TEACHING TAP TO THE ELEPHANT

Media Planners Have Fewer Scheduling Options Than They Think.

(Erwin Ephron with Melissa Heath)

Before we get into the analysis, let's bury the straw men that are commonly used to defend a frequency strategy. We agree that one exposure is not always enough. We accept that repetition across time is essential to effective advertising. We stipulate that additional frequency can generate additional response, although usually at a reduced rate.

But here we address the larger question. *What is the best way for a brand to spend the money?* What pattern of weekly frequency is most productive over the full year? Will the advertising produce more sales if it reaches fewer prospects more often, (*a frequency strategy*), or more prospects less often, (*a reach strategy*)?

The question is important because reach and frequency goals are the marching orders for scheduling the advertising. A brand has a budget for the year. It buys so many GRP's, which can be scheduled over more or fewer weeks. Which is the better scheduling decision for the brand, "bursts" or a more continuous campaign?

Recency

Today, the starting point for most media planning is Recency theory. It is a common-sense approach to scheduling based on three ideas:

- *Receptivity*. Advertising is most effective when a person is in the market to buy a product. Then a single message can influence which brand is selected.

- *Propinquity*. Advertising messages have their greatest effect when they are received close to the purchase. This requires using a reach/frequency-planning interval of no longer than a week.[1]

- *Near random distribution*. We know people buy the product every day. We don't know exactly who is going to buy it tomorrow, but except for seasonal patterns, it is a fairly random process across time.

Based on this set of assumptions, the Recency model calls for reaching as many different potential purchasers as possible over as many weeks as possible. The key Recency measure of a schedule is its 52-week total of weekly reach-points.[2]

Recency planning always leads planners to moderate weekly reach goals, because that will produce the greatest total of weekly reach-points. Not

---

[1] The ANA reach/frequency monographs (Naples, 1979 and McDonald, 1995) talk about the purchase interval, which actually has little relevance to reach/frequency planning. See Erwin Ephron, *The Bible, Lately Revised*, Inside Media, January 10, 1996

[2] Recency also requires 4- and 13-week reach goals.

everyone agrees with this *one-size fits all* solution. Experienced analysts believe bursts of advertising run for fewer weeks can be more effective for many brands. It is essentially the old debate about *Reach versus Frequency*.

Reach Vs Frequency

The disagreement comes down to two different models of the value of frequency, which co-exist in nature. Decreasing marginal utility, (the convex-down response curve), where the incremental value of frequency declines. This argues for reach scheduling. And the threshold effect (an S-shaped curve), where the incremental value of frequency increases over the first two exposures and then diminishes sharply. This argues for frequency scheduling (actually reach at a minimum frequency of two).

To compare the workings of these two models, we need to add the complications of *Time* and *TV Viewing Patterns. Time* is the absolute requirement that a scheduling strategy work across the entire year, and *Viewing Patterns*, are the de facto limitations on what reach and frequency combinations can be bought, which is imposed by the different viewing rates of different people.

REACH X FREQUENCY = GRP'S

The old formula Reach x Frequency equals GRP's is mathematically correct, but misleading. It suggests Reach/Frequency is a zero-sum game. It isn't. As reach increases, frequency must increase also.

A 100 GRP's can buy a 50 reach at an average frequency of 2.0. It can't buy a 70 reach at a frequency of 1.3, because people view different amounts of TV. A 70 reach will usually require a frequency close to 3.0 and more than 200 GRP's.

It is this dependent relationship between reach and frequency that makes our old approach to Reach/Frequency planning limited. We consider reach more valuable than frequency (a principle of Recency planning), but we often act as if high reach goals carry no frequency penalty. They do.

It is the opportunity-cost of the frequency penalty on high reach (or minimum frequency) goals that severely limits our scheduling options.

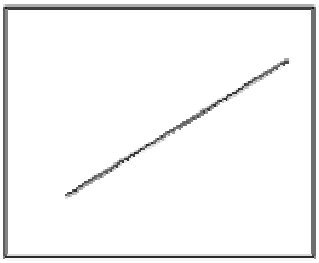
Response Functions

The models we have just discussed are called *response functions*. They are quantitative expressions of how we think frequency works in getting consumers to respond to a brand campaign. They are useful for planning and for comparing the value of different scheduling strategies.

In the following examples, (simplifications that do no great violence to reality), the advertising planning period is one week. In this first case, data, (or more likely judgment), tells us that four exposures to the brand's message in a week will produce the maximum response, and that added exposures will do nothing more. So four (and over) in a week is the upper

limit and is entered in the response chart as 100 or 1.00.[3] If the four exposures produce equal response, each will have a value of 0.25 and the response function will be a straight line, (Table and Figure 1).

1. A Linear Response Function



Frequency	Value	Total Value
1	0.25	0.25
2	0.25	0.50
3	0.25	0.75
4+	0.25	1.00

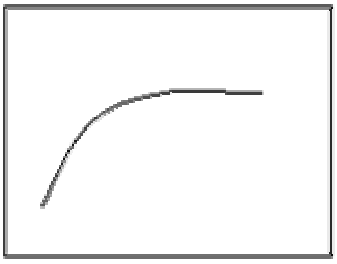
Linear response functions describe a campaign where a frequency strategy doesn't matter (as long as it doesn't produce a large five-and-more exposure group). Here four exposures to one consumer have the same total value as one exposure to four consumers, in our example, 1.00.

Since there is little evidence of linear response functions in advertising, the controversy centers on response functions that curve up or down.

If we believe there is a diminishing response to advertising frequency; that the fourth exposure produces less response than the third, the third less than the second, the second less than the first, we have a convex-down response function (as shown in Table and Figure 2).

[3] We could put the maximum at a number higher than four and it would not affect the analysis, because additional exposures past four would still contribute very little to total response.

2. A Convex-down Response Function



Frequency	Value	Total Value
1	0.70	0.70
2	0.20	0.90
3	0.08	0.98
4+	0.02	1.00

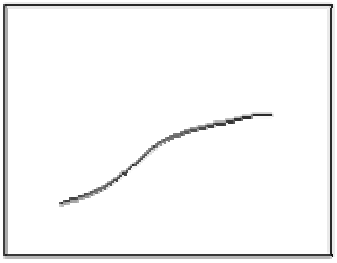
A convex-down response function argues for a single exposure in a week, which is a reach strategy. [4]

In our example, reaching three people once will produce a greater total response than reaching one person three times (3 x 0.70 = 2.10 versus 1 x 0.98). Convex-down response functions appear to be most common by far in advertising.

But if the second exposure has a greater value than the first, perhaps because we believe the second exposure is the real response trigger, the response function will be S-shaped (as in Table and Figure 3).

[4] That single exposure is the most recent of a series of brand messages received by the consumer.

3. An S-shaped Response Function



Frequency	Value	Total Value
1	0.35	0.35
2	0.45	0.80
3	0.15	0.95
4+	0.05	1.00

An S-shaped response function calls for a *minimum of two*-frequency strategy, because reaching one person twice will produce a greater total response than reaching two people once (1 x 0.80 versus 2 x 0.35 = .70).

This will usually call for "bursts" of advertising to reach more target consumers at the two-frequency level.

The S-Shaped Response Function

The point of contention is this S-shaped response function. Recency always assumes a convex-down response curve and recommends moderate weekly reach goals and more weeks of advertising, so-called continuous reach scheduling.[5] Some authorities reject this as a "one-size-fits-all" approach to scheduling (Broadbent, du Plessis, Spittler, Uyenco, to name a few). And admittedly, it does make the process appear over-simple.

[5] Moderate reach goals will produce more total weekly reach points for a budget. Reach costs less at lower levels because each reach-point added makes the yet-to-be-reached group smaller and harder to reach because they view less television.

Furthermore Recency does not require a convex-down response curve. The core idea of *propinquity*, advertising working best close to the purchase, is executable at any frequency.

This paper accepts the possibility of S-shaped response functions, but will demonstrate the *unthinkable*; that for media scheduling the shape of the response function doesn't matter. That even with an S-shaped response curve, the best course for a brand is to schedule for moderate weekly reach at no minimum frequency. Period.

There are two reasons for this. A high reach or minimum frequency goal shifts GRP weight to the 3, 4 and 5+ frequency groups, which by general agreement have a far lower value. And the high weekly cost of a high reach or minimum frequency goal results in far fewer weeks of advertising. The combination produces a less cost-effective schedule when evaluated by the schedule's own objective, *i.e., it results in a lower total frequency value for the schedule over the full plan year.*[6]

The Analysis Plan

The following analysis clearly identifies the most cost-effective scheduling strategies for a brand. It compares the full year response-weighted value of schedules optimized for a variety of reach goals that might result

[6] We have used reach at a frequency of two-or-more as the S-Shaped response function execution, because response functions that show increased value to the third exposure, if they exist, are exceedingly rare. "Two-or-more" also has historical standing. It was the frequency recommendation of the current (1995) ANA Monograph on effective frequency.

from a range of S-shaped response functions (weak, moderate and strong).[7]

The work was done on Kantar's X*Pert optimizer system with TV costs and NTI respondent data supplied by MindShare.[8] It is based on four weeks in May 2000.

The analysis plan is in two parts. First we calculate the one-week weighted frequency value of the schedules, then we multiply that by the number of weeks afforded by the budget to get the full-year value. It is the full year value comparison that is decisive.

The annual budget for the demonstration brand is $13,500,000, a reasonable sum for a packaged-good, but one that would require care in using TV. The consumer target is the most common, Women 25-to-54.

The S-shaped response functions, shown in Table 4, are characterized as *weak*, *moderate* and *strong*, based upon the increase in value supplied by the second and third exposures.

---

[7] Optimizers are ideal for a frequency value test because they provide a uniform approach to constructing schedules and supply detailed frequency distributions.

[8] The authors would like to thank David Marans of MindShare for his generous assistance.

Table 4. S-Shaped Response Functions
(Incremental value of frequency)

Frequency	Weak	Moderate	Strong
1	0.40	0.35	0.25
2	0.50	0.45	0.50
3	0.07	0.15	0.15
4+	0.03	0.05	0.10

Table 5 shows least-cost reach optimizations done at the 30 and 35, 1+ and 2+ reach levels to determine the weekly costs of each schedule.[9] The 2+ reach goals would be recommended by an S-shaped response function.

Table 5. Schedule Costs

Goals	30 1+ Reach	35 1+ Reach	30 2+ Reach	35 2+ Reach
Cost	$270,000	$366,000	$865,000	$1,127,000
Weeks	50	37	16	12

The weekly costs produced by the optimizations are used to calculate affordable weeks of advertising, which will be used later to determine the full-year value of the schedules.

[9] While these reach goals may seem low, they are weekly and translate to the more familiar 4-week goals of a 65-to-70 reach.

The important point from Table 5 is higher reach and higher frequency goals cost more and result in far fewer weeks of advertising. We will return to this when we compare the full-year value of the schedules.

Table 6 shows the frequency distribution of Women 25-to-54 reached by each schedule. (We will use the reach generated at each frequency laterto compare the performance of the schedules.)

The 30 1+ reach schedule is very efficient. It produces 20.2 reach points with a single exposure (shaded). The 35 2+ reach schedule is less efficient. It produces only 11.5 reach points with two exposures.[10]

Table 6. Distribution Of Reach Points By Frequency Group

	30 1+ Reach	35 1+ Reach	30 2+ Reach	35 2+ Reach
1	20.2	21.3	18.0	19.0
2	6.4	7.9	10.1	11.5
3	2.0	3.1	5.6	6.7
4+	1.4	2.8	14.3	16.8
Reach Goal	30.0	35.0	30.0	35.0

Another key observation from Table 6 is the concentration of reach points in the 3 and 4+ frequency group for the 2+ reach schedules (5.6 and 14.3, 6.7 and 16.8). This is wasted frequency.[11]

---

[10] The one frequency group does not count in the reach calculation for the 2+ reach schedules.

[11] In GRP's, the 30 2+ reach schedule delivers 45% of it weight to the 3+ frequency group, the 35 2+ schedule delivers 48%.

Table 7. Frequency-Value Weighted Reach
Weak S-Shaped Response Function

	30 1+ Reach	35 1+ Reach	30 2+ Reach	35 2+ Reach
1 (0.40)	8.1	8.5	7.2	7.6
2 (0.90)	5.8	7.1	9.1	10.4
3 (0.97)	1.9	3.0	5.4	6.5
4+ (1.00)	1.4	2.8	14.3	16.8
Weekly Vvalue	17.2	21.4	36.0	41.3
Index	100	124	209	240

Table 7 shows the reach distribution weighted by the frequency values of a weak S-shaped response function. This is the comparative value calculation.

Looking at the 30 1+ reach schedule, the 8.1 value for women reached once is the result of multiplying the 20.2% reach from table 6, by the frequency value of 0.40 from table 4 (20.2 x 0.40 = 8.1).

The weekly schedule values produced, (17.2, 21.4, 36.0, 41.3), show the advantage of a minimum frequency goal when the response function is S-shaped. Even with a weak S-shaped response function, a higher frequency goal produces a much higher weekly schedule value. For example, the 35 2+ reach schedule has more than two times the value of the 30 1+ reach schedule (an index of 240). A higher reach goal also produces a higher value one-week schedule.

And this is where the reach/frequency value analysis usually stops.

Full Year Frequency Value

But the above comparison is based on one-week schedules with very different costs (Table 5). The number of weeks of advertising that the $13,500,000 budget can buy is decisive to the full-year value of the schedule and this varies by reach goal. A higher reach goal, or a reach at a minimum frequency goal results in far fewer weeks of advertising.

Table 8 shows that over the year a $13,500,000 brand can afford as many as 50 weeks of advertising if the reach goal is 30 1+ and as few as 12 weeks if the reach goal is 35 2+.

When the comparison is extended to a full plan year by multiplying the weekly schedule value by the number of weeks the budget can support, the results are the reverse of the one-week schedule comparisons. Lower reach goals always produce higher value schedules.

Table 8. Full-Year Plan Comparison
Weak S-shaped Curve. Frequency-value weighted reach points

	30 1+ Reach	35 1+ Reach	30 2+ Reach	35 2+ Reach
Weekly cost	$270,000	$366,000	$865,000	$1,127,000
Weeks	50	37	16	12
52-week value	860	792	576	496
Index	100	92	67	58

Table 8 shows the 30 1+ reach schedule generates 860 frequency value-weighted reach points for the $13,500,000. The 35 2+ schedule generates only 496.

Increasing the reach goal from 30 to 35 loses eight percent (100-92), increasing the frequency goal from 1+ to 2+ loses 33- and 42-percent.

Table 9 shows a similar full year comparison for plans using a strong S-shaped response function at higher reach goals of 35 1+, 35 2+, 40 1+ and 40 2+. The strong S-shaped response function is the best-case scenario for a frequency strategy, yet here again the indices show moderate goals are far more cost-effective.

A 35 1+ reach goal produces 629 value-weighted reach points. The 40 2+ reach goal produces only 374, a loss of 40% (100 – 60).

Table 9. Full-Year Plan Comparison
Strong S-Shaped Curve. Frequency-value weighted reach points

Goals	35 1+ Reach	40 1+ Reach	35 2+ Reach	40 2+ Reach
Weekly cost	$366,000	$489,000	$1,127,000	$1,465,000
Weeks	37	28	12	9
52-week value	629	582	439	374
Index	100	93	70	60

Table 10 extends the analysis to a full range of reach goals for weak, moderate and strong S-shaped Response functions. In every case moderate goals are more cost-effective across a full year of advertising.

Table 10. Full-Year Plan Comparison
Frequency Value-Weighted Reach Points.
Full Range of Data Analyzed

REACH	Weak S	Moderate S	Strong S
30 1+	860	775	660
35 1+	792	725	629
40 1+	717	655	582
30 2+	576	544	507
35 2+	496	469	439
40 2+	418	396	374

In total, this analysis demonstrates that as long as a brand's response to frequency begins to flatten after the second exposure, the best strategy is always a moderate 1+ reach goal (30 or 35) and more weeks.[12]

Conclusions

The argument in favor of bursts, flights and effective frequency ignore both the *real* and *opportunity* costs of those strategies. Even when the second exposure is worth more than the first, planning reach for a minimum frequency of two will always produce a lower value plan. That is because minimum frequency goals are costly. They require more GRP's and buy far fewer weeks of advertising.

Minimum frequency goals also build very high frequency among heavy viewer groups. This additional frequency has little communication value.

[12] The extension of this argument is to advertise continuously at very low levels. But since tracking cannot read advertising effects much below 60 TRP's a week (a

Both the loss of continuity and concentration of message weight result in less cost-effective schedules. Similarly, planning for too high a 1+ reach is not cost-effective.

As a result, the best scheduling solution for any brand is more weeks of advertising at moderate weekly reach goals, regardless of the presumed value of frequency (as long as it is within the range found in nature).

This analysis makes another useful point. If the scheduling strategy is to be driven by frequency value, then total frequency value, not reach, should be the optimization goal.

This paper was co-authored by Melissa Heath of Kantar. It won the WPP *Atticus Award* in the Media category.

- August 3, 2001 -

30-35 reach), the brand has no in-market measure of whether the campaign is working.