Melville J Weiss
Mediamark Research Inc, USA

6.8 THE USE OF PAGE EXPOSURE DATA IN MAGAZINE AUDIENCE SCHEDULES

I am going to talk to you today about some of the additional types of data that can be obtained by incorporating page exposure data into print schedule reach and frequency analyses. Hopefully the resultant data base can provide fresh insights into the efficacy of schedules. Before proceeding with the details of how this is done and what it produces, let me spend a few minutes to review briefly the two chief components – the measurement of page audience and MELLO, the MRT system in MEMRI for estimating schedule reach and frequency.

One of the very important things advertisers and media planners need to know is the exposure of an ad, that is how many people see it, who these people are and how often they see it. Print media provides the opportunity for repeat exposure to a given ad. This dimension is missing in standard audience data. It was to come closer to this feature that we at MRI among others, developed a page exposure measure – a measure of the number of times an average page is read or looked at by the reader. We have used it in conjunction with our magazine audience measure for the past four years.

The number of days read within the circulation period of the magazine, (7 days for weeklies, 30 days for monthly's etc.) multiplied by the number of issues read on all average day multiplied by the percent of pages read on an average day yields the page exposure score (Table 1).

This procedure produces an average page exposure for the audience or audience segment. However this average, while descriptive, has limited utility. What is required is a frequency distribution which can be obtained by modelling. We use the Poisson distribution for this – a model used for computing the frequency of relatively scarce events, characterised by a continuous single peaked distribution that origins at zero, and requires only a mean as input.

Table 1

Page exposure algorithm

Reading days		3
Number of issues read		1
% of pages opened		50
Average page exposure	=	3 x 1 x .5 = 1.5

Table 2

Page exposure distribution

Issue audience		15,000
Average page exposure		1.5
Frequency of exposure	0	3,347
	1	5,020
	-	-
	-	-
	7	11
	8	2

Table 2 shows the page exposure distribution for a single issue audience. We note that the page audience is lower than the average issue audience – and that there is greater frequency detail – affording greater analytic flexibility and the opportunity for more detailed analyses. In most instances we are concerned with multiple issues of a given medium. We reason that if the average page exposure for readers of a single issue is K, then the average exposure for readers of N issues is N x K. Therefore the page exposure distribution for the N issue reach of a medium can be derived by applying to each level of the issue frequency distribution, the Poisson distribution centred on the

Table 3

Four issue page exposure distribution

		No of issues read				
		1	-	-	4	Total
Audience		4,431	-	-	5,610	15,860
Average page exposure		1.5	-	-	6	
Frequency of exposure	0	989	-	-	14	1,181
	1	1,483	-	-	83	2,149
	-	-	-	-	-	-
	-	-	-	-	-	-
	7	3	-	-	772	1,077
	8	1	-	-	579	737

appropriate multiple of the average page exposure. This is shown in Table 3. Note that each issue audience frequency level is estimated separately and then summed to produce the overall multi-issue distribution.

The page exposure frequency distribution for multiple insertions in a given magazine is a function of the basic page exposure score, the number of issues used, and the cume rate of the magazine which of course determines the audience frequency distribution. A higher cume rate means a greater reach and lower frequency and page exposure scores, while lower cume rates mean a smaller reach but higher issue frequency and higher page exposure scores.

It is important to differentiate between the two types of estimates we are dealing with, issue audience, the number of different people reached by N issues and page audience, the number of different people expected to see the average page.

So, to summarise what we have done so far:

(1) We compute the number of reading days x number of pages read x number of issues read at last reading = individual page exposure. Summed across all readers and divided by the audience yields the average page exposure.

(2) Using the Poisson function and the average page exposure we obtain the page exposure frequency distribution for a single issue.

(3) For multiple issues, we create a Poisson distribution for each cell of the issue frequency distribution, sum this across all frequencies and produce a page exposure frequency distribution for the schedule.

We now turn to estimating page exposures for a schedule of several media for which we employ MELLO, a schedule analysis system incorporated in MEMRI, the MRI tab system for microcomputers.

MELLO has the following features:

– it utilises as input, the measured one and two issue reach of each magazine in the schedule and all of the measured duplication between these media.

– it builds the schedule incrementally, magazine by magazine, producing both the net reach and multi-peaked frequency distribution at each incremental level.

– the page exposure measure is built in, producing a page exposure distribution at each incremental level.

Now let us consider briefly how we do this. Consider a schedule composed of four issues of each of two magazines. Initially, the issue frequency distribution for each of the two magazines, with the corresponding page exposure averages are arrayed in cross tab format as shown in Table 4. Then the detailed cells of the matrix are computed, along with the corresponding page exposure averages as shown in Table 5.

Table 4

MELLO tab plan

Magazine B	Magazine A frequency distribution				
Freq. distr.	Total	0	1	- -	4
Total	173,933	107,981	12,278	- -	34,428
0	134,636				
1	11,105				
2	7,398				
3	7,241				
4	13,553				

Table 5

MELLO tab plan expanded

Magazine B	Magazine A frequency distribution				
Freq. distr.	Total	0	1	- -	4
Total	173,933	107,981	12,278	- -	34,428
0	134,636	91,304	8,067	- -	22,620
1	11,105	4,713	1,189	- -	-
2	7,398	3,140	-	- -	-
3	7,241	3,073	-	- -	-
4	13,553	5,752	-	- -	4,072

Table 6

Frequency distribution audience

Total	86,629
1 of 8	12,779
2 of 8	10,255
"	"
"	"
"	"
8 of 8	4,072

This matrix is then summed across its lower-left-upper-right diagonals producing the issue frequency for the schedule. Table 6 associated with each cell of this frequency distribution is an average page exposure – which is used to obtain the page exposure frequency distribution for each cell. These, when summed across all cells of the issue frequency distribution yields the page exposure distribution for the schedule, as shown in Table 7.

Table 7

Frequency distribution page exposures

		No of issues read				
		1	2		8	Total
Audience		12,779	10,255	-	4,072	86,629
Average page exposure		2.51	5.04	-	19.08	
Frequency of exposure	0	1,034	66	-	0	2,985
	1	2,601	335	-	0	2,985
	–					
	17+	0	0	-	2,907	7,941

If the schedule contained more than two vehicles, then the entire process would be repeated, using at each insertion level a matrix consisting of the frequency distribution of the schedule so far – as one axis, and the medium to be added as the other. The process is continued until the last medium is added – yielding as an end product, the issue exposure frequency for the entire schedule.

Let us turn to what all these generated data show. Table 8 shows that the amount of data available for evaluating the delivery of a magazine consists of four principle components, issue audience, page audience, the complete frequency distributions and cost. The value of the complete frequency distribution is that it provides the user with a great deal of flexibility. One might define a heavy reader or heavily exposed group, or one might use impact weights, or work with a concept that I call effective exposure. Let us assume that the media planner has at his disposal, from other sources, knowledge of the effectiveness of repeat exposure, and that the desired level of awareness is only reached after N exposures.

Table 8

Evaluation of a single medium total audience

		Coverage %	Cost per thousand $
Issue audience	49,678	28.56	2.21
Average page audience	46,881	26.95	2.34
3+ exposure audience	27,259	15.67	4.03
Gross exposures	143,073		0.77
Effective exposure	109,857		1.00

Further, a point of no return is reached as exposure level increases. We term the range between these two points the effective exposure. Anything below the range is effectively lost since it does not produce the desired awareness level.

Anything above the range is wasted since it does not produce any added awareness. For illustrative purposes, I am assuming an effective range of three to six exposures. The number of effective exposures is shown as one of the measures of a magazine's performance.

These data are available not only for the total audience but for specified target segments. The audience segments can be defined in terms of any of the characteristics available in the data base, demographic, geographic or product/service segments.

Table 9 shows the same type of data for multiple issues of a given medium, and Table 10 compares the single issue delivery of two different media.

Table 9

Evaluation of a single medium four issue audience

		Coverage %	Cost per thousand $
4 issue reach	65,953	37.92	6.66
4 issue page audience	65,231	37.50	6.73
3+ issue audience	44,652	25.67	9.84
3+ exposures	572,291	34.30	7.36
Gross exposures	572,291		0.77
Effective exposures	334,138		1.31

Table 10

Evaluation of two media cost performance

	Cost per thousand Mag A $	Mag B $
Issue audience	2.21	2.16
Average page audience	2.34	2.30
3+ exposure audience	4.03	4.04
Gross exposures	0.77	0.77
Effective exposure	1.00	1.00

SCHEDULING

I would like now to talk briefly about schedule building. Adding to a schedule does a number of different things to audience parameters.

– Previously unreached audience is added.

– The intensity or frequency of exposure of the existing audience is increased so that some of

the less than effective exposures move into the effective exposure range and some of the effective exposures are incremented beyond the effective range.

These phenomena can be observed at both the issue audience and page audience level. Moreover these may operate differently on individual target segments.

By examining the effect of adding additional issues the media planner may be aided in arriving at an effective balance between reach and effective impact, for the entire audience or for special targets.

The fact that the model we employ is modular enables the user to evaluate the effect of the addition of any vehicle (or vehicles) on each parameter of the schedule performance. Table 11 shows a simple illustration of this.

Having decided on a particular print vehicle the media planner may want to look for other vehicles that best augment or complement the initial choice in terms of whatever criteria he may choose, adding issue reach, issue frequency, page exposure reach or frequency or effective exposure. Here again there is an abundance of data that can be generated.

We illustrate two alternative schedules and compare their respective deliveries (Table 12), cost implications (Table 13) and coverage (Table 14). Since all of these operations are computerised we can obtain optimisations on whatever criteria are used: reach, impact, cost and combinations of these factors for whatever target group is available in the data base.

SUMMARY

Page exposure as an estimate of the number of people who will see the average page in a magazine goes one step beyond issue reach in evaluating the effectiveness of media buys.

Table 11

Adding four issues of a magazine to an existing schedule

	4 issues magazine A	
	Total	Adds to existing schedule
Total issue reach	39,297	16,676
Read 3+ issue	20,794	7,481
Total page reach	37,427	16,292
Effective page reach	16,887	3,281
Gross impressions (issues)	101,838	101,838
Superfluous		11,530
Effective	75,937	87,335
Insufficient	25,901	2,973
Gross impressions (pages)	192,887	192,887
Superfluous	34,276	107,511
Effective	145,027	82,776
Insufficient	13,584	2,600

Table 12

Comparison of two schedules women 18-34

	Schedule A	Schedule B
Schedule issue reach	18,221	21,203
Schedule page reach	65,231	21,039
3+ issue audience	12,415	16,152
3+ exposure audience	15,738	19,758
Gross exposures	150,355	241,202
Effective exposure	86,733	112,944

Table 13

Comparison of two schedules women 18-34

	Cost per thousand Schedule A $	Schedule B $
Schedule issue reach	40.54	39.54
Schedule page reach	41.37	39.85
3+ issue audience	59.50	51.90
3+ exposure audience	46.94	42.43
Gross exposures	4.91	3.48
Effective exposure	8.52	7.42

Table 14

Comparison of two schedules women 18-34

	Coverage Schedule A %	Schedule B %
Schedule issue reach	52.4	60.9
Schedule page reach	51.3	60.5
3+ issue audience	35.7	46.4
3+ Exposure audience	45.2	56.8

When modelled into print schedule analysis it provides a wealth and variety of data that can aid the media planner in zeroing in or optimising in terms of whatever combination of reach, impact and cost he chooses on the target group, – which can be any definable population in the data base.

In short, the model can deliver:

For any definable target, for any print schedule, for issue and/or page audience an estimate of the coverage, frequency, cost and effective frequency for the entire schedule or the contribution of any subset to the schedule parameters.

A FEW CAVEATS

Page exposure. Over and above the model limitations, the sample variations of page exposures are high – two to three times the relative variance of the corresponding audience. This is primarily due to the fact that on a respondent level audiences have value of zero or one, while page exposures take on a much broader range of possible values.

The reach frequency model, the beta binomial, is non-parametric. Therefore changes in order will produce slightly altered results, and demographic segments may not add back precisely to the population total.