Breaking Through Fast-Forwarding: Brand Information and Visual Attention

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Abstract
This research explores how fast-forwarding through commercials alters the visual attention of viewers, and how marketers can tailor ads to retain effectiveness as DVR usage rises. Building upon prior work in visual marketing and perceptual psychology, two eyetracker studies show that fast-forwarding viewers pay more attention during commercials, but their attention is heavily limited to the center of the screen. Fast-forwarded ads containing brand information at screen center still create brand memory even with a 95% reduction in frames and complete loss of audio, while ads 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 DVRs by ensuring their ads are heavily branded and the branding is centrally located.

Keywords
Fast-forwarding, Visual attention, Eye-tracking, Television advertising, Digital video recorder (DVR)
“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, January 2008

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. DVRs 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 American homes had DVRs as of mid-2007, and predicts 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 ads (Shim 2005), placing extra ads at the end of recorded shows (Gonsalves 2006), or adding “telescoping ads” (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 ads 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 has particular relevance given that television advertising still accounts for more than 24% of total U.S. advertising expenditures (Advertising Age 2006). While some prior work suggests that fast-forwarded ads can retain a measure of benefit for less complex outcomes such as brand memory (Friedman 2006; Greene 1988), explanations of what differentiates more effective from less effective fast-forwarded ads remain scarce, and little work explores differences between various measures of ad effectiveness, from brand memory to brand attitude and choice behavior. The research reported here 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 ads when fast-forwarded. In Study 1, we use eyetracker technology to compare active and passive fast-forwarders 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 to 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 VCRs gained market penetration in the 1980s, studies explored the effects of “zipping” through commercial pods. 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 ads (Stout and Burda 1989; Martin, Nguyen and Wi 2002). Although further empirical research has shown that ads previously seen at normal speeds retain some effectiveness when fast-forwarded (Goode and Dobinson 2006; Gilmore and Secunda 1993), the increasing rate of DVR adoption suggests that many viewers will have no prior normal-speed exposure to many advertisements, as over 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 suggests that marketers can ensure viewers remain attentive by varying the length and timing of commercial pods because it disrupts the “rhythm” of the ads (Danaher 1995). However, objective measures such as ad length or ordinal position within the show have

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1 A commercial pod refers to a group of commercials and non-program materials; a commercial break refers to the “hole” in the program that the commercial pod is placed into. The two terms are similar but not interchangeable.
exhibited no conclusive effects on traditional outcome measures during fast-forwarding (Baumgartner, Sujan, and Padgett 1997; Singh and Cole 1993).

Prior work also posited a brand dominance concept, arguing that commercials with greater brand name and logo (hereafter, 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. The proposition that heavily branded ads enjoy increased recall or recognition when fast-forwarded, however, receives limited literature support (Lee and Lumpkin 1992; Metzger 1986). While recent work on Internet advertising suggests that increased brand duration leads to greater brand memory (Danaher and Mullarkey 2003), conclusive evidence that strongly branded television ads enjoy increased retention in fast-forwarding conditions remains yet to be seen (Stout and Burda 1989).

**Fast-Forwarding and the Visual Search Pattern**

Little research currently explores how the changing media landscape affects our perceptual processes as consumers. 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 Zhao 1987), and further studies suggest that screen attention is halved during commercial pods (Krugman, Cameron, and White 1995). As 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 visual attention is a key driver of advertising effectiveness, a better understanding of these changes can illustrate how to make fast-forwarded ads more effective.

Visual cognition research suggests that fast-forwarding might 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 they have reached the end of the commercial pod (Greene 1998). Advertising research suggests that the viewer’s increased attention necessary to know when to stop fast-forwarding (Martin, Nguyen, and Wi 2002), or 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 investigation. 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.

H1: Viewers who are fast-forwarding themselves will exhibit higher attention during commercials compared to viewers who are viewing at normal speeds or who are having 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 one constant motion cue, as 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, those watching fast-forwarded ads should exhibit less motion in their visual
search pattern compared to 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 renders the initial movement likely pointless as the original source that triggered the movement will not still be on the screen at the intended location. To compound this effect, there is a refractory period of roughly 150 milliseconds before the visual system can make another saccadic movement. Stimulus tracking therefore 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.

H2a: Viewers observing fast-forwarded commercials will exhibit reduced visual search motion and a smaller overall visual search field compared with viewers observing commercials at regular speed.

There should also be differences between someone actively fast-forwarding and someone passively viewing fast-forwarded content. Previous work in psychology and visual marketing suggests 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 shows that an increased
cognitive load tends to shrink the active visual field (Rantanen 2003). In addition, research in scene–target congruency suggests that viewers hyper-attenuate toward potential signal areas and limit their attention to signal-inconsistent areas (Neider and Zelinsky 2006). Therefore, actively fast-forwarding viewers should have smaller visual search patterns and attend to smaller areas of the screen compared to someone viewing commercials fast-forwarded by someone else.

H2b: Viewers who actively fast-forward through commercials will constrain their visual attention to a smaller area of the screen than do those who passively view fast-forwarded commercials.

**Visual Search and Advertising Effectiveness**

These 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 shows that increased attention dampens peripheral vision (Schwartz et al. 2005; White, Rayner, and Liversedge 2005), so brand information directly within visual attention when fast-forwarding may gain elevated importance.

H3: The amount of brand information visually attended to (a) predicts advertising effectiveness; (b) the predictive power will be strongest among viewers who actively fast-forward.

We predict fast-forwarding participants attenuate their vision to a smaller screen area and
only brand information in that area drives 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 where 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 might encompass the majority of visual attention (Goldstein, Woods, and Pelli 2007) for involved viewers. This central bias, combined with the elimination of motion cues, suggests 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.

H₄a: The amount of brand information placed in a central diagnostic area of the screen drives ad effectiveness by fast-forwarding viewers.

H₄b: 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 or brand information overall.

**Study 1: Fast-Forwarding and The Visual Pattern**

To test the hypotheses, we conducted an eyetracker study in which participants view a custom-edited 24-minute television show with commercials under three different viewing conditions. Two separate fast-forwarding conditions are used because most current studies of advertising effectiveness treat fast-forwarding as an “on or off” condition, whereas we also want
to explore differences between viewers who actively control and those who merely watch fast-forwarded content. This is an important distinction as television frequently is viewed in social contexts, where only one viewer has control of the remote. The experimental design therefore attempts 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 eyetracker-based methodology offers several unique advantages in this context. Previous work has used eyetrackers to explore print and Web advertisements (e.g., Jones, Stanaland, and Gelb 1998; Lohse 1997; Rayner et al. 2001; Wedel and Pieters 2000), but point-of-gaze measures of visual attention to dynamic media such as television commercials remain rare. The eyetracker system allows us to explore moment-by-moment differences in the visual attention (Rayner 1998), which are of critical importance when exploring television advertising (Elpers et al. 2003).

**Methods**

**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 fills roughly 15% of the screen and is visually salient (see Appendix). While the bumper was placed at the end of the commercial pod for the first four commercial breaks, in the final commercial pod the bumper appeared in the middle slot to provide an action-oriented test of whether the bumper serves as a stopping signal for fast-forwarding viewers.
Sixteen advertisements were selected 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 three to six advertisements each simulate a traditional distribution of ads during a full one-hour show, in that four ads appear twice, and one ad appears three times (study timeline 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×), as the first level (3×) appeared unrealistically slow based on the usual user pattern fast-forwarding through an entire commercial pod.

Participants, Design and Procedure

48 undergraduates 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 eyetracker methodology demanded that experimenters run participants individually, each participant taking roughly 45 minutes to complete the study protocol.

The study used a three-level (viewer fast-forwards, automatic fast-forwarding, no fast-forwarding) between-subjects design. After entering the lab and signing consent, participants completed a survey of basic television and DVR usage. We explained the eyetracker 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 automatic fast-forward condition (Auto-FF) 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 subjects in the self-fast-forward condition (Self-FF) 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 viewed by the Auto-FF participants.

Participants then were calibrated on the eyetracker system by fixating on a nine-point grid on the screen. Following this the eyetracker 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 eyetracker system to ensure that the device was capturing data properly, while the other surreptitiously watched the participant to ensure 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**

The survey measures were recorded in two questionnaires, pre- and poststimulus, created using procedures similar to 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 ads. The more extensive poststimulus survey first asked a series of free-response recall questions about which ads participants saw and provided affective measure rating scales for the show (i.e., interesting, exciting, informative, 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, as well as 12 distractor 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, both measured with Likert scales.

**Eyetracker Measures**

The eyetracker system gave two key outputs. First, a datafile with point-of-gaze coordinates and pupil dilation at 60 frames per second was created for each subject. Second, a video file of the viewer’s stimulus exposure with the point-of-gaze mapped onto the video was created that allowed 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 (first, second, etc.), commercial number (eleventh commercial shown, etc.), 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 Appendix). This transformation process took hundreds of hours to complete, as 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. The overlay was used to record any brand information that appeared on screen according to the cells it occupied. Brand information was only marked as overlapping the central bumper area 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 each Self-FF participant was completed separately because small differences in fast-forward timing led to changes in the number of brand information frames shown. After completing each subject’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 the commercial blocks. Pupil dilation frequently serves as a measure of attention or cognitive effort (Beatty 1982; Dionisio et al. 2001); with higher levels indicating increased attention or effort. A normalized measure of dilation during commercials as percentage of dilation during the show was used 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 (all ANOVA $F(2,44) < 3, p > .40$). 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

² Media ethnographers will be pleased to discover 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.
recognized the bumper preceded more commercials, with an average delay of 1.7 seconds. Second, all but one of Self-FF viewers stopped fast forwarding on the GEICO commercial (the only ad to elicit such behavior), which featured highly show-congruent images of swimming salmon. In the poststimulus survey the GEICO ad scored the highest recognition measures of any ad in any condition (M=7). Because fast-forwarding participants viewed this ad predominantly at normal speed, we removed it from the analysis.

Also, 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; \( r = -0.198, r = -0.08, \) all \( p > 0.4 \)), 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 as prior research suggests 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 commercial-by-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 M = 2.31 to 4.75, SD = .56; Auto-FF M = 2.71 to 5.73, SD = .80; No-FF M = 2.19 to 6.50, SD = 1.23).

**** INSERT TABLE 1 HERE****

We use planned contrasts to explore the strong effect of the fast-forwarding manipulation on mean recognition (see Table 1). Results show that fast-forwarding participants are less confident in identifying present brands and rejecting non-present distractor brands compared to regular speed viewers (Bonferroni and Tukey p < .001). Recognition scores for present and distractor 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 ad has little more recognition confidence than non-present distractor ads, we investigate the interaction between condition and commercial; what causes certain ads to enjoy increased recognition in a fast-forwarding environment?

H1 posits that viewers who actively fast-forward through commercials pay greater attention than people who passively view. 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, while Auto-FF and No-FF viewers reduce attention during commercials, and provides support for H1.

Fast-Forwarding and the Visual Search Pattern

When Self-FF viewers were asked how they decided to stop fast-forwarding, 62.50% explicitly stated 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 (mean percentages are used rather than raw time because No-FF participants experience a longer overall exposure), and we find a significant main effect of the fast-forwarding manipulation ($F_{(2,46)} = 9.178, p < .001$). As can be seen in Table 1, $H_{2a}$ is strongly supported, with fast-forwarding viewers spending significantly more time in the central bumper area during commercials. $H_{2b}$ is not supported however, as 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). Using 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 the Self-FF participants have a smaller gaze SD than No-FF participants (Bonferroni and Tukey $p = .04$), but no significant difference presents between Self-FF and Auto-FF conditions. These results provide further strong support for $H_{2a}$, but do not support $H_{2b}$.

What Makes Ads 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. Given how fast-forwarding focuses the visual search pattern, however, total branded frames is a potentially misleading measure. Instead, we must compare brand information located in the same central area as the bumper logo (see Appendix) with brand information located elsewhere. There is a

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3 Among No-FF viewers, the number of audio mentions of a brand in a commercial correlates significantly with recognition ($r = .437, p < .05$); the loss of audio thus appears to play an important role in the lost effectiveness of fast-forwarded ads (in support of Unnava and Sirdesmukh 1994).
strong difference between the overall percentage of brand information located in the central bumper logo area that participants visually attend to (M = 55%) and the percentage of brand information located outside the bumper logo attended to (M = 3%, t(46) = 16.476, p < .001). Across all conditions, brand information located within the central bumper area has an enormous advantage in visual attention when compared to brand information located elsewhere on screen.

Because prior results suggest that fast-forwarding viewers constrain their attention more than regular-speed viewers, the attentional bias towards central branding should be stronger for fast-forwarding viewers. A 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 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 do 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 do No-FF viewers (M = 1% versus 5.7%, Bonferroni p < .01). The differences between Self-FF and Auto-FF are not significant however, suggesting that even though Self-FF viewers are paying more attention than Auto-FF viewers, their visual search patterns are similar. When Self- and Auto-FFers are combined into one Fast-Forwarding group, the difference between Fast-Forwarders 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)

**INSERT FIGURE 1 AROUND HERE**
Do these effects impact 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 $F > 4$, all $p < .03$). 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, while gazepoints on brand information outside ($t(223) = 1.89, p < .10$) the bumper were non-significant. Finally, among Self-FF viewers, gazepoints on brand information inside the bumper area predicts 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 $H_{3a}$ showing that the disparity in predictive power is stronger for fast-forwarding viewers, but little support for $H_{3b}$ 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 $H_{4a}$ and $H_{4b}$? For all three conditions, brand information in the central bumper logo area correlates with recognition (Self-FF $r = .354$, Auto-FF $r = .255$, No-FF $r = .213$; all $p < .01$), while brand information outside the center or brand information overall has no correlation with recognition for fast-forwarding participants. This supports $H_{4a}$; regression results are consistent with $H_{4b}$. 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 ($t(223) = 0.333 p > .50$). 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 insignificant ($t(223) = 1.758, p = .08$). 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 $H_{4a}$ and $H_{4b}$.

**Discussion**

The results of Study 1 provide strong support for our system of hypotheses comparing fast-forwarding viewers to 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 gets 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 fast-forwarded; even though the ads last little over a second and lose all audio and narrative consistency, ads with strong central branding can break through fast-forwarding and still achieve brand memory.

While 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 it is the changes to visual attention cues between regular and fast-forward delivery that bias and constrain attention, rather than the show bumper creating a diagnostic signal-searching bias. This is reassuring news for marketers, as fast-forwarding in a social context should have a similar effect on vision across all viewers. It is also important to note that elevated central branding helped fast-forwarded ads without harming the experience of regular speed viewers. Based on the results of Study 1, 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 only encompassed 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 individuals 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 they expect diagnostic signals to appear in the future (Ehret 2002; Oulasvirta, Karkkainen, 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.

H₅: The area of the screen corresponding to the bumper logo receives elevated fixations and attention during fast-forwarding irrespective of its location on the screen.

While this psychological research exploring how diagnostic signals capture attention
holds considerable weight, recent research also explores 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 screen-center, 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, irrespective of where the bumper logo is located.

H₆: The central area of the screen receives greater visual fixations and attention during fast-forwarding when compared to normal viewing, irrespective of the diagnostic signal location.

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

**Study 2: Separating Central and Bumper Visual Capture**

**Methods**

*Stimuli*

The *Blue Planet* nature show from Study 1 was retained as the stimulus, and half the brands (including GEICO) were replaced 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 8-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 8 seconds (see Appendix). The Discovery Channel logo is highly salient but fills roughly 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. Participants entered the lab, signed consent, and then filled out a general media usage pre-survey. After being introduced to TiVo and allowed to practice fast-forwarding at 20× speed, participants were calibrated to the eyetracker system, and the subject watched the appropriate version of the show for their randomly-assigned condition. All subjects fast-forwarded through the commercial pods. After completing the show, participants filled out the remaining survey measures, received their gift certificate, and were debriefed. Forty-eight undergraduates 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.

Measures

The eyetracker software created an extensive datafile for each participant, with 60 frames per second gazepoint data capture. Matching each participant’s datafile and video record enabled us to determine the exact transition points between the show, commercial pod, and bumper (if present). Measures including pupil dilation, standard deviation of gaze, and gazepoint-to-
gazepoint pixel distance measure 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 top-right and bottom left 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 (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 constrain their attention while fast-forwarding, such that the standard deviation of gazepoint location drops 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 report waiting for the Discovery Channel logo to come on as a stopping signal, and a further 14% report using the blue background as a signal to stop without mentioning the bumper logo itself. Visual cues dominate overall; in the bumper-absent condition only one subject reported attempting to stop using a non-visual 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, No Bumper) on the number of gazepoints in the area of the screen equivalent to the top right and bottom left bumper locations during commercial breaks (see Table 2). The bumper manipulation
has a strongly significant effect on gazepoints in the bumper areas (top right $F_{(2,45)} = 284.836, p < .001$; bottom left $F_{(2,45)} = 250.704, p < .001$). 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). TR Bumper participants have considerably more gazepoints in the top-right bumper area during commercials than the bottom left bumper area ($t_{(15)} = 22.516, p < .001$).

Similarly, BL Bumper participants have more gazepoints in the bottom-left bumper area than the top right 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 $H_5$; viewers bias their visual attention towards bumper-consistent areas of the screen while fast-forwarding through commercials. We must note, however, 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.

**** INSERT TABLE 2 AROUND HERE ****

**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 $H_6$ (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 BL Bumper ($t_{(15)} = 45.717, p < .001$) conditions, even though no bumper was present at screen center. When comparing the findings supporting $H_5$ with the results supporting $H_6$, we see that the center of 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 the first study’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. Irrespective of bumper logo location, the screen center captures viewers’ gaze; the center 5% of the screen captures 27% of gazepoints during the show, but rises above 40% during the commercials. The bumper logo exhibits a secondary attention-capturing effect, where gazepoint capture increases for the off-center bumper logo area of the screen during commercial pods. When directly compared, 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 impact brand memory. Recognition remains a highly relevant advertising outcome (Singh, Rothschild and Churchill 1988); the traditionally low information content of television ads (Resnick and Stern 1977; Dowling 1980) and their frequent use as reminder advertising suggests that brand-name memory is frequently a primary goal. Memory is not the only dimension of advertising effectiveness however. Given the strength of centrally-branded ads in affecting recognition, might strongly branded ads also show retained effectiveness for more complex outcomes such as brand attitude or behavioral measures (Braun-Latour and Zaltman 2006)?

Properly designed fast-forwarded ads might be able to affect attitudinal or behavioral
measures due to spreading activation theory (Anderson 1983), where exposure to the brand name calls to mind a web of brand associations. Researchers have also argued for a “sleeper effect” (Moore and Hutchinson 1985), where simple exposure to brand messages can lead to increased brand attitude at a later time due to 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 ads only last 1.5 seconds while losing audio and narrative, suggesting that the opportunity to form an attitude towards the ad is limited. In addition, the “sleeper effect” has mixed support in follow-up research (Pashupati 2003).

To address these questions, a third study was conducted 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. This third study also allowed us to manipulate the amount of branding and brand location in the ads used, control for prior ad familiarity, and use a more natural ratio of commercial content to show content. Also, baseline measures were collected prior to stimulus exposure to explore change across time.

**Study 3: Can Fast-Forwarded Ads Impact Attitude and Behavior?**

**Methods**

*Stimuli*

A new edit of the *Blue Planet* aquatic nature show was utilized, with roughly twenty minutes of show content rather than fourteen, and four commercial breaks instead of five. The addition of twenty 30-second advertisements to the show made the overall running time a traditional thirty minutes, and better matches a 1:2 ad-to-show ratio frequently used in cable
programming (Getz 2006; Foote 2007). Given their relative lack of effect in Study 2, no network bumpers were used. Eighteen of the twenty commercials were selected to create three groups: Limited Branding, Heavy Peripheral Branding, and Heavy Central Branding. Six ads were selected for each branding condition to give each condition a variety of brands and ad executions; each commercial was used once in the show. ThePeripheral and Central commercials had frames with branded information overall than the Limited commercials (M = 422 / 485 vs. 218); Central commercials had roughly triple the number of frames with brand information at the center of the screen than Peripheral or Limited commercials (M = 304 vs. 95 or 119); Peripheral commercials had at least double the number of frames with brand information at locations other than the center than Central or Limited commercials (M = 308 vs. 141 or 98). The commercials were randomly ordered then placed into the four commercial breaks.

The other two commercials included were for two British chocolate bars: Flake and Aero. These commercials utilized audio from actual UK commercials, but the visuals were custom-designed. Two versions of each commercial were created, one with heavy branding where brand information was on-screen and central for twelve of the commercial’s thirty seconds, and one with limited branding where the brand information was on-screen for three seconds. These ads (see 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. Four different versions of the show were utilized (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 also control for potential order-effects in the chocolate ad exposure.

**Design, Procedure, and Participants**

The study was a 2 by 3 design with a Fast Forwarding (FF versus No-FF) between
subjects manipulation and three three-level Branding (Limited vs. Peripheral vs. 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 T1 or T2 and were dropped from the analysis. Pre-screening ensured no participants in Study 1 or 2 participated in Study 3.

The study employed a two-phase design. One week prior to 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, while 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 post-stimulus survey of recognition, purchase intent, brand attitude, and behavioral intent. During this time the experimenter placed two baskets with the 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, then told 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

Recognition measures similar to the ones employed in Studies 1 and 2 were collected post-stimulus exposure. A new measure of visual recognition was introduced: a page of brand
logos arranged in a grid where the participant circled the logos for brands they recalled seeing in the show. Purchase Intent ($\alpha = .78$) and Brand Attitude ($\alpha = .89$) were each measured using three Likert-scale measures adapted from DePelsmacker et al. (2002). Behavioral Intent ($\alpha = .82$), such as desire to visit the brand website or tell a friend about the brand, was measured using three Likert scales adapted from Reading et al. (2006), and familiarity was measured using a Likert scale asking “how familiar are you with the advertising for [brand]?” ($7 = ‘\text{highly familiar’ and } 1 = ‘\text{not at all familiar’}$). These constructs were measured at both Time 1 and Time 2.

Results

Memory Measures

Study 3 strongly replicates the results of Studies 1 and 2. A repeated measures ANOVA for recognition was run, using Fast Forwarding as the between-subjects manipulation, and Branding condition as the within-subject measure. Results show a significant main effect for Fast-Forwarding ($F(1,46) = 36.225, p < .001$), with fast forwarding subjects reporting lower ad recognition than non-fast-forwarding subjects (significant for both binomial and polynomial effects, $F(1,46) = 28.09 / 6.35, p < .001 / .05$). Contrasts reveal that recognition is highest for the High Central Branding ads, lower for High Peripheral Branding ads, and lowest for Limited Branding ads. There is a significant Branding by Fast-Forwarding interaction (binomial and polynomial contrasts $F(1,46) = 10.95 / 5.53, p < .01 / .05$); regular speed subjects have similar recognition scores for all three branding conditions, but for Fast Forwarding subjects Central ads ($M = 5.5$) outperform Peripheral ($M = 3.4$) or Limited ($M = 3.6$) ads.

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 \( (F_{2,90} = 31.28, p < .001, \text{contrast } F_{1,45} = 64.98, p < .001) \), and a significant Branding by Fast-Forwarding interaction \( (F_{2,90} = 9.76, p < .001, \text{contrast } F_{1,45} = 18.55, p < .001) \).

Regular speed participants circled most of the logos of the advertised brands regardless of branding condition, while fast-forwarding participants circled High Central Branding brands considerably more than High Peripheral Branding or Limited Branding brands \((M = 60\% \text{ vs } 34\% / 24.5\%, t_{38} = 6.14 / 9.917, p < .001 / .001)\).

**Attitudinal Measures, Behavioral Intent, Purchase Intent**

To explore the effects of fast-forwarding and branding on Brand Attitude, Behavioral Intent, and Purchase Intent, a repeated mixed-measures MANOVA was conducted with fast-forwarding as the between-subjects manipulation and branding as the within-subjects manipulation. Brand Familiarity, as recorded at T1, was included as a covariate in order to control for potential familiarity effects. While familiarity has a significant effect on the DVs (Pillai’s Trace \( F = 3.205, p < .03 \)), the branding manipulation remains strongly significant (Greenhouse Geisser \( F = 57.192, p < .001 \)). Interestingly, 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 viewers and fast-forwarders. Looking at the pattern of results for the key DVs 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 can be seen in Table 3, brands in the Heavy Central condition create increased brand attitude and behavioral intent, even when their ads are fast-forwarded, when compared to brands using Heavy Peripheral or Limited Ads.

**** INSERT TABLE 3 AROUND HERE****
These findings provide evidence that ads featuring heavy central branding can breakthrough 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 pre-stimulus perceptions of the various brands, a pair of repeated-measures ANOVA analysis was run on the change from T1 to T2 for Brand Attitude and Behavioral Intent using the branding manipulation and fast-forwarding as the within- and between- subjects manipulations, and the score for each brand at T1 on Brand Attitude and Behavioral Intent as covariates in it’s respective ANOVA. This would partial out any variance due to differences in initial starting position on the DVs from the manipulation effects.

Score at T1 for Brand Attitude and Behavioral Intent were significant covariates for their respective deltas (F = 49.235 / 14.868, p < .001/ .001), however the branding manipulation remained strongly significant for both DVs (F= 17.603 / 3.307, p < .001 / .05 contrast p < .001 / .02). Results show that for fast-forwarding subjects (see Table 3), controlling for each brand’s pre-stimulus score at T1, High Central brands enjoyed higher deltas from T1 to T2 for Brand Attitude and Behavioral Intent when compared to High Peripheral (Bonferroni and Tukey p < .01) and Limited (Bonferroni and Tukey p < .01) brands. While deltas were positive regardless of branding conditions for regular-speed viewers, for fast-forwarding viewers only the High Central branded ads had positive pre-stimulus to post-stimulus 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 these brands were little harmed by fast-forwarding, unlike brands using High Peripheral or Limited branding ads.

*Actual Behavior: Chocolate Bar Choice*

The amount of branding in the chocolate bar ads had a strong effect on which chocolate
bar was actually chosen by the participants. This effect was consistent across Fast Forwarding Conditions; regular speed viewers chose the heavily-branded chocolate bar 64% of the time, while Fast-Forwarding participants chose the heavily branded bar 67% of the time. (See Figure 3) Crosstabulation reveals a significant association between Branding condition and bar 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, even though the chocolate bar commercials were reduced to roughly 1.5 seconds without audio for fast-forwarding viewers, and they had no prior brand exposure, participants chose the chocolate bar with the heavily-branded commercial two-to-one over the chocolate bar with the limited-branding commercial.

**** INSERT FIGURE 3 AROUND HERE****

Discussion

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

General Discussion
The overall pattern of results from our three studies confirm that DVR fast-forwarding has a negative effect on advertising outcomes, but 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 eyetracker 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 to the most 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 fast-forwarding regardless of the bumper logo location; the show bumper exhibits only a secondary diagnostic pull on visual attention. Study 3 shows that ads with heavy central branding can lead to positive impact on attitude towards the brand, behavioral intent, and actual behavior. Indeed, participants chose an unfamiliar chocolate bar with heavily branded ads two-to-one over a chocolate bar with limited branding ads, even when the ads 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 eyetrackers can provide offers an important tool for studying visual attention, especially for dynamic and interactive media. While most current work in visual marketing explores relatively static visuals such as magazine ads 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 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 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, as the current lessons for advertising attention learned from decades of print media study may not carry forward into the contexts of videogame product placement, online video, and interactive websites.

This research presents a preliminary exploration as to how the changing media environment leads to base-level changes in visual attention by altering visual attention signals such as motion cues, and highlight the power of visual attention, given differences between ads 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. While prior work explored the number of frames with brand information, it did not consider 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 ads can retain some promotional effectiveness, and both marketers and consumers should appreciate the greater ad effectiveness possible during fast-forwarding. Ads 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 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 ads is as important as the cognitive and affective processing frequently researched. As eyetracker technology becomes more commonplace, managers could 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.

It is important to note that the central bias shown during commercials was universal and highly resistant to change. While 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. While this suggests that the central bias may be outside of marketers’ control, one key benefit is consistency. Rather than be concerned with program-to-program differences in bumper location, commercial pod duration, or surrounding advertisements, our work suggests 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 which feature a brand banner near the top or the bottom of the screen. As central branding led to no ill effects for regular-speed viewers, marketers should consider both increasing the average brand information in their ads and ensuring that information is as central as possible.

Finally, it is important to note that these results have particularly strong implications for
reminder ads and advertising where brand exposure and memory are a primary goal. Ads 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 ads 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, while 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 with marketing outcome variables. Perhaps logos and icons that more clearly ‘pop’ from the background engender quicker recognition than traditional product packaging images, and encourage less advertising miscomprehension (Jacoby and Hoyer 1982).

Future work might also explore the long-term impact of fast-forwarded commercial exposure. Perhaps by using foreign brands and unfamiliar commercials at both regular and fast-forwarding speeds, researchers might explore how the positive effects on advertising outcome variables decay with time. For example, recognition might prove relatively impervious to time, while increased brand attitude might decay within a few hours. Such work should also explore whether the effects might be re-invigorated 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 fast-forwarded ads likely generate little affect on their
own due to lack of narrative, might show-to-brand affect transfer 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 eyetracker studies that explore participants’ visual attention to a custom-designed television show with a number of 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 an enormously 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 commercials was located elsewhere, the screen center still enjoyed a positive bias during fast-forwarding.

A third study shows that fast-forwarded ads with heavy central branding can lead to increased brand attitude and behavioral intent, while ads with peripheral or limited branding have little or no effect. Properly-designed ads can impact actual choice behavior even when fast-forwarded; fast-forwarding study participants chose a product with heavy-central branded ads over a product with limited branding two-to-one. These findings have implications both for marketing managers and for future 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
Branding and Bumper Examples, Studies 1, 2, and 3

Study 1 Bumper Logo

Study 1 Central Branding Example

Study 2 Bumper Logo (Bottom Left Version)

Study 3 Peripheral Branding Example

Study 3: Aero Ad Branding Example

Study 3: Flake Ad Branding Example
# Table 1
## Study 1 Recognition and Visual Attention Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Self-FF</th>
<th>Auto-FF</th>
<th>No-FF</th>
<th>Sig. Self-FF vs Auto-FF</th>
<th>Sig. Self-FF vs No-FF</th>
<th>Sig. All FFers vs No-FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition(^a): real ads</td>
<td>3.5</td>
<td>4</td>
<td>5.8</td>
<td>(p &lt; .001)</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .01)</td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>3.4</td>
<td>1.9</td>
<td>(p &lt; .001)</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .001)</td>
</tr>
<tr>
<td>distractor ads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pupil dilation during commercials(^b)</td>
<td>99%</td>
<td>94%</td>
<td>95%</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .01)</td>
<td></td>
</tr>
<tr>
<td>% of time in central bumper area during commercials</td>
<td>74%</td>
<td>70%</td>
<td>58%</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .01)</td>
<td></td>
</tr>
<tr>
<td>Increase in time spent in central bumper area during commercials vs during show</td>
<td>16%</td>
<td>19%</td>
<td>6%</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .001)</td>
<td></td>
</tr>
<tr>
<td>SD of gazepoint location during commercials(^c) (pixels)</td>
<td>105</td>
<td>124</td>
<td>140</td>
<td>(p &lt; .03)</td>
<td>(p &lt; .05)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\): Recognition was measured as a 7-point Likert scale with 1 = “definitely wasn’t shown” and 7 = “definitely was shown”

\(^b\): dilation during commercial expressed as a percentage of dilation during show content

\(^c\): Screen resolution was 1024*768
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 attend to brand information for 67% of the frames in which brand information occurred within the bumper area.
Table 2
Study 2 Measures of Visual Attention

<table>
<thead>
<tr>
<th></th>
<th>Gazepoints in Top Right Bumper Area During Commercials</th>
<th>Gazepoints in Bottom Left Bumper Area During Commercials</th>
<th>Sig. of Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Right Bumper</td>
<td>3.30%</td>
<td>0.39%</td>
<td><em>p &lt; .01</em></td>
</tr>
<tr>
<td>Bottom Left Bumper</td>
<td>0.79%</td>
<td>2.94%</td>
<td><em>p &lt; .01</em></td>
</tr>
<tr>
<td>No Bumper</td>
<td>1.22%</td>
<td>1.87%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Gazepoints in the Center 5% of Screen During Show Content</th>
<th>Gazepoints in the Center 5% of Screen During Commercials</th>
<th>Sig. of Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Right Bumper</td>
<td>28.5%</td>
<td>42.3%</td>
<td><em>p &lt; .01</em></td>
</tr>
<tr>
<td>Bottom Left Bumper</td>
<td>26.2%</td>
<td>43.7%</td>
<td><em>p &lt; .01</em></td>
</tr>
<tr>
<td>No Bumper</td>
<td>27.4%</td>
<td>38.6%</td>
<td><em>p &lt; .01</em></td>
</tr>
</tbody>
</table>

Note: all participants in Study 2 were Fast-Forwarding participants.
Figure 2
Study 3 Visual Recognition

Percentage of Brands Correctly Circled

- Central Branding
- Peripheral Branding
- Limited Branding

Normal Speed Viewers
Fast-Forwarding Viewers
### Table 3
Study 3 Attitudinal and Behavioral Measures

<table>
<thead>
<tr>
<th></th>
<th>Fast-Forwarding Viewers</th>
<th>Regular Speed Viewers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Central Branding</td>
<td>Peripheral Branding</td>
</tr>
<tr>
<td>Brand Attitude</td>
<td>5.3</td>
<td>4.6</td>
</tr>
<tr>
<td>Behavioral Intent</td>
<td>3.9</td>
<td>3.4</td>
</tr>
<tr>
<td>Purchase Intent</td>
<td>5.3</td>
<td>4.8</td>
</tr>
<tr>
<td>Brand Attitude T1 to T2 (\Delta)</td>
<td>+.54</td>
<td>+.02</td>
</tr>
<tr>
<td>Behavioral Intent T1 to T2 (\Delta)</td>
<td>+.51</td>
<td>+.08</td>
</tr>
<tr>
<td>Purchase Intent T1 to T2 (\Delta)</td>
<td>+.47</td>
<td>+.25</td>
</tr>
</tbody>
</table>

(Note: Adjusted Brand Attitude, Behavioral Intent, and Purchase Intent scores are presented to control for a significant Pre-Exposure Brand Familiarity covariate. Adjusted \(\Delta\) are presented to control for a significant Raw T1 Score covariate.)
Figure 3
Study 3 Chocolate Bar Choice

- Chose Bar with Heavy Branding Ad
- Chose Bar with Limited Branding Ad

[Bar chart showing chocolate bar choice for fast-forwarding and regular speed viewers]
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