

Ehrenberg-Bass Institute Working Paper

Forthcoming in the *Journal of Advertising Research*, 2013 53(2): 200-211

“Is the multi-platform whole more powerful than its separate parts? Measuring the sales effects of cross-media advertising”

Authors:

Rachel Kennedy - Ehrenberg-Bass Institute

Jennifer Taylor - Ehrenberg-Bass Institute

Colin McDonald - McDonald Research

Laurent Larginat - Mars Marketing Laboratory

Yassine El Ouarzazi - Mars Catalyst

Nassim Haddad - Mars Catalyst



Is the Multi-Platform Whole
More Powerful Than Its Separate Parts?: Measuring the Sales Effects
Of Cross-Media Advertising

Rachel Kennedy
Ehrenberg-Bass Institute for Marketing Science
rachel.kennedy@marketingscience.info

Jennifer Taylor
Ehrenberg-Bass Institute for Marketing Science
jennifer.taylor@marketingscience.info

Colin McDonald
McDonald Research
colin.mcdonald5@ntlworld.com

Laurent Larginat
Mars Marketing Laboratory
laurent.larginat@effem.com

Yassine El Ouarzazi
Mars Catalyst
yassine.el.ouarzazi@effem.com

Nassim Haddad
Mars Catalyst
nassim.haddad@effem.com

Rachel Kennedy, associate director/special projects, Ehrenberg-Bass Institute, University of South Australia, has been conducting empirical research on advertising and buyer behavior for twenty years. She is on the editorial advisory boards for the *Journal of Advertising Research*, *International Journal of Market Research* and *International Journal of Advertising*.

Jennifer Taylor is a senior research associate and lecturer in the Ehrenberg-Bass Institute for Marketing Science, University of South Australia. Her key area of research interest and expertise is advertising effectiveness, with a particular focus on single-source measurement.

Colin McDonald has worked in market research since 1961. He is an external researcher with the Ehrenberg-Bass Institute, a member of Media Trust, and a Fellow and Gold Medalist of the UK Market Research Society. In the 1960s, he analyzed the first “single-source” panel for JWT/London.

Laurent Larginat is the director of the Mars Marketing Laboratory, which is

responsible for all of the marketing-science research at Mars Inc. The lab's mandate is to collaborate with world-class academic partners to help establish Mars as the marketing science leader within the fast-moving-consumer-goods (FMCG) industry.

Yassine El Ouarzazi graduated in 2000 as an industrial engineer from Ecole des Mines de Paris (Mines Paritech, France). He is the research program manager at Mars/Marketing Sciences.

Nassim Haddad, business analytics manager, is responsible for the development and the deployment of Mars Catalyst's competencies in data mining and statistics. He joined Mars Catalyst in 2009 and holds degrees in mathematics and in management

MANAGEMENT SLANT

- Television reach can still be vast. When online advertising is added to a typical television campaign much of the extra reach achieved is duplicated and could therefore be regarded as frequency across media.
- A single television exposure can nudge sales among those who are exposed in the days before purchase. Higher frequency typically brings extra sales with diminishing returns. Online advertising exposure often demonstrates a sales response among those exposed, but not consistently.
- The sales effects of mixed media exposure (online and television) do not indicate the presence of a synergy in sales impact, where the sum of exposure to both media is greater than the parts, but more research is needed.
- Future single source research must control for a wide range of confounds and biases such as purchase-viewing bias, pricing, promotions and competitive clutter. Building future empirical generalizations in this area will require testing of different combinations of media exposure, going beyond consumer goods and established brands.

EMPIRICAL GENERALIZATION

Since the 1960s, single-source analysis has indicated that television advertising exposure will stimulate short-term brand sales. Even with all the changes in the media environment, this empirical generalization still holds, with online exposure also shown to stimulate sales (though less consistently).

ABSTRACT

Cross-media campaigns are becoming a norm for brand advertising, yet there is a lack of knowledge on how to best use them to maximize sales response. The aim of this paper is twofold. To:

- share empirical results on the sales response to cross-media campaigns from cross-media single-source data;
- highlight challenges and considerations for undertaking this type of research.

This study finds evidence that, when online advertising is added to a television campaign, the extra reach achieved is primarily duplicated.

Consistent with prior findings, in a majority of cases, a single television exposure stimulates sales among those who are exposed and, similarly, online advertising exposure demonstrates a sales response. The current study does not find evidence of a synergy in sales impact, where the sum effect of exposure to both television and online is greater than the parts, but much more work is needed in this area. The authors detail what is required to build robust knowledge about cross-media advertising effects using single-source data.

INTRODUCTION

The practice of media has been changing for some time, most recently including the growth of social media, technologies that put the viewer in more control, the introduction of screens of different types and, with them, more interactivity.

Although it makes for exciting times, the adoption of new technologies—and advertising in them—has expanded at a faster rate than knowledge about how to leverage them (Romaniuk et al. 2012). Consumers appear to have adjusted with simultaneous media consumption becoming the norm for many (Bardhi et al., 2010; Holmes et al., 2005), but marketers lack the information they would like for media decision-making in this more complex environment.

Given that advertising clutter is at daunting proportions in many markets (White and Dawson, 2007) and cross-media campaigns are becoming typical—the average U.K. company now uses at least six communications channels (WARC News, 2011)—there is a lot of scope to waste media spend. It is no wonder that most brand owners are finding it hard to prove the effects of their marketing activities (for example see, “UK firms Struggle with ROI” (WARC News, 2011)).

Although there is some variation in global viewing habits—reach typically is lower in the U.S. than it is in Australia or Europe due to fragmentation—television still is capable of vast reach (Sharp et al., 2009).

For brands to grow, advertising needs broad reach (Sharp, 2010). A key appeal for brands in running cross-media campaigns is the potential to obtain this kind of broader reach. So important questions for marketers include:

- How much extra reach they will achieve?
- Will that extra reach enable them to hit the elusive light viewer?
- How much will be duplicated with households exposed to advertising in multiple media?

Understanding medium-reach profiles, therefore, is a necessary foundation for any analysis and discussion of possible cross-media sales synergies.

Possible synergies between media are a key tenet of the popular concept of Integrated Marketing Communications (Naik and Raman, 2003). The role of synergy in multimedia communications, where each medium enhances the contribution of all other media (Naik and Raman, 2003), is not well understood.

Some of the more traditional interactions (*e.g.*, print with television) have been studied extensively (Consterdine, 2002). But, especially in the cases of new media (*i.e.*, digital, online, and social), more research is needed, including, for example, documenting

different types of outcomes from cross-media campaigns such as antergy ($1+1=1.5$), summative ($1+1=2$), and synergy ($1+1=3$) (Romaniuk et al., 2012).

Cross-media studies have tended to demonstrate the relative impact of different media using measures other than individual level sales effects (Assael, 2011). To measure the impact of the cross-media advertising, they have used:

- aggregate sales (Naik and Raman, 2003);
- intermediate variables like recall and attitude (Edell and Keller, 1999; Voorveld et al., 2012);
- purchase intent (Havlena, et al., 2007);
- fused data (Enoch and Johnson, 2010, who combined the use of fused and single-source data).

Some of these studies have dealt with the impact of digital media, examining the impact of online advertising exposure (e.g. Voorveld et al 2012, Havlena et al, 2007), but much of the cross-media literature relates to print or radio combined with television (Edell and Keller, 1999).

Those that have examined the impact of cross-media campaigns have indicated greater impact on these measures from exposure to multiple media, than the use of one medium (Voorveld et al., 2012), but a siloed approach still exists in much of the examination of media effects. And the most promise lies in measurement of the impact of cross-media exposure on disaggregate purchasing behavior (Assael, 2011).

Disaggregate single-source data, where viewing and purchasing are matched for a panel of households over an extended period, has been used to answer questions about the short-term advertising-response function for television (Jones, 1995b). Process replication by different researchers on different data sets over time has established the empirical pattern that the consumer-goods response function tends to be convex, with diminishing returns after the first exposure (Deighton, 1994; McDonald, 1996; Taylor et al., 2009).

But insight available beyond television is limited. The cross-media individual level single-source data now available records campaign exposure longitudinally for many respondents, across relevant media (all media in an ideal world), and captures brand buying at the individual, or more typically, household level.

Cross-media individual level single-source data can assist researchers to answer questions such as:

- How does a dollar spent on television equate to one spent in social media, pre-rolls, print or radio?
- What is the most efficient and effective way to spread a budget across media and time for the greatest sales impact?

But the data—and particularly the analysis tools to interpret that data—are still unproven. In fact, we are only beginning to discover what generalized knowledge may be possible.

The objectives of this study include:

- document the reach consumer goods brands in Europe achieve in cross-media campaigns;

- examine the relative impact of exposure to television and online advertising using single-source data;
- discuss the challenges that lay ahead in building robust knowledge about cross-media advertising effects measurement.

To those ends, the authors have posed the following specific research questions:

- What proportion of additional unduplicated reach is achieved when online advertising is added to a television campaign?
- Given all the changes to the media ecosystem, does television advertising still demonstrate a positive sales effect, and is the response function convex?
- Does online advertising demonstrate a positive sales effect?
- Is there evidence of synergy, where the sales effect on those purchases preceded by exposure to both media is greater than that of those exposed to only one medium?

DATA AND METHODOLOGY

Advertising-sales effects are often difficult, if not impossible, to evaluate because much of the effect of the advertising works to maintain existing buying propensities (stopping consumers from forgetting or neglecting to buy their preferred brands), particularly in the face of competitor activity (Kennedy et al., 2008b). Sales effects will often be hidden in aggregated data such as weekly or monthly sales when correlated to advertising spend. As a result, econometric models based on these are generally inappropriate media/campaign evaluation tools (Pedrick and Zufryden, 1991).

Other approaches and data such as attitudinal, preference, or purchase intentions have been tried in attempts to investigate cross-media results but, to date, none has offered a direct link between advertising exposure and subsequent purchasing behavior.

Cross-sectional survey data, where respondents report on their buying and use of media, is popular. Although it may give some big-picture information that's useful at the planning stage, it too is not capable of measuring the success of the individual elements of a campaign.

Similarly, fused data do not directly measure the effect on buying for those who were actually exposed to a campaign, bringing noise into an area where precision is essential. Fused data can only estimate the exposure of the average person, rather than each person (Jarvis, 2004), and it can suffer from flaws arising from the matching process (Levine, Morgan, Hepenstall, North and Smith, 2001).

To attempt to overcome these issues, the current study draws on individual level single-source data, which is longitudinal data measuring advertising exposure (opportunities to see [OTS]), collected electronically through set-top boxes and Internet tracking, as well as household-level brand buying collated from scanner data.

Data

The data used in this paper comes from GFK's Media Efficiency Panel. This panel combines media usage with both online and offline shopping behavior for the same households over time. Although the panel consists of 15,000 households, 6,000 of these formed the basis of the analysis for this study, because these households participated in both the online and offline panels. Category-purchasing transactions were compiled with

the television viewing and online browsing data from these households for the last six months in 2010 and, in one category, for the first six months in 2011 (category M).

Online behavior—visited URLs or exposure to advertising—was captured by use of an installed browser extension on participants PCs. Television advertising exposure was measured using audio signals emitted from small in-home devices that compared audio signals with television data flow.

The two analyzed categories consisted of 10 consumer goods brands, specifically:

- a staple category (D)
- an impulse category (M).

The brands studied all were well established brands in Europe.

ANALYSIS AND KEY MEASURES

The first calculations were television reach, online reach, and the proportion of additional reach achieved by adding online to a TV campaign (*i.e.*, unduplicated reach). This process provided an initial benchmark of what consumer goods brands may expect, running a cross-media campaign with a reach objective.

Although the authors appreciate that the actual spend and how it is scheduled will bring some variance to their findings, they believe these figures offer value in documenting typical campaigns for established brands. High levels of unduplicated reach suggest that adding online reaches a different audience. High levels of duplication, on the other hand, suggest that brands are reaching the same people with their campaign, just in a different medium.

To measure sales response, the Short Term Advertising Strength (STAS) measure was used (Jones, 1995a). STAS is an index wherein a baseline of purchases where no advertising was seen is compared with those where advertising was seen in a short time period before purchase. The comparison of stimulated to baseline purchases for the studied brand gives an indication of whether a greater proportion of purchases occur when accompanied by advertising. And, in turn, those findings are compared to the regular proportion of purchases achieved without the benefit of advertising.

This in-market measurement draws on what is a natural experiment: sometimes households happen to see advertising shortly before a purchase situation. But sometimes they do not and, therefore, no manipulation is required to expose households to advertising in an unnatural setting.

The STAS measure has been used on single-source data to measure short-term effects of advertising across a range of time periods, typically one to four weeks of exposure before purchase. The current study used a period of four weeks to maximize the sample of exposed respondents, and to enable demonstration of the sales impact of advertising on the different media (solo and combined).

The purchase occasion in this research was measured as at least one purchase in a one-week purchase period. Although purchase occasion defined as one purchase in one shop, on one day, would be preferable (Jones, 1995b; McDonald, 1996; Reichel, 1997), the one-week purchase period allowed for the analysis of the available weekly data.

Purchase occasions were grouped into those with one or more Opportunity to See (OTS)

in the four weeks prior to purchase on:

- television (only)
- online (only)
- both television and online
- those without OTS on either media

Ideally, rather than capturing the purchases with any OTS frequency, a more precise comparison would examine actual frequency of exposure. Purchases with no OTS would be compared to:

- two OTS for television
- two OTS online,
- one online plus one on television.

Such comparison would allow assessment of the impact of adding an additional media, relative to increasing frequency. Sample size restrictions, particularly for those with OTS on both online and television, prevented this analysis. Analysis of frequency effects was possible for TV only. Average frequency was calculated for each medium to mitigate the possibility that a much higher frequency in a particular medium masked the true effect of an exposure to the medium (or combination of media). This provided at least an indication of frequency effects, without splitting the data into unworkably small groups for analysis.

Confidence intervals were calculated for the STAS scores, based on a bootstrapping technique. From the total household panel, 500 random bootstrap populations were sampled. The sampling was done with repetition, each resulting population containing as many households as the original one. The metric was then computed independently on each of these populations, resulting in a distribution of scores. The top 5 percent and 95 percent values were extracted and constitute the confidence interval.

RESULTS: EMPIRICAL PATTERNS

Reach patterns

Before documenting the sales response to the advertising, the reach the various media obtain provides important context.

Despite the rise of new media in recent years, large television campaigns are still capable of large reach, with the brands in Category D gaining an average of 70 percent television reach (57 percent unique television reach and 13 percent duplicated reach with online), with consistency across the individual brands (See Table 1). Although 70 percent is an impressive television reach, it is important to recognize that these figures are across six months, rather than a shorter period, still leaving many potential customers in the “not-reached-recently” category.

In Category D—the staple category—the effect of adding online to campaign reach was 3 percent additional unique reach and an average of 13 percent duplicated reach (measured here as the average across the two years of data) (See Table 1). Of the 16 percent additional reach, 81 percent of it was duplicated.

Table 1: Reach by Medium (Category D—Staple) % - overall campaign

Brand	television unique reach	Online unique reach	Duplicated reach	% of additional reach duplicated
A	65	1	5	83
B	54	5	15	75
C	55	4	17	81
D	55	3	11	79
E	55	4	15	79
Average	57	3	13	81

Category M—the impulse category—achieved lower television-only reach, but displayed the same pattern wherein the additional reach obtained by adding online provided approximately one-quarter unduplicated reach and three-quarters duplicated reach.

Table 2: Reach by Medium (Category M--Impulse) % - overall campaign

Brand	television unique reach	Online unique reach	Duplicated reach	% of additional reach duplicated
V	33	12	38	76
W	50	8	21	72
X	41	11	28	72
Y	39	10	35	78
Z	32	13	40	75
Average	39	11	32	74

These results (Tables 1 and 2) indicated that much of the “additional” reach online was, in fact, duplicated.

A relationship does emerge in the examination of reach and duplication across the two media for the campaigns of the 10 brands in this study. Although the reach of the campaigns for each brand varied, for each of the brands the total additional reach achieved comprised of mostly (72-83 percent) duplicated reach.

Thus, an initial empirical pattern demonstrates that, when adding online to a typical television campaign, European marketers can expect approximately three-quarters of the online reach they buy to be frequency, because it will be reaching people who have also been exposed to the brand on television.

Result for RQ1: Television reach is still vast. When online is added to a typical television campaign, the extra reach achieved is approximately one quarter unduplicated and three quarters duplicated.

Television-Advertising Sales Response

Despite the growth in new media—and the resulting additional clutter and competition for consumers attention—the current study was consistent with past work (Jones, 1995b;

Wood, 2009) in that it found that television stimulates short term sales among those exposed. The majority of the television campaigns in the data demonstrated a positive sales effect (See Table 3 and 4)—a result consistent with prior research that found 70 percent of advertising had a positive effect (Jones, 1995). Hence, television still works to drive sales, even in a more active cross-media environment.

In category D (the staple), being exposed elevated household propensity to buy in the next 28 days by an average of 10 percent, where a weighted average of the STAS scores was used, based on the number of purchases for the brand (Tables 3).

The variation ranged from +35 percent to -6 percent (where a negative score represents those who were exposed to the campaign being less likely to buy the brand than those not exposed). Similarly, Category M (impulse) demonstrated that exposure lifted propensity to buy by 18 percent (See Table 4).

The wide range of STAS scores for the studied brands is consistent with the dramatic influence of individual creative copy to sales (Wood, 2009), where there is significant variation in how successful individual executions are at driving sales.

Tables 3 and 4: Television-Sales Response, Categories D & M (Staple & Impulse)

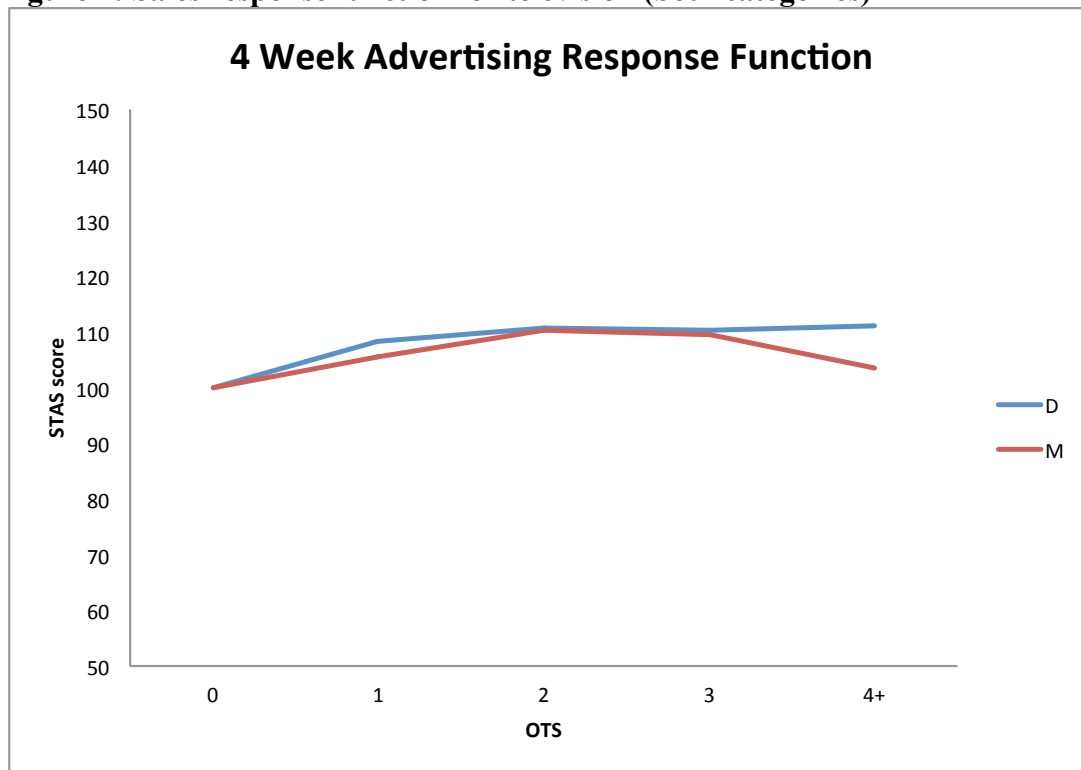
Brand	Television 1+ STAS
D	135
B	124
A	103
E	96
C	94
Weighted Average	110

Brand	Television 1+ STAS
Y	172
Z	120
W	109
X	105
V	101
Weighted Average	118

The largest incremental change to the STAS score occurred from the first OTS, with diminishing returns from television advertising frequency (See Figure 4), consistent with previous findings from empirical studies that used single-source data, conducted by different researchers, in other markets and time periods (Taylor et al., 2009).

The replication of this work provides support for the generalization that the television-advertising response function for consumer goods is typically convex, rather than having a threshold of frequency under which advertising is not effective on those who have seen it.

Figure 4: Sales response function for television (both categories)



Result for RQ2: Consistent with previous findings, a single television exposure can stimulate sales among those who are exposed. Higher frequency typically brings extra sales but with diminishing returns.

Online-Advertising Sales Response

Consistent with television, there is evidence that online advertising exposures drive sales among those who are exposed to the messages. Importantly, this difference manifests itself driving sales of consumer brands in traditional outlets, rather than on online sales.

Though there are too few brands present to make substantive comparisons about the typical magnitude of the effect of online versus television exposures, four of the seven brands with STAS scores for online demonstrated a positive impact of exposure on purchase propensity (See Tables 5 and 6). The individual execution (which could vary across media) is likely to have a significant influence on the magnitude of these results (Wood, 2009).

It should be noted in examination of these results, the average frequency for online was significantly higher in Category D (staple) and the sample size much smaller (See Tables 5 and 6).

Table 5: STAS for television and Online (Category M--Impulse)
(n=3176) (n=1097)

Brand	Television	Online
Y	172	178
Z	120	136
W	109	96
X	105	81
V	101	108
Weighted Average	118	116
Average frequency	3.5	4

Table 6: STAS for television and Online (Category D--Staple)
(n=2024) (n=229)

Brand	Television	Online
D	135	77
B	124	114
A	103	*
E	96	*
C	94	*
Weighted Average	110	97
Average Frequency	3.4	11

CAPTION: The results in Table 6 indicated with * were omitted due to confidence intervals being greater than three times the standard deviation.

Result for RQ3: Online advertising exposure often demonstrates a sales response among those exposed, but not consistently.

Television and Online Advertising Sales Synergies

Synergies between media—a key tenet of the popular concept of Integrated Marketing Communications (Naik and Raman, 2003)—were examined by looking to those purchases preceded by OTS for both television and online.

Synergies in sales effect from cross-media exposure are not apparent (See Tables 7 and 8). Although the average frequency of OTS received prior to purchase was much higher for those who were exposed to both online and television, the sales effect was not.

Table 7: STAS for television and Both (Category M--Impulse)

	(n=3176)	(n=836)
Brand	Television	Both
Y	172	101
Z	120	122
W	109	107
X	105	97
V	101	105
Weighted Average	118	105
Average Frequency	3.5	9

Table 8: STAS for television and Both (Category D—Staple)

	(n=2024)	(n=174)
Brand	Television	Both
D	135	*
B	124	65
A	103	*
E	96	*
C	94	*
Weighted Average	110	65
Average Frequency	3.4	17

CAPTION: The results in Table 8, indicated with *, were omitted following the same procedure discussed in relation to Table 6.

These results suggest that exposing consumers to both media did not provide a clear synergistic impact (i.e., where the combination of media provided a greater result than equivalent exposure to just one medium). Lower sales response from those purchases preceded by both online and television OTS occurred in five of the seven brands.

For the brands (V, Z), where exposure on both media led to a slightly higher response, the results represent a change in propensity to purchase of 4 percent or less, even given the much higher frequency in this exposure group. These results suggest that synergy did not occur as a natural byproduct of cross-media exposure.

Result for RQ4: With mixed media exposure (online and television), there is little indication of a synergy in sales impact, where the sum of exposure to both media is greater than the parts, but more research is needed.

Further research is needed to better understand these cross-media effects and to identify confounds. For instance, further examination of the purchases preceded by online and television advertising exposure in this study revealed that purchases captured in “both” (See Tables 7 and 8) were predominantly made by households that watched the most television.

Splitting the panel households into thirds—based on the total number of television advertisements seen, and examining the composition of the purchases (see Roberts, 1998)—revealed that 85 percent of the purchases in category M (impulse) and 91 percent in category D (staple) accompanied by exposure to both media, were by households in the top-third of weight of television viewing. This means that the people who were exposed to both forms of advertising tended to be those who saw many advertisements for the brand and its competitors. The effects of competitive clutter, where the consumer actually may see many advertisements for the category in close succession, are noted to dampen the sales effect for individual brand's advertising (Danaher et al., 2008).

So although it may be surprising that the STAS score was often lower for purchases accompanied by exposure to both media (and with a much higher average frequency), the skew toward heavy viewers may be critical in understanding the discrepancy.

DISCUSSION

Examining 10 brands in two distinct categories, covering different time periods, the current study compared the relative impact of television and online advertising on households' propensity to purchase.

Even with all of the changes to the media ecosystem—among them social media and a variety of other online activity—the authors found results consistent with previous empirical work—specifically, a single television exposure can still stimulate sales among those who are exposed.

Importantly, television is still capable of vast reach over time. Higher frequency of exposure typically brings extra sales with diminishing returns. This repeated finding provides the most solid base for an empirical generalization relating to the sales effects of advertising, and confirms that television advertising remains highly important, as it continues to drive sales despite the broad proliferation of digital media.

The other cross-media empirical patterns the authors discovered require further replication in order to build knowledge. The results of the current study suggest that online advertising does improve campaign reach, but much of this is duplicated. Moreover, when duplication does occur, it often happens in households with heavy-viewing consumers who also see advertisements for many competing brands. Sample size often prevents closer examination of the sales effect of online advertising compared to television. Much of the complexity is also hidden in the seemingly simple presentation of index methods.

To build solid empirical generalizations in cross-media measurement much work must be done, including extending the efforts of the current paper. For example, the authors are uncertain if the revealed patterns would hold for less established brands, where frequency may be more important; in other markets (especially emerging); for durables; for services; and for other combinations of media.

Building on the Foundations

There is still much work needed to understand the short-term effects of advertising on sales, especially in terms of cross-media. Even with single-source data more readily available, there still are many challenges in working with the data. To build empirical

generalizations, researchers require more than just access to data. In the course of completing the current study, the authors recognized the need for larger sample sizes (particularly in the analysis of cross media) of disaggregated data (*e.g.* not aggregated across time, people, or stores).

Biases can occur in results due to the broad classification groups for households. Finding ways to control for biases, such as competitive interference, without cutting the data into unworkably small groups presents an ongoing challenge that may necessitate alternative approaches to data examination (*e.g.*, Kennedy et al., 2008a).

To help other researchers work in the advancement of understanding the effects of cross-media programs, the authors believe that certain areas that merit further consideration. Specifically:

- **Biases, Confounds, and Considerations**

To ensure that biases are limited, researchers must remove—or at least control for—distortions that are artifacts of the measurement process. Purchase-Viewing (PV) bias is a well known example: It is a bias because it can generate an apparent cause-effect relationship that, in fact, is attributable instead to the correlation between purchase and viewing frequency within a household, not between purchase and the advertising.

Purchase-Viewing (PV) bias occurs when a brand is bought more (or less) by heavy television viewers (or other media users). In such cases those who have, for instance, higher level of Opportunity to See (OTS)—because they are heavier viewers/surfers/listeners—may have a greater propensity for buying, regardless of whether advertising is having an effect. PV bias means that there is an association between OTS and purchase opportunities that is due simply to media targeting rather than a causal relationship between advertising and sales.

A positive PV bias, where a brand is bought more by heavy television viewers, tends to be associated with a positive advertising response (*e.g.*, STAS score). Conversely, a negative bias tends to be associated with a negative score (McDonald, 1997).

PV bias was first noted in 1967 with the discovery that although higher brand awareness may be associated with increased OTS, so is awareness of other brands (Broadbent and Segnit, 1967). An example of this relationship is a mild coffee brand that has buyers who are typically older and watch more commercial television than those who might buy a boutique coffee brand (Broadbent, 1999). These former buyers may simply prefer the milder taste, but the fact that they are heavy viewers may skew results to suggest a strong sales effect from a high number of OTS.

If a campaign is well targeted to likely buyers, heavy buyers (with more purchases in a given period) also are very likely to just be those who also have a higher number of OTS. Heavy viewers/buyers may be unlikely to deliver any (or enough) instances of zero OTS for comparison to generate appropriate measures.

In the new cross-media ecosystem, this bias should be called Purchase-Exposure (PE) to reflect the fact that not all media are viewed (*e.g.*, radio). But the

complications may go beyond simple definition. In one medium, the bias may be minimal. But across media and across markets, there may be very different media profiles, with some people heavily exposed to online, others heavily exposed on television, some heavy on both.

It is unclear how these findings ultimately affect cross-media single-source measurement. But, to move closer to this understanding, a necessary first step will be clear descriptive knowledge of patterns of campaign exposure (by media type). With such knowledge in hand, marketing researchers will be better prepared to examine sales-response patterns.

- **The Need for Variation in the Data**

Single-source analysis remains quasi-experimental—on one hand, a powerful asset in that it is in-market and directly related to sales. But, on the other hand, it carries the risk of insufficient variation in the data of interest.

With cross-media campaigns, it is entirely possible that almost everyone who has been exposed to a small part of a campaign (*e.g.*, a radio commercial) was also exposed to a more dominant component (*e.g.*, a television spot for the same product). Such considerations restrict the kinds of questions marketers can answer, including matters of which medium delivers a stronger response and how different synergies may play out.

Researchers and analysts need to be cognizant of such concerns as they undertake cross-media analysis. For example, the “n” should be examined for each brand at each OTS for each medium. If a brand has many instances of people/households with many OTS in one medium but few in the alternative media, it may not be possible to provide an accurate or complete analysis. Such descriptions of the data characteristics provide a general basis upon which the findings can be considered.

Depending on the nature of the research questions, it may be necessary to combine media experiments with single-source measurement to ensure the necessary data exists for the questions of interest. This may mean planning controls into the tests to allow for varying media exposure opportunities. Split-cable experiments are one example and, in fact, these have been used with single-source data (Lodish and Lubetkin, 1992). But to date, the analysis has been mostly on the split-cable component, without looking at the lessons from the individual level single-source data, where the authors believe additional learning opportunities exist.

- **Analysis Window and Recency**

The proximity of the advertising to purchase event (or window of analysis) has a number of complexities that need to be addressed in a cross-media world.

For television advertising, sales-effect analysis using single-source data is typically conducted for short time windows (7, 14 or 28 days before purchase). Shorter windows such as one day have appeal. But, to date, the data size has not typically allowed this, and practically it may be unrealistic to plan at a daily level.

Conversely, if longer windows (1 month +) are used, then very few people (for large campaigns) have zero exposures and the quasi-experimental design

underpinning single source becomes hampered. When data size permits—and depending on the questions—it may be possible to go further (*e.g.*, three months). But there are any number of other confounding variables—brand use, for one—that become more likely over a longer period.

Looking at longer windows means that the people in the larger number OTS groups are much more likely to have had a recent exposure. In such instances, recency effects could be confounded with frequency. There also is a danger that a simple conclusion such as, “low numbers of exposures have a weak sales effect” may in fact mask a more relevant finding, such as reporting that non-recent exposures have less effect.

Compounding the issue of the length of the window is how the OTS are distributed within that window. A week with seven evenly distributed OTS equates to one OTS in the last day before the purchase. But this kind of configuration is very different from a week wherein all the 7 OTS occur in the first or the last day. There is some initial evidence that suggests we are measuring very short-term effects, which diminish quickly over a day or two (Roberts, 1999; Wood, 2009), but clearly more replications and extensions of this work are necessary to build our generalized knowledge. We should be able to develop a generalized model of the typical decay rate with increasing time between exposure and purchase opportunity (or, if you like, decreasing recency).

In the context of a new cross-media ecosystem, such questions point to fundamental differences between media (*e.g.*, magazines come out once a month; billboards maybe seen every day). This creates a continuing challenge in measurement.

But once exposure data are obtained, there is no clear reason to treat the different media any differently: The timing and recency of exposures remains the most important issues.

- **Competitive Advertising Intensity/Clutter**

To fully understand in-market sales response, the impact of the presence or absence of competitive advertising on brands needs to be determined.

Advertising elasticities are higher when other brands are not advertising (Danaher, 2008). This makes sense given that repertoires are the norm and viewers can be expected to respond to a range of competitors advertising (Ehrenberg, 1988). Furthermore, additional competitor advertising affects the recency effect of viewers seeing any category advertising. Also, shorter windows are less distorted by competitor advertising.

One obvious way of looking at this area is to define the independent variable in share (relative) terms: share of voice, as well as presence or absence of the stimulus. This has already been done to some extent, but further replications and extensions are needed—systematically comparing examples of different share of voice levels to see what patterns emerge including across media, if any, and then modeling them. The same applies to clutter generally.

- **Pricing and Promotions**

The effects of promotions occur in the short-term (Jones, 1995b; Roberts, 1996) and consumer promotions occurring at the same time as advertising make it difficult to determine the degree to which either (or both) have an impact on sales. In the short-term, promotions can have a greater effect than advertising (Deighton et al., 1994; Pedrick and Zufryden, 1991; Tellis, 1988b), which needs to be accounted for in producing advertising knowledge (*e.g.*, response functions).

Disentangling the relative impact of the advertising, the promotion, and their interaction presents a challenge. If we find that, for instance, television appears more (or less) effective when there is also a promotion (or even that it is only effective with the promotion), do we then say that the effect is ‘really’ the promotion? The television advertising may, in fact, interact with the promotion. The promotion may be more effective with the television advertising than if it were without it (and/or vice versa).

The task for researchers is to uncover how they interact, looking at how the media behave when they are in combination with each other, at the same time compared with at different times, and in different relative weights. On a practical front, this will also rely on the on the reliability of the promotions data.

- **Loyalty**

It has been suggested that brand-loyalty effects dominate all others and that advertising seems to reinforce household preferences for current brands (Tellis, 1988a).

Investigating the impact of loyalty, one study found that those with low loyalty (*i.e.*, the brand represented less than 50 percent of a consumer’s category purchases in that year) responded the most in the short-term to advertising; higher loyalty buyers also respond but to a lesser extent (Roberts, 1998). Given known patterns of brand loyalty, for instance, with brand size and category usage (Ehrenberg, 1988), market share is likely to influence many results and should be incorporated into analysis and interpretation.

This suggests that to understand advertising effects, research needs to draw on the established knowledge about loyalty and buyer behavior (Kennedy et al., 2008a). If advertising is stimulating light buyers and having little effect on solus buyers, then finding a way to incorporate it is an important input for analysis. This may take the form of analysis of covariance, switch and repeat analysis or developing something like Broadbent’s ‘buy minus loyalty’ definition for the dependent variable (described in his book (Broadbent, 1999)).

- **Advertising vs. Media**

To build knowledge on cross-media effectiveness, it is important to separate media from advertising effects. Although in-market studies of the short-term sales effects of advertising aim to measure the effect of media and frequency, they also, by definition, include the effect of advertising copy in market.

If consumers cannot work out which brand a copy supports, it may take several exposures to achieve a sales response. In such an instance the media may be

working efficiently, but the creative execution may be negating the intelligent placement of the advertising.

Media and advertising are related but different and both affect single-source measures. Separating media from advertising content requires analysis over long periods of time and over numerous brands/executions—a challenge for marketers who seek a short-term answer.

Priorities for Building Generalized Knowledge about Cross Media Sales Effects

To advance cross-media knowledge, establishing benchmarks of what is typical is an important step. From benchmarks, individual campaigns and media performance can be judged. This is what empirical generalizations provide us with.

The authors propose that the key priorities for building knowledge about cross-media measurement based on single-source research include:

- Determining (by multiple observations and replications) how purchasing responds to campaigns in one medium alone and in various combinations, taking into account relative weights and timings (overlap or not).

The authors acknowledge that media vary and are not necessarily interchangeable, hence anything learnt about a television/online combination is not directly transferable to other media combinations (*e.g.*, online/print).

- Extending the current learning beyond large consumer goods brands to all sorts of brands and categories (*e.g.*, small brands, developing categories, or durables). While this is very important, it is ambitious and will create challenges, and may involve adapting methods, for instance a re-emphasis on surveys (Hansen, 1999), diary based methods or, more likely, using technology to actively (rather than passively) transmit panel data.

MESH Planning, for instance, asked people to keep an online diary and regularly text back information on what they had seen (and where) and what they thought about it (see Dobsin and Blades, 2011). Although this program lacked linked purchasing data, it could be linked to phone-based applications that store purchases for the same individuals. As such, it could create opportunities for non-consumer-goods categories, without the disadvantage of relying heavily on people's memory. The obvious attraction: the potential for obtaining larger samples more quickly.

- Documenting responses across widely varying situations (*e.g.*, impulse and planned categories; across different conditions including developing markets).

Categories and markets vary widely in their brand proliferation and degrees of competitive clutter. Categories like cheese, wine, and chocolate, for instance, have major brand proliferation, while other categories such as toilet tissue have far fewer brands competing for consumer attention. They also vary in the levels of advertising spend. Systematic pattern spotting by such variables will be critical in such documentation.

- Investigating new brand launches that may be different to the bulk of evidence on

mature brands.

There are other issues and questions that have not been considered here, such as brand families, and how a brand is defined in a single-source data set, recognizing that advertisements for variants may affect the sales of each other. There also are considerations relating to the level of STAS score achieved, relative to production costs, management time and opportunity costs.

The authors hope, however, that this background provides a useful checklist for those wishing to advance knowledge in this area.

CONCLUSION

Research has demonstrated that advertising—both online and television—drives sales among those who are reached, but no cross-media synergy effect is apparent. A mixed-media campaign may be successful if it broadens reach cost effectively, but still may not generate additional sales synergies.

Synergies need to be explored in much more detail to understand, for example, their role in broadening the timing and context of consumer touch-points (different media types peak at different times of the day) or to provide enhanced repetition while building reach (Romaniuk et al., 2012).

The current study demonstrates the value of cross-media single-source data, highlighting key issues in working with it. Single-source data has had a problematic past but the single-source ecosystem is developing and new options such as GfK/Google, Nielsen Catalina, TiVo/TRA, comScore and Kantar Retail/Media undoubtedly will offer new research opportunities. Importantly, these new business models will enable larger more automated data collection and hence past problems with the small samples will be minimized. This will enable researchers to more readily pull apart and examine like purchases, while accounting for biases.

Given the promise of this data, the authors have provided guidelines to execute and measure the sales impact of cross-media single-source data in order to generate robust results, and as a solid foundation for building empirical generalizations. Building generalized knowledge still requires extensive documentation and replication across a wide range of conditions. The authors repeat an old call that more studies are needed (Assmus et al., 1984), particularly for relatively new products, in locations other than the U.S. and Europe, and for products other than packaged goods (*e.g.*, durable goods and industrial products).

Through building on some of the empirical patterns that have been replicated numerous times, and beginning the process of extension on the newer cross-media findings, researchers can start to build the much needed empirical generalization in this area. This will give media planners and researchers useful benchmarks, help brand owners to get their strategy-directed combinations of media properly aligned and, in doing so, avoid media wastage.

In terms of what the findings of current study mean for practical marketers, this research is already in use. Mars, Inc. operates under the premise that science can—and should—produce actionable, business-relevant insights that can be leveraged to support more informed decision-making leading to comparative business advantages (Kennedy and

McColl, 2012). Media oversight, data analysis, data-based experiments, and empirical generalizations are critical foundations of this knowledge.

Although research such as this offers useful preliminary insights, much remains to be discovered. Repeated analysis of large samples of multi-media single-source data is needed to truly understand the impact of cross-media exposure on sales.

This is a challenge for advertisers, marketing scientists and data providers. But it is the only means through which our accumulated knowledge will reach a level required to make reliable and fact-based investment decisions.

References

- ASSAEL, H. "From Silos to Synergy: A Fifty-year Review of Cross-media Research Shows Synergy Has Yet to Achieve its Full Potential" *Journal of Advertising Research* 51 (1), (2011). 23.
- ASSMUS, G., J. U. FARLEY, and D. R. LEHMANN. "How Advertising Affects Sales: Meta-Analysis of Econometric Results." *Journal of Marketing Research* 21, February (1984): 65-74.
- BARDHI, F., A. J. ROHM, and F. SULTAN. "Tuning in and tuning out: media multitasking among young consumers." *Journal of Consumer Behaviour* 9, 4 (2010): 316-32.
- BROADBENT, S. *When to Advertise*, Henley-on-Thames: Admap Publications, 1999.
- BROADBENT, S. R. and S. SEGNET. "Response functions in media planning: 1967 silver medal winning paper." In *Ten years of advertising media research: Collected winning papers of the Thomson Gold and Silver Awards for Advertising Research 1962-1971*. England: The Thomson Organisation Limited, 1967.
- CONSTERDINE, G. (2002), "How magazine advertising works," Vol. IV. London.
- DANAHER, P. J., A. BONFRER, and S. DHAR. "The effect of competitive advertising interference on sales of packaged goods." *Journal of Marketing Research* 45, 2 (2008): 211-25.
- DEIGHTON, J., C. M. HENDERSON, and S. A. NESLIN. "The Effects of Advertising on Brand Switching and Repeat Purchasing." *Journal of Marketing Research* 31, February (1994): 28-43.
- DOBSIN, J. and F. BLADES (2011), "360 Degree Advertising: Measuring ROI at different consumer touchpoints," in Warc's Advertising Research: Warc.
- EDELL, J.A., and K. L. KELLER (1999), "Analyzing media interactions: The effects of coordinated television-print advertising campaigns". Report No 99-120 Cambridge, MA: Marketing Science Institute.
- EHRENBERG, A. S. C. *Repeat-buying: facts, theory and applications*, London: Oxford University Press, 1988.
- ENOCH, G, and K JOHNSON. "Cracking the Cross-Media Code: How to Use Single-Source Measures to Examine Media Cannibalization and Convergence." *Journal of Advertising Research* 50, 2 (2010): 125-136.

HANSEN, F. "ASTAS: An Attitudinal Measure of STAS Effects Enabling the Comparison and Brand Media and Effects in Different Periods." *Forum for Advertising Research* October (1999).

HOLMES, M. E., R. A. PAPPER, M. N. POPOVICH, and M. BLOXHAM (2005), "Concurrent media exposure," in *Middletown Media Studies: Observing consumers and their interactions with media*: Center for Media Design, Ball State University.

HAVLENA, W., R. CARDARELLI, and M. DE MONTIGNY. (2007). "Quantifying the isolated and synergistic effects of exposure frequency for television, print, and internet advertising." *Journal of Advertising Research* 47: 215–21.

JARVIS, T. "The future of fusion." *Admap*(2004).454.

JONES, J. P. "Single-Source Research Begins to Fulfill its Promise." *Journal of Advertising Research* 35, 3 (1995a): 9-16.

----. *When Ads Work - New Proof that Advertising Triggers Sales*, New York: Lexington Books, 1995b.

KENNEDY, R., C. DRIESENER, G. GOODHARDT, C. McDONALD, and L. WOOD (2008a), "Using an established framework and Project Apollo data to investigate how advertising works," in *Key Issues Forum of Audience [ME]asurement Symposium*. Millennium Broadway Hotel, New York City.

KENNEDY, R. and B. MCCOLL. "Bringing Science into Marketing at Mars Inc." *Journal of Advertising Research* (2012).

KENNEDY, R., C. McDONALD, and B. SHARP. "Pure single source data and take off time for Project Apollo." *Admap*, February (2008b): 32-35.

LEVINE, M. G. MORGAN, N. HEPENSTALL, N. NORTH AND G SMITH. "Single source - for increased advertising productivity in a multimedia world." *Advertising Research Foundation Workshop* (2001). Chicago, Advertising Research Foundation.

LODISH, L. M. and B. LUBETKIN. "General Truths? Nine Key Findings from IRI Test Data." *Admap*, February (1992): 9-15.

MCDONALD, C. (1995). *Advertising Reach and Frequency: Maximising Advertising Results Through Effective Frequency*. Illinois, NTC Business Books, Lincolnwood.

MCDONALD, C. (1996). "How Frequently Should You Advertise?" *Admap* July.

MCDONALD, C. "Short-Term Advertising Effects: How Confident Can We Be?" *Admap*, June (1997): 36-39.

NAIK, P. and K. RAMAN. "Understanding the impact of synergy in multimedia communications." *Journal of Marketing Research* 40, 4 (2003): 375-88.

PEDRICK, J. H. and F. S. ZUFREYDEN. "Evaluating the Impact of Advertising Media Plans: A Model of Consumer Purchase Dynamics Using Single-Source Data." *Marketing Science* 10, 2 (1991).

Reichel, W. and L. Wood. "Recency in Media Planning - Redefined." *Journal of Advertising Research* July/August (1997): 67-74.

ROBERTS, A. "Measuring the short-term sales effects of television advertising." *Admap*, April (1998): 50-56.

----. "Recency, Frequency and the Sales Effects of television Advertising." *Admap*, February (1999): 40-44.

----. "What Do We Know About Advertising's Short-Term Effects?" *Admap*, February (1996): 42-45.

ROMANIUK, J., V. BEAL, and M. JEANS (2012), "Planning For Synergy: Harnessing the Power of Multi-Platform Media," Ehrenberg-Bass Institute and CNBC.

SHARP, B. *How Brands Grow*, South Melbourne: Oxford University Press, 2010.

SHARP, B., V. BEAL, and M. COLLINS. "Television: back to the future." *Journal of Advertising Research* 49, 2 (2009): 211-19.

TAYLOR, J., R. KENNEDY, and B. SHARP. "Making generalizations about advertising's convex sales response function: is once really enough?" *Journal of Advertising Research* 49, 2 (2009): 198-200.

TELLIS, G. J. "Advertising exposure, loyalty, and brand purchase: A two-stage model of choice." *Journal of Marketing Research* 25, May (1988a): 134-44.

----. "The Price Elasticity of Selective Demand: A Meta Analysis of Econometric Models of Sales." *Journal of Marketing Research* 25, November (1988b): 331-41.

VOORVELD, H., P. NEIJNS, and E. SMIT. "The Interacting Role of Media Sequence and Product Involvement in Cross-Media Campaigns" *Journal of Marketing Communications* (2012) Vol. 18, Iss. 3, 201

WARC NEWS (2011), "UK firms struggle with ROI." 20 October ed.

WHITE, S. and C. DAWSON. "Clutter, Clutter on the Screen - Is This the Way It's Always Been?" *Admap* 482 (2007): 6.

WOOD, L. "Short-term effects of advertising: some well established law-like patterns."
Journal of Advertising Research 49, 2 (2009): 186-92.