CIRCULATION CHANGES AND AUDIENCE ESTIMATES

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Synopsis

This paper describes previous work done to understand the relationship between changes in magazine circulation and changes in audience estimates.

The paper describes new efforts to understand the relationship using both lag effects and studying the impact of large circulation changes over time. No strong, observable relationship between circulation changes and readership estimate changes was found on a short term basis. This finding is particularly key to advertising agencies where assessments of short-term circulation changes are often made. Some evidence was found that the large circulation changes have a significant but weak correlation with audience changes. At best, when the changes are correlated, there were not proportionate changes in circulation and readership.

Introduction

We have witnessed endless debates about the relationship between magazine circulation and audience levels. Specifically, questions have arisen regarding the impact of circulation changes on corresponding audience estimates. Is there a consistent pattern or rule of thumb that can be applied to audience levels when circulation changes are made? This paper hopefully adds new information to the circulation/ readership debate.

Despite the many heated discussions on the proper relationship between circulation and readership, we have found very few articles on the subject. Perhaps the most illuminating paper on circulation is Timothy Joyce's theoretical discourse on magazine readers-per-copy (Joyce, 1983). Joyce contended that understanding a magazine's reader-per-copy depends on many factors related to supply and demand. In addition, Joyce reminded us that readership of different copies of a magazine may vary from 1 to as many as 100. Because of the complexity of market forces, it is then difficult to assert that circulation changes will inevitably lead to similar changes in readership. In effect, there can be no hard and fast rule to describe the relationship between circulation and readership.

We agree with Dr. Joyce's conclusions. There are simply too many factors affecting magazine readership levels to contend that circulation alone has a substantial and consistent effect on readership. Bruce Goerlich's 1993 paper (Goerlich, 1993), analyzing five year trends in readers per copy, found "no simple relationship between changes in circulation and changes in magazine audience." Guy Consterdine's San Francisco paper (Consterdine, 1993) lends further support to our thesis. Consterdine enumerates 20 factors influencing reader-per-copy levels; circulation is but one of these factors. Consterdine is unable to find a consistent pattern for readership changes:

"One thing which stands out from the comments is that variations in rpc depend very heavily on specific combinations of factors that are peculiar to individual magazines. There is no standard explanation of rpc changes. Each case must reassessed on its own circumstances." (Consterdine, 1993).

Craig Gugel of Backer Spielvogel and Bates, Inc. drew similar conclusions regarding circulation and readership (Gugel,1993). Using MRI data, he found no consistent evidence that circulation and readership change together. In fact, he found that magazines may well experience sizable and significant audience gains without a corresponding change in circulation. Finally, Helen Johnston (Johnston, 1993) concluded "It cannot be demonstrated that there is a one-to-one relationship in circulation change and audience change."

All the evidence seems to point in a similar direction; there is no necessary correlation between circulation changes and readership changes. Because this position still seems to challenge "common sense" to many, we have taken a new look at more recent MRI data. Although, as indicated, prior research has not uncovered any consistent relationship between changes in circulation and changes in measured audience levels, we felt that an analysis that focused on a lag effect might uncover a relationship. Magazine audience measurements are driven in part by title recognition. (see Appel, McGlathery). Increased or decreased circulation can afford more or less opportunities to be exposed to a title. And as other research had indicated, increases or decreases in awareness often lag exposure (see Broadbent).

Analysis

Our method of analysis was to create a database of 148 magazines that were included in Waves 22 through 32 of the MRI survey (Fall 1991 through Spring 1995). The MRI survey is conducted in two waves of 10,000 interviews. The first one runs from September through January (called the Spring Wave because the data are first reported in the spring). The second wave runs from March through July (called the Fall Wave because the data are first reported in the fall). The database included the estimated total audience for each wave, and the average circulation in the measured months as reported by the magazines to the Audit Bureau of Circulation.
We then calculated the - for each publication between each wave for both circulation and audience. This afforded us 10 sets of observation points for each publication across the 11 survey periods. We then ran a linear regression for each publication. This echoed the analysis outlined in previous work (see Goerlich). As Table 1 indicates, 86 magazines showed an r^2 of .10 or less.

Table 1

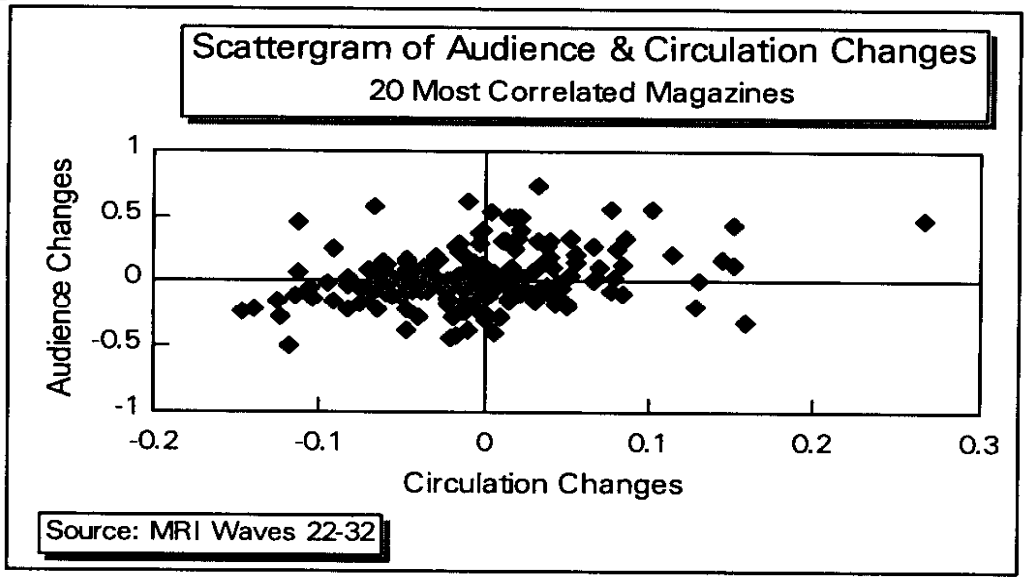
Distribution Of Regression Statistics For 148 Publications
Wave To Wave Changes In Circulation And Audience

	# Of Magazines
$r^2 = 0$	18
$0 < r^2 > .10$	68
$.10 = < r^2 > .20$	31
$.20 = < r^2$	31
Average $r^2 = .11$	
Average $\beta = .18$	
# of Negative β 's	46
# of $f < .05$	3

The average r^2 was only a .11. 46 magazines had negative β 's, indicating an inverse relationship between circulation and estimated audience. An increase in measured audience while circulation decreases would appear to violate common sense. Only 3 publications indicated a statistically significant relationship, and one of those had a negative β.

The lack of a strong, positive relationship between circulation and audience is also shown in Graph 1 which is a scattergram of the Δ's for top 20 publications with the highest r^2 which ranged from .25 to .52. No easy fit is indicated.

Graph 1



We then wanted to test the possible impact of a lag effect. We therefore kept the circulation – for each publication constant but recalculated the estimated audience Δ's by a one wave lag, that is instead of calculating the percentage difference in audience from wave 22 to wave 23, we calculated the percentage difference from wave 22 to wave 24. We felt that the recent reading technique employed by MRI is akin to an awareness measure of exposure, which does have a decay effect (see Broadbent & Dodson).

This approach meant that we could only look at 9 sets of Δ pairs for each publication, since wave 32 could not be included in the analysis. Again we ran 148 regressions, one for each magazine. And again, as Table 2 lays out, we could not find a strong overall relationship between changes in circulation and changes in audience estimates. There was a large increase in negative β's to 63 publications, which drove the average β down to .05.

Table 2

Distribution Of Regression Statistics For 148 Publications
Wave To Wave Changes In Circulation And 1 Wave Lag In Audience

	# Of Magazines
$r^2 = 0$	20
$0 < r^2 > .10$	72
$.10 = < r^2 > .20$	29
$.20 = < r^2$	27
Average $r^2 = .10$	
Average $\beta = .05$	
# of Negative β 's	63
# of *f* <.05	2

We continued to estimate the possibility of a lag effect by increasing the Δ for estimated audience from 2 to 3 waves, that is the difference between estimates for wave 22 and wave 24. This limited our observations for each publication to 8, since wave 31 could not be included in the analysis. Table 3 indicates further failure to find a direct linear relationship.

Table 3

Distribution Of Regression Statistics For 148 Publications
Wave To Wave Changes In Circulation And 2 Wave Lag In Audience

	# Of Magazines
$r^2 = 0$	21
$0 < r^2 > .10$	62
$.10 = < r^2 > .20$	34
$.20 = < r^2$	31
Average $r^2 = .13$	
Average $\beta = .00$	
# of Negative β 's	66
# of *f* <.05	8

However, the number of publications with a statistically significant relationship between circulation and audience estimates did increase to 8, although two of these had negative β's.

The series of successive wave changes in circulation and readership failed to generate any consistent or strong relationship between the two variables. We recognized, however, that the relatively large sampling errors for the readership point estimates and some very small wave-to-wave circulation changes complicated our analysis. In addition, the r^2 for the 2 wave lag analysis seemed to provide a better fit between the two variables. Therefore, we took another approach to uncover any circulation/readership relationship.

From among the 11 waves of data, we isolated the two waves with the highest and lowest circulation levels for each magazine, regardless of the time span between the minimum and maximum circulation. We divided the minimum circulation by the maximum circulation and also divided the readership estimates for the minimum circulation wave by the readership estimates for the maximum circulation wave. In effect, we created a condition which maximized the change in circulation. Theoretically, this provided the best opportunity for circulation changes to have an observable effect on readership estimates. These sets of data generated only positive numbers which allows for curvealinear as well as linear analysis. We then ran regression analyses with 148 paired variables, one for each measured magazine.

The scattergram plot of the data is shown in Graph 2. The results of linear, logarithmic and exponential regression analysis are shown in Table 4.

Table 4

Regression Statistics For 148 Publications
Minimum And Maximum Circulation Changes
In Waves 22 Through 32
With Corresponding Measured Audience Changes

	r^2	*f*	β
Linear	.08	.00	.56
Logarithmic	.08	.00	.40
Exponential	.10	.00	.77

Graph 2

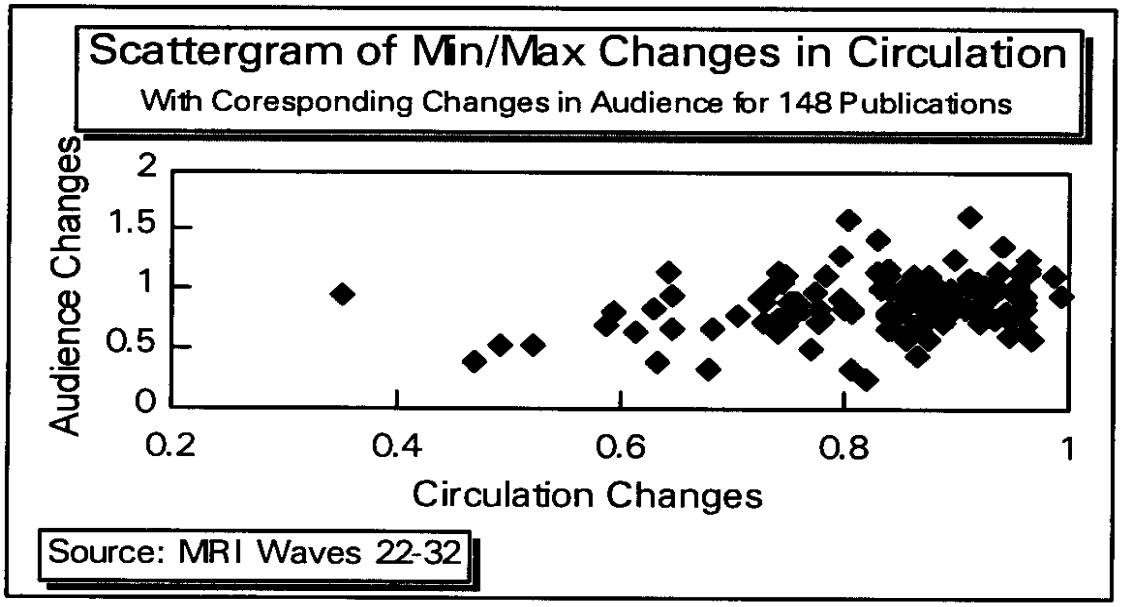


Table 4 shows that an exponential curve provides the best fit of the data, although the explained variance is still only around 10%. The scattergram does show that a substantial number of the readership changes is in the same direction as the circulation changes. Still, the unexplained variance remains too high to conclude that there is a strong linear relationship between circulation and audience changes. Equally important, we had created a condition which maximized the possibility of circulation changes bringing about audience changes.

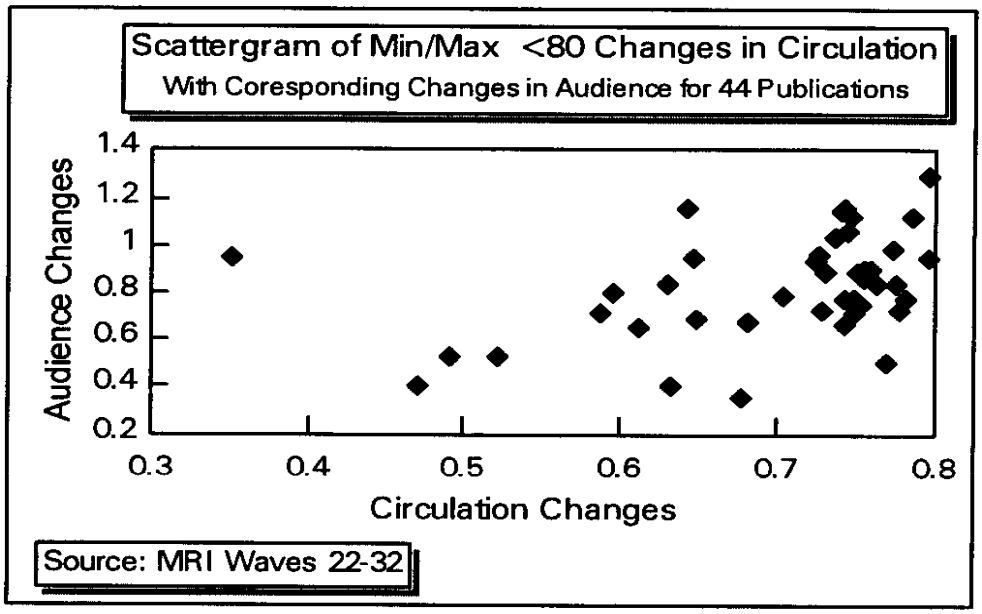
We then examined only those magazines which had at least a 20% difference (i.e. the minimum circulation is less than .80 of the maximum circulation) between the minimum and maximum circulation. By concentrating exclusively on major circulation changes, we removed sampling errors even more as a factor in the regression analysis. The results of the regression are shown in Table 5 and Graph 3. The r^2 does improve to .15 and .16 for linear and exponential regressions, respectively. Although the r^2 is statistically significant, much of the variance still remains unexplained.

Table 5

Regression Statistics For 44 Publications
Minimum And Maximum Circulation Changes Of <.80
In Waves 22 Through 32
With Corresponding Measured Audience Changes

	r^2	f	β
Linear	.15	.01	.87
Logarithmic	.12	.02	.46
Exponential	.16	.01	1.23

Graph 3



We further refined the analysis to the 14 publications where the minimum circulation was less than 70% of the maximum circulation. Table 6 and Graph 4 show that this failed to produce any better fit between circulation and readership. Even if we removed the one outlier from the data set, the r^2 (Table 7) is no better than observed for the 80% analysis. (We should point out that 13 of the magazines did show lower audience estimates for the minimum circulation wave compared to the readership figure for the maximum circulation wave. However, only 3 of the 14 magazines had the minimum and maximum audience levels for the 11 waves coinciding with the minimum and maximum circulation waves.)

Table 6

Regression Statistics For 14 Publications
Minimum And Maximum Circulation Changes Of<.70
In Waves 22 Through 32
With Corresponding Measured Audience Changes

	r^2	*f*	β
Linear	.00	.98	-.02
Logarithmic	.00	.89	-.05
Exponential	.00	.96	-.06

Graph 4

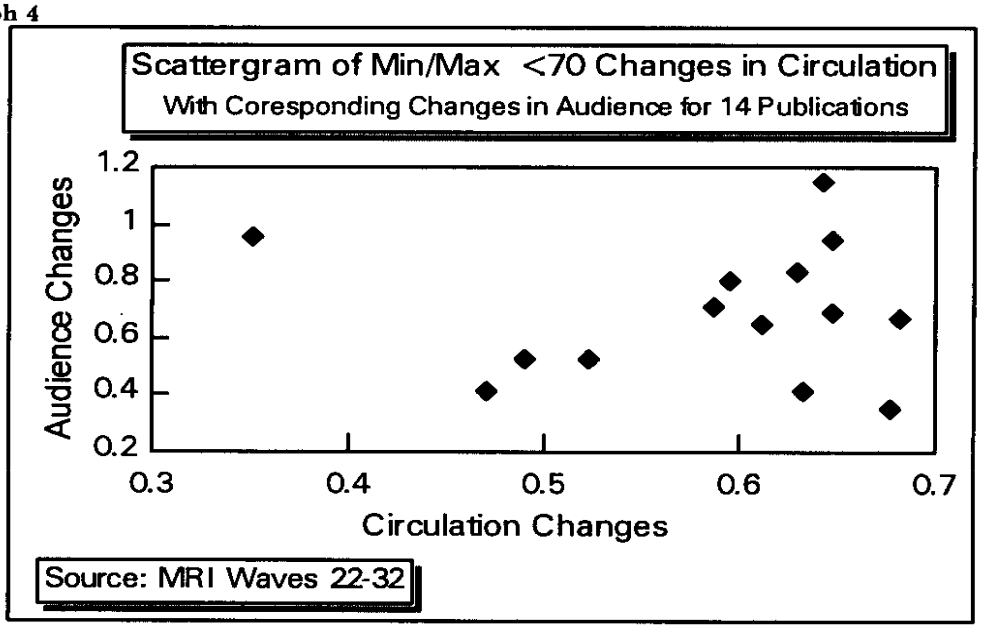


Table 7

Regression Statistics For 13 Publications
Minimum And Maximum Circulation Changes Of <.70
In Waves 22 Through 32
With Corresponding Measured Audience Changes

	r^2	*f*	β
Linear	.12	.25	1.15
Logarithmic	.13	.23	.69
Exponential	.10	.30	1.59

A closer look at the 14 books experiencing the largest circulation changes also shows no overriding pattern. The magazines were:

First For Women
PC World
Workbasket
Parenting
Consumer's Digest
Popular Photography
Architectural Digest
True Story
Vanity Fair
Penthouse
Home Office Computing
Cycle World
PC Magazine
Yankee Magazine

Three of the books are in the computer field where growing demand could well explain both circulation and readership growth. Two others acquired the circulation list from competing, defunct magazines, a special case of circulation change. We can observe no other discernible patterns.

Conclusions:

If under these circumstances, we could not uncover a strong, consistent correlation between the two variables, it would be difficult to envision any stronger evidence that circulation and readership changes are strongly correlated. Our findings then run parallel to those found in the earlier cited papers:

(1) We cannot find any strong, observable relationship between circulation changes and readership estimate changes in the short run. The wave-to-wave analysis simply fails to elicit any consistent or strong relationship.

This finding is particularly key to advertising agencies where assessments of short-term circulation changes are often made. The data offer little if any guidance in predicting the impact of short-term circulation changes on audience estimates.
(2) We found some evidence of a "lag effect" between circulation changes and the corresponding readership estimates. The wave-to-wave regression analysis and the "minimum-maximum" analysis, representing longer time intervals, tended to produce higher R^2.

(3) We found some evidence the large circulation changes have a significant but weak correlation with audience changes. Our "minimum-maximum" analysis did strengthen the relationship between the two variables. Still, most of the variation in readership estimates went unexplained.

(4) At best, when the changes are correlated, we do not necessarily see proportionate changes in circulation and readership. For the "minimum-maximum" linear analysis the β was .56.

In sum, as Timothy Joyce suggested over a decade ago, there is simply no easy rule-of-thumb in assessing the impact of circulation changes on audience levels.