaze toward the different areas.

	News website	YouTube		
		All participants	Ad skipped	Ad completed
Ad area	69	51	18	69
"Skip ad" or "countdown timer" area	4	10	15	8
Rest of screen	27	39	67	23

Percentage of time in which participants' gaze was directed towards the different areas, as a proportion of the total possible amount of time of 20s. The ad area and the skip ad/countdown timer areas are shown in Images 3 and 4 (in dotted line and in continuous line, respectively).

within-subjects factors included the three media (television, news website, and YouTube) and two screen areas (ad area versus skip ad/countdown timer area). Pearson's correlations were also used in order to examine, depending on the media, the associations between memory rates and frustration, watching habits, and eye-tracking measures (for the two online media). The alpha was set at 0.05 and partial effect sizes (η_p^2) are specified in the statistics. An η_p^2 of .02 or less is considered as small, .13 as medium, and .26 or higher as large (Cohen, 1988).

Results

Gaze direction

In line with the hypothesis, results have shown a significant impact of the media on gazing behavior and ad effectiveness. Table 1 shows the percentages of time in which participants' gaze was directed toward the different areas of the interfaces, as a proportion of the total ad duration (20 s). While the ad was displayed over the entire screen for the television medium, two different areas were isolated regarding the online media interfaces. They included for YouTube the ad area and the skip ad area, and for the news website the ad area and the countdown timer (remaining time).

The first major type of data relates to gazing behavior. As for the two online media central to the study, the eye-tracking data showed that gaze duration toward the ad amounted to 69% (news website) and 51% (YouTube), and that the type of media interacted with the different areas (ad area versus skip ad/countdown timer area; $F_{1, 63} = 85.37, p < .001, \eta_p^2 = 0.58$; see Table 1). Compared with YouTube, in the news website, participants spent more time looking toward the ad area and less time looking toward the countdown timer (compared with YouTube's skip ad area; see Table 1 and Figure 1). With regard to YouTube, the percentage of time on the ad area was further reduced when considering the 22 participants (34%) who decided to skip the ad before it was completed. In fact, they spent only 18.3% ($SD = 11\%$) of the ad duration actually gazing toward the ad area. They looked toward the skip ad area for 15.4% ($SD = 10\%$) of the remaining time, and the ad was skipped for 37.9% of its 20-s duration.

Ad effectiveness (memory)

Free recall task. Importantly, these results paralleled those related to ad effectiveness (examined through participants' memory of the ad). Free recall of the brand was significantly affected by the media ($F_{2, 63} = 6.24, p < .01, \eta_p^2 = 0.17$). Compared with the television medium (42% accuracy), participants' recall of the brand was significantly lower for the news website (34%) and especially YouTube (15%, $F_{2, 62} < 1$, *ns*; confirming H4 and H3, respectively). Similar trend effects emerged

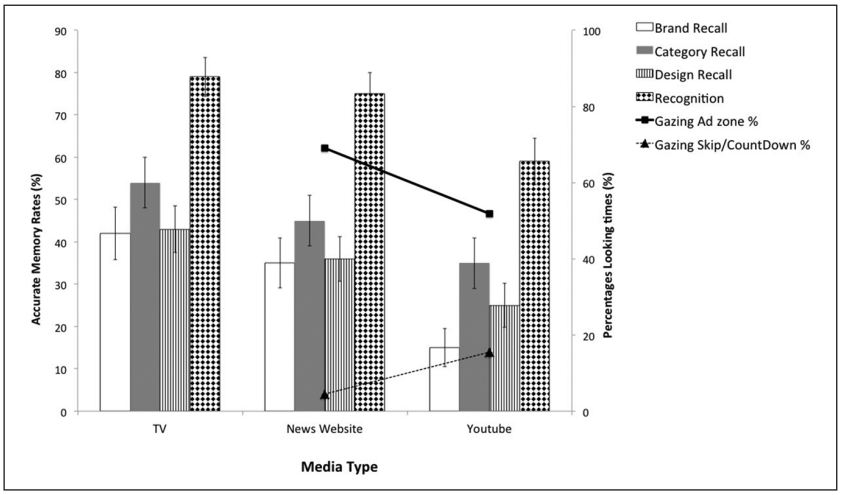

Figure 1. Memory for the ad and gaze durations.

for both the recall of the product category ($F_{2, 63} = 2.20, p = .12, \eta_p^2 = 0.07$) and of the design elements of the ad ($F_{2, 62} = 2.77, p = .07, \eta_p^2 = 0.08$; see Figure 1). The negative impact of the skip ad option (H3) was confirmed by results regarding specifically YouTube and showing that participants who skipped the ad were significantly less accurate at recalling the brand (18%; $F_{1, 63} = 6.01$, $p < .02, \eta_p^2 = 0.09$) and the product category (35%; $F_{1, 63} = 4.77, p = .03, \eta_p^2 = 0.07$), in comparison with participants who did not skip the ad (36% and 50%, respectively) (see Figure 1).

Recognition task. These results were complemented by data provided by a cued recognition task in which participants were invited to indicate, on the basis of representative screenshots, the three previously presented ads embedded among six novel ones. Findings showed a significantly lower recognition rate for YouTube (59%) than for the news website (75%; $p < .05$) and television (79%; $p < .01$). This lower YouTube's score can actually be attributed to participants who skipped the YouTube ad, who were significantly less accurate at identifying the three accurate ads (39%) than participants who did not skip the ad (79%; $F_{1, 63} = 10.42, p < .01, \eta_p^2 = 0.14$). This translated into a significant interaction between whether a group skipped the YouTube ad and the type of media ($F_{2, 62} = 3.37, p < .05, \eta_p^2 = 0.10$), as a significant effect of media was found only in the group of participants who skipped the YouTube ad (39%, 71%, 77%; for YouTube, the news website, and television, respectively), unlike in the group of participants who did not skip the YouTube ad (79%, 80%, 80%; for YouTube, the news website, and television, respectively).

Gaze direction and ad effectiveness

The link between gaze direction and ad effectiveness (H1 and H2) was confirmed by correlational analyses. Regarding YouTube, participants' gaze toward the ad area correlated positively with memory for the ad (recall of the brand and of design elements, and recognition; see Table 2). Conversely, the time participants spent gazing toward the skip ad area correlated negatively with memory for the ad, for both the recall and the recognition rates. In other words, ad effectiveness was positively (negatively) related to looking toward the ad area (skip ad area). Regarding the news website, gaze direction toward the countdown timer correlated negatively with brand recall

Table 2. Eye-tracking and memory.

Memory types/Display zones			
News website	Ad area	Countdown area	Rest of screen
Brand recall	.221†	–.248*	–.145
Product category recall	.143	–.071	–.124
Design elements recall	–.034	–.089	.066
Cued recognition rates	.087	–.064	–.069
YouTube	Ad area	Skip ad area	Rest of screen
Brand Recall	.285*	–.263*	–.225†
Product category recall	.063	–.303*	.049
Design elements recall	.250*	–.314*	–.163
Cued recognition rates	.435***	–.384**	–.350**

Correlations between eye-tracking measures and memory rates, as a function of the media and the screen areas.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3. Frustration, users' habits, eye-tracking, and memory. Correlations between frustration, watching habits, eye-tracking measures (for the two online media) and memory rates, as a function of the media.

	Ad frustration toward the media			Frequency of users' watching habits toward the media		
	TV	News website	YouTube	TV	News website	YouTube
Brand recall	–.11 (.13)	–.23† (–.13)	–.44*** (.17)	.12	–.08	–.35**
Category recall	–.08 (.02)	–.27* (.01)	–.22† (.17)	–.01	.09	–.27*
Design elements recall	.00 (.23†)	–.13 (–.18)	–.20 (.01)	.08	–.20	–.06
Cued recognition rates	.00 (.01)	–.28* (–.21†)	–.27* (.16)		.02	–.29*
Gaze toward ad area		–.17 (–.12)	–.44*** (–.03)		.18	–.34**
Gaze toward countdown timer/skip ad		.19 (.11)	.49*** (.08)		.02	.26*

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

(while the positive correlation between gaze direction toward the ad area and brand recall was marginally significant).

Gaze direction, memory for the ad, and frustrated feelings

Finally, as shown in Table 3, ad frustration following unwanted ad presentation correlated negatively with gaze direction toward the ad (for the YouTube medium only; partially supporting H5) and with memory for the ad (for both online media; supporting H5). With regard to YouTube, a negative correlation was also observed between frustration and use frequency.

Discussion

This study aimed at examining how viewers' attention to the ad and ad effectiveness can be impaired by interactivity and control offered by online media. It shows that, compared with the traditional television medium, memory for the ad is significantly reduced with the two online media used, when the ads are presented with surrounding stimuli (including a countdown timer or "skip ad" area) and—especially—when participants are given the opportunity to control (skip) the ad. It can reasonably be assumed that YouTube ad effectiveness may even be overestimated in this study, as only 34% of the participants actually "dared" skipping the ad in the context of the experiment (most likely fewer than in real life).

As such, although previous studies emphasized the positive impact control may have on users' subjective experience and attitude toward the ad, it is worth clarifying that distractibility and control (widely associated with rich and interactive media) may have a detrimental effect when it comes to actual ad effectiveness. More specifically, while the link between ad attention and ad memory (effectiveness) had already been addressed by previous research, a contribution of this study is to provide data emphasizing the scale of ad effectiveness decrease that may occur when the media interfaces include various stimuli surrounding the ads as well as a countdown timer or a skip ad option.

This study also provides insights into how ad attention and ad effectiveness may relate to ad frustration (i.e., frustrated feelings resulting from the unsolicited ad being presented before the selected video). Regarding the YouTube medium, greater ad frustration was associated with gaze direction being reduced toward the ad area and increased toward the skip ad area, and with less ad effectiveness. In other words, participants with greater ad frustration showed greater ad avoidance behaviors, which may be manifested as both gazing and ad skipping behaviors. While previous research has emphasized the link between ad irritation (which closely relates to frustration) and ad avoidance (e.g., Cho & Cheon, 2004; Edwards, Li, & Lee, 2002; Goodrich, Schiller, & Galletta, 2015; Li, Edwards, & Lee, 2002), the present study shows how frustrated feelings caused by an unsolicited ad may be associated with specific ad avoidance behaviors in the context of a rich medium offering users such a "skip ad" opportunity. This highlights that advertising professionals should be sensitive to factors increasing these unpleasant feelings, such as the amount of advertising stimuli (e.g., video, banner, or pop-up ads) on the medium and the perception of users that this is excessive (i.e., "perceived ad clutter"; e.g., Elliott and Speck, 1998). Other factors influencing users' irritation may relate to the ad content. For example, Aaker and Bruzzone (1985) found greater irritation when commercials emphasized an unattractive or unsympathetic character, poor casting, an unbelievable situation, a threatened relationship, or a graphic portrayal of physical discomfort. Conversely, irritation was reduced when the ads conveyed a credible spokesperson, a happy mood, humor, or useful information. In the present study, similar correlations with detrimental ad avoidance behaviors in the YouTube condition were also found with regard to users' familiarity with the medium. These results thus stress that being more familiar with such a medium also involves being more familiar with using the means it offers to avoid the ad, such as focusing on the "skip ad" option, at the expense of the ad (and of ad effectiveness).

The findings of this study thus contribute to the literature on ad avoidance by showing how this avoidance may translate into consumers' propensity to focus on a countdown timer and to use a skip ad opportunity, and how such avoidance behaviors may relate to ad frustration and familiarity with the medium. This is especially the case as other major factors influencing ad avoidance did not vary across the three media used, such as ad-related factors (e.g., ad credibility: Jin & Villegas, 2006; ad informativeness and ad entertainment: Edwards et al., 2002; Kim, Choi, Kim, & Yeh, 2013), since the different ads used in this experiment were equally likely to appear across the three media.

Overall, this study thus puts into perspective the advertising impact of one of the most dominant video advertising formats on YouTube and elsewhere online, namely the "in-stream video

advertising" (in which short video ads are played on the interface prior to the user-selected video content). Of course, these data do not question in any way the value of the Internet as a fantastic tool for advertisers to reach their target consumers—especially as more and more consumers around the world are intensively using online media (e.g., YouTube statistics, 2017), in particular among the millennial or "digital native" generation. Rather, they emphasize how important it is for advertisers to try to reduce the detrimental impact "distractibility" and "control" might have on their online ads, for example, by designing ads that prove especially effective in attracting (and maintaining) consumers' attention and interest in the context of rich and interactive websites; or by paying close attention to the level of distractibility/control involved in the media they are considering when developing a media plan (i.e., avoiding media with particularly high levels, when relatively similar but lower-level options are available). Also, while interactive technologies have been increasingly used to disseminate commercial messages, the current study suggests that "traditional television" still remains a relevant advertising medium, which may prove more capable of prompting consumers to process—and be impacted by—the ad content. As a result, these findings may help marketers to identify the ideal marketing mix that will translate to the best possible return on ad spending or marketing investment.

With regard to limitations, ad memory is only one way of measuring ad effectiveness, and that it would have been useful for such a study to include other measures such as attitude toward the brands and toward the ads (which are also considered as major indicators of ad effectiveness; e.g., Belanche et al., 2017). However, it was reasonably assumed that the quite familiar brands used in the study were already associated with established attitudes, which could hardly be shaped by just presenting one (additional) ad via a specific medium instead of another (and to some extent, the same line of reasoning may also hold for attitude toward the ads). Extending the analysis to viewers' attitude toward the ads and the brands would have required using ads for unknown brands. However, after considering several options (e.g., ads in the same language but for local products which are available/known only in other countries), we reached the conclusion that it would have implied having created ads specifically for the purpose of the study, which might be somewhat unrealistic.

Also, it may be argued that the environment of the study was not as conducive as real-life contexts to advertising avoidance. This limitation could arguably be especially problematic for the television medium. First, no participant used the remote control (placed on the lounge table) to skip the television ads. Nevertheless, skipping behaviors were also underestimated regarding the YouTube medium, as previously noted. In addition, the possibility for TV viewers to fast forward the ads only applies when watching recorded TV programs (but not live programs). It may consequently be argued that, to a fairly large extent, the absence of fast-forwarding reflects reality. A second factor that may have discouraged ad avoidance was that the lab setting did not contain various real-life distracters and devices that may detract attention from the screen showing the ads, and that may even lead to performing concurrent tasks (e.g., using a smartphone or tablet while ads are delivered via the television). However, recent studies suggest that television advertising still has the effect of increasing sales, even in a more active cross-media environment (Taylor et al., 2013), and that media multitasking is not always detrimental to memory for the ad (e.g., Angell, Gorton, Sauer, Bottomley, & White, 2016). As a result, television and advertising professionals should not be overly pessimistic about the increasing trend of media multitasking, which is also in keeping with the present study that contributes to supporting the major role that television advertising can still play to reach the consumers.

Finally, this lab experiment did not consider a variety of factors that can potentially moderate ad effectiveness in the context of online media such as those used in this study. Such factors may relate to the ad (e.g., ad duration, amount of time before consumers are able to skip the ad, countdown timer position, level of "noise" surrounding the ads, general layout of the interfaces, persuasive content included in the ads), to the device used (e.g., desktop PC, tablet, smartphone), or to the consumers (e.g., personality traits, previous exposure to identical ads). Examining how

such factors may moderate the impact of "distractibility" and "control" in the context of interactive websites raises a useful avenue for future research in advertising.

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Appendix 1

Pre-test of the ads

A total of 15 females and 15 males, aged 20–56 years (with a median age of 29 years) took part to the pre-test aimed at selecting the three ads to be used in the study. These participants were randomly exposed to nine different ads, which had been preselected based on an a priori assessment of comparability with regard to the evaluative criteria according to which participants were asked to assess each ad (see Table 4). The three ads used in the study were selected because they were quite similarly evaluated as unknown ads, relatively pleasant but not really exciting, dealing with familiar brands that have a moderate level of likeability, and with product categories associated with a relatively low perceived importance.

Table 4. Pretest regarding the three ads that were selected for the study.

	Scale	Blender by *Braun*	Razor by *Philips*	Coffee pads by *Senseo*
I had already seen this ad before	"No" (0) / "Yes" (1)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
This ad is pleasant	5-point Likert-type scale ranging from "Not at all" (1) to "Definitely" (5)	3.77 (.97)	3.69 (1.08)	4.16 (0.84)
This ad is exciting (emotionally intense)	5-point Likert-type scale ranging from "Not at all" (1) to "Definitely" (5)	1.96 (.86)	2.09 (.75)	2.68 (1.19)
I know this brand	"No" (0) / "Yes" (1)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
I like this brand	5-point Likert-type scale ranging from "Not at all" (1) to "Definitely" (5)	3.23 (.94)	3.31 (1.05)	3.35 (.88)
Purchasing such a product is typically a very important decision	5-point Likert-type scale ranging from "Not at all" (1) to "Definitely" (5)	1.84 (1.09)	1.71 (1.14)	1.43 (.98)

For each criterion, the table shows the rating scale used, as well as the mean and standard deviation (in parentheses).