Competing for consumer memory in television advertising
An empirical examination of the impacts of non-editorial clutter on brand memory in mega-event broadcasts

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The purpose of this study is to examine how brand recall and recognition are affected by non-editorial clutter in mega-event broadcasting. Using longitudinal data collected during four years of Super Bowl broadcasts, this study investigates the effects of three different types of television clutter (other ads, on-air promos and TV billboards) and their composite effects on brand memory. The results show that increases in numbers and lengths of other ads and on-air promos negatively affect brand recall and recognition. However, such effect was not found with TV billboards. Theoretical and marketing implications are discussed.

Introduction

Ads in a commercial break compete for audiences’ attention and memory (Zhao 1997). Thus, when advertising competition becomes intense due to an increase in the number of ads in a pod, this competition will generate negative influence on the overall success of television advertising (Claggett 1986; Ray & Webb 1986; Zhao 1997). This assumption has been confirmed by numerous researchers who find that cramped clutter causes less audience attention to the commercials while increasing viewer...
confusion (Ray & Webb 1986; Zhao 1997; Elliott & Speck 1998). Thus, clutter has been a concern for marketers, particularly in television advertising that commonly involves substantial financial investment (Mándese 1991; Kent 1995; Creamer 2007).

To examine clutter effects on advertising effectiveness, past studies have generally defined TV ad clutter as *other ads in a pod*. Using this definition, Kent (1993) found that exposure to more ads decreases advertising effectiveness as measured by persuasion, likeability, attention and recall. Similarly, Zhao (1997) concluded that the number of other ads in a pod is negatively associated with memory-based evaluations of TV commercials.

More broadly, to have a more composite understanding of a clutter effect, some scholars have suggested a definition for TV ad clutter as *non-editorial content* (Brown & Rothschild 1993; Ha & McCann 2008). Few empirical studies, however, have adopted this definition to determine the impacts of non-editorial components such as *on-air promos* (programme promotion) or *TV billboards* (brief sponsor identification) in conjunction with other ads on advertising performance. Considering that both on-air promos and TV billboards are similar to advertising in their roles as persuasive messages to attract target audiences’ attention and memory (Lardinoit & Derbaix 2001; Eastman *et al.* 2005), our understanding of clutter effects in a television medium remains limited, as does the strategic advantage of ad placement. This study defines TV ad clutter as non-editorial messages, and investigates composite clutter effects on audience brand memory using the Super Bowl, a mega-broadcasting event in which the three clutter types (other ads, on-air promos and TV billboards) are frequently employed.

**Advertising clutter**

An average consumer is known to be exposed to 254 to 5000 commercial messages a day (Creamer 2007). From a clutter viewpoint, this amount exceeds the information processing abilities of most consumers (Webb 1979; Woodside & Glenesk 1984; Rumbo 2002; Ha & McCann 2008), and can negatively affect attention, recall and persuasion (Brown & Rothschild 1993; Kent 1995; Laroche *et al.* 2006).

The negative impact of clutter on television advertising effectiveness has been studied in several aspects. One line of research attempted to
explain clutter effects by taking a psychological information processing approach. According to Ray and Webb (1986), the number of concepts or pieces of information (e.g. advertisements or brand names) people can process thoroughly is about three to five. Hence, when the number of advertisements exceeds this threshold, people generally experience difficulty in processing and storing incoming stimuli. Ray and Webb (1986) found that viewers were able to recall 26% of commercials in the lowest clutter condition (8 minutes of ad) while they could recall only 12% of commercials in the highest clutter setting (18 minutes and 20 seconds of ad). Webb and Ray (1979) also found that brand recall dropped from 21% to 8% in a highly cluttered advertising condition. Similarly, in a radio advertising clutter study, respondents in a low-clutter setting (1.5 minutes of ad) recalled 36.7% of ads while those in a high-clutter setting (4.5 minutes of ad) recalled only 15.6% (Riebe & Dawes 2006).

The second line of research has determined the effect of competitive clutter that involves placing commercials of competing brands together within the same editorial programme. Mandese (1991) noted that during a typical prime-time network programme, 42% of ads had at least one or more competitors in the same hour. Kent (1993) also observed that network television is highly cluttered with ads of directly competing brands, and showed that competitive clutter produced significantly more negative effect on audiences’ memory-based evaluations than non-competitive clutter.

The third line of research in this area has determined the impact of advertising clutter in a broader scope. A group of researchers argue that severe advertising clutter accelerates the decline of network TV viewership (Patzer 1991) and will eventually decrease the effectiveness of overall TV advertising (Claggett 1986; Ray & Webb 1986). According to Patzer (1991), viewers are likely to have negative impressions towards not only the ads but also the TV programmes that allowed such a cluttered environment. Similarly, Danaher (1995) revealed that rating points during a commercial break decreased considerably as the number of ads in a break increased.

**On-air promotion**

The marketing of TV programmes on a network’s own air is referred to as on-air promotion (also called promo) or programme ad (Eastman et al. 1998).
This marketing tactic gained particular importance to broadcast network stations because of an increase in programme cost, competition and use of remote controls (Eastman et al. 1998). Broadcasters found it necessary to market network stations as brands (Meech 1999) and promote their own programmes to boost the ratings and, consequently, attract advertisers. Therefore, on-air promos are used as a means for the networks to differentiate themselves from other competing channels as well as to build a positive brand name for the network (Eastman et al. 1996; Meech 1999; Walker & Eastman 2003).

Generally, the goal of on-air promos is to attract the audience and generate viewership for future programming. Hence, on-air promos play a pivotal role for TV networks in their battle for ratings, especially during mega-events (e.g. the Super Bowl, the Olympics and the Academy Awards) that offer a rare self-promoting opportunity to networks by reaching mass audiences (Eastman et al. 2003). To evaluate its role of driving future programme audiences, the effectiveness of on-air promos is typically determined by analysing the change in ratings for the promoted programme (Walker 1993; Eastman et al. 1998; Walker & Eastman 2003). For instance, Eastman and colleagues (1996) looked at the impact of prime-time promos in a large selection of professional and college sporting events. They concluded that there is a modestly positive impact on programme ratings when on-air promos are used during sporting event broadcasts.

Since on-air promos take up the air time that would normally be allocated for advertising, networks are in a way forfeiting their advertising revenue particularly during popular programmes (e.g. the Super Bowl) where advertising demand is high. Nonetheless, this is a necessary investment considering its potential to drive viewership for future programming and to allow networks to recoup the cost in the near future. However, because this promotional activity also attempts to attract viewers' attention and memory, on-air promos compete with other commercials. Accordingly, the use of on-air promos is expected to increase the degree of clutter and cause cognitive overload. Thus, broadcasters must find a balance between advertisers' desire for advantageous placement of their commercials and the networks' need to attract large audiences to their programmes (Eastman et al. 1998).
Television billboard

A television billboard is an identification of a sponsor during a broadcast, usually accompanied by an on-screen logo and a voiceover announcement that the broadcast is ‘brought to you by’ a specific sponsor. A TV billboard is different from typical TV advertising in that only sponsorship holders are allowed to take advantage of this special announcement during a broadcast. This marketing activity is commonly called a television billboard in practice, but is also labelled as a TV or programme sponsorship (Thomas 1985; Lardinoit & Derbaix 2001) or a pre-commercial break announcement (Turner 2004).

The general purpose of a TV billboard is to associate advertisers’ brand names with the sponsored broadcast so that brands can benefit from the broadcast by seeking a halo of goodwill effect. Although TV billboards last for only a few seconds, this technique can offer an additional opportunity for the audience to process information such as brand name or logo, and learn about the sponsor in a less cluttered environment (Lardinoit & Derbaix 2001).

In spite of its pervasive use in practice, only a handful of studies have been conducted on this technique. Specifically, there is a lack of research examining the impact of TV billboards on advertising effectiveness from the clutter perspective. Instead, prior studies have generally focused on the effectiveness of a TV billboard itself. For instance, Lardinoit and Derbaix (2001) found that viewers recall the sponsor’s name better with exposure to a TV billboard than stadium signage. Turner (2004) investigated the impact of TV billboards on viewers’ ability to distinguish official sponsors of a sporting event from general programme advertisers, both of which were mentioned in the pre-break announcement. The results showed that TV billboards increase brand recall, but can also be a source of confusion.

Although TV billboards do not share a similar format with ads, they still contain visual and auditory cues that can be viewed as marketing messages aimed at viewers. Since any information learned before or after an ad can affect audience memory (Kent 1993), TV billboards, which are usually delivered immediately before or after a commercial break, may inhibit viewers’ ability to process and to remember the ensuing ads. However, this potential impact of TV billboards on ad memory has not been empirically examined.
Hypotheses

Television viewers are exposed to thousands of messages that attempt to get them to think, feel and behave in particular ways (Eastman et al. 2005). According to information processing theories, when fewer messages are presented, viewers are more likely to pay close attention and the information is more likely to be processed at a deeper level (Ha & McCann 2008). On the contrary, as the number of other ads in a pod increases, ads suffer from reduced attention and this results in retrieval failure (Pieters & Bijmolt 1997). Thus, it is hypothesised that:

H1a: General advertising clutter will have a negative impact on the recall of the advertised brand.

H1b: General advertising clutter will have a negative impact on the recognition of the advertised brand.

Little empirical research has investigated the impact of other non-editorial elements on advertising effectiveness, such as on-air promos and TV billboards. Eastman and colleagues (2003) refer to excitation transfer theory to explain the impact of on-air promos on ad effectiveness. They suggest that the excitation generated by TV programmes lasts for only seconds after the original exposure. In this condition, on-air promos are assumed to deter the transfer of emotions from TV programmes to ads by consuming additional attention and memory. This will result in an interference of the processing of ads. Thus, this study hypothesises that:

H2a: On-air promos will have a negative impact on the recall of the advertised brand.

H2b: On-air promos will have a negative impact on the recognition of the advertised brand.

Generally shown outside traditional commercial breaks, TV billboards during a broadcast are known to influence both the recall and recognition of the advertised brands (Lardinoit & Derbaix 2001; Turner 2004). This implies that TV billboards serve as additional sources of more brand
names and product information, and compete for the audiences' attention in the already highly cluttered ad environment. Thus, TV billboards are also expected to hinder the processing of the ads. Therefore, this study hypothesises that:

**H3a:** TV billboards will have a negative impact on the recall of the advertised brand.

**H3b:** TV billboards will have a negative impact on the recognition of the advertised brand.

TV clutter can be defined as 'the sum of the nonprogram components of broadcast materials' (Brown & Rothschild 1993, p. 138). Past studies have found that a cluttered advertising environment induces audiences to pay less attention to the commercials while increasing their confusion (Ray & Webb 1986; Pieters & Bijmolt 1997; Zhao 1997; Elliott & Speck 1998). Similarly, visually and aurally busy messages produced by other ads, on-air promos and TV billboards quickly fill up short-term memory, and leave little space and time for storage of subsequent messages (Lang 2000; Eastman *et al.* 2005). Therefore, this study hypothesises:

**H4a:** Overall clutter (other ads, on-air promos and TV billboards) will have a negative impact on the recall of the advertised brand.

**H4b:** Overall clutter (other ads, on-air promos and TV billboards) will have a negative impact on the recognition of the advertised brand.

**Method**

**Mega-event: the Super Bowl**

A mega-event broadcast is an important venue to examine composite clutter effects in TV broadcasts not only because it guarantees sufficient viewership to investigate audience reactions to ads but also because it frequently contains all the aforementioned non-editorial clutters. This study used the Super Bowl because more than 100 million people watch the
game each year (Quindt 2003) and four out of ten households are tuned in to each Super Bowl game (Kanner 2004).

Data collection: quasi-experiment

Using natural quasi-experiments, the recall and recognition of brands advertised during four Super Bowl games (2002, 2003, 2004 and 2006) were assessed. Audience data were collected through telephone interviews and aggregated across respondents by brand. Using a computer-assisted survey, interviews were conducted with local residents of North Carolina from Monday evening through Thursday evening following each Super Bowl game. People who reported viewing at least a part of the game were asked for participation, and those who did not view the broadcast were excluded from the study. In this setting, respondents were unaware of the study until at least 24 hours after the game, and thus their viewing (or non-viewing) behaviours were assumed to be natural.

Respondents were first asked which parts of the game they watched. The respondents who did not watch the game or could not exactly remember the section they watched were excluded from the study. For those who reported watching more than one part of the game broadcast, multiple recall and recognition assessments were made. In general, those who reported watching at least some parts of the game remembered the sections they watched. Overall, 1529 interviews were completed, with an average response rate of about 60%.

Independent variable: non-editorial TV clutter

This study defined TV clutter as any non-editorial message in a pod and identified three types of TV clutter: ad clutter, on-air promos and TV billboards. Ad clutter was measured in two ways: the number and length of other ads in a pod. First, using Zhao’s approach (1997), the number of other ads was calculated as the total number of commercials in the pod minus one when a brand was advertised only once during a broadcast. When more than one ad was aired, the numbers of other ads in all pods

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1 The original study was designed as a three-year trend study from 2002 to 2004. However, recall measures were accidentally excluded in 2004. Ideally, we would have conducted the study again in 2005 to compensate for our lack of recall data in 2004, but we did not have the resource to conduct the study. Thus, the study was extended to 2006.
in which the brand was advertised were added together. Second, because different length formats (e.g. 15-, 30- and 60-second) are used in TV advertising, which can create different viewing environments, this study also measured the lengths of those ads. The assessments were the same for on-air promos and TV billboards. For brands that advertised only once during the entire broadcast, numbers and lengths of on-air promos/TV billboards in a pod were identified as clutter. For brands with multiple ads, numbers and lengths of on-air promos/TV billboards in all pods in which the brand was advertised were summed to measure the total amount of on-air promo/TV billboard clutter.

Dependent variable: brand memory

Brand recall and recognition were used to assess audiences’ brand memory. Although the recall and recognition assessments are not perfect measures for evaluating advertising effectiveness, since brand memory is directly related to other outcomes of marketing communication such as brand knowledge, likeability, trust, attitude and purchase intention, both recall and recognition tests have been widely used to assess the cognitive aspect of advertising effectiveness in the advertising industry (du Plessis 2005; Wells et al. 2006) and in a great deal of advertising and marketing research (Singh et al. 1988; Stacy et al. 2004; Schneider & Cornwell 2005; Siefert et al. 2008; Veer & Pervan 2008; Delattre & Colovic 2009; Hammer et al. 2009).

For brand recall, respondents were asked to list all the advertised brands they remembered seeing during the commercial break. Their responses were recorded verbatim during the interviews, and brand recall rate was obtained by calculating the percentage of respondents who recalled the brand out of those who reported watching the segment(s) of the game where the brand appeared. One cautionary note is that brand recall data were not collected in 2004 (see footnote 1).

Brand recognition was assessed by presenting respondents with a list of brand names compiled based on the ads that aired during the games. Recognition rate was calculated by dividing the number of respondents that recognised the brand by the number of respondents that watched the segment(s) in which the brand was advertised. To detect false alarms, in which respondents mistakenly report a brand they had not seen during
the game, several major competitors of the advertised brands that were not
promoted during the game were included in the list. The recognition rates
were recalculated after taking into account the results of false-alarm tests.
The correlation between the weighted and unweighted scores was 0.99,
and thus false alarms are not anticipated to significantly affect the correla-
tions between variables of interest in this study. Nonetheless, weighted
scores were used to report the results in the study, and parallel analyses
based on the unweighted scores gave essentially the same results.

Control variables

The year of the Super Bowl
Audiences’ reactions to the ads aired in four Super Bowl games can vary
from year to year due to various factors, such as ad creativity and game
flow. Thus, when the data are pooled, there is a chance that differences
across years can confound advertising effectiveness (Zhao 1997).

Product type
Brands in certain product categories may perform better than other prod-
ucts due to bigger advertising budget, higher production quality and
manufacturers’ public relations efforts. Zhao (1997) found that the impact
of this variable was significant in explaining the effectiveness of ads aired
during the three years of Super Bowl games (1992–94). Differences in
audiences’ reactions towards the products promoted during Super Bowl
games were also detected by Wu and Newell (2003) and Youn et al. (2001).
This study identified eight product categories: service, automobile,
shoes/clothes, health/beauty, household, food/beverage, public service
announcement (PSA), and entertainment.

Advertising frequency
Previous studies have found that ad repetition is positively associated with
advertising effectiveness (Singh & Rothschild 1983; Rethans et al. 1986;
Singh et al. 1988; Murray & Jenkins 1992; Singh et al. 1995). Thus, this
study controlled for ad frequency to detect the unique clutter effects on
brand memory.
Results

A total of 272 brands were analysed: 75 (2002), 64 (2003), 67 (2004) and 66 (2006). Brand recognition rates varied from 6% to 88%, and recall rate varied from 0 to 88%. The average number of other ads was 3.7, ranging from 0 to 15. The total length of the ads varied in length from 0 to 477 seconds, with the mean of 109.5 seconds. On-air promos and TV billboards also varied in number and length. Average number and length of on-air promos were 2.1 and 31.5 seconds, and those of TV billboards were 1.2 and 5.5 seconds, respectively. Lastly, the average number and length of overall clutter including all three non-editorial clutter types were 6.9 and 146.7 seconds, respectively. Table 1 displays the descriptive statistics of major variables.

<table>
<thead>
<tr>
<th>Table 1: Univariate statistics of major variables</th>
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<tbody>
<tr>
<td>Minimum</td>
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<tr>
<td>Brand recognition* (N = 272)</td>
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<tr>
<td>Brand recall'' (N = 204)</td>
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<tr>
<td>Ad frequency*</td>
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<tr>
<td>Ad clutter number*</td>
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<tr>
<td>Ad clutter length (second)*</td>
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<tr>
<td>On-air clutter number*</td>
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<tr>
<td>On-air clutter length (second)*</td>
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<tr>
<td>TV billboard number*</td>
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<tr>
<td>TV billboard length (second)*</td>
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<tr>
<td>Overall clutter number*</td>
</tr>
<tr>
<td>Overall clutter length (second)*</td>
</tr>
</tbody>
</table>

Notes:
* The percentage of people who recognise a given commercial (0–100)
'' The percentage of people who recall a given commercial (0–100, recall data were not collected in 2004)
* The number of times a given brand was advertised
* The number of other ads
* The length of other ads
* The number of on-air promos
* The length of on-air promos
* The number of TV billboards
* The length of TV billboards
* The number of overall non-editorial clutter (ads, on-air promos and TV billboards)
* The length of overall non-editorial clutter (ads, on-air promos and TV billboards)
 Statistical procedure

The dependent variables were normally distributed, satisfying the basic assumption of regression analysis. Multiple regression analyses were performed, and a total of 16 models were constructed. For each model, the year, product category and advertising frequency were entered as a control block. The independent variables (numbers and lengths of other ads, on-air promos and TV billboards) were entered on top of the controls individually (Models 1–12) and then as a composite (Models 13–16). The results are summarised in Tables 2, 3, 4 and 5.

Effects of control variables

The results show that control variables significantly affect brand memory. Brands advertised in the 2002 and 2003 games had higher recall rates than brands in 2006. In terms of product type, respondents recalled shoes/clothes, food/beverage and service brands more than entertainment brands. Lastly, ad repetition had a significant positive impact on brand recall. Similarly, brand recognitions differed by the year and product categories. Those promoted in the 2004 Super Bowl game were less...

<table>
<thead>
<tr>
<th>Table 2: Ad clutter effects</th>
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<tr>
<td>Constant</td>
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<td>1. Independent variables</td>
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<tr>
<td>Ad clutter number</td>
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<td></td>
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<tr>
<td>Ad clutter length</td>
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<td></td>
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<tr>
<td>2. Incremental/total $R^2$</td>
</tr>
<tr>
<td>Ad clutter number (%)</td>
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<tr>
<td>Ad clutter length (%)</td>
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<tr>
<td>Control variables (%)</td>
</tr>
<tr>
<td>Total model</td>
</tr>
</tbody>
</table>

Note:

1 Cell entries in section 1 are regression coefficients (standardised beta coefficients are shown in parentheses). (*p < 0.05, **p < 0.01, ***p < 0.001)

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### Table 3: On-air promotion effects

<table>
<thead>
<tr>
<th></th>
<th>Brand recall</th>
<th>Brand recognition</th>
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<tr>
<td></td>
<td>5 On-air number</td>
<td>6 On-air length</td>
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<tr>
<td>Constant</td>
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<td>-13.70***</td>
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<td>1. Independent variables</td>
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<tr>
<td>On-air promo number</td>
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<tr>
<td>On-air prom length</td>
<td>(-0.21)</td>
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<tr>
<td></td>
<td>-0.08**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.19)</td>
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</tr>
</tbody>
</table>
| 2. Incremental/total $R^2$
| On-air number (%) | 2.6          |                  | 5.8            |                |
| On-air length (%)  | 2.4          |                  |                | 4.4            |
| Control variables (%) | 43.9        | 43.9             | 37.4           | 37.4           |
| Total model        | 46.6         | 46.3             | 43.1           | 41.8           |

**Notes:**
- Cell entries in section 1 are regression coefficients (standardised beta coefficients are shown in parentheses). (*p < 0.05, **p < 0.01, ***p < 0.001)
- Because brand recall was not assessed in 2004, the data collected in 2004 were excluded from the analyses.

### Table 4: TV billboard effects

<table>
<thead>
<tr>
<th></th>
<th>Brand recall</th>
<th>Brand recognition</th>
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<tbody>
<tr>
<td></td>
<td>9 TV billboard number</td>
<td>10 TV billboard length</td>
</tr>
<tr>
<td>1. Independent variables</td>
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<td></td>
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<tr>
<td>TV billboard number</td>
<td>0.15</td>
<td>0.64</td>
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<tr>
<td>TV billboard length</td>
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<td>0.11</td>
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<tr>
<td></td>
<td>(-0.00)</td>
<td></td>
</tr>
</tbody>
</table>
| 2. Incremental/total $R^2$
| TV billboard number (%) | 0.0          |                  | 0.3            |                |
| TV billboard length (%) | 0.0          |                  | 0.2            |                |
| Control variables (%) | 43.9        | 43.9             | 37.4           | 37.4           |
| Total model        | 43.9         | 43.9             | 37.6           | 37.5           |

**Notes:**
- Cell entries in section 1 are regression coefficients (standardised beta coefficients are shown in parentheses). (*p < 0.05, **p < 0.01, ***p < 0.001)
- Because brand recall was not assessed in 2004, the data collected in 2004 were excluded from the analyses.
Table 5: Overall clutter effects

<table>
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<tr>
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<th>13</th>
<th>14</th>
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<tbody>
<tr>
<td></td>
<td>Brand recall</td>
<td>Brand recognition</td>
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<td>Clutter length</td>
<td>Clutter number</td>
<td>Clutter length</td>
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<tr>
<td>Constant</td>
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<td>25.94***</td>
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<td>(-0.36)</td>
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<td>Ad clutter length</td>
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<td>-0.08***</td>
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<td></td>
<td>(-0.24)</td>
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<td></td>
<td>(-0.39)</td>
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<tr>
<td>On-air promo number</td>
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<td>-2.35***</td>
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<td></td>
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<td>(-0.31)</td>
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<tr>
<td>On-air promo length</td>
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<td>-0.08**</td>
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<td>-0.12***</td>
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<td>(-0.20)</td>
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<tr>
<td>TV billboard number</td>
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<td>(-0.04)</td>
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<tr>
<td>TV billboard length</td>
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<td>-0.01</td>
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<td>(0.00)</td>
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<td>2. Incremental/total R²</td>
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<tr>
<td>Clutter length (%)</td>
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<td>9.2</td>
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<tr>
<td>Control variables (%)</td>
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<tr>
<td>Total model</td>
<td>48.7</td>
<td>48.1</td>
<td>47.7</td>
<td>46.6</td>
</tr>
</tbody>
</table>

Notes:
1. Cell entries in section 1 are regression coefficients (standardised beta coefficients are shown in parentheses). (*p < 0.05, **p < 0.01, ***p < 0.001)
2. Because brand recall was not assessed in 2004, the data collected in 2004 were excluded from the analyses.

recognised compared to those in the 2006 game. Service, automobile, health, household and beauty brands were generally less recognised than entertainment brands, and there was a significant positive ad frequency effect on brand recognition rates.

Ad clutter effect

This study hypothesised that the number and length of other ads are negatively associated with brand recall and recognition (H1a and H1b). The results supported these hypotheses. Models 1 and 2 (see Table 2) show that both the number (Model 1: $b = -1.31$, $\beta = -0.25$, $p < 0.01$) and the length (Model 2: $b = -0.04$, $\beta = -0.23$, $p < 0.05$) of other ads significantly lowered brand recall. Similarly, the number of other ads (Model 3: $b = -2.43$, $\beta = -0.39$, $p < 0.001$) and the length of other ads (Model 4:...
$b = -0.09, \beta = -0.41, p < 0.001$) had significant negative effect on the brand recognition rates. The findings indicate that an additional ad decreased brand recall rate by 1.31% and brand recognition by 2.43%, and an additional second of other ads lowered brand recall and recognition by 0.04% and 0.09%, respectively.

**On-air promotion clutter effect**

The second set of models (see Table 3) examined the hypotheses that predicted the negative impact of on-air promos on brand recall (H2a) and recognition (H2b). The results also support these hypotheses. For brand recall, the number of on-air promos (Model 5: $b = -1.63, \beta = -0.21, p < 0.01$) and the length of on-air promos (Model 6: $b = -0.08, \beta = -0.19, p < 0.01$) had significant negative effects. Similarly, audiences’ brand recognition rates significantly decreased as the number of on-air promos (Model 7: $b = -2.41, \beta = -0.32, p < 0.001$) and the length of on-air promos (Model 8: $b = -0.13, \beta = -0.26, p < 0.001$) increased. The findings show that each additional on-air promo dropped brand recall rate by 1.63% and brand recognition by 2.41%, and each extra second of on-air promo decreased brand recall by 0.08% and brand recognition by 0.13%.

**TV billboard clutter effect**

This study hypothesised that TV billboards would lower audiences’ memory on advertised brands (H3a and H3b). However, the results failed to support the hypotheses (see Table 4). The number (Model 9: $b = 0.15, \beta = 0.02$) and length (Model 10: $b = 0.0, \beta = 0.0$) of TV billboards did not significantly influence brand recall. Similarly, the impact of the number (Model 11: $b = 0.64, \beta = 0.06, p > 0.05$) and length (Model 12: $b = 0.11, \beta = 0.05, p > 0.05$) of TV billboards on brand recognition was not significant.

**Overall clutter effects**

The last sets of models (see Table 5) tested the hypotheses that predicted a negative impact of overall clutter (other ads, on-air promos and TV billboards) on brand memory (H4a and H4b). The results supported the hypotheses, indicating that composite clutter significantly decreased
audiences’ brand memory. The number of other ads and on-air promos significantly decreased brand memory. Interestingly, the impact of the number of on-air promos (Model 13: $b = -1.67$, $\beta = -0.22$, $p < 0.01$) was similar to that of the number of other ads (Model 13: $b = -1.28$, $\beta = -0.24$, $p < 0.01$), although the number of ad clutter had a slightly greater impact. Similarly, the length of other ads (Model 14: $b = -0.04$, $\beta = -0.24$, $p < 0.05$) and the length of on-air promos (Model 14: $b = -0.08$, $\beta = -0.20$, $p < 0.01$) also lowered audiences’ recall of brands. The findings show that each additional ad and on-air promo decreased brand recall by 1.28% and 1.67%, respectively, and each extra second of ads and on-air promos decreased brand recall by 0.04% and 0.08%, respectively. The impact of the number and length of TV billboards was not significant.

Brand recognition rates also significantly decreased as the number of other ads (Model 15: $b = -2.24$, $\beta = -0.36$, $p < 0.001$) and number of on-air promos (Model 15: $b = -2.35$, $\beta = -0.31$, $p < 0.001$) increased. Similarly, the length of other ads (Model 16: $b = -0.08$, $\beta = -0.39$, $p < 0.001$) and length of on-air promos (Model 16: $b = -0.12$, $\beta = -0.25$, $p < 0.001$) lowered audiences’ ability to recognise brand names. The effects of the number and length of TV billboards were not statistically significant. The findings indicate that each additional ad and on-air promo decreased brand recognition rate by 2.24% and 2.35%, respectively, and an additional second of ads and on-air promo lowered brand recognition by 0.08% and 0.12%, respectively, while the impact of the number and length of TV billboards were minimal.

In addition to a series of regression analyses, this study examined the clutter in quartiles to compare how brand recall and recognition are affected based on the level of non-editorial clutter. The results clearly show an inverse relationship between the degree of non-editorial clutter and audiences’ brand memory. As displayed in Table 6, brand recall and recognition scores are the highest in quartile 1 (the lowest clutter), while brand recall and recognition progressively decreased and scored the lowest in the quartile 4 (the highest clutter).

**Discussion**

The purpose of this study is to examine how brand recall and recognition are affected by non-editorial clutter during mega-event broadcasts. Each
of the three types of clutter and their composite effect on two measures of brand memory were examined. The overall findings suggest that the presence of other ads and on-air promos negatively influence memory-based brand evaluations.

These findings are consistent with previous studies on ad clutter effects which show that highly cluttered environments reduce advertising effectiveness (Webb & Ray 1979; Ray & Webb 1986; Patzer 1991; Ha & Litman 1997; Pieters & Bijmolt 1997; Zhao 1997; Elliott & Speck 1998). As explained by the limited capacity principle in cognitive psychology, an increasing number of events (e.g. ads and on-air promos) during a broadcast causes cognitive overload and becomes a key factor for incomplete processing of persuasive messages (Simon 1974; Webb 1979; Woodside & Glenesk 1984). As a result, cramped environments due to the presence of ads and on-air promos lead to less attention and to increased confusion, inhibiting viewers’ ability to remember information.

However, such a negative relationship was not found with TV billboards. This can be explained by the nature of TV billboards, which contain fewer informational cues and lack visual stimuli compared to other clutter types. Moreover, TV billboards are typically presented as part of a programme with synchronised voice narration, which is different from ads and on-air promos that involve various settings, voices and more visual cues. As a result, it is possible that viewers simply paid similar attention to TV billboards as they paid to typical TV programmes. Not viewed as promotional or commercial activities, TV billboards might not have been
memorable enough to influence audience memory in competition with other clutter elements that had created severe cognitive burdens.

In addition to individual clutter effects, this study also analysed the composite effect of three types of non-editorial clutter to gain a better understanding of the relationship between TV clutter and brand memory. The outcomes echoed the findings of individual analyses: both numbers and lengths of ads and on-air promos inversely affected audiences' brand evaluations, while the influence of TV billboards was not significant. In this analysis, the relative effect sizes of each type of clutter were compared, controlling for other clutter types. The results show that the effects of on-air promos on brand memory are considerable and comparable to those of ad clutter. This observation demonstrates that viewers conceive on-air promos, which typically come at the beginning and end of ad breaks, as another form of persuasive messages that compete with other ads. Considering that on-air promos are employed by broadcasters largely to attract audiences as well as advertisers for their future programming, the irony is that broadcasters' marketing activities may decrease the effectiveness of their customers' promotional efforts.

Another noticeable finding is that clutter effects were found more detrimental to brand recognition than to brand recall for all clutter types. This can be explained by the nature of two measures. In general, recall requires more effortful processing than recognition that asks people only to distinguish the brands promoted during the shows from those not (Singh et al. 1988). For a brand to be recalled, certain attributes/features of ads must trigger viewers' information processing mechanism and motivate them to actively process and store the information, and thus it is a more difficult test of memory. In contrast, recognition does not require such cognitive effort to distinguish identifiable brands from others. As a result, since less cognition is involved in the assessment, recognition can be more easily influenced by environmental cues such as the extent of clutter.

Managerial and theoretical implications

This study suggests several important implications for advertising practitioners and researchers. First, the findings provide practical implications for strategic media planning decisions, particularly during mega-event broadcasts, in which all three clutter elements are often employed. This
study found that the presence of other ads and on-air promos significantly lowers memory-based brand evaluations, while advertisers may not have to be too concerned about TV billboards. Thus, advertisers should understand the non-editorial block of intended TV programmes when placing ads and use it as one of the negotiation references. For example, similar to how networks guarantee gross rating points, advertisers could proscribe placing their ads in heavily cluttered environments by asking networks to guarantee that their ads are aired in a less cluttered environment or asking for discounts if there is too much more clutter than advertisers had expected.

Second, despite the pervasive use of other promotional techniques in practice, previous studies have focused on the number of other ads in determining the clutter effects in TV advertising. By defining clutter as non-editorial messages in a pod, this study successfully expanded the ad clutter research to a broader context. Although there may be other forms of brand or sponsor identifications during broadcasting, numbers and lengths as well as their expected impacts are considered rather minimal compared to the three tested in this study. Thus, the findings of this study contribute to a more collective understanding of clutter effects in TV advertising.

Third, this study analysed longitudinal data collected through quasi-experiments during four Super Bowl games. This natural setting compensates for the limitation of a laboratory setting in which the level of attention to the ads and involvement are generally more magnified than in a natural setting. Compared to an artificial environment, this study is naturalistic in several aspects including variations in lengths and qualities of commercials, different pod lengths, various product types, home viewing environment that can include behaviours such as zapping, room-leaving and engagement in other non-TV-focused activities, and passage of time between exposure and memory test. This natural setting carries particular importance in effects studies because forced exposure in a laboratory setting may alter true advertising effects (Zhao 1997). Hence, in comparison with most laboratory experiments in advertising research, this study is assumed to be more externally valid.

Nevertheless, the findings of this study cannot be taken without considering some methodological reservations. First, this study did not consider the effects of creativity and quality of the ads that might affect viewers’ memory. Second, because the data were collected during the following
week of each Super Bowl game, it is possible that respondents had opportunities to obtain information about the ads from other sources, such as USA Today's Super Bowl Ad Meter. It is also possible that there was memory decay over time during data collection. Third, one may question the use of the Super Bowl by arguing that it is a unique annual event in the US that may evoke different emotions, involvement level, physiological response and attention to commercials, which are not representative of those induced by general broadcasts. However, others reported that this seemingly unique viewing condition has been overstated, and found lower-than-expected recall scores of Super Bowl ads (Deveny 1993; Moore 1993; Goldman 1994). In addition, practically, obtaining sufficient data using a regular TV programme is extremely difficult even with popular mega-events. Super Bowl broadcasts are one of few TV programmes that meet sufficient viewership for a research opportunity in a natural setting that results in high reach and can also attract light TV viewers. With this advantage of attracting a large audience in a natural TV viewing environment, Super Bowl advertising has been widely used as a functional means to examine numerous aspects of advertising such as ad content (Nail 2007), message publicity (Jin et al. 2006), movie box office performance (Yelkur et al. 2004), appeal method (Chung & Zhao 2003), length and frequency of ad (Newell & Henderson 1998), ad placement (Newell & Wu 2003), ad clutter (Zhao 1997), ad likeability (Tomkovick et al. 2001) and sports sponsorships (O'Reilly et al. 2008).

This was the first study to explore clutter effects in a broader spectrum. Future research may take this area of study in several directions. A direct extension of this research may examine clutter effects on other aspects of advertising effectiveness, such as attitudinal and behavioural evaluations. Other types of clutter elements, such as brand mentions in the sponsored section of a programme (halftime show, pre/post-game analysis), stadium signage in sports broadcasts and brand identification on the bottom line of the TV screen, could be explored for more comprehensive understanding of clutter effects in TV advertising. In addition, subsequent studies may investigate the ad content, the role of creativity, viewers' involvement, mood, physiological status and brand familiarity as potential moderating variables of clutter effects on advertising performance. Furthermore, research on determining the ideal length of a pod or the magic number of ads/on-air promos in a pod that can maximise advertising effectiveness...
before audiences’ recall or recognition starts to fall would yield useful marketing implications as well as meaningful understanding of ad clutter effects. Finally, future research on the effect of memory decay will contribute to the better understanding of the long-term clutter effects on advertising effectiveness.

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