CLUTTER AND SERIAL ORDER REDEFINED AND RETESTED

Xinshu Zhao

University of Minnesota / University of North Carolina

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About the Author

Xinshu Zhao (Ph.D., Wisconsin-Madison; M.A., Stanford; B.A., Fudan Univ. in Shanghai, China) is a visiting professor of journalism and mass communication at University of Minnesota, Twin Cities Campus, and an associate professor of journalism and mass communication at the University of North Carolina at Chapel Hill. He was an assistant professor of communications at the Pennsylvania State University from 1989-1990, a statistical consultant with Madison Academic Computing Center in Madison, Wisconsin from 1986-1989, an intern reporter with Xinhua News Agency and *People's Daily* in China from 1981-1982, and a labor worker on the assembly lines of Shanghai 27th Radio Factory from 1973-1978. Zhao's research has appeared in such journals as *Asian Survey, Communication Research, Comparative Education Review, International Journal of Advertising, International Journal of Public Opinion Research, Journalism and Mass Communication Quarterly,* and *Public Opinion Quarterly.*

Abstract

The traditional definitions of advertising clutter and serial order have deficiencies. The position effects may be better defined in terms of two components, i.e., *proaction* from preceding ads and *retroaction* from succeeding ads. Clutter and serial order effects can be seen as results of interaction between proaction and retroaction. There is also a need to distinguish pod clutter from program clutter. A holistic theory of position effects is proposed based in part on the redefined concepts.

A naturalistic quasi-experiment was conducted in North Carolina during the 1992-1994 Super Bowl games. The results suggest that preceding ads have negative effects on brand recall, brand recognition, and advertisement liking; and succeeding ads have a negative effect on brand recognition. Each proactive effect is stronger than its counterpart retroactive effect. Hence, an advertisement would fare better in a pod of less ads and/or in an earlier position within the pod. Further, position effects appear as strong as the effects of more established factors such as advertising frequency, length, or quality. Also discussed are implications for advertisers, television networks and stations, researchers, and consumers.

CLUTTER AND SERIAL ORDER REDEFINED AND RETESTED

For an advertiser, is it better to place a television advertisement in a pod of fewer ads? Within a same pod, are some positions better than others? Some advertisers suspect the answer is yes. "The days are waning when an agency media buyer could be content simply to put a spot on a given television show" (Brown, 1988, p. bt38). Nevertheless, television networks and local stations say no, by not allowing advertisers to choose positions, and by regularly charging the same price for all positions within a program (John Hunt of Ogilvy & Mather, quoted by Brown, 1988). Some textbook writers (Rossiter and Percy, 1987, p. 618) agreed: "contrary to popular opinion, this (position) does not make a substantial difference ..... Position in general is not worth adjusting for."

In the meantime, advertising practitioners who suspect a position effect don't know which positions are more desirable (Brown, 1988, p. bt38). "Its hard to find simple relationships," according to Roger Baron of Foote, Cone & Belding. Therefore, some advertisers, like Bob Warrens who was then with J. Walter Thompson, tried to "get a good rotation among all the pods ..., as well as rotation within pods."

While the word “position” may represent different concepts in advertising research (cf., Zhao, 1989; Zhao, Shen, and Blake, 1995), it most often refers to “clutter” and “serial order,” which are the focuses of this article. We will first review how researchers and practitioners think about those two concepts, especially what is lacking in the existing conceptualization. A reconceptualization will be proposed.

Based on the redefined concepts, a holistic theory of position effects will be proposed. The theory leads to the following hypotheses, which are tested in a naturalistic quasi-experiment.

An advertisement tends to generate lower brand memory when it is placed in a more crowded pod.

An advertisement tends to generate lower brand memory when it is placed in a later position in the pod.

An advertisement is less likely to be liked by the audience when there are more ads before it.

For this article, I will assign different functions to three often-used terms -- "advertisement" for an entry by a given advertiser; "ad" for an entry by any other advertiser advertising in the same pod or the same TV program; and "commercials" for general reference to both kinds of entries.

Redefining Clutter and Serial Order Effects

Some researchers (Webb and Ray, 1979; Thorson, Zhao, and Friestad, 1988; Kim and Zhao, 1993; Grimes and Meadowcroft, 1994; Thorson, 1994) and advertising practitioners (cf., Brown, 1988) defined an advertisement's position in terms of its serial order — the first, second, ... or the last position in a pod of TV commercials. Others (Wheatley, 1968; Webb, 1979; Webb and Ray, 1979; Pillai, 1990; Brown and Rothschild, 1993) used the word "position" to describe "clutter," defined as the number of ads, including all kinds of non-program contents, surrounding a given advertisement.

According to Brown and Rothschild (1993, p. 138), "clutter has been addressed sparingly in advertising research," (also see Kent, 1993). Two early experiments (Webb, 1979; Webb and Ray, 1979) found a correlation between higher clutter and a decrease in brand recall. But Brown and Rothschild (1993) hypothesized *no* clutter effects on memory, and reported supporting evidence from their experiments.

Brown and Rothschild (1993, p. 145) attributed the conflicting findings to the changes in advertising environment between the 1970s and the 1990s: "The baseline

of advertising clutter (today) is already at such a high level that further increases in clutter are relatively harmless." While this is a plausible explanation, there are other design differences which may account for these conflicting findings. For example, Webb and Ray's (1979) laboratories offered sofas, comfortable chairs, magazines, and refreshments in a nearby kitchen. The adult subjects were encouraged to "talk with each other," "relax" and "enjoy." Brown and Rothschild's (p. 140) undergraduate student subjects do not appear to have had such a semi-natural environment. Consequently, the variation in viewing behavior and attention level in Brown and Rothschild's (1993) forced-viewing experiment appears to be more restricted than the variation in Webb and Ray's (1979) study. The level of watching and attention may be higher in the 1993 study, which may have contributed to a lower sensitivity to clutter increases. Another study with a different methodology might be useful.

While there is "sparing research" (Brown and Rothschild, 1993, p. 138) on clutter, there are even fewer studies on serial order of television commercials. Research literature, starting from Steiner (1966), typically touches upon the matter as a side issue. In two unpublished reports focused on clutter, Ray and Webb (1976, 1978, cited in Webb and Ray, 1979) mentioned that the first position produced the highest attention and recall, the middle positions yielded the lowest, and the last position showed a slight increase. In their chapters focused on measurement of attention, Grimes and Meadowcroft (1994) and Thorson (1994) cited an unpublished study (Zhao, 1989) that reported a one-minute-cycle effect: attention and memory decline at the beginning of a pod, turn to climb about thirty seconds later, and reach a peak another thirty seconds or so later. Then the second cycle begins, attention and memory decline again; and the cycle continues. Much of the design and analysis details were not available in the published sources. More systematic research may be warranted.

In psychology literature, there has been a long tradition of studying serial order effects on recall (Ebbinghaus, 1902; cf., Lachman, Lachman, and Butterfield, 1979). Some of the early studies (McKinney, 1935; Blankenship and Whitely, 1941) used

print commercials as stimuli. Based on those experiments, cognitive psychologists (e.g., Glanzer and Cunitz, 1966; Glanzer, 1972) established the famous tilted "U" curve and the theories of short-term versus long-term memory. But here the “short term” is really short -- less than half a minute between exposure and recall tests. And no distracting mental activities are allowed in between. For most marketing purposes, however, hours, days, or even weeks elapse between advertising exposure and purchase decisions, and many mental activities inevitably occur in between. Also, the psychological theories assume no competing messages from before or after the series; and the stimulus series did stand alone in the experiments. In contrast, "real-world" commercial pods face competing messages because they are embedded in programming. More naturalistic tests are needed.

Before further tests, however, additional work on the concepts might be needed. The current conceptualization of clutter equates *proaction*, i.e., the effect of preceding ads, with *retroaction*, i.e., the effect of succeeding ads. Psychologists studying serial order have explicitly hypothesized and have empirically demonstrated that the proaction was distinctively different from retroaction (Glanzer, 1972). Advertising practitioners also intuitively differentiate the two. They have often speculated that larger numbers of preceding ads lead to a drop in the number of viewers and their attention levels (Brown, 1988). In contrast, there has been no reported speculation about the same effect from succeeding ads.

It may be noted that other researchers have also proposed to conceptually separate different kinds of clutter effects, albeit on another dimension. Kent and others (Kent and Machleit, 1992; Kent 1993, 1995; Kent and Allen, 1994) have argued that competitive clutter, i.e., the ads for directly competing brands in a same program, may have a larger effect than non-competitive clutter.

Further, it may also be useful to differentiate the competition from other ads within *the same pod*, which I will call *pod clutter*, and the competition from ads of *other pods* within the same program, which I will call *program clutter*. In prior studies, the condition of high pod clutter was also high in program clutter, and the

condition of low pod clutter was also low in program clutter. Results from these studies, therefore, can not answer a question frequently asked by practitioners: "Because television stations and networks are unlikely to negotiate regarding the number of ads in a program, should an advertiser ask for a position in a less cluttered pod, which television people might give for a price?"

The serial order effect may also be redefined. The traditional definition focuses on order location. In contrast, cognitive theories and common sense suggest that it is not the physical location per se that affects viewers' reaction to a given advertisement, but the surrounding ads that define the advertisement's position.

Advertising researchers studying clutter and cognitive psychologists studying serial order rarely cite each other, in part because the traditional definitions of clutter and serial order fail to recognize the conceptual overlap between the two. An advertisement can be at the Nth position only if there are N or more commercials in a pod; an advertisement in a pod of 3, on the other hand, has no chance of being in the 4th or 5th position, a chance that an advertisement in a pod of 5 would have.

The psychologists treat clutter effect as a potential confounding factor, so they typically fix the length of the series in their experiments. For advertising research, this creates an unnatural context for the advertisements, because the lengths of advertising pods vary significantly in the real world. The clutter researchers treat serial order as a potential confounding factor, so they often rotate the serial positions of the commercials. Nevertheless, longer pods inevitably contain more later positions, a confound that can not be completely eliminated by rotation. Consequently, any effects, or lack thereof, may not be exclusively attributed to either clutter or serial order under the current definitions of the two.

I propose to explicitly recognize the conceptual (and mathematical) linkage between clutter and serial order as they are currently defined. Consider the two traditional ways of defining the *serial (order) position* of an advertisement:

1a. *Ascending order*, that is, counting the number of commercials from the beginning of a pod until reaching the given advertisement.

1b. *Descending order*, that is, counting the number of commercials from the end of the pod until reaching the given advertisement.

The two may be revised as the following without changing their meanings:

2a. *Ascending order*, that is, the number of other ads before the given advertisement (plus one).

2b. *Descending order*, that is, the number of other ads after the given advertisement (also plus one).

The two combined define, precisely,

3a. *Pod clutter*, that is, the total number of ads in a pod other than the given advertisement itself.

The "plus one" clauses in definitions 2a and 2b reflect a constant difference of 1 between two ways of defining position -- "order location" or "number of other ads." As a constant, this difference of 1 does not affect theorizing, data analysis, or interpretation, and therefore can be disregarded in most situations.

To explicitly differentiate proaction from retroaction, the general concept of *pod clutter effect* may be divided into two distinctive parts:

3b. *Proactive clutter effect*, defined as a result of a change (increase or decrease) in the number of preceding ads without a change in the number of succeeding ads.

3c. *Retroactive clutter effect*, defined as a result of a change (increase or decrease) in the number of succeeding ads without a change in the number of preceding ads.

The no-change clauses in Definitions 3b and 3c prevent possible confusion with serial order under our new conceptualization. For example, an increase in preceding ads *and* a decrease in succeeding ads do not necessarily indicate a change in clutter but possibly a backward move of position by the given advertisement, therefore a change in serial order, as is defined below.

4a. *Serial order effect*, defined as a result of moving an advertisement (forward or backward) within a pod without changing the number of ads in the pod.

Here, the no-change clause prevents possible confusion with clutter effect under our new definitions. It is also consistent with serial order researchers' practice of holding the length of a series constant while examining position effect (e.g., McKinney, 1935; Blankenship and Whitely, 1941),

When there is no change in the total number of ads in a pod, a change in serial position requires a change in the number of preceding ads and a change in the number of succeeding ads by the same number in the opposite direction. That is, a *forward move* in serial position may be defined as:

4b. A decrease in the number of preceding ads and an increase, by *equal number*, in the number of succeeding ads.

Similarly, a *backward move* in serial position may be defined as:

4c. An increase in the number of preceding ads and a decrease, by *equal number*, in the number of succeeding ads.

These definitions explicitly recognize the defining impact of preceding/succeeding ads on the concept of serial order, encouraging serial order researchers to focus their theorizing more on the surrounding ads, rather than location per se.

Together, the above re-definitions of clutter and serial order effects underline an often-overlooked common characteristic shared by the two concepts. That is, each of the two is a special case of the interaction between preceding and succeeding ads. Clutter effect occurs when only one of the series changes its length, or both increase their lengths, or both decrease their lengths. Serial order effect occurs when the length of one series increases while the other decreases by an equal number. A combination of clutter and serial order effects occur when one increases while the other decreases by an *unequal* number.

More meaningfully defined concepts allow more meaningful operationalizations of key measurements. An immediate beneficiary is the measurement of serial order when a brand is advertised more than once in a program. Airing multiple advertisements within a single program is a common practice. During a football game, for example, 30-40% of the advertised brands place more than one advertisement (Zhao, Bleske, and Bennett, 1993). When serial order was defined in terms of its physical location (i.e., 1st, 2nd, etc.) it did not make immediate sense to add, average, or perform any other mathematical operations with those location IDs across pods. As researchers did not know how to code the position of multiple advertisements, prior studies on serial order (and studies on clutter) all use one advertisement per brand in their stimulus.

Now that serial order has been defined in terms of number of preceding/succeeding ads, it makes good sense to add the total number of preceding/succeeding ads across pods. When a brand places an additional advertisement, the advertisement is typically accompanied by additional competition from before and after. Adding preceding / succeeding ads across pods simply recognizes this fact. When the total number of other ads in the pods are held constant, a change in total number of preceding ads means an opposite change by the same number in the succeeding ads, therefore a move in serial position by at least one of the advertisements a brand airs.

To understand how preceding ads alone can indicate serial position when the total number other ads in the pods are held constant, let's consider a relatively simple example of one brand airing 2 advertisements (designated by symbol "A") and other advertisers airing 4 other ads (designated by symbol "O") in two pods of 3 commercials each.

When there is 0 preceding ad, the two pods should look like --

Scenario 0: AOO, AOO.

When there is 1 preceding ad, the two pods should look like --

Scenario 1a: AOO, OAO; or

Scenario 1b: OAO, AOO.

Comparing any of the two scenarios (1a or 1b) with Scenario 0, we may see that the only difference is in serial position – a difference by one position.

When there are 2 preceding ads, the two pods should look like --

Scenario 2a: OAO, OAO; or

Scenario 2b: AOO, OOA; or

Scenario 2c: OOA, AOO.

Once again, serial position is the only difference between any of the above three scenarios (2a, 2b, or 2c) and either of the one-preceding-ad scenarios (1a or 1b) – a difference by one position. Among the comparisons, the comparison between Scenarios 1b and 2b might be the most interesting: the advertisement in the first pod moves forward by one position, while the advertisement in the second pod moves backward by two positions. The net result of the movements is a change of one position toward the back of the pods.

When each of the 2-preceding-ad scenarios (2a, 2b, or 2c) is compared with Scenario 0, we can see that this time there is a difference of two positions, and serial position is still the only difference.

Similar, albeit more elaborate, illustrations can be made when there are more preceding ads, or more advertisements per brand, or the number of ads in each pod are allowed to vary (but the total number of ads in all pods combined are held constant).

All those comparisons have been, as they should be, made within the same level of frequency (number of advertisements per brand). That is, 1-advertisement brands should be compared to other 1-advertisement brands, and 2-advertisement brands should be compared to other 2-advertisement brands. Therefore, to assess serial position effect, a researcher needs to control both clutter (total number of other ads in all pods) and frequency (total number of advertisements each brand airs). When both are controlled, the preceding ads become an indicator of serial position.

In case there are still doubts about the technique of "adding across pods" for multiple-advertisements-per-brand situation, it may be helpful to compare serial order

effects on one-advertisement brands with the effects on brands of multiple advertisements. If the observed effects are about the same for two groups of brands, it implies that the new concepts and the corresponding measurements perform consistently in two situations, therefore an empirical verification for the operationalization proposed above. The details are left to data analysis section.

A Holistic Theory of Position Effects on Memory and Liking

Advertising practitioners (Brown, 1988) often talked about position effects in terms of viewers physically not *exposed* to commercials. Once a commercial pod begins, some viewers start to go to the bathrooms, kitchens, or zap and surf channels. As the number of "deserters" accumulate over time, the later pod positions tend to have fewer viewers.

Advertising researchers studying clutter (Webb and Ray, 1979; Brown and Rothschild, 1993) wrote about competition for *attention* during exposure. Even when viewers stay physically in front of a TV during an advertisement, their attention is not always totally on the messages currently on the screen. The competition may come from other concurrent activities and messages, such as magazine reading and conversation between viewers; or it may come from messages that were previously on the screen and are still on the minds of the viewers. More distractions lead to less attention to the advertisement currently on the screen.

The cognitive psychologists studying serial order theorized about competition even *after* a given message has been presented (cf. Lachman et al., 1979). It has been shown that incoming information goes initially into sensory and short term memory stores. During a short period immediately after the initial exposure, the information may be transferred from the short term storage to the long term storage, provided that a sufficient amount of mental energy is used to process the information. If, during that period of a few seconds or half a minute, the attention is diverted totally to other activities or messages, the information may never get stored in the long term memory and consequently become unavailable for later retrieval.

All three processes — *physical exposure*, *attention during exposure*, and *attention after exposure* — are probably at work (Figure 1). Physical exposure and attention during the exposure should be negatively affected by the preceding ads; more preceding ads should be associated with less exposure and less attention, therefore less memory. Almost by definition, neither exposure nor the concurrent attention should be affected by succeeding ads: by the time the first succeeding ad appears, both processes have been completed for the advertisement in question. Nevertheless, the third process, post-exposure attention, takes place after the given advertisement has ended. Therefore, both preceding and succeeding ads are expected to have negative effects. Higher competition from preceding or succeeding ads should lead to less cognitive capacity for the storing of the information regarding a given brand, therefore less long-term memory for the brand.

Figure 1 about here

Because proaction involves a combination of the three processes and the retroaction consists of just one of those processes, the preceding ads are predicted to have a larger impact on memory than succeeding ads. Because both proactive and retroactive effects are negative, the general clutter effect is also predicted to be negative.

Prior clutter/serial order studies have used memory indicators, such as recognition and recall, as the only dependent variables. This study introduces advertisement liking as another dependent variable. The attitude toward an advertisement, a broader concept that comprises advertisement liking, has been shown to be an important mediator between input and outcome variables, and has been used in many studies as an indicator of advertising effects (Mitchell and Olson, 1981; Shimp, 1981; MacKenzie, Lutz and Belch, 1986).

It is often assumed that most viewers, even when they stay in front of a television, would prefer that the programming resumes immediately. As the number

of preceding ads increase, the viewers grow impatient and increasingly dislike the advertisements that appear on screens. Hence a negative impact of preceding ads on advertisement liking is predicted. There is, however, no apparent reason to predict a retroactive effect, negative or positive, on liking.

A change in serial position is, by our definition, a one-for-one exchange between preceding and succeeding ads. Because the proactive competition is expectedly stronger than the retroactive competition, a forward move of position means a decrease in the total competition, therefore better memory and liking scores. Hence the earlier positions should fare better in both regards.

Methodology

While most of advertising studies use controlled experiments or conventional surveys, this study is based on a quasi-experiment (Cook and Campbell, 1979) conducted during the three Super Bowl games played between 1992 and 1994. Part of the data have been reported in a series of conference/proceeding papers addressing various topics (Kim and Zhao, 1993; Zhao et al., 1993, 1995; Zhao and Lewis, 1994; Shen et al., 1995; Zhao and Chen, 1996). The analysis reported here was specially designed for the purpose of this article.

As the most highly priced and probably the most visible advertising event of the year, the Super Bowl broadcast has attracted much attention from applied researchers (e.g., Gallup and Robinson, 1991, cited in Mandese, 1992; *USA Today*, 1991-1993, 1994b, 1995). Academic researchers also have used the event to test general theories or measurement instruments (Pavelchak, Antil, and Munch, 1988; Pokrywczynski, 1994; Anderson, 1996), or as a symbol that may help us to "better understand the society we inhabit" (Schwartz, 1993, p. 33).

The implication of such studies may go beyond the games. Some national advertisers use the games to release new commercials, while others re-run their favorites. These national commercials are sometimes considered the best of a year, while the local advertisers air commercials of lower quality (Elliott, 1994). The

game is more than a sporting event. With nearly half of the Americans watching, the live broadcast represents the biggest TV event of any given year, a festival that many non-sports fans also attend (Schwartz, 1993; Martzke, 1994; *USA Today*, 1994a). Higher ratings also mean less time and expenses wasted on interviewing people who did not watch the game.

Because the respondents knew nothing about the study until at least twenty-four hours after the game, their viewing (or non-viewing) behavior may be assumed to be perfectly natural. Such behavior may include a reduced exposure and attention to television during a commercial break, as a result of zapping, room-leaving, socializing, and participation in other non-TV focused activities (cf. Greene, 1988). This factor carries particular importance in clutter or serial order studies. A basic assumption of those studies is that some positions attract more attention from the typically uninvolved viewers (Krugman, 1965; Webb and Ray, 1979; Thorson et al., 1988; Brown and Rothschild, 1993; Thorson, 1994). If the baseline attention/involvement is artificially intensified, as it might in a laboratory setting, the true position effects could be distorted. This possibility is supported by Webb's (1979) finding that clutter has an effect *only* under low involvement, and could explain Brown and Rothschild's (1993) findings of no clutter effects in a laboratory setting.

Hence, in comparison with most of the forced viewing experiments, this study appears naturalistic in several important aspects, including naturally varying length of commercial pods, broader range of commercial qualities, more representative sample of viewers, home viewing environment, and longer time between exposure and memory test. Generalizability, however, is only relative. In comparison with a hypothetical "dream study," this study's generalizability may be limited in a number of regards. The quality of the Super Bowl advertisements, especially the network advertisements, may be higher than the quality of average advertisements. The annual media hoopla surrounding the two "super championships" -- the football championship in stadiums and the advertising championship on the air -- may have

also contributed to an unusually high exposure or attention to both the broadcast and the advertisements. Nevertheless, advertisers and commentators suspect that the uniqueness of the Super Bowl as an advertising event has been overstated, and they cite the lower than expected recall scores of Super Bowl advertisements to support their suspicion (Deveny, 1993; Moore, 1993; Goldman, 1994).

A trade-off for a higher generalizability is a lower degree of internal control. Like most field studies gauging "effects," this study is correlational. Although various measures were taken to guard against some of the methodological threats, causal inference should be made with caution. The design in itself is no more valid than the more often used controlled experiments. It is strong where the controlled experiments are often weak, and it is weak where the others are typically strong. This difference, however, may be one of this study's main contributions. By comparing field results with laboratory findings, a comparison that is done extensively in such disciplines as public health, our collective understanding of position effects may become more valid externally *and* internally.

The unit of analysis in this study is each brand advertised during the games. The dependent variables were measured through telephone interviews and then aggregated across respondents. The independent variables were measured by analyzing the content of the television commercials taped during the games.

Although such a design is rarely seen in advertising research, it has been used often in other disciplines. Political scientists and communication researchers who study agenda setting effects, for example, typically aggregate survey responses to measure dependent variables, analyze the content of media coverage to measure independent variables, and use "issue" as the unit of analysis (McCombs and Shaw, 1972; Shaw and McCombs, 1977). One difference is that this study analyzed some 170 "units" (brands), while the agenda setting studies typically analyzed fewer than 15 "units" (issues).

Telephone Interviews: Measuring Memory and Attitude. A telephone survey was conducted from Monday evening through Thursday evening following

each of the three Super Bowl games played between 1992 and 1994. Graduate and undergraduate students enrolled in research classes at a major university used random digit dialing to reach the local residents of Orange County of North Carolina, which includes the cities of Carrboro, Chapel Hill, Hillsborough, Mebane, Pittsboro, and the vicinity in between. Guided by a computerized questionnaire, the interviewers asked for the person who had the next birthday. If a call yielded a machine-recorded answer or no answer, that number was re-dialed at least three times before being discarded. A total of 1,134 interviews were completed, with an average response rate of nearly 63%. Each year, more than two thirds of the respondents reported having watched the game. The high ratings support some writers' (e.g., Martzke, 1994) observation that non-sports fans also watch Super Bowl games.

Dependent Variable 1: Unaided Brand Recall. The interviewers asked each respondent whether he or she had watched the Super Bowl game, and which part. Those who watched any part were then asked to list all advertisements they remembered seeing *during the game*. Two coders coded separately the responses, which had been recorded verbatim during the interviews. The two sets of results were in agreement in all but one case (more than ninety nine percent). The recall rates were then calculated according to:

$$\text{Recall Rate} = \frac{R_b}{W_s} * 100$$

where R_b is the number of respondents who recalled the brand, and W_s is the number of respondents who watched the segment(s) in which the brand was advertised.

To see if any of the recalls may have been a false alarm — a respondent could mistakenly recall a brand he or she had seen elsewhere but not during the Super Bowl advertising — we searched the responses for brands that were not advertised during the game segments that a given respondent reportedly watched. No such false alarms were found.

Dependent Variable 2: Brand Recognition. After the unaided recall measure, each respondent was given a list of brand names. Students, teaching assistants, and the instructor had compiled the list by observing the advertisements aired during the game. The observations were cross-verified via video tapes. Respondents were asked if they remembered seeing an advertisement for that brand during the game. The recognition rates were calculated according to:

$$\text{Recognition Rate} = \frac{G_b}{W_s} * 100$$

where G_b is the number of respondents who recognized the brand.

The threat of false alarms is typically larger for recognition measures than for unaided recall. To address this concern, interviewers emphasized to respondents that the brands listed may or may not have been advertised during the game.

Further, various false-alarm tests were conducted for each of the three years. For example, the 1994 questionnaire included seven brands that had not been advertised during the game but were major competitors of the advertised brands. The false-alarm rate for 1994 was 8.1% according to the seven tests. The average false alarm rate across the three years is a relatively low 8.8%.

The recognition rate and liking score were then recalculated after being *weighted by each respondent's correction rate in the false-alarm tests*. The correlation between the weighted and unweighted scores is .91 for the recognition measure and .99 for the liking measure. Those results suggest that false alarms, while a low frequency phenomenon, also occurred rather randomly and distributed quite evenly among brands. Therefore, false alarm should not significantly affect correlation between variables, which is the basis of our analysis.

Because the formats of the false-alarm tests and their degrees of difficulty differ between the three years, the unweighted scores were used as the major basis of analysis and reporting in this article. A parallel analysis based on the weighted scores gave essentially the same results.

Dependent Variable 3: Advertisement Liking. Advertisement liking was measured by asking those respondents who remembered seeing an advertisement how good or poor they thought the advertisement was. Likert scales (1-7 for 1992 and 1994, 1-9 for 1993) were used. To facilitate interpretation, all liking scores were linearly transformed to a 0-100 scale (100: the best; 0: the poorest):

$$\text{(for 1992 and 1994)} \qquad \text{Liking} = \frac{OL - 1}{6} * 100$$

$$\text{and (for 1993)} \qquad \text{Liking} = \frac{OL - 1}{8} * 100$$

where OL is the original liking score. Those scores were then averaged across respondents for each brand of each year.

Content Analysis: Measuring Position. Each independent variable involved at least two coders who did independent coding using video tapes recorded during the games. Coders initially agreed in all but one case. Consensus on the case was reached quickly after re-examining the tape.

To gauge advertisement position in a pod of commercials with varying lengths, researchers may choose between two measurement units: *clock time*, or *number of ads*. That is, an advertisement's position may be measured in terms of its distance in minutes/seconds from the two ends of the pod, or in terms of the number of ads before and/or after the advertisement. A preliminary analysis (Zhao et al., 1995) was conducted to test and compare the two units. They yielded similar results in testing the position effects on brand memory and advertisement liking; and in most situations *number of ads* appeared to be a better predictor than *clock time*. Accordingly, *number of ads* was chosen as the measurement unit for this study.

When a brand had just one advertisement in the Super Bowl broadcasting, the general concept of clutter (Definition 3a) was measured by the *number of other ads in the pod*, that is, the total number of commercials in the pod minus one. When a

brand was advertised twice or more, the number of other ads in all pods in which the brand was advertised were summed to measure the total amount of clutter competing with the advertisements of the given brand.

To separate and compare the proactive and retroactive effects, two more variables were measured: the *number of preceding ads* (Definition 2a), and the *number of succeeding ads* (Definition 2b). When a brand was advertised more than once, the numbers were added across relevant pods, in the same way that the clutter was measured when there were multiple advertisements for a brand.

While those three served as the major independent measures, none of them alone could cleanly gauge the *serial order effect* (Definitions 4a-c), the *proactive clutter effect* (Definition 3b), or the *retroactive clutter effect* (Definition 3c). Because each of the effects has been defined in terms of interaction between *number of other ads*, *number of preceding ads*, and *number of succeeding ads*, a proper combination of those measures has to be used to gauge each effect. The details are reported in data analysis section.

Identifying and Measuring Control Variables. An obvious confounding factor is *frequency*, defined as the number of advertisements promoting the same brand during a given game. Higher frequency may be associated with better memory. Our independent variables, clutter and order, are also associated with frequency; a brand airing three advertisements tends to have more preceding and succeeding ads than a brand advertised only once. Prior studies address this problem by restricting frequency to one advertisement per brand. To test position effects under multiple-advertisement situation, this study controlled frequency statistically, rather than physically. Conceptually, it is equivalent to examining the effects within each level of frequency, and then averaging the magnitude of the effects across frequency levels.

Another possible source of contamination was the *year* variable. Each year meant a different game, a different list of advertisements, a different class of student interviewers, and a different sample of viewers. As mentioned above, there also

were some small differences in the measurement scales of liking. When the data were pooled together, there was a chance that differences between the years could confound position effects. Two dummy variables, *year 1993* and *year 1994*, were created. The brands from 1992 served as a comparison group (cf. Pedhazur, 1982; Cohen and Cohen, 1983).

Product categories posed yet another problem requiring statistical control. Brands in certain product categories might be more easily remembered than others, and some of those brands might happen to be in certain positions. Therefore, seven dummy variables were created to represent seven product categories. An eighth category, entertainment advertisements, served as a comparison group.

Our re-conceptualization of serial position requires that the length of the pods be held constant while the impact of preceding/succeeding ads is examined. Faced with the methodological threat, experimental psychologists physically fix or restrict the length of the series. To preserve the natural variation in the length of the pods, this study statistically, rather than physically, controlled the variable *number of other ads*. Other two variables, *number of preceding ads* and the *number of succeeding ads*, were also measured, so each of them can be statistically controlled when retroactive effect or proactive effect is respectively examined.

Data Analysis and Results

The results supported virtually all of the major predictions: preceding ads and succeeding ads both have negative impacts on brand memory; preceding ads also have a negative impact on advertisement liking; the negative impact of preceding ads is larger than that of the succeeding ads. In other words, an advertisement fares better when it is placed in a less crowded pod, or when it is placed in an earlier position in the pod.

Position effects were found to be as important as frequency effects -- placing an advertisement in an advantageous position within a program could be as beneficial as

running an additional advertisement. In another analysis, some position variables were also square with advertisement length or advertisement quality in terms of their effects on brand memory or advertisement liking.

While advertising researchers often use ANOVA to analyze experimental data, this study chose multiple regression, a technique most often used in field studies for its power and flexibility (Pedhazur, 1982; Cohen and Cohen, 1983).

The analysis procedure was the same for each dependent variable. *Year, product,* and *frequency* were entered first (10 entries because of dummy coding). (See Section 1 of Table 3.) On top of those controls, three blocks of the independent variables were entered *alternately*; each block was removed before the next was entered. Each block consisted of one or two of the three clutter/order variables. (See Sections 2-4 of Table 3.) The results of other analyses are summarized in Tables 1-4.

Background Findings from Univariate Analysis. Nearly sixty brands advertised in each game, totaling 170 for analysis. Those brands were from eight product categories (Table 1). The most successful brands had a recall rate of more than 50%, or a recognition rate of nearly 80%, as is shown in Table 2. The least successful brands recorded no recall at all, or less than 6% of recognition. The average across brands is nearly 3% for recall and 30% for recognition. Those who recognized the brands also tended to like the advertisements moderately, giving an average score of nearly 60 on a scale of 0-100. The number of ads in each pod ranged from one to seven. The positions of the advertisements ranged from the first to the last. A little less than two thirds (112) of the brands advertised only once during the game, while each of the other fifty-eight brands placed two to seven advertisements.

Tables 1 and 2 about here

Two of our dependent variables, recognition and liking, had reasonably bell-shaped distributions. Deviation from normality is nevertheless inevitable for unaided recall. By nature a difficult test, recall distribution tends to have a high hump skewed toward the lower end. Because of the robustness of regression, however, such deviation is deemed within the tolerable range. The other variables I used are independent or control variables, therefore their normal distribution is not required.

Table 3 about here

Effects of Control Variables. Average brand memory and advertisement liking did not change significantly from one year to another. They varied significantly, however, among product categories. Another important factor was the number of advertisements that each brand aired during each game – an additional advertisement tends to increase recall by more than three percentage points and increase recognition by over six percentage points. But frequency did not appear to have affected advertisement liking.

In Table 3, the regression coefficients for the two "year" variables indicate the differences between those years and 1992. The average recall rate of 1993 advertisements, for example, is lower than that of 1992 ads by 0.57 point. Most between-year differences are very small, and none is statistically significant.

The effects of product category appears larger. Advertisements for shoes and clothes, for example, have a higher liking score than entertainment advertisements by over 14 points on a scale of 0-100.

Those controls explain over 50% of the variances in recall or recognition and nearly 30% in liking (Section 5). They appear to be reasonable models that have accounted for a good amount of variances due to outside factors.

General Pod Clutter Effects. Advertisements placed in longer pods tended to generate lower brand memory for the advertised brand -- each additional "other" ad in

the pod may be associated with a decrease in recall by one percentage point and a decrease in recognition by two and half percentage points.

When an advertiser runs an additional advertisement, he should expect it to bring additional memory for his brand – each additional advertisement may bring in over five and one-half percentage points of additional recall and close to twelve and one-half percentage points of additional recognition. But the advertiser has to pay a high "income tax." Over one third of the additional recall and nearly half of the additional recognition may be taken away by the additional clutter surrounding the additional advertisement(s). Consequently, the “take-home income” brought by each additional advertisement is less than three and one-half percentage points of recall and less than six and one-half percentage points of recognition.

In data analysis, the variable *number of other ads* (Section 2 of Table 3, representing Definition 3a) was entered on top of the control variables (Section 1 of Table 3). The results show general clutter effects on memory. An additional ad in clutter is associated with a decrease in brand memory by 1 to 2.5 percentage points ($p<.001$ in both cases). With average recall (3 percent) and recognition (28 percent) as the baselines, those figures represent decreases by nearly 35% and 10%. An additional ad in clutter is also associated with a lower liking score, by over half a point. But it barely failed the conventional .05 probability test.

Table 4 about here

Table 4 attempts to estimate the general clutter effects again, albeit based on a different logic. When an advertiser airs an additional advertisement, it should lead to an increase in brand memory. But such positive frequency effects are expected to be offset in part by the negative impact of clutter competition surrounding the additional advertisement. Table 4 asks: *how much* of the frequency effects are offset? The regression coefficients in Equations 1a, 2a and 3a represent the net effects of an additional ad *after* the clutter competition has taken its bite. Those are

to be compared with the counterpart "b" equations, in which clutter effects are statistically suppressed. An additional ad, for example, is expected to increase recall by nearly three and a half percentage points (Eq. 1a) when clutter competition is present. But when the clutter effects were suppressed (Eq. 1b), the same frequency effect jumped to over five and a half points, representing an increase of 62%. The parallel increase in frequency effect on recognition is 94% (Equation 2a and 2b). In other words, advertising in the Super Bowl games was 38-48% less effective on brand memory than it could have been had there been no clutter competition.

When clutter effect was suppressed, the increase in frequency effect on liking was even larger: 350%. This particular finding related to liking, however, should be taken with a grain of salt, because the baseline frequency effect was close to zero, and the frequency effect was non-significant with or without controlling for clutter.

The approach demonstrated in Section 2 of Table 3 is analogous to prior studies that implicitly equate proaction with retroaction. In the following section the two were explicitly separated and compared.

Proactive vs. Retroactive Clutter Effects. The audience is more likely to remember a brand and may like its advertisement(s) more if there are fewer other ads *before* the advertisement(s). The other ads *after* the advertisements may have a similarly negative, albeit smaller, effect on the recall of the advertised brand. On *each* of the three major dependent variables, succeeding ads' negative effect, if any, appears smaller in magnitude than its counterpart effect of preceding ads.

In data analysis, the variable *number of other ads* (Section 2 of Table 3) was removed. Entered in its place were two other independent variables, *number of preceding ads* and *number of succeeding ads* (Section 3 of Table 3). The simultaneous entry holds one variable constant while examining the effects of the other. So the two lines in Section 3 represent, respectively, proactive and retroactive clutter effects (representing Definitions 3b and 3c), but not serial order effect.

Proactive clutter effects are strong. An additional ad before is associated with a decrease in memory by one to three percentage points, and a decrease in liking score

by seven tenth of a percentage point. They represent decreases by nearly 40%, 10%, and more than 1%, respectively, with average recall, recognition, or liking as the baselines.

Retroactive clutter effects, while also negative, are smaller — about one fifth to one half of the size of the counterpart proactive effects. Further, only one of the retroactive effects, that on recognition, is statistically significant. In that case, adding an ad behind is associated with a decrease in brand recognition by nearly one and one-half percentage points.

Serial Order Effects. The observed differences between proactive and retroactive effects suggest that our predictions about serial order effects might be supported. Sure enough, the next step of analysis indicates that a brand may indeed be remembered by more viewers when its advertisement is placed earlier, rather than later, in a pod.

As a more formal test, the *proactive/retroactive clutter block* was removed from each equation (Section 3 of Table 3), and entered in its place a *serial order block* (Section 4). This is to hold constant the clutter level, represented by *number of other ads*, while examining the effects of preceding ads (representing Definitions 4a-c). The effect, if any, can only come from serial order (i.e., moving an advertisement forward or backward) but not from proactive clutter (i.e., adding or dropping preceding ads).

As expected, the coefficients for preceding ads are all negative. An additional ad in the front, representing one position move toward the end of a pod (Definition 4c), is associated with a decrease in brand memory by one percentage point plus or minus a third of a point. The move is also associated with a decrease in advertisement liking, although it is statistically non-significant.

Comparing Position Effects with Effects of Frequency and Other Variables. TV networks and local stations are often unwilling to let an advertiser to choose positions; and they typically charge the same price for all positions within a same program. On the other hand, the number of advertisements to be aired is decided by

the advertiser; and there is almost always a cost for any additional advertisement. While the position and frequency are treated quite differently in practice, our data suggest that the two may compensate each other; and effects of position may be as strong as the effects of frequency. Advertisement length and advertisement quality are two other important factors, and an advertiser has to pay to increase the length or to improve the quality. A separate analysis of our data suggests that position may be as important as length or quality in affecting TV viewers' memory and/or liking.

By comparing the appropriate regression coefficients (in Sections 1 & 3 of Table 3) we can see that getting rid of two or three preceding ads of other advertisers may have about the same effects on brand memory as running one additional advertisement. If the objective is an improved liking, kicking out one preceding ad of another advertiser might match the effect of running two more advertisements!

The beta coefficients are often used for comparing the effects of different independent variables (Zhao, 1997). The beta coefficients in Table 3 show that clutter/order variables are among the best predictors, competing with frequency in predicting memory, and competing with a couple of product dummies in predicting liking.

In a previously published analysis focused on single-frequency brands, we found that position variables can be as important as other established factors, such as advertisement length or advertisement quality, in predicting brand memory and/or advertisement liking (see Zhao et al., 1995, for details).

Predictive Power of Position Variables. The within-program position of an advertisement is a good predictor of the brand memory. That is, if an advertisement is moved to a better position, we should not only predict that the advertised brand may be remembered by more people, but we should also be fairly confident that our prediction may be quite close to the actual effects.

Our confidence comes from the (incremental) R squared statistics. On top of the more than 50% variance in memory already explained by the control variables, the block of order/clutter variables can add another 10% or so (Sections 5 & 7 of Table

3) . Both results represent substantial predictive powers of the position variables, and they are both statistically significant. To predict advertisement liking, however, the position variables are not as accurate, and the R squared statistics barely failed the confidence test at .05 level.

Of the three independent variables — preceding ads, succeeding ads, and all other ads in the pod — each is a mathematical function of the other two. Therefore, entering all three simultaneously into regression is mathematically forbidden. The relationship also implies that *any* two of the three produce the same predictive power, representing a combination of clutter and order effects.

Interaction Effects. We found that position effects are about the same across different levels of advertising frequencies, and serial order effects are about the same across different levels of clutter. The first finding suggests that our reconceptualization and the corresponding measurements may indeed be extended to situations when a brand advertises twice or more in a TV program. For advertising practitioners, it suggests that the position effects reported above can be applied at various frequency levels. For example, if an additional ad is placed before one of your advertisements, the addition should decrease the recognition rate of your brand by nearly three percentage points, *regardless of how many advertisements you air during the same program*.

Those findings are the results of a dozen interaction tests, which all yielded statistically non-significant probability scores (statistics not shown in tables).

Non-Linear Effects. No evidence was found in support of any kind of non-linear effects. That is, the longest pods and the latest positions in those pods were found to generate the lowest brand memory and least positive advertisement liking scores for the advertisements in those positions. No leveling-off, nor concave-up of the effects were found.

Those null findings are the results of half a dozen polynomial equations with square and cubic terms, which were all statistically non-significant (statistics not shown in tables). This means that no pattern of curvilinear effects of position

variables on memory or liking was detected. Those results contradict the U-curves such as those cited by Webb and Ray (1979) and reported by cognitive psychologists (McKinney, 1935; Blankenship and Whitely, 1941; Glanzer, 1972). But they are consistent with the findings of those psychologists (Glanzer and Cunitz, 1966; Craik, 1970) who reported monotonously declining recalls when recall tests were delayed and distracting tasks were inserted between message exposure and the tests.

Discussion

There appears to be a negative correlation between clutter and recall, a finding consistent with prior studies (Webb and Ray, 1979; Pillai, 1990). Further, the clutter effect may extend to recognition as well, which was not reported in previous studies. An estimated 38-48% of the advertising effects on memory may have been lost to clutter competition. Those results contradict at pod level an implication of Brown and Rothschild's (1993) study indicating that clutter effects are no longer important in the 1990s.

While prior studies have mixed the program clutter and pod clutter, findings of this study suggest that clutter effect may come, at least partly, from the competition within a pod. Further research is needed to ascertain the impact of program clutter. Questioning the implicit assumption that proaction and retroaction are equal, this study offers evidence that proactive effects may be stronger than the retroactive effects on memory. Further, the proactive clutter effect may go beyond memory and extend to advertisement liking, while the retroactive clutter effect on liking was not predicted, and was not found.

Serial order may also be important. Earlier positions appear to be more effective in generating higher brand memory. The results contradict some experimental researchers' (McKinney, 1935; Blankenship and Whitely, 1941) conclusion that memory is the highest for the last few stimuli.

In general, the findings of various position effects contradict Rossiter and Percy’s (1987) notion that position makes little difference. In fact, the magnitude of

some position effects appeared comparable to that of other more established variables such as advertisement quality, advertisement length, or advertising frequency.

The findings also imply that our reconceptualization of clutter and serial order can be useful. Clutter effect may be thought of as having two components: proaction and retroaction. Their impacts are quite different. Serial order effect may be defined as an exchange between proaction and retroaction. While clutter and serial order are closely related — probably more closely than previously thought — they can be conceptually and distinctively separated, as our definitions have done. Further, our conceptualizations appear extendible to situations where a brand airs multiple advertisements during a program. Indeed, the magnitudes of the position effects demonstrated little variation across levels of frequency.

Pending verification by other researchers using different methods, our findings may have a number of practical implications. It might be sufficient and efficient to think about position in terms of the preceding and succeeding ads (rather than the traditionally defined clutter or serial order). Assuming equal price, an advertiser may want to have fewer preceding ads *and* fewer succeeding ads, because both tend to have a negative impact. When the total number of ads in a pod(s) are given, the advertiser may want to move his/her advertisement(s) toward the beginning of the pod(s), because the negative impact of preceding ads tends to be larger than that of the succeeding ads. The magnitudes of the position effects that I have estimated may be useful to the TV networks/stations and advertisers who wish to negotiate a reasonable premium for the desirable positions or a discount for the less effective ones. The comparative effects of position vs. frequency, length, and quality may provide a guideline for media planners in their daily decision makings.

When more crowded pods and later positions require a lower price, television stations and networks may have less incentive to add too many of them. When advertisers realize that lower frequency can be compensated by more effective positioning, they may feel less pressured to place more commercials. A better

understanding of pod clutter and serial order effects, therefore, may help to slow down the trend toward more clutter.

A more theoretical note is also in order. Advertising effect is a complex process involving many physical and mental activities, such as exposure, attention, evaluation, persuasion, information storing, retention, retrieval, and decision making. Each of the activities and the interactions between them together shape the outcome. Controlled experiment has been a powerful tool that can effectively "freeze" some activities, such as exposure and attention (e.g., every subject has to watch), so that researchers can examine another activity, such as information storing, in isolation. While such investigation has lead to a much improved understanding of memory and advertising effects, this study took a more holistic approach, asking what might happen if we allow all activities to vary naturally and simultaneously. The results may eventually add to our collective knowledge.

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Figure 1: A Holistic Theory of Position Effects on Brand Memory and Advertisement Liking

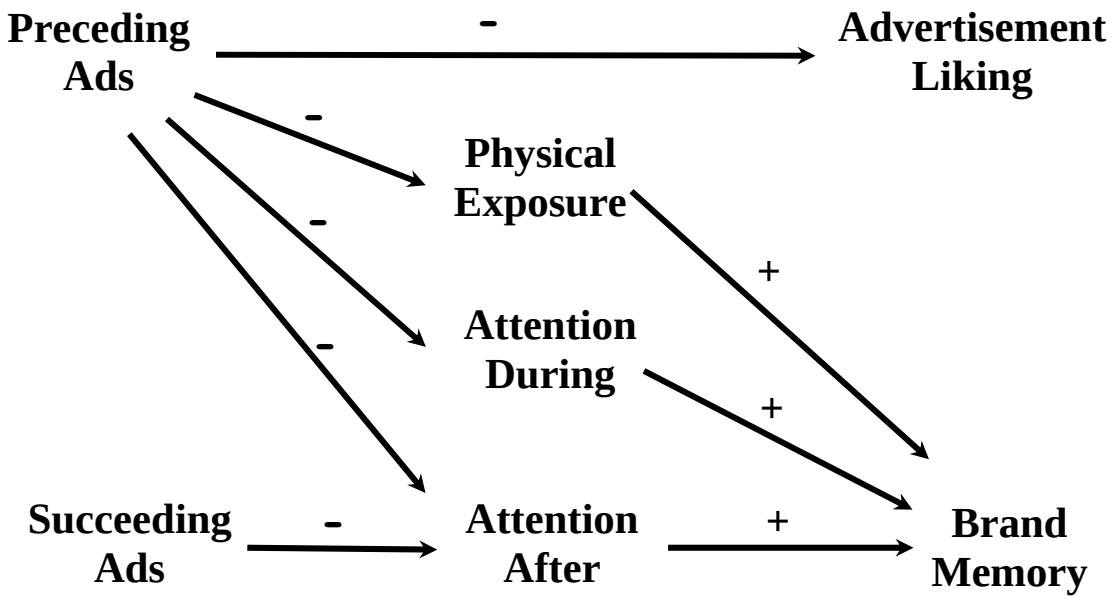

TABLE 1

NUMBER OF BRANDS ADVERTISED BY YEAR AND PRODUCT CATEGORIES

Across: Year Down: Product Categories	Super Bowl 1992	Super Bowl 1993	Super Bowl 1994	Total:
Entertainment	2	4	4	10
Services	12	14	13	39
Auto Related Products	8	14	10	32
Shoes & Clothes	3	4	4	11
Health & Beauty Products	12	5	3	20
Household Products	3	4	4	11
Food & Beverages	11	12	16	39
Public Announcements	4	2	2	8
Total:	55	59	56	170

TABLE 2

UNIVARIATE STATISTICS OF MAJOR VARIABLES

	Minimum	Maximum	Mean	Median	Std. Dev.	Skewness	Kurtosis	N
Brand Recall (%)	0.00	52.12	2.92	0.00	7.52	3.68	15.32	170
Brand Recognition (%)	5.26	78.31	28.27	23.53	15.08	1.22	1.22	170
Advertisement Liking (0-100)	21.88	91.58	57.92	57.41	9.41	-0.11	1.73	170
Total Number of Other Ads <per pod>*	0 <0>	22 <6>	4.89 <3.20>	4 <3>	3.50	2.15	5.97	170
Total Number of Preceding Ads <per pod>*	0 <0>	21 <5>	2.17 <1.45>	2 <1>	2.62	4.37	27.53	170
Total Number of Succeeding Ads <per pod>*	0 <0>	14 <6>	2.73 <1.75>	2 <2>	2.44	1.66	4.06	170
Advertising Frequency	1	7	1.59	1	1.11	2.50	6.61	170

*: When there were two or more advertisements per brand, the clutter and serial order variables were summed across relevant pods. This operationalization is the basis of our subsequent regression analysis (see text for the underlying rationales). To aid understanding of this rather complex data, I added in < > additional information on a "per-pod" basis. The "Maximum" column, for example, indicates that the maximum number of “other ads” (in all relevant pods combined) for a brand are 22. The number <6> in the same cell, on the other hand, indicates that the longest pod in our data has 7 commercials, including the advertisement in question.

TABLE 3: POSITION EFFECTS ON BRAND MEMORY AND ADVERTISEMENT LIKING

Dependent Variables:	Brand Recall (%)	Brand Recog. (%)	Advertisement Liking (0-100)
1. Control Block [a]			
Constant	-3.39***	20.96***	57.40***
Year 1993	-0.57 (-.04)	1.42 (.04)	0.20 (.01)
Year 1994	-0.12 (-.01)	-1.22 (-.04)	-0.91 (-.04)
Auto Related Products	-0.75 (-.04)	-10.66 (-.27)***	-2.24 (-.09)
Public Serv. Anmnts	0.05 (.00)	2.90 (.04)	6.21 (.13)*?
Household Products	0.05 (.00)	-5.03 (-.08)	5.37 (.13)*?
Shoe & Clothes	8.37 (.28)***	10.48 (.16)*	14.19 (.36)***
Health & Beauty Prdt	-0.59 (-.03)	-8.97 (-.19)**	-7.09 (-.24)**
Services	-1.06 (-.06)	-9.18 (-.24)**	-2.39 (-.10)
Food & Beverages	4.27 (.24)**	6.26 (.17)*	2.61 (.11)
Advertising Frequency	3.41 (.51)***	6.44 (.44)***	0.33 (.04)
2. Gen. Clutter Block: [b]			
# of Other Ads	-0.99 (-.49)***	-2.61 (-.60)***	-0.61 (-.22)*?
3. Pro/Retr Clutter Blk: [b]			
# of Preceding Ads	-1.14 (-.42)***	-2.82 (-.48)***	-0.70 (-.20)*
# of Succeeding Ads	-0.37 (-.13)	-1.43 (-.23)*	-0.14 (-.03)
4. Serial Order Block: [b]			
# of Other Ads	-0.37 (-.18)	-1.55 (-.35)**	-0.16 (-.06)
# of Preceding Ads	-0.77 (-.29)***	-1.32 (-.23)**	-0.55 (-.15)
5. Total R^2 of Control Block (Section 1) (%)	51.15***	50.09***	28.01***
6. Incremental R^2 due to # of Other Ads (Section 2) (%)	6.54***	9.69***	1.37*?
7. Incremental R^2 due to block of any 2 clutter/order vars (Section 3 or 4) (%): [c]	9.71***	11.36***	2.27*?

Cell entries in Sections 1-4 are regression coefficients and standardized beta coefficients (the latter are in parentheses).

a: The brands from 1992 serve as a baseline for comparison with the brands from the other two years. Entertainment serves as a baseline for comparison with the other seven product categories.

b: Number of Other Ads (General Clutter Block, Section 2) was entered on top of the control variables listed in Section 1. This variable was then replaced with the Proactive/Retroactive Clutter Block (Section 3), which was then replaced with the Serial Order Block (Section 4). Because of the mathematical link among the three clutter/order variables, it is mathematically forbidden to enter all three variables simultaneously.

c: Because of the mathematical link among the three clutter/order variables, any two-variable combination produces the same R^2 statistics.

*?: p<.10; *: p<.05; **: p<.01; ***: p<.001

TABLE 4
IMPACT OF CLUTTER ON ADVERTISING EFFECTIVENESS

Equations:	Eq. 1a	Eq. 1b	Eq. 2a	Eq. 2b	Eq. 3a	Eq. 3b
Dependent Variables:	Brand Recall (%)	Brand Recall (%)	Brand Recog. (%)	Brand Recog. (%)	Ad Liking (0-100)	Ad Liking (0-100)
Control Variables:	Years, Products.	Years, Products, # of Preceding Ads & # of Succeeding Ads	Years, Products.	Years, Products, # of Preceding Ads & # of Succeeding Ads	Years, Products.	Years, Products, # of Preceding Ads & # of Succeeding Ads
Regression Coefficients of Advertising Frequency	3.41***	5.51***	6.44***	12.47***	0.33	1.49
Standardized Beta of Advertising Frequency	0.51***	0.82***	0.44***	0.86***	0.04	0.17
Percent Increase in Regression Coefficients when Preceding/Succeeding ads are controlled	61.58		93.63		351.52	
Percent Decrease in Regression Coefficients when Preceding/Succeeding ads are NOT controlled	38.11		48.36		77.85	

*?: p<.10; *: p<.05; **: p<.01; ***: p<.001