S. Adam Brasel & James Gips

Breaking Through Fast-Forwarding: Brand Information and Visual Attention

This research explores how fast-forwarding through commercials alters the visual attention of viewers and how marketers can tailor advertisements to retain effectiveness as digital video recorder usage rises. Building on prior work in visual marketing and perceptual psychology, the authors conduct two eye-tracker studies that show how fast-forwarding viewers pay more attention during commercials, but their attention is heavily limited to the center of the screen. Fast-forwarded advertisements containing brand information at screen center still create brand memory even with a 95% reduction in frames and complete loss of audio, whereas advertisements with brand information located elsewhere are of virtually no value. A third study shows that fast-forwarded commercials containing extensive central brand information can positively affect brand attitude, behavioral intent, and even actual choice behavior. These findings show that marketers can counteract the negative effects of digital video recorders by ensuring that their advertisements are heavily branded and that the branding is centrally located.

Keywords: fast-forwarding, visual attention, eye tracking, television advertising, digital video recorder

> I discovered in 2003 that the heads of NBC's news division and entertainment division, the president of the network, and the chairman all owned TiVos, which enabled them to zap past the commercials that paid their salaries. "It's such a great gadget. It changed my life," one of them said at a corporate affair in the Saturday Night Live studio. It was neither the first nor the last time that a television executive mistook a fundamental technological change for a new gadget.
>
> —John Hockenberry (2008, p. 65)

Rapid advancements in technology have given consumers increasing interactive control over traditionally passive media. For example, consumers now use digital video recorders (DVRs) to time-shift shows and skip through commercial breaks. Digital video recorders have raised concerns about the removal of ad content from an ad-supported medium (Poltrack 2006), and marketers are growing increasingly vocal as DVRs move toward mainstream market penetration. Nielsen Media Research estimates that 20% of U.S. homes had DVRs as of mid-2007 and predicts that this number will rise to greater than 40% by the close of the decade. Recent research finds that essentially all DVR users fast-forward through advertising (Goetzel 2006), and marketers are no longer willing to ignore this shift in television-viewing habits. A survey of large national advertisers (Bernoff 2004) revealed that 75% planned to cut back their televised advertising in response to the rise in DVR usage, and 70% responded that DVRs would "reduce or destroy" the usefulness of traditional 30-second commercials.

Although DVR companies have experimented with superimposing branded banners over fast-forwarded advertisements (Shim 2005), placing extra advertisements at the end of recorded shows (Gonsalves 2006), or adding "telescoping advertisements" (Reading et al. 2006), these methods have unknown effectiveness. Some companies advocate solutions such as disabling the fast-forward button during commercials (Stross 2006), but such drastic measures would meet strong consumer resistance. Rather than attempting to eliminate fast-forwarding, a more productive strategy for marketers may be to make their television commercials as effective as possible when consumers view them in a fast-forwarded mode. Research devoted to this idea remains sparse, however, and the current literature can suggest little about how fast-forwarded advertisements are processed.

As the nascent visual marketing literature (Wedel and Pieters 2007) calls for further research on visual search in television advertising and how consumers actually experience advertising (Lull 1998; Vakratsas and Ambler 1999), two key questions drive our exploration. First, how does fast-forwarding through commercials change a viewer's visual search pattern and perception? Second, given a better understanding of how fast-forwarding affects perception, what marketer-controllable elements can influence the effectiveness of fast-forwarded advertisements? This question has particular relevance given that television advertising still accounts for more than 24% of total U.S. advertising expenditures (*Advertising Age* 2006). Although some prior work has suggested that fast-forwarded advertisements can retain a measure of benefit for less complex out-

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comes, such as brand memory (Friedman 2006; Greene 1988), explanations of what differentiates more effective from less effective fast-forwarded advertisements remain scarce, and little work explores differences between various measures of ad effectiveness, from brand memory to brand attitude and choice behavior. The research we report herein explores marketer-controllable ways to maximize traditional television advertising effectiveness in the face of the fast-forwarding threat presented by rapidly increasing DVR adoption.

To provide a foundation for our studies, we draw on visual marketing and perceptual psychology research to build predictions as to how fast-forwarding may change the visual search pattern and how brands can maximize the effectiveness of their advertisements when fast-forwarded. In Study 1, we use eye-tracker technology to compare active and passive fast-forwarding viewers with regular-speed viewers and explore how fast-forwarding changes viewers' visual search patterns. Study 2 separates the effects of top-down diagnostic and bottom-up central attention capture to determine which screen locations maximize attention. Study 3 explores whether effects on brand memory can translate into more complex advertising outcomes, such as brand attitude, behavioral intent, and actual behavior. Our findings offer key implications both for visual marketing theory and for marketing practitioners and represent some of the first explorations of the effects of the changing video media environment on visual search patterns within a marketing context.

Maximizing Fast-Forwarded Ad Effectiveness

As video cassette recorders gained market penetration in the 1980s, studies explored the effects of "zipping" through commercial pods.[1] Early commercial fast-forwarding estimates ranged from 60% to 91% (Cronin and Menelly 1992; Yorke and Kitchen 1985), and people zipped through entire commercial pods rather than selecting individual commercials to avoid. Fast-forwarding appeared to have a strongly negative effect on brand memory for unfamiliar advertisements (Martin, Nguyen, and Wi 2002; Stout and Burda 1989). Although further empirical research has shown that advertisements previously seen at normal speeds retain some effectiveness when fast-forwarded (Gilmore and Secunda 1993; Goode and Dobinson 2006), the increasing rate of DVR adoption suggests that many viewers have no prior normal-speed exposure to many advertisements, because more than 80% of DVR users skip "most or all" commercial exposures (ABI Research 2007).

Most work on the effects of fast-forwarding focuses on how fast-forwarding changes the media environment by reducing the length of commercial exposure and eliminating audio, which in turn limits attention to and elaboration on ad content (Unnava and Sirdeshmukh 1994). Prior advertising literature has suggested that marketers can ensure that viewers remain attentive by varying the length and timing of commercial pods because this disrupts the "rhythm" of the advertisements (Danaher 1995). However, objective measures, such as ad length or ordinal position within the show, have exhibited no conclusive effects on traditional outcome measures during fast-forwarding (Baumgartner, Sujan, and Padgett 1997; Singh and Cole 1993).

Prior work has also posited a brand dominance concept, arguing that commercials with greater brand name and logo (hereinafter, "brand information") presence better retain their effectiveness when fast-forwarded. Mere exposure effects (Baker 2003; Zajonc 1968) and low-involvement learning models (Smith and Swinyard 1983) support the idea that brand exposure, however brief, can lead to increased positive affect for future brand interactions. However, the proposition that heavily branded advertisements enjoy increased recall or recognition when fast-forwarded has received limited support in the literature (Lee and Lumpkin 1992; Metzger 1986). Although recent work on Internet advertising suggests that increased brand duration leads to greater brand memory (Danaher and Mullarkey 2003), evidence that strongly branded television advertisements enjoy increased retention in fast-forwarding conditions is not yet conclusive (Stout and Burda 1989).

Fast-Forwarding and the Visual Search Pattern

Little research has explored how the changing media landscape affects consumers' perceptual processes. Yet by drastically changing the visual stimuli presented, fast-forwarding should alter a viewer's visual attention patterns. Early advertising research shows that the percentage of time spent looking at the screen affects brand memory (Thorson, Friestad, and Zhoa 1987), and further studies suggest that screen attention is halved during commercial pods (Krugman, Cameron, and White 1995). Because the literature has called for further explorations of how the difference between advertising and show content can lead to changes in perception (Lull 1988) and given that visual attention is a key driver of advertising effectiveness, a better understanding of these changes can illustrate how to make fast-forwarded advertisements more effective.

Visual cognition research implies that fast-forwarding may put viewers into a more active and goal-driven visual processing state (i.e., Janiszewski 1998). Goal-driven states often result in increased attention because the person must actively search for goal-diagnostic stimuli (Desimone and Duncan 1995; Yantis and Johnson 1990). Unlike normal viewers, who frequently "tune out," change channels, or leave the room during commercials (Yorke and Kitchen 1985), actively fast-forwarding viewers must remain attentive for the signal that informs them that they have reached the end of the commercial pod (Greene 1998). Advertising research implies that the viewer's increased attention necessary to know when to stop fast-forwarding (Martin, Nguyen, and Wi 2002), or the greater mental activity engendered by the rapid scene changes (Smith and Gevins 2004), may mitigate the negative effects of fast-forwarding, but these claims have not been subject to empirical investiga-

[1]A "commercial pod" refers to a group of commercials and nonprogram materials; a "commercial break" refers to the "hole" in the program into which the commercial pod is placed. The two terms are similar but not interchangeable.

tion. If fast-forwarding causes a shift from passive to active visual processing, viewers who actively fast-forward should exhibit greater attention than viewers who see the pod at normal speed or have no control over speed.

H_1: Viewers who actively fast-forward exhibit higher attention during commercials than those who view commercials at normal speeds or those who have the commercials automatically fast-forwarded.

Viewers also should reveal different visual search patterns between normal and fast-forwarded content. Traditionally, the visual search system is drawn to motion (Folk, Remington, and Wright 1994; Franconeri and Simons 2003), but by removing narrative consistency and dropping the majority of frames from playback, fast-forwarding eliminates most motion cues as the scene rapidly shifts during the accelerated presentation. In essence, the entire screen becomes a constant motion cue because fast-forwarding also eliminates motion-path-initiation cues that are highly effective at capturing visual attention (Abrams and Christ 2003; Hillstrom and Yantis 1994). Therefore, people watching fast-forwarded advertisements should exhibit less motion in their visual search pattern than those watching the commercial pod at regular speed.

In addition to the lack of perceived motion, the rapid delivery of fast-forwarded frames in DVR playback should reduce consumers' incentive to move their focal visual attention. The eye moves in small, saccadic jumps (Cassin and Rubin 2006), each of which takes from 20 to 200 milliseconds to initiate and execute. When the time to execute a saccade is added to visual signal detection latency (50–200 milliseconds) and the 200–300 milliseconds necessary to process the newly viewed area, 5.4 to 14 seconds of the original show will have passed (assuming a common 20× fast-forwarding speed). This likely renders the initial movement pointless because the original source that triggered the movement will no longer be on the screen at the intended location. To compound this effect, there is a refractory period of approximately 150 milliseconds before the visual system can make another saccadic movement. Therefore, stimulus tracking becomes exceedingly difficult for fast-forwarding viewers. In such a visual environment, it makes little sense to chase fleeting visual stimuli; people should inhibit their visual motion and reduce the distance covered by the visual search process.

H_2: Viewers who observe fast-forwarded commercials exhibit reduced visual search motion and a smaller overall visual search field than viewers who observe commercials at regular speed.

There should also be differences between someone who actively fast-forwards and someone who passively views fast-forwarded content. Previous work in psychology and visual marketing has suggested that the more active process of fast-forwarding leads to more focused attention (White, Rayner, and Liversedge 2005), but these findings have not been tested in media consumption or marketing contexts. A person's state of vigilance influences the size of the useful visual field (Roge, Kielbasa, and Muzet 2002), and prior work in visual processing has shown that an increased cognitive load tends to shrink the active visual field (Rantanen 2003). In addition, research in scene–target congruency has suggested that viewers hyperattenuate toward potential signal areas and limit their attention to signal-inconsistent areas (Neider and Zelinsky 2006). Therefore, viewers who actively fast-forward should have smaller visual search patterns and attend to smaller areas of the screen than someone who views commercials fast-forwarded by someone else.

H_3: Viewers who actively fast-forward through commercials constrain their visual attention to a smaller area of the screen than those who passively view fast-forwarded commercials.

Visual Search and Advertising Effectiveness

The predictions regarding the effects of fast-forwarding on visual search provide a potential explanation of the limited support for brand information driving fast-forwarded brand memory. If fast-forwarding viewers pay more attention but focus on a small portion of the screen, measuring the overall amount of brand information in a commercial may be misleading. Much of the branding could fall outside viewers' visual attention, and advertising effectiveness may occur only when consumers directly attend to the brand information (Wedel and Pieters 2000). Although this should apply at both fast-forwarded and normal viewing speeds (Krugman et al. 1994), the effect may be stronger for fast-forwarding viewers as a result of their more tightly focused visual search patterns. In addition, prior work has shown that increased attention dampens peripheral vision (Pestilli and Carrasco 2005; White, Rayner, and Liversedge 2005), and thus brand information directly within a viewer's visual attention when fast-forwarding may gain elevated importance.

H_4: (a) The amount of brand information visually attended to predicts advertising effectiveness, and (b) the predictive power is strongest among viewers who actively fast-forward.

We predict that fast-forwarding participants will attenuate their vision to a smaller screen area and that only brand information in that area will drive brand memory. Can we also predict the most effective screen locations for brand information placement? Many networks provide a visual signal that the commercial break is ending, known as a "commercial bumper." Most bumpers place a large network or program logo in a relatively central screen position for 2–8 seconds. If people constrain their vision to areas in which they expect a diagnostic signal (Neider and Zelinsky 2006), brand information located in the same area should enjoy increased visual attention. Preliminary work also finds early evidence for an overall visual bias toward the center of the screen (Tosi, Mecacci, and Pasquali 1997), and human–computer interaction work on movie perception suggests that the central area of the screen encompasses the majority of visual attention (Goldstein, Woods, and Pelli 2007) for involved viewers. This central bias, combined with the elimination of motion cues, suggests that the central area of the screen should attract even more attention from viewers fast-forwarding through commercial pods. In addition, the potential attention-capturing power of the bumper logo as a diagnostic cue suggests that a central bumper area provides

the key location in which to place brand information to maximize ad effectiveness.

H_5: The amount of brand information placed in a central diagnostic area of the screen drives ad effectiveness for fast-forwarding viewers.

H_6: Among fast-forwarding viewers, brand information placed in a central diagnostic area of the screen better predicts ad effectiveness than brand information outside the center of the screen or brand information overall.

Study 1: Fast-Forwarding and the Visual Pattern

To test the hypotheses, we conducted an eye-tracker study in which participants viewed a custom-edited 24-minute television show with commercials under three different viewing conditions. We used two separate fast-forwarding conditions because most current studies of advertising effectiveness treat fast-forwarding as an "on-or-off" condition; we also wanted to explore differences between viewers who actively control and those who merely watch fast-forwarded content. This is an important distinction because television frequently is viewed in social contexts in which only one viewer has control of the remote. Therefore, the experimental design attempted to separate the motivational effects of actively fast-forwarding, such as increased attention and goal-driven visual search, from the environmental effects of viewing fast-forwarded material, such as reduced exposure time and loss of audio. An eye-tracker-based methodology offers several unique advantages in this context. Previous work has used eye trackers to explore print and Web advertisements (e.g., Jones, Stanaland, and Gelb 1998; Lohse 1997; Rayner et al. 2001; Wedel and Pieters 2000), but gazepoint measures of visual attention to dynamic media, such as television commercials, remain rare. The eye-tracker system enables us to explore moment-by-moment differences in the visual attention (Rayner 1998), which are of critical importance when exploring television advertising (Elpers, Wedel, and Pieters 2003).

Method

Stimuli. We placed a series of commercial pods within an edited program to maximize external validity within experimental constraints (Winer 1999). An aquatic nature show (*Blue Planet: Seas of Life*) from the BBC and Discovery Channel served as the stimulus. The first 30 minutes of the program were edited into a 14-minute show block with five commercial breaks. The show began by displaying a *Wild Discovery* show bumper from the Discovery Channel. The logo in the bumper filled approximately 15% of the screen and was visually salient (see the Appendix). The bumper was placed at the end of the first and fourth commercial break and in the middle of the final commercial break to provide an action-oriented test of whether the bumper serves as a stopping signal for fast-forwarding viewers.

We selected 16 advertisements from 15 hours of recorded Discovery Channel programming, encompassing a wide range of product categories and creative executions, to create the commercial pods. The five pods of 3 to 6 advertisements each simulate a traditional distribution of advertisements during a full one-hour show, in that 4 advertisements appear twice and 1 advertisement appears three times (study time line tables are available for all studies at www2.bc.edu/~brasels/BreakingFFTimeline.pdf). The completed show lasted approximately 24 minutes and was loaded into a TiVo DVR for display. A second, 14.5-minute version of the show consisted of a rerecording in which the experimenter fast-forwarded through the commercials using the second level of speed (20×) because the first level (3×) appeared unrealistically slow according to the usual user pattern of fast-forwarding through an entire commercial pod.

Participants, design, and procedure. Forty-eight undergraduate students at a U.S. East Coast private university participated in exchange for a $10 gift certificate from a leading online retailer. We randomly assigned participants to conditions while balancing gender within condition. The requirements of the eye-tracker methodology demanded that experimenters run participants individually, with each participant taking approximately 45 minutes to complete the study protocol.

The study used a three-level—viewer fast-forwards (self-FF condition), automatic fast-forwarding (auto-FF condition), and no fast-forwarding (no-FF condition)—between-subjects design. After entering the lab and signing consent forms, participants completed a survey of basic television and DVR usage. We explained the eye-tracker system (an ASL 6000 corneal-reflection, desk-mounted unit) and provided an introduction to the TiVo DVR to all participants. Those who would be viewing the show at normal speed (no-FF) heard an explanation of the basics of DVR operation. Participants in the auto-FF condition viewed an example of what DVR fast-forwarding would look like at the 20× speed using a video clip unrelated to the study stimulus. We instructed participants in the self-FF condition to fast-forward through the commercial breaks at the 20× fast-forwarding speed and allowed them to practice fast-forwarding and returning to normal play speeds using the same video clip the auto-FF participants viewed.

Participants then were calibrated on the eye-tracker system by fixating on a nine-point grid on the screen. Following this, the eye tracker began recording, the TiVo video source was activated, and the respective show started for each condition. During the stimulus exposure, one experimenter attended to the eye-tracker system to ensure that the device was capturing data properly, and the other surreptitiously watched the participant to ensure that he or she was following protocol. After the stimulus exposure, participants completed a paper survey with the dependent measures and covariates, received their compensation, and were debriefed.

Measures

Survey measures. We recorded the survey measures in two questionnaires, before and after the stimulus, created using procedures similar to those of Bradburn, Sudman, and Wansink (2007). The prestimulus measures were questions related to television and DVR usage, preferences for various show genres, and frequency of fast-forwarding through

advertisements. The more extensive poststimulus survey first asked a series of free-response recall questions about which advertisements participants saw and provided affective measure rating scales for the show (i.e., interesting, exciting, informative; all seven-point Likert scales). Next, brand memory was operationalized through a series of ad recognition scales, anchored by "definitely wasn't shown" and "definitely was shown," with "not sure" as the midpoint; this measured brand recognition as analogous to aided recall. The recognition items included the 16 brands actually advertised during the program and 12 distracter brands that were not advertised. Participants in the self-FF condition also answered free-response and Likert questions about the nature of their "stopping strategy." Finally, all participants provided their opinions of advertising overall and within the show, again using Likert scales.

Eye-tracker measures. The eye-tracker system gave two key outputs. First, a data file with gazepoint coordinates and pupil dilation at 60 frames per second was created for each participant. Second, a video file of the viewer's stimulus exposure with the gazepoint mapped onto the video was created, which enabled the experimenter to match brand location and gaze location frame-by-frame. A research assistant processed the video for each participant and recorded the following variables for each commercial pod on a frame-by-frame basis: pod number (e.g., first, second), commercial number (e.g., 11th commercial shown), fast-forward (a 0 or 1 dummy variable, evident because TiVo displays a progress bar on the bottom of the screen when a viewer is fast-forwarding), presence of brand information onscreen, brand information located within the bumper logo area, brand information outside bumper logo area, and gaze overlap with brand information (all 0 or 1 dummy variables). For the latter four measures, we define brand information as a clear graphic of the product name and/or logo or product packaging with the name and/or logo clearly displayed (see the Appendix). This transformation process took hundreds of hours to complete because each participant could generate up to 86,000 frames of data.

To determine which brand information overlaps the central bumper logo location, we designed a 36-cell grid on an acetate screen overlay, such that the *Wild Discovery* logo filled six boxes of the grid. We used the overlay to record any brand information that appeared on screen according to the cells it occupied. Brand information was marked as overlapping the central bumper area only if it fully covered at least one of the six bumper cells. We completed this analysis once for the no-FF and auto-FF viewers, but we completed each self-FF participant separately because small differences in fast-forward timing led to changes in the number of brand information frames shown. After completing each participant's frame-by-frame analysis, we computed summary statistics for each participant, including the total number of commercial frames; the number of frames with brand information; the number of gazepoints within and outside the bumper logo location; and the number of gazepoints on brand information overall, within, and outside the bumper location. We also computed these measures for each commercial separately. Finally, we captured the standard deviation of gazepoint location and average pupil dilation during the show and during the commercial blocks. Pupil dilation frequently serves as a measure of attention or cognitive effort (Beatty 1982; Dionisio et al. 2001), such that higher levels indicate increased attention or effort. We used a normalized measure of dilation during commercials as a percentage of dilation during the show to account for individual variations in pupil size and reactance to changing chroma and brightness levels.

Results

Participants were similar in their media habits; we found no difference for mean viewer preference for nature shows or the DVR ownership and familiarity questions across conditions. In the poststimulus survey, viewers in all three conditions rated the stimulus show as equally interesting, exciting, appealing, visually interesting, and educational (analyses of variance [ANOVAs]: $F_{(2, 44)} < 3$, $p > .40$). The self-FF viewers were accurate, starting and stopping fast-forwarding within an average of 1.5 seconds from the beginning and ending of the commercial pod.[2] Viewers committed few accidental stopping errors, with two exceptions. First, 81.25% of self-FF viewers stopped on the bumper located in the middle of the fifth pod. They quickly resumed fast-forwarding when they recognized that the bumper preceded more commercials, with an average delay of 1.7 seconds. Second, all but one of the self-FF viewers stopped fast-forwarding on the GEICO commercial (the only advertisement to elicit such behavior), which featured highly show-congruent images of swimming salmon. In the poststimulus survey, the GEICO advertisement scored the highest recognition measures of any advertisement in any condition (M = 7). Because fast-forwarding participants viewed this advertisement predominantly at normal speed, we removed it from the analysis.

In addition, before exploring the role of fast-forwarding, we measured the effects of individual differences and other environmental triggers on brand memory. Ad position within the commercial pod and overall ad position in the show are not significantly correlated to recognition (Zhao 1997; r = –.198, r = –.08, both *p*s > .4), and participants' stated familiarity with DVRs and DVR usage measures also had no effect on the results.

Fast-forwarding's effect on recognition and attention. To test the effects of the fast-forwarding manipulation on advertising effectiveness, we ran a repeated measures ANOVA on recognition, with fast-forwarding as a three-level between-subjects variable and 16 commercial replications within subjects. Recognition served as the key outcome variable because prior research suggests that recognition scores are more discriminating for brand memory than recall measures (Singh, Rothschild, and Churchill 1988). A significant main effect for FF condition ($F_{(2, 40)} = 15.258$, $p < .001$), a significant main effect for commercial (Pillai's trace $F_{(11, 30)} = 16.220$, $p < .001$; within-subject Greenhouse–Geiser F = 11.782, $p < .001$), and a significant

[2]Media ethnographers will be pleased to discover that the stereotype of women as poor remote controllers compared with men turns out to be false; we find no significant gender effects regarding starting and stopping accuracy.

commercial × condition interaction (Pillai's trace $F_{(22, 60)}$ = 5.440, $p < .001$; within-subject effect Greenhouse–Geiser F = 3.712, $p < .01$) emerge for recognition. The main effect of the commercial replication shows that different commercials experienced different levels of recognition, and follow-up data exploration reveals that commercials exhibit high variance in mean recognition scores, regardless of the condition (self-FF Ms = 2.31 to 4.75, SD = .56; auto-FF Ms = 2.71 to 5.73, SD = .80; and no-FF Ms = 2.19 to 6.50, SD = 1.23).

We used planned contrasts to explore the strong effect of the fast-forwarding manipulation on mean recognition (see Table 1). The results show that fast-forwarding participants are less confident in identifying present brands and rejecting nonpresent distracter brands than regular-speed viewers (Bonferroni and Tukey $p < .001$). Recognition scores for present and distracter brands are no different from each other for fast-forwarding viewers. These results confirm prior findings that fast-forwarding has a negative impact on ad recognition. Because the average fast-forwarded advertisement has little more recognition confidence than nonpresent distracter advertisements, we investigated the interaction between condition and commercial. What causes certain advertisements to have increased recognition in a fast-forwarding environment?

H_1 posits that viewers who actively fast-forward through commercials pay greater attention than people who passively view advertisements. An ANOVA reveals a significant main effect of the fast-forwarding manipulation on the pupil dilation ratio ($F_{(2, 45)} = 9.2$, $p < .001$), and planned contrasts (see Table 1) show that the self-FF viewers have a significantly higher ratio than the auto-FF or no-FF conditions. This suggests that self-FF viewers pay roughly the same amount of attention during show content and commercials, whereas auto-FF and no-FF viewers reduce attention during commercials, in support of H_1.

Fast-forwarding and the visual search pattern. When self-FF viewers were asked how they decided to stop fast-forwarding, 62.50% explicitly stated that they looked for the *Wild Discovery* logo, a higher percentage than all other explanations combined. Therefore, we conducted a three-level ANOVA for the mean percentage of time they spent looking at the bumper logo area during the commercial pod (we used mean percentages rather than raw time because no-FF participants experience a longer overall exposure). We find a significant main effect of the fast-forwarding manipulation ($F_{(2, 46)} = 9.178$, $p < .001$). As Table 1 shows, H_2 is strongly supported; fast-forwarding viewers spend significantly more time in the central bumper area during commercials. However, H_3 is not supported, because the difference between self-FF and auto-FF is only directional.

That fast-forwarding viewers constrain their visual attention is also evident in exploring the standard deviation of gaze location during commercials for each condition (see Table 1). Use of the standard deviation of gaze location during commercials (in pixels) reveals a significant effect of the fast-forwarding manipulation ($F_{(2, 46)} = 3.883$ $p < .05$), with contrast tests showing that the self-FF participants have a smaller gaze standard deviation than no-FF participants (Bonferroni and Tukey $p = .04$), but there is no significant difference between self-FF and auto-FF conditions. These results provide further strong support for H_2 but do not support H_3.

What makes advertisements effective during fast-forwarding? To explore what drives ad recognition in fast-forwarding conditions, we first must explore overall brand dominance. We find no correlation between the total number of frames containing brand information and the recognition score for commercials.[3] Given how fast-forwarding focuses the visual search pattern, however, total branded frames are a potentially misleading measure. Instead, we must compare brand information located in the same central area as the bumper logo (see the Appendix) with brand information located elsewhere. There is a strong difference

[3]Among no-FF viewers, the number of audio mentions of a brand in a commercial correlates significantly with recognition (r = .437, $p < .05$); thus, the loss of audio appears to play an important role in the lost effectiveness of fast-forwarded advertisements (in support of Unnava and Sirdesmukh 1994).

TABLE 1
Study 1: Recognition and Visual Attention Measures

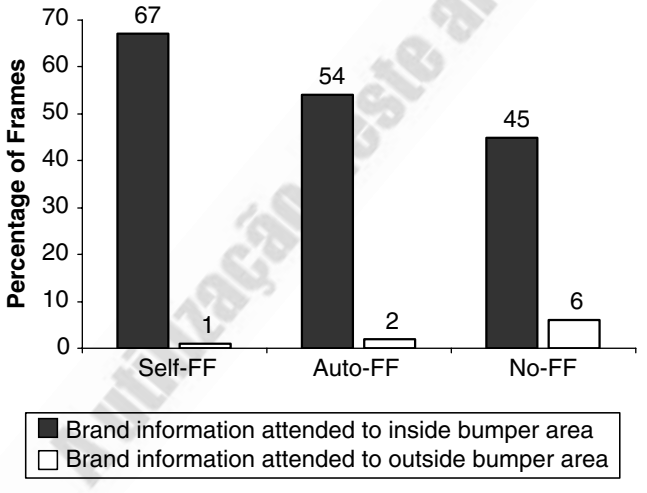
	Self-FF	Auto-FF	No-FF	Significance of Self-FF Versus Auto-FF	Significance of Self-FF Versus No-FF	Significance of Self- and Auto-FF Versus No-FF
Recognition[a]						
Real advertisements	3.5	4.0	5.8		$p < .001$	$p < .01$
Distracter advertisements	3.3	3.4	1.9		$p < .001$	$p < .001$
Pupil dilation during commercials[b]	99%	94%	95%	$p < .01$	$p < .01$	
Time in central bumper area during commercials (%)	74%	70%	58%		$p < .01$	$p < .01$
Increase in time spent in central bumper area during commercials versus during show	16%	19%	6%		$p < .01$	$p < .001$
Standard deviation of gazepoint location during commercials (pixels)[c]	105	124	140		$p < .03$	$p < .05$

[a]We measured recognition as a seven-point Likert scale ranging from "definitely wasn't shown" (1) to "definitely was shown" (7).
[b]Dilation during commercial expressed as a percentage of dilation during show content.
[c]Screen resolution was 1024 × 768.

between the overall percentage of brand information located in the central bumper logo area to which participants visually attend (M = 55%) and the percentage of brand information located outside the bumper logo to which participants visually attend (M = 3%; $t_{(46)} = 16.476$, $p < .001$). Across all conditions, brand information located within the central bumper area has an advantage in visual attention compared with brand information located elsewhere on the screen.

Because prior results have suggested that fast-forwarding viewers constrain their attention more than regular-speed viewers, the attentional bias toward central branding should be stronger for fast-forwarding viewers. A multivariate analysis of variance (MANOVA) testing the fast-forwarding manipulation on the number of frames in which viewers visually attend to brand information within and outside the bumper logo areas (across all commercials) reveals a significant main effect on both the percentage of brand information within the bumper area to which participants visually attend ($F_{(2, 44)} = 5.101$, $p < .01$) and the percentage of brand information outside the bumper to which participants visually attend ($F_{(2, 44)} = 9.251$, $p < .001$). Cell-to-cell contrasts (see Figure 1) show that self-FF viewers visually attend to more brand information within the bumper logo area than no-FF viewers (M = 67% versus 45%, Bonferroni $p < .01$). Likewise, self-FF viewers visually attend to less brand information outside the bumper area than no-FF viewers (M = 1% versus 5.7%, Bonferroni $p < .01$). However, the differences between self-FF and auto-FF are not significant, suggesting that though self-FF viewers pay more attention than auto-FF viewers, their visual search patterns are similar. When self- and auto-FF viewers are combined into one fast-forwarding group, the difference between fast-forwarding and regular-speed viewers is significant for both at-center brand fixations (60% versus 45%; $t_{(45)} = 2.495$ $p < .02$) and outside-center brand fixations (1.6% versus 5.7%; $t_{(45)} = -4.254$, $p < .001$).

FIGURE 1
Study 1: Brand Information Location and Visual Attention



Notes: Percentages are relative to the total number of frames with brand information. For example, self-FF participants attended to brand information for 67% of the frames in which brand information occurred within the bumper area.

Do these effects influence recognition? We ran regressions to test the predictive power of gazepoints at brand information inside and outside the bumper logo area on commercial recognition; all three regressions showed significant predictive power (all Fs > 4, all *p*s < .03). Among no-FF viewers, gazepoints on brand information both inside ($t_{(223)} = 3.48$, $p < .01$) and outside ($t_{(223)} = 2.14$, $p < .05$) the bumper area predict recognition. Among auto-FF viewers, gazepoints on brand information inside ($t_{(223)} = 4.85$, $p < .001$) the bumper were a strong predictor, whereas gazepoints on brand information outside ($t_{(223)} = 1.89$, $p < .10$) the bumper were not significant. Finally, among self-FF viewers, gazepoints on brand information inside the bumper area predict recognition ($t_{(238)} = 4.13$, $p < .01$), whereas gazepoints on branding outside the bumper area are not significant ($t_{(238)} = 1.65$, $p > .10$). These results provide support for H_{4a}, showing that the disparity in predictive power is stronger for fast-forwarding viewers, but little support for H_{4b}, positing differences between active and passive fast-forwarding viewers.

Given the disparity in attended-to brand information, can simple counts of brand information accounting for location predict recognition, as posited in H_5 and H_6? For all three conditions, brand information in the central bumper logo area is correlated with recognition (self-FF r = .354, auto-FF r = .255, no-FF r = .213; all *p*s < .01), whereas brand information outside the center or brand information overall has no correlation with recognition for fast-forwarding participants. This supports H_5, and the regression results are consistent with H_6. For self-FF participants ($r^2 = .117$, $p < .001$), brand information in the bumper logo area is a strong predictor of recognition ($t_{(223)} = 5.527$, $p < .001$), but brand information outside the area has no predictive power ($t_{(223)} = .333$ $p > .50$). For auto-FF participants ($r^2 = .069$, $p < .001$), brand information within the logo area is a strong predictor ($t_{(223)} = 4.133$, $p < .001$), but brand information outside is not significant ($t_{(223)} = 1.758$, $p = .08$). Finally, among no-FF participants ($r^2 = .056$, $p < .01$), brand information both inside and outside the bumper logo area predict recognition ($t_{(238)} = 3.447$, $p < .001$; $t_{(238)} = 2.129$, $p < .05$). This pattern of results strongly supports H_5 and H_6.

Discussion

The results of Study 1 provide strong support for our system of hypotheses comparing fast-forwarding viewers with regular-speed viewers. Although fast-forwarding harms ad effectiveness overall, there is considerable variance between commercials. Fast-forwarding viewers focus their attention on a small central portion of the screen. Only brand information within this central diagnostic area is visually attended to, and the disparity in visual attention between central and peripheral brand information attention is strongest for fast-forwarding viewers. Brand information within the central bumper area strongly predicts ad recognition, whereas information outside it has no predictive power for fast-forwarding viewers. This shows how advertising

can be made effective when it is fast-forwarded; although the advertisements last little more than a second and lose all audio and narrative consistency, those with strong central branding can break through fast-forwarding and still achieve brand memory.

Although actively fast-forwarding viewers pay more attention during commercials, their visual search patterns are similar to those viewing automatically fast-forwarded content. This suggests that the changes to visual attention cues between regular and fast-forward delivery both bias and constrain attention, rather than the show bumper creating a diagnostic signal-searching bias. This is reassuring news for marketers because fast-forwarding in a social context should have a similar effect on vision across all viewers. Note also that elevated central branding helped fast-forwarded advertisements without harming the experience of regular-speed viewers. From the results of Study 1, we conclude that increasing the amount of central branding in advertisements appears to be a positive strategy with little negative consequence.

Central Versus Diagnostic Attentional Capture

In Study 1, we used a real network bumper with a brand logo near the center of the screen. Although this central area encompassed only 17% of the screen, it attracted more than 50% of the gazepoints during commercial breaks, even among participants watching at normal speed. In addition, many of the measures of visual attention were similar for self-FF and auto-FF viewers in Study 1. Therefore, we must consider whether the increased attentional capture associated with the center of the screen occurs because participants keep their foveal vision constrained to the location in which they know the diagnostic bumper logo will appear or because traditional eye movement triggers are attenuated or eliminated during fast-forwarding. Should advertisers match brand information to the bumper location regardless of where the bumper is, or should they invariably locate their brand information in the center of the screen?

Recent findings have explored the ability of goal-driven environments to constrain and direct visual attention and processing. Activating behavioral goals causes people to focus on goal-relevant stimuli (Moskowitz 2002), and active goals can drive the attention-allocation phase of visual processing to the same degree that scene stimulus features do (Allport 1993). Goal congruency may even explain more visual attention than physical characteristics of stimuli (Maruff et al. 1999). Additional work also shows that people constrain their attention to the areas in which they expect diagnostic signals to appear in the future (Ehret 2002; Oulasvirta, Kärkkäinen, and Laarni 2005). Therefore, if the bumper logo provides a diagnostic signal, fast-forwarding viewers should constrain their visual attention to the bumper logo area during commercial pods.

H_7: The area of the screen corresponding to the bumper logo receives elevated fixations and attention during fast-forwarding, regardless of its location on the screen.

Although this psychological research exploring how diagnostic signals capture attention holds considerable weight, recent research has also explored attentional biases relevant to visual marketing. Human–computer interaction media studies suggest that visual attention rarely encompasses an entire screen but rather centers on points of interest, such as motion or human faces (Goldstein, Woods, and Peli 2007). Visual points of interest tend to occur closer to the center of the screen, and the center receives more visual attention than the screen periphery overall (Tosi, Mecacci, and Pasquali 1997). Early results also support an overall bias toward the screen center in terms of gaze movement, errors, and adjustments (Vitu et al. 2004). If a general center-of-screen bias occurs for television viewing, fast-forwarding should exacerbate this effect because it eliminates motion paths and other cues that can draw focal attention away from the center of the screen, and the rapidly changing visual stimulus is unlikely to reward moving focal attention. Thus, fast-forwarding viewers should exhibit increased bias toward the center of the screen, regardless of where the bumper logo is located.

H_8: The central area of the screen receives greater visual fixations and attention during fast-forwarding than normal viewing, regardless of the diagnostic signal location.

To test these hypotheses and their relative strengths, we conducted a second study that varies the location of the bumper from the center of the screen. By manipulating bumper location on the screen, we can compare the differential effects of diagnostic and central attentional capture.

Study 2: Separating Central and Bumper Visual Capture

Method

Stimuli. We retained the *Blue Planet* nature show from Study 1 as the stimulus and replaced half the brands (including GEICO) with new commercials. The show length remained unchanged at 24 minutes, and the *Wild Discovery* bumper was replaced with three bumper conditions. The first condition (TR bumper) used a new experimenter-designed eight-second Discovery Channel bumper featuring the channel logo in the top right of the screen on a mottled blue background. The second condition (BL bumper) featured the same image but with the logo in the bottom left of the screen for eight seconds (see the Appendix). The Discovery Channel logo is highly salient but fills only approximately 5% of the screen. The final condition (no bumper) contained no bumper to measure the baseline effects of fast-forwarding on visual attention.

Design, procedure, and participants. The design and procedure of Study 2 were similar to Study 1. Forty-eight undergraduate students at a U.S. East Coast university participated in return for course credit and a $10 gift certificate to a leading online retailer. Prescreening ensured that no participants of Study 1 registered for Study 2. Participants entered the lab, signed consent forms, and then filled out a general media usage presurvey. After being introduced to TiVo and allowed to practice fast-forwarding at a 20× speed, participants were calibrated to the eye-tracker system, and then they watched the appropriate version of the show for their randomly assigned condition. All participants

fast-forwarded through the commercial pods. After completing the show, participants filled out the remaining survey measures, received their gift certificate, and were debriefed.

Measures

The eye-tracker software created an extensive data file for each participant, with a gazepoint data capture of 60 frames per second. Matching each participant's data file and video record enabled us to determine the exact transition points among the show, the commercial pod, and the bumper (if present). Measures including pupil dilation, standard deviation of gaze, and gazepoint-to-gazepoint pixel distance measured visual attention during the fast-forwarded commercial pods. To determine how the bumper manipulation affects participants' visual attention, we calculated the number of gazepoints during commercial pods in the areas of the screen corresponding to the TR and BL bumper logo location and a bumper-logo-sized equivalent area in the center of the screen. A poststimulus survey had participants describe their strategy to determine when to stop fast-forwarding and answer Likert-scale questions on stopping strategies (e.g., time elapsed, number of commercials, recognize bumper, recognize show content).

Results

Focusing of visual attention and bumper attention capture. Similar to Study 1, pupil dilation exhibits little decrease during fast-forwarded commercial pods and remains at 99% of show dilation on average, which confirms that fast-forwarding engenders high levels of attention. Viewers strongly constrained their attention while fast-forwarding, such that the standard deviation of gazepoint location dropped from an average of 152.1 during the show to 114.3 during commercials for fast-forwarding viewers. Fast-forwarding viewers reported using the bumper as a signal to stop fast-forwarding; in the conditions with a bumper, 72% of respondents reported waiting for the Discovery Channel logo to come on as a stopping signal, and 14% reported using the blue background as a signal to stop without mentioning the bumper logo itself. Visual cues dominated overall; in the bumper-absent condition, only one participant reported attempting to stop using a nonvisual cue, such as elapsed time.

To explore the attention-capturing ability of the bumper logo areas of the screen, we ran two ANOVAs of the effects of the bumper logo manipulation (TR bumper, BL bumper, and no bumper) on the number of gazepoints in the area of the screen equivalent to the TR and BL bumper locations during commercial breaks (see Table 2). The bumper manipulation has a strongly significant effect on gazepoints in the bumper areas (TR bumper: $F_{(2, 45)} = 284.836$, $p < .001$; BL bumper: $F_{(2, 45)} = 250.704$, $p < .001$). The data reveal that focal attention is biased toward the respective bumper logo area during commercial pods for the two bumper-present conditions (see Table 2). The TR-bumper participants have considerably more gazepoints in the TR-bumper area during commercials than the BL-bumper area ($t_{(15)} = 22.516$, $p < .001$). Similarly, BL-bumper participants have more gazepoints in the BL-bumper area than the TR-bumper area ($t_{(15)} = 21.896$, $p < .001$) during commercials. No-bumper participants show no visual preference between the two off-axis bumper locations. These results are strongly consistent with H_7; viewers bias their visual attention toward bumper-consistent areas of the screen while fast-forwarding through commercials. However, note that the percentages of gazepoint capture exhibited by these off-center bumper logo areas are considerably smaller than those of the larger and more central bumper logo in Study 1.

TABLE 2
Study 2: Measures of Visual Attention

Condition	Gazepoints in TR-Bumper Area During Commercials	Gazepoints in BL-Bumper Area During Commercials	Significance of Contrast
TR bumper	3.30%	.39%	$p < .01$
BL bumper	.79%	2.94%	$p < .01$
No bumper	1.22%	1.87%	

Condition	Gazepoints in the Center 5% of Screen During Show Content	Gazepoints in the Center 5% of Screen During Commercials	Significance of Contrast
TR bumper	28.5%	42.3%	$p < .01$
BL bumper	26.2%	43.7%	$p < .01$
No bumper	27.4%	38.6%	$p < .01$

Notes: All participants in Study 2 were fast-forwarding participants.

Center-of-screen attentional capture. The percentage of gazepoints contained within the 5% center of the screen (roughly equivalent in size to the off-center bumper logos) is higher during commercials than during the show across all three conditions (42% versus 27%; $t_{(47)} = 19.284$, $p < .001$), and bumper presence or location has no effect on this central bias. This pattern of results strongly supports H_8 (see Table 2). The screen center also captures more attention than the bumper-equivalent logo location in both the TR-bumper ($t_{(15)} = 48.582$, $p < .001$) and the BL-bumper ($t_{(15)} = 45.717$, $p < .001$) conditions, though no bumper was present at the center of the screen. Comparing the findings that support H_7 with those that support H_8, we find that the center of the screen exhibits a far stronger pull on focal attention during fast-forwarding; the off-center diagnostic bumper logos create only a secondary pull on visual attention.

Discussion

The results of Study 2 provide a strong replication of Study 1's effects and further distinguish the attention-capturing effects of diagnostic bumper logos and the center of the screen. Similar to Study 1, we find that fast-forwarding viewers constrain their visual attention to a small area of the screen during commercial breaks. Regardless of bumper logo location, the center of the screen captures viewers' gaze; the center 5% of the screen captures 27% of gazepoints during the show, and this rises to more than 40% during the commercials. The bumper logo exhibits a secondary attention-capturing effect, in which gazepoint capture

increases for the off-center bumper logo area of the screen during commercial pods. When directly compared, we find that the screen center has stronger attention-capturing power than the off-center bumper logo areas.

Moving Beyond Memory

Taken together, Studies 1 and 2 provide strong evidence that advertising can break through fast-forwarding and affect brand memory. Recognition remains a highly relevant advertising outcome (Singh, Rothschild, and Churchill 1988); the traditionally low information content of television advertisements (Dowling 1980; Resnick and Stern 1977) and their frequent use as reminder advertising suggest that brand-name memory is often a primary goal of marketers. However, memory is not the only dimension of advertising effectiveness. Given the strength of centrally branded advertisements in affecting recognition, do strongly branded advertisements also show retained effectiveness for more complex outcomes, such as brand attitude or behavioral measures (Braun-Latour and Zaltman 2006)?

Properly designed fast-forwarded advertisements may be able to affect attitudinal or behavioral measures as a result of spreading activation theory (Anderson 1983), according to which exposure to a brand name calls to mind a web of brand associations. Researchers have also argued for a "sleeper effect" (Moore and Hutchinson 1985), in which simple exposure to brand messages can lead to increased brand attitude at a later time as a result of increased subconscious brand familiarity, and prior work in mere exposure effects and low-involvement learning (Smith and Swinyard 1983) has shown how brief exposures can change affective and attitudinal responses. Yet our fast-forwarded advertisements last only 1.5 seconds and lose audio and narrative, suggesting that the opportunity to form an attitude toward the ad is limited. In addition, the sleeper effect has received mixed support in follow-up research (Pashupati 2003).

To address these questions, we conducted a third study to explore whether the brand memory effects shown in Studies 1 and 2 replicate to more complex outcome measures, such as behavior and brand attitude. Study 3 also enabled us to manipulate the amount of branding and brand location in the advertisements, to control for prior ad familiarity, and to use a more natural ratio of commercial content to show content. In addition, we collected baseline measures before stimulus exposure to explore change across time.

Study 3: Effect of Fast-Forwarded Advertisements on Attitude and Behavior

Method

Stimuli. For this study, we used a new edit of the *Blue Planet* aquatic nature show, with approximately 20 minutes of show content instead of 14 and four commercial breaks instead of five. The addition of 20 30-second advertisements to the show made the overall running time a traditional 30 minutes and better matches a 1:2 ratio of ad to show frequently used in cable programming (Foote 2007; Getz 2006). Given their relative lack of effect in Study 2, no network bumpers were used. Of the 20 commercials, we selected 18 to create three groups: limited branding, heavy peripheral branding, and heavy central branding. We selected 6 advertisements for each branding condition to give each condition a variety of brands and ad executions; each commercial was used once in the show. The peripheral and central commercials had more frames with branded information overall than the limited commercials (Ms = 422 and 485 versus M = 218, respectively), central commercials had roughly triple the number of frames with brand information at the center of the screen compared with peripheral or limited commercials (M = 304 versus Ms = 95 and 119, respectively), and peripheral commercials had at least double the number of frames with brand information at locations other than the center compared with central or limited commercials (M = 308 versus Ms = 141 and 98, respectively). We randomly ordered the commercials and then placed them into the four commercial breaks.

The other two commercials we included were for two British chocolate bars: Flake and Aero. These commercials used audio from actual U.K. commercials, but the visuals were custom designed. Two versions of each commercial were created, one with heavy branding, in which brand information was on screen and central for 12 of the commercial's 30 seconds, and one with limited branding, in which the brand information was on screen for 3 seconds. These advertisements (see the Appendix) were placed in the second and third commercial breaks during the show, and each participant saw heavy branding for one brand and limited branding for the other. We used four different versions of the show (heavy Flake followed by limited Aero, limited Flake followed by heavy Aero, heavy Aero followed by limited Flake, and limited Aero followed by heavy Flake) to control for potential order effects in the chocolate ad exposure.

Design, procedure, and participants. Study 3 was a 2 × 3 design with a fast-forwarding (FF versus no-FF) between-subjects manipulation and three three-level branding (limited versus peripheral versus central) within-subjects manipulation, with six brand replications within each branding condition. Sixty-three undergraduate participants at an East Coast university were compensated with course credit and a $10 gift certificate to a major online retailer for their involvement. Seven participants were missing data at either Time 1 or Time 2, and we dropped them from the analysis. Prescreening ensured that no participants in Studies 1 or 2 participated in Study 3.

Study 3 employed a two-phase design. One week before watching the show stimulus, participants completed an online survey to establish baseline levels of brand familiarity, purchase intent, brand attitude, and behavioral intent. The following week, participants were run individually on the study protocol to avoid any social priming effects. Participants entered the lab and took a seat in front of a monitor attached to a TiVo DVR. They were instructed that they would watch a nature program and then fill out a survey after the show. One-half of the participants were given no further instructions and watched the show at normal speed;

the other half were instructed to fast-forward through the commercial breaks in a manner similar to Studies 1 and 2. Following the show, participants filled out a poststimulus survey of recognition, purchase intent, brand attitude, and behavioral intent. During this time, the experimenter placed two baskets filled with the British chocolate bars near the door; the basket closer to the door was randomized between participants. When participants finished the survey, they were thanked, given their gift certificates, and were told that they were free to take a chocolate bar on their way out. Only one participant declined to take a chocolate bar; the rest had their choice recorded.

Measures

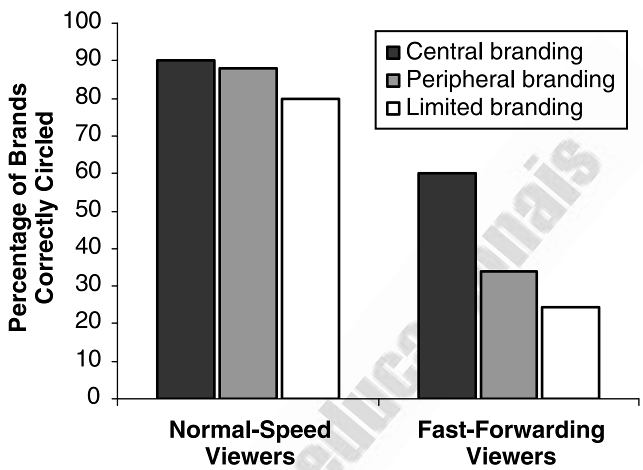
We collected recognition measures similar to the ones employed in Studies 1 and 2 after exposure to the stimulus. We introduced a new measure of visual recognition: a page of brand logos arranged in a grid in which the participant circled the logos for brands they recalled seeing in the show. We measured both purchase intent (α = .78) and brand attitude (α = .89) using three Likert-scale measures adapted from the work of De Pelsmacker, Geuens, and Anckaert (2002). We measured behavioral intent (α = .82), such as the desire to visit the brand's Web site or tell a friend about the brand, using three Likert scales adapted from the work of Reading and colleagues (2006), and we measured familiarity using a Likert scale asking, "How familiar are you with the advertising for [brand]?" (7 = "highly familiar," and 1 = "not at all familiar"). We measured these constructs at both Time 1 and Time 2.

Results

Memory measures. Study 3 strongly replicates the results of Studies 1 and 2. We ran a repeated measures ANOVA for recognition, using fast-forwarding as the between-subjects manipulation, and branding condition as the within-subject measure. The results show a significant main effect for fast-forwarding ($F_{(1, 46)} = 36.225$, $p < .001$), such that fast-forwarding participants report lower ad recognition than non-fast-forwarding participants (significant for both binomial and polynomial effects: $Fs_{(1, 46)}$ = 28.09 and 6.35, *p*s < .001 and .05, respectively). Contrasts reveal that recognition is highest for the high-central-branding advertisements, lower for the high-peripheral-branding advertisements, and lowest for the limited-branding advertisements. There is a significant branding × fast-forwarding interaction (binomial and polynomial contrasts: $Fs_{(1, 46)}$ = 10.95 and 5.53, *p*s < .01 and .05, respectively); regular-speed participants have similar recognition scores for all three branding conditions, but for fast-forwarding participants, central advertisements (M = 5.5) outperform peripheral (M = 3.4) or limited (M = 3.6) advertisements.

This effect is also evident for the visual recognition measure (see Figure 2). An ANOVA reveals a significant effect of fast-forwarding ($F_{(1, 45)} = 52.42$, $p < .001$), a significant effect of branding ($F_{(2, 90)} = 31.28$, $p < .001$; contrast $F_{(1, 45)} = 64.98$, $p < .001$), and a significant branding × fast-forwarding interaction ($F_{(2, 90)} = 9.76$, $p < .001$; contrast $F_{(1, 45)} = 18.55$, $p < .001$). Regular-speed participants circled most of the logos of the advertised brands regardless of branding condition, whereas fast-forwarding participants circled high-central-branding brands considerably more than high-peripheral-branding or limited-branding brands (M = 60% versus Ms = 34% and 24.5%; $ts_{(38)}$ = 6.14 and 9.917, *p*s < .001 and .001, respectively).

FIGURE 2
Study 3: Visual Recognition



Attitudinal measures, behavioral intent, and purchase intent. To explore the effects of fast-forwarding and branding on brand attitude, behavioral intent, and purchase intent, we conducted a repeated mixed measures MANOVA with fast-forwarding as the between-subjects manipulation and branding as the within-subjects manipulation. We included brand familiarity, as recorded at Time 1, as a covariate to control for potential familiarity effects. Although familiarity has a significant effect on the dependent variables (Pillai's trace F = 3.205, $p < .03$), the branding manipulation remains strongly significant (Greenhouse–Geisser F = 57.192, $p < .001$). Notably, the fast-forward manipulation fails to reach significance (Pillai's trace F = 2.4, $p < .068$), suggesting that the overall pattern of results appears similar for both regular-speed and fast-forwarding viewers. An examination of the pattern of results for the key dependent variables reveals strong effects for the branding manipulation on brand attitude and behavioral intent (Bonferroni and Tukey $p < .05$ for both) but a lack of effects on purchase intent. As Table 3 shows, brands in the heavy central condition create increased brand attitude and behavioral intent, even when their advertisements are fast-forwarded, compared with brands using heavy peripheral or limited branding advertisements.

These findings provide evidence that advertisements featuring heavy central branding can break through fast-forwarding and affect more complex constructs, such as brand attitude and behavioral intent. To ensure that the branding manipulation was driving the effects and not any difference between conditions in prestimulus perceptions of the various brands, we ran a pair of repeated measures ANOVAs on the change from Time 1 to Time 2 for brand attitude and behavioral intent using the branding manipulation and fast-forwarding as the within- and between-

TABLE 3
Study 3: Attitudinal and Behavioral Measures

	Central Branding	Peripheral Branding	Limited Branding	Significance of Central Versus Peripheral	Significance of Central Versus Limited
Fast-Forwarding Viewers					
Brand attitude	5.3	4.6	4.1	$p < .05$	$p < .01$
Behavioral intent	3.9	3.4	3.0		$p < .05$
Purchase intent	5.3	4.8	4.4		
Brand attitude from Time 1 to Time 2 (Δ)	+.54	+.02	−.16	$p < .01$	$p < .001$
Behavioral intent from Time 1 to Time 2 (Δ)	+.51	+.08	−.08	$p < .05$	$p < .05$
Purchase intent from Time 1 to Time 2 (Δ)	+.47	+.25	+.14		
Regular-Speed Viewers					
Brand attitude	5.6	4.9	4.4	$p < .05$	$p < .01$
Behavioral intent	3.8	3.6	3.3		
Purchase intent	5.6	5.3	4.8		
Brand attitude from Time 1 to Time 2 (Δ)	+.34	+.17	+.31		
Behavioral intent from Time 1 to Time 2 (Δ)	+.19	+.11	+.12		
Purchase intent from Time 1 to Time 2 (Δ)	+.24	+.37	+.23		

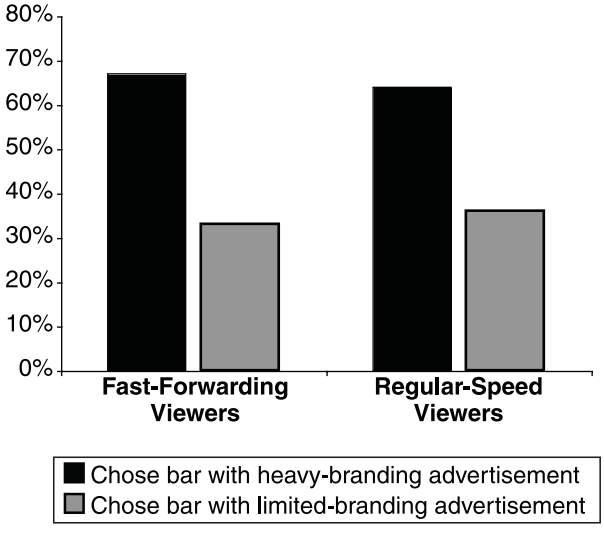
Notes: We present adjusted brand attitude, behavioral intent, and purchase intent scores to control for a significant preexposure brand familiarity covariate. We present adjusted Δ to control for a significant raw Time 1 score covariate.

subjects manipulations, respectively, and the score for each brand at Time 1 on brand attitude and behavioral intent as covariates in the respective ANOVA. This would partial out any variance due to differences in initial starting position on the dependent variables from the manipulation effects.

Brand attitude at Time 1 was a significant covariate for the brand attitude T1 – T2 delta, and behavioral intent at Time 1 was a significant covariate for the behavioral intent T1 – T2 delta (Fs = 49.235 and 14.868, *p*s < .001 and .001, respectively); however, the branding manipulation remained strongly significant for both dependent variables (Fs = 17.603 and 3.307, *p*s < .001 and .05; contrast *p*s < .001 and .02). The results show that for fast-forwarding participants (see Table 3), when we controlled for each brand's prestimulus score at Time 1, high central brands had higher deltas from Time 1 to Time 2 for brand attitude and behavioral intent than high peripheral (Bonferroni and Tukey $p <$ .01) and limited (Bonferroni and Tukey $p < .01$) brands. Although the deltas were positive regardless of branding conditions for regular-speed viewers, for fast-forwarding viewers, only the high-central-branded advertisements had positive prestimulus to poststimulus change for brand attitude and behavioral intent. Indeed, the deltas for fast-forwarded high central brands were not significantly different from the regular-speed high central deltas, suggesting that these brands were minimally harmed by fast-forwarding, unlike brands using high-peripheral- or limited-branding advertisements.

Actual behavior: chocolate bar choice. The amount of branding in the chocolate bar advertisements had a strong effect on which chocolate bar participants actually chose. This effect was consistent across fast-forwarding conditions; regular-speed viewers chose the heavily branded chocolate bar 64% of the time, and fast-forwarding participants chose the heavily branded bar 67% of the time (see Figure 3). Cross-tabulation reveals a significant association between branding condition and the chocolate bar that was chosen (Pearson's $\chi^2 = 5.263$, $p < .05$, Fisher's exact test = .021); the adjusted standardized residuals reveal that participants were much more likely to choose the candy bar for which they saw the heavily branded advertisement. In short, although the chocolate bar commercials were reduced

FIGURE 3
Study 3: Chocolate Bar Choice



to approximately 1.5 seconds without audio for fast-forwarding viewers and though the viewers had no prior brand exposure, participants chose the chocolate bar with the heavily branded commercial at a ratio of two to one over the chocolate bar with the limited-branding commercial.

Discussion

The results of Study 3 replicate the findings of Studies 1 and 2 and extend the results in important ways. First, both the amount and the location of branding have a strong effect on brand attitude and behavioral intent, such that brands using heavy central advertisements significantly outperform heavy peripheral- or limited-branding advertisements. Second, we found a considerable effect on actual choice behavior for the advertised foreign chocolate bars. Participants chose a chocolate bar with the heavily branded commercial at a ratio of two to one over the chocolate bar with the lightly branded commercial, even when fast-forwarding through the advertisements. These results provide strong evidence that advertisements with heavy central branding can affect advertising outcome variables beyond brand memory when the advertisements are fast-forwarded and can even affect actual choice behavior.

General Discussion

The overall pattern of results from our three studies confirms that DVR fast-forwarding has a negative effect on advertising outcomes, but we also show how marketers can take active steps to improve their fast-forwarded ad effectiveness. Fast-forwarding creates strong and consistent biases within visual processing by eliminating traditional visual attention cues, and marketers must place brand information within the areas that capture attention. The eye-tracker measures in Study 1 show that fast-forwarding viewers strongly focus their attention on a central area of the screen. Although the overall count of frames with brand information provides only a weak predictor of ad recognition, a count of frames with brand information located within the central area strongly predicts ad recognition. This is because fast-forwarding viewers visually attend most to the brand information within the central bumper logo area and almost completely ignore information outside it. In Study 2, we show that the center of the screen captures increased visual fixations when viewers fast-forward regardless of the bumper logo location; the show bumper exhibits only a secondary diagnostic pull on visual attention. Study 3 shows that advertisements with heavy central branding can yield a positive effect on attitude toward the brand, behavioral intent, and actual behavior. Indeed, participants chose an unfamiliar chocolate bar with heavily branded advertisements at a ratio of two to one over a chocolate bar with limited-branding advertisements, even when the advertisements were fast-forwarded.

Theoretical Implications

Our work highlights the importance of visual attention when studying consumer behavior (echoing Wedel and Pieters 2007). We show that the moment-to-moment attention information that eye trackers can provide offers an important tool for studying visual attention, especially for dynamic and interactive media. Although most current work in visual marketing explores relatively static visuals, such as magazine advertisements or Web pages, our studies extend this work to explore visual search patterns for a visually dynamic television show with commercials. The difference in visual patterns between normal-speed and fast-forwarding viewers shows how environmental changes can lead to large biases in visual search and attention. As consumers embrace new methods of ad-driven media distribution and as the methods of media delivery continue to splinter into numerous online and offline formats, we must explore how changes in the media context change the basic visual search patterns of viewers and take care not to assume that older models of visual attention apply unchanged. These new media environments present enormous opportunities for exciting and useful marketing research, because the current lessons for advertising attention learned from decades of print media study may not carry forward into the contexts of video game product placement, online video, and interactive Web sites.

This research presents a preliminary exploration of how the changing media environment leads to base-level changes in visual attention by altering visual attention signals, such as motion cues, and it highlights the power of visual attention, given that differences between advertisements measured in milliseconds led to strong changes in advertising effectiveness. These changes in visual attention can also explain some prior inconsistent findings in the literature. For example, Studies 1 and 3 clarify mixed support for the brand dominance theory for effective advertising during fast-forwarding. Although prior work has explored the number of frames with brand information, it has not considered the location of brand information on screen. Our research shows that only the brand information at the center of the screen is useful in predicting brand memory, brand attitude, or behavioral intent for fast-forwarding viewers.

Practical Implications

Fast-forwarded advertisements can retain some promotional effectiveness, and both marketers and consumers should appreciate the greater ad effectiveness possible during fast-forwarding. Advertisements with more brand information in a central location enjoy increased recognition, brand attitude, and behavioral intent, qualifying the "more-branding-is-better" argument in prior advertising literature. Because people's visual attention, especially that of fast-forwarding viewers, focuses on the center of the screen during commercials, marketers must ensure that their brand information is centrally located to prompt the necessary visual processing for brand memory and recognition. They cannot assume that a viewer's visual search pattern will eventually lead to brand processing. This work suggests that exploring the visual processing of advertisements is as important as the cognitive and affective processing frequently researched. As eye-tracker technology becomes more commonplace, managers can benefit from marketing research that empirically explores visual attention on their advertisements, in addition to more traditional post hoc survey-based measures of attentional focus.

Note that the central bias shown during commercials was universal and highly resistant to change. Although it was stronger for fast-forwarding viewers, it also presented for regular-speed viewers. In addition, moving the diagnostic show bumper around the screen had only a secondary effect on visual attention, with most gazepoints still captured by the center of the screen. Although this implies that the central bias may be outside marketers' control, a key benefit is consistency. Rather than exploring program-to-program differences in bumper location, commercial pod duration, or surrounding advertisements, our work suggests that one route to increased ad effectiveness is elevated amounts of branded information at the center of the screen. This calls into question many current heavy branding executions that feature a brand banner near the top or the bottom of the screen. Because central branding led to no ill effects for regular-speed viewers, marketers should consider both increasing the average brand information in their advertisements and ensuring that information is as central as possible.

Finally, note that these results have particularly strong implications for reminder advertisements and advertising in which brand exposure and memory are a primary goal. Advertisements with high information loads will likely not retain effectiveness as well as the examples shown here. With the loss of audio and the severe truncation of visual exposure time, fast-forwarded advertisements that focus on brand attribute knowledge or brand positioning may suffer regardless of brand information amount and location.

Avenues for Further Research

In the current studies, the brand information varied from commercial to commercial; some provided static close-ups of the product packaging with a prominent brand logo, whereas others displayed the brand logo as a graphic on a plain background. Further work could directly manipulate the style of brand information within a set of commercials. Although it would require customized commercials, such a study would elucidate how the style of visual brand information affects the relationship to marketing outcome variables. Perhaps logos and icons that more clearly "pop" from the background engender faster recognition than traditional product packaging images and thus encourage less advertising miscomprehension (Jacoby and Hoyer 1982).

Future work might also explore the long-term impact of fast-forwarded commercial exposure. By using foreign brands and unfamiliar commercials at both regular and fast-forwarding speeds, researchers could explore how the positive effects on advertising outcome variables decay with time. For example, recognition might prove relatively impervious to time, whereas increased brand attitude might decay within a few hours. Such work should also explore whether the effects could be reinvigorated with relevant shopping or choice environments. Finally, further work might also explore affect transfer from show content to advertised brands (Schumann and Thorson 1990; Tavassoli, Schultz, and Fitzsimons 1995) and how it changes under fast-forwarding conditions. Given that fast-forwarded advertisements likely generate little affect on their own because of the lack of narrative, show-to-brand affect transfer might be stronger.

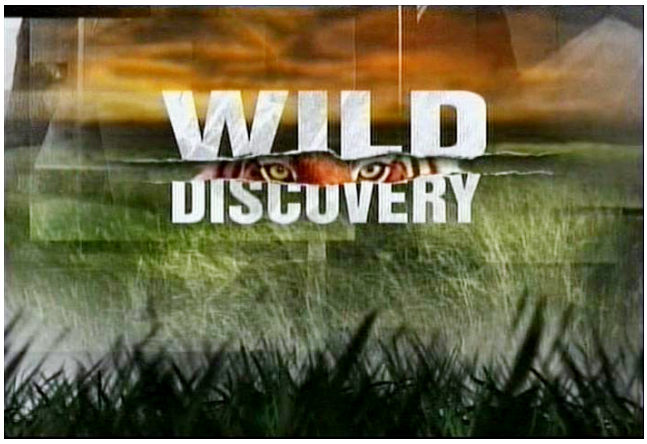
Conclusion

This research explains how fast-forwarding through commercial pods focuses and alters the visual attention of viewers and identifies centrally located visual brand information as a key driver of advertising effectiveness. Building on visual marketing and perceptual psychology literature, we conduct two eye-tracker studies that explore participants' visual attention to a custom-designed television show with several commercial breaks. Fast-forwarding eliminates most motion cues that encourage visual search and discourages attempts to track stimuli, so fast-forwarding viewers strongly constrain their vision to the center of the screen. Brand information located at the center of the screen is visually attended to at a greater rate than brand information placed elsewhere, and this central brand information is a much stronger predictor of ad recognition for fast-forwarding viewers than brand information overall. This effect is stable; even when the signal for the end of the commercials was located elsewhere, the screen center still had a positive bias during fast-forwarding.

A third study shows that fast-forwarded advertisements with heavy central branding can lead to increased brand attitude and behavioral intent, whereas advertisements with peripheral or limited branding have little or no effect. Properly designed advertisements can affect actual choice behavior even when they are fast-forwarded; fast-forwarding participants chose a product with heavy central-branded advertisements over a product with limited branding at a ratio of two to one. These findings have implications both for marketing managers and for further research in visual marketing. Many questions still remain, and further work should continue to explore how changes in the media landscape are creating changes in viewers' visual search and attention.

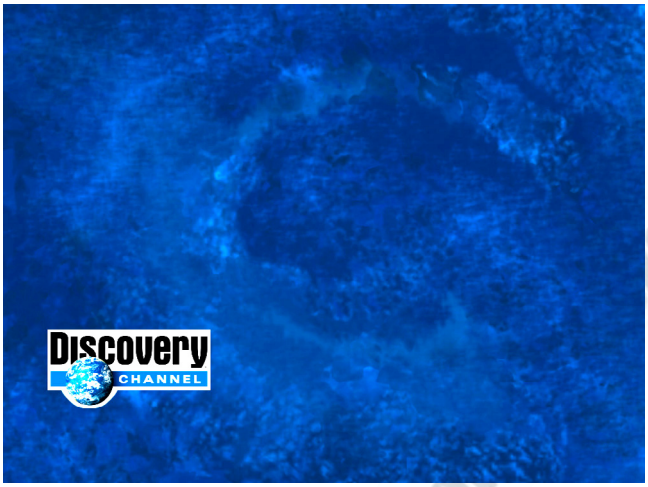
APPENDIX
Studies 1, 2, and 3: Branding and Bumper Examples

A: Study 1: Bumper Logo



B: Study 1: Central-Branding Example

C: Study 2: Bumper Logo (BL Bumper)



D: Study 3: Peripheral-Branding Example

E: Study 3: Aero Advertisement Branding Example

F: Study 3: Flake Advertisement Branding Example

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