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An Experiment in Testing Advertising Levels By Measuring Natural Test Market Variation

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Abstract **-** A field experiment utilizing a new experimental approach to measuring advertising exposure which provides a range of levels of exposure was conducted in eight main test market and eight fringe cities for a global Fortune 500 company consumer durable product. The results showed: a) targeted rating points of advertising delivered are strongly related to advertising effectiveness, and b) this effect is attributable to advertising level and to whether the members of the target audience live close to or far from the broadcast source.

Keywords – Advertising experiment, Testing advertising, Field experiment, Advertising levels, Test market variation.

Relevance to Marketing Educators, Researchers and/or Practitioners – The benefit is the ability, with some caveats, to simulate numerous levels of advertising with a single media buy.

Background

Historically, advertising levels tests have been conducted to determine an 'optimum' amount of money to be spent on a media plan (Wright, 2009). Today there are theorems of optimization indicating that in the absence of specific information on markets and advertising sensitivity, optimal advertising expenditures are found by multiplying advertising elasticity by gross profit. But, for new products, there are no gross profits because firms have development and launch costs that have not been amortized over a sales history for the product. (See a review by Hu, Lodish, Krieger, and Hayatti, (2009) for an extensive discussion of 50 recent TV advertising tests concerning established products for further discussion of this issue.) The present experiment involves a new product rendering existing product methods media planning and buying useless.

Advertising measurement begins target audience definition, and the measurement of Reach (R) and Frequency (F) in a target market. Reach is defined by the total percentage of a market that is exposed to an advertisement at least

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once during campaign. Frequency of exposure is also important since the number of exposures to an advertisement is related to its effectiveness. In measuring advertisement delivery Gross Rating Points (GRPs) are calculated by taking the product of Reach and Frequency, or GRPs = R X F.

Using the Gross Rating Points formula, if 20 percent of all televisions in a city are tuned to a show that contains the campaign advertisement, 20 GRPs would be generated. The next time the advertisement is on the air, suppose 30 percent are tuned in, there are now 20 + 30 = 50 GRPs generated. GRPs would grow cumulatively, throughout the campaign each time the advertisement is on the air.

The next important element of measuring TV advertising delivery is target market which brings into play Targeted Rating Points (TRPs), a concept which recognizes it's necessary to take into account the fact that not every audience member in a market is a target for a TV advertisement. Or to put it another way, all GRPS are not valuable in delivering impressions to a target audience. TRP defines a measure of impressions delivered to the part of the gross audience that is the target audience. As an example, suppose the target audience in a city consists of male golfers, and that male golfers make up ten percent (0.10) of the potential audience reached by a local TV station. At any point in the advertising campaign utilizing that local TV station, the total TRPs equal the total GRPs times the percentage of the target audience that is relevant, or in this case 10%. So, for example, 50 GRPs translates into 5 TRPs in that particular market, or 50 x 0.10 = 5.0. Media planning is based on allocation of media dollars using TRPs to be delivered into each specific market.

Advertising research is used in test markets to determine the relationship between TRPs and advertising effectiveness defined by metrics such as awareness for a new product. Advertising test markets are intended to be microcosms where one can execute a scaled-down version of a national media plan to see how effective it is. Test markets are used to measure the target audience's responses to the advertising stimuli and predict the performance of the full-scale national advertising program. The accuracy of such predictions is generally considered to be dependent on two factors defining how well the test markets represent:

1. The national program based on TRPs delivered.

2. The universe of markets in the nation.

Media delivery models are used to devise experiments to test TV ad effectiveness by representing the national program in one of two ways. These are called:

1. 'As It Falls' (AIF) and

2. 'Little U.S.' (LUS).

Little U.S. (or Little America as it is sometimes called) is a method of media testing where a national campaign might be tested in test market cities that are most similar demographically across the whole country (LUS). In LUS, the interest is in differences in TRP effectiveness based on the same media weight delivered to different parts of the country in cities chosen for their demographic profiles. LUS is used to identify differences in advertising effectiveness (awareness) between geographically dispersed test market cities. If more media weight is needed to get the desired level of awareness in some parts of the country compared to others, advertising dollars can be appropriately allocated according to the LUS media plan.

As It Falls (AIF) is a media testing method aimed at having each test market receive the same media weight, purchased locally instead of nationally. Instead of allocating the same media weight to all test markets, the media weight is adjusted depending on local conditions.

An example of the two models representing a 1500 Targeted Rating Point [(TRP = (Total Messages) / (Reach X Frequency)] is presented in Table 1.

Table 1: Example of Total U.S. Television TRP Deliveries vs. Test Market Requirement

		Test Market Requirements	
Test Market	Total US TV Market	As It Falls	Little U.S.
A	1000	1000	1500
B	2000	2000	1500
C	1500	1500	1500

The LUS design ignores the total U.S. TRP delivery pattern and concerns itself with measuring response to a constant 1500 TRPs in cities A, B, and C. Here, any variation in advertising response is assumed to be due to differences between cities not TRP's delivered. LUS assumes the three cities are equivalent and do not show natural variation in advertising response due to perfect demographic profile matching. In practice, one city may be used in the LUS design completely ignoring variation in advertising response between cities.

The AIF design attempts to simulate the TRP delivery pattern by varying TRP's between cities under the assumption the cities are not the same. This approach generally requires a larger sample of cities with correspondingly greater costs. The primary cost penalty is due to buying media in more cities to measure inherent city-to-city variation in advertising response at the same level of TRP's.

Purpose of the Present Study

The purpose of this advertising experiment was to determine the feasibility of combining the best features of the LUS and the AIF designs in advertising levels

testing. The basic hypothesis is that one can take advertising response measures at different TRP levels in a single test market (AIF design) by sampling in the test market city and a fringe city. It is also possible to measure advertising response between test market and fringe cities in various geographic regions including a zero TRP test market to have as a control for the passage of time (LUS). The basic hypothesis is that if one can take advertising response measures at different TRP levels in a single market (LUS design) by sampling in the test market and a fringe city, then it would be possible to deliver lower TRPs in a second TV test market with the added expense of buying additional media in that market.

Measurement Issues

Advertising research experiments are conducted to get specific data using cities assigned to either a test or control market condition, with pre- and post-advertising effectiveness measurements taken. Many times advertising effectiveness is defined in terms of product or brand awareness since that is the beginning of the consumer buying process (Rubinson, 2009). Every attempt is made to rule out the effects of other possible non-advertising factors on advertising effectiveness measures by matching cities in the control and test market conditions on all know factors believed to influence advertising effectiveness and the buying process. The control and test market cities are also spread geographically as a further precaution against spill-in/spill-out contamination. Spill-in occurs when programming viewed within a target market area comes from stations that are licensed to an adjacent market. Spill-out occurs when programming originating in the target market area by local stations is viewed in an adjacent market. Each of these situations interferes with accurate measurement of advertising effectiveness the effects of spill-in are not measured or controlled. Determining if a media plan is effective is based on the relationship between TRPs and level of awareness generated by the delivery of TRPs; the higher the TRPs the higher awareness should be.

Care is taken in this advertising experiment to insure that measurements of advertising-related behavior are not taken beyond the geographic range of delivered advertising. This approach creates some question as to the appropriateness of using the geographic Designated Market Area (DMA) as a basis for the definition of an advertising test market. For example, the Neilsen Test Market Profiles refer to three levels of the DMA unit:

Metro Area

1. Local Area

2. Adjacent Area

The rationale for these three levels of the DMA rests on the natural variation in media delivery as one moves out geographically from the main test market city

and its broadcast TV source. Media delivery is strongest in the metro area of a given DMA and weakens as one moves to the fringes of the broadcast range. This gradient of delivery occurs due to the physical and programming limitations of broadcast media and due to spill-in of media from adjacent DMAs. It should be pointed out that this adjacency gradient of media delivery analysis applies to spot advertising and not necessarily to national network advertising. This representation of a media delivery gradient is consistent with the A. C. Nielsen definition of a DMA that can be found on their website (Nielsen Television, 2009).

Media delivery is a little understood concept which is vital to advertising levels experiments (Hallward, 2008). Without a verifiable controlled delivery of media into test markets, no valid advertising experiment can be conducted. Usually, 'high' and 'low' levels of advertising are discussed in terms of dollars spent on advertising (e.g., $2 million versus $4 million). However, dollars do not provide an objective measure of media delivery because messages sent are not necessarily received. Thus, media delivery is defined for research purposes in terms of TRPs. Here, media delivery is measured by reach and frequency, where reach refers to the number of target audience members exposed to the experimental advertising and frequency refers to the distribution of the number of times different members of a target audience are exposed to the experimental advertising. Some target audience members may see the advertising a minimum frequency of once, some twice, and some as many times as the advertising is on air (maximum frequency). Thus, the practice of defining a test market as the metro area DMA maximizes both reach and frequency, as the share of viewing in most metro areas for DMA channels is about 100% (Rubinson, 2009). Spot TV measurement services, generally have small samples in the outlying counties of a DMA, and therefore, report a minimum amount of detail for each county. The only available viewership data seem to be a measure of 'share of viewing' for the metro DMA cable stations. This share generally declines as one moves further from the Metro DMA.

In addition to media delivery definitions, advertising-related behavior measures are also important and come in many forms including (Hallward, 2008):

1. Unaided brand name awareness
2. Aided brand name awareness
3. Proven brand name awareness based on demonstrated knowledge of product attributes or message copy points after unaided or aided awareness is demonstrated
4. Intention to buy
5. Attitudes toward the product
6. Trial, repeat purchase, purchase frequency, and brand switching
7. Sales dollars or units of product sold

The effectiveness of advertising is then defined in terms of a differential improvement in one or more of these advertising-related behavior measures.

Hypotheses

This field experiment was designed to test two basic hypotheses

H1: Targeted Rating Points of advertising delivered are related to advertising effectiveness.

H2: This effect of TRPS on effectiveness is attributable to advertising level and to whether the members of the target audience live close to (in the test market city) or far from (in the fringe city) the broadcast source.

Method

A consumer advertising levels test was conducted using a consumer durable goods product that has been marketed by a large multinational firm for over a decade. The product's weak sales record suggests the product suffers from low consumer awareness, and thus, appears to be an appropriate vehicle for the research test purposes. The model under consideration has three elements of media delivery:

1. Type of city in the media delivery area,
2. The type of awareness measured, and
3. Sales volume measures.

In this model, type of city in the media delivery area was defined in terms of whether or not a city was the main test market in its geographic area. Higher TRPs were delivered in the main test market cities compared to the fringe test market cities where TRPs were measured. The type of awareness for the brand was based on demonstrated knowledge of product attributes following aided awareness (proven awareness). Sales volumes in a city were used to define the type of city for test marketing purposes based on effective distribution, with higher volumes identifying test cities and low volumes defining fringe cities.

Thus, the factorial design was a Region (4), by City Type (2), by Advertising Level (2) balanced design with a city as the unit of analysis. This experimental design was implemented as follows. The main test market metro city selection process began with a regional analysis of the consumable durable product in a multi-card study. Sales management then selected a number of metro cities based on effective distribution. After a secondary analysis of demographics, media availability, and factory sales, the number of cities was cut to 15. Visits to the potential test markets by marketing and marketing research personnel were made to get targeted impressions of economic conditions in the 15 cities under

consideration. Due to funding constraints, eight cities were selected from the 15 to be test markets on the basis of product unit sales per household, age of housing, and geographic region of the country. The eight selected main test market metro cities and their final matching criteria are presented in Table 2. The three previous tracking studies established that although the product had been available in limited distribution for over ten years, sales were flat, and any kind of awareness of the product was extremely low and stable at 10%. Four of the main test market cities were assigned to a low level of advertising condition (1250 TRPs) and a matching set of four were assigned to a higher level of advertising condition (2500 TRPs).

Table 2: Eight Selected Test Market Cities and Matching Criteria

Test Market City	Geographic Region	Sales $/Household	Number of Years Since Construction %		
			0 – 10 Yrs.	11-20 Yrs.	20+ Yrs.
Syracuse, NY	Northeast	$.42	13%	18	69
Rochester, NY	Northeast	.34	16	19	65
St. Louis, MO	Midwest	.26	17	17	66
Milwaukee, WI	Midwest	.26	17	17	66
Seattle, WA	Northwest	.18	24	26	50
Denver, CO	Northwest	.16	38	21	41
San Diego, CA	Southwest	.30	48	23	29
Phoenix, AZ	Southwest	.13	38	23	39

A set of eight additional fringe market cities was selected on the basis of TRPs spilling into their areas from the broadcast sources in the main test market cities. Three of the selected fringe cities were actually the metro city of an adjacent DMA. Table 3 shows the percentage of each fringe city viewing of the test market city programming source used to match test market and fringe cities and determine fringe city TRPs.

Table 3: Percentage of Fringe City Viewing of Test Market Programming Source

Fringe City	Test Market City	% of Fringe City Viewing of Test Market City Programming Source
Longview, WA	Seattle	30%
Quincy, Il	St. Louis	28
Batavia, NY	Rochester	43
Racine, WI	Milwaukee	74
Flagstaff, AZ	Phoenix	78
Colorado Springs, CO*	Denver	18
Sacramento, CA*	San Diego	0
Utica, NY*	Syracuse	27

* Adjacent DMA

Main test market and fringe cities and their TRPs are presented in Table 4. As can be seen in Table 3, the final experimental design included sixteen cities with TRP values ranging from 0 to 2598.

Table 4: Summary of Design and TRPS Delivered to Test Market and Fringe Cities

City	Region	City Type	Advertising Level	TRPs Delivered
Rochester, NY	NE	Test	High	2598
Milwaukee, WI	MW	Test	High	2402
Phoenix, AZ	SW	Test	High	2558
Denver, CO	NW	Test	High	2350
Seattle, WA	NW	Test	Low	1122
St. Louis, MO	MW	Test	Low	1183
San Diego, CA	SW	Test	Low	1212
Syracuse ,NY	NE	Test	Low	1048
Batavia, NY	NE	Fringe	High	1117
Racine, WI	MW	Fringe	High	1777
Flagstaff, AZ	SW	Fringe	High	1995
Colorado Springs, CO	NW	Fringe	High	423
Longview, WA	NW	Fringe	Low	337
Quincy, IL	MW	Fringe	Low	331
Sacramento, CA	SW	Fringe	Low	0
Utica, NY	NE	Fringe	Low	283

Advertising was delivered:

- As a single 30-second commercial
- Involved only daytime spot TV during soaps programming
- In two flights of approximately 13 weeks each in the Spring and Fall

Daytime TV was considered an appropriate channel since the target audience for the product was determined to be women ages 25 to 54, with little variation in other demographic variables. This is the demographic for the 'soaps' which show the highest viewer attention to TV shows (Hallward, 2008). Concentration in low cost daytime spot TV resulted in a media plan with relatively limited reach (64%) and an average frequency of 30+ times. Product management recognized the potential hazards of excessive frequency, but decided to error on the side of overexposure rather than lose the opportunity to show advertising effects through underexposure since the business was under consideration for discontinuation if a growth plan had no hope of success.

The field work involved a telephone survey using city directories and an nth name sampling scheme. Two measures of awareness were obtained:

1. Aided awareness for the brand name of the product being advertised and two competitive products.

2. Proven awareness of the brand name of the product being advertised through correct identification of the product's main attribute and the ad's central copy point in a direct comparison with the main competitive product which does not have this attribute.

These measures were taken before the advertising flights began (pre-advertising) and then again after the flights ended (post-advertising). Due to a quota sampling procedure, sample sizes varied by city and time of measurement (pre- and post-advertising), ranging from a low of 26 in a city in the post-advertising measurement period to a high of 40 in a city in the pre-advertising measurement period. In the pre-advertising research, 20 members of the target audience who demonstrated awareness of the product through their knowledge of both key product attributes and copy points were interviewed in each of the cities. Demographic data were also collected from 20 members of the target audience who were proven to be unaware of the advertised product in each city. Thus, 40 members of the target audience were interviewed in each of the 16 cities. In the post-advertising research, the number of target audience members proven aware of the advertised product ranged from a low of 7 to a high of 30. The same interview schedule was used in the pre- and post-advertising measurement periods.

RESULTS

A summary of the design factors, TRPs delivered, pre-, post-, and change in proven awareness for each of the 16 cities in this experiment appear in Table 5 below. For purposes of analysis, the change in proven awareness score was the main dependent variable.

Table 5: Summary of Advertising Effects on Proven Awareness for Cities

City	% Pre-Aware	% Post-Aware	% Change
Rochester, NY	13	43	30
Milwaukee, WI	13	32	19
Phoenix, AZ	5	30	25
Denver, CO	10	29	19
Seattle, WA	12	17	5
St. Louis, MO	4	20	16
San Diego, CA	7	25	18
Syracuse, NY	7	21	14
Batavia, NY	6	14	8
Racine, WI	9	20	11
Flagstaff, AZ	8	20	12
Colorado Springs, CO	10	26	16
Longview, WA	6	7	1
Quincy, IL	4	5	1
Sacramento, CA	9	7	-2
Utica, NY	8	13	5

Sample Characteristics

An ANOVA for Regions was done on TRPs delivered, percentages of pre- and post-proven awareness, and the change in proven awareness. No significant differences were found indicating the Regions were comparable for advertising delivery and effects on awareness.

Regional ANOVAs were also done on the Sales per Household ($1,000) and the percentages of houses in the three categories for Number of Years Since Construction (0-10 Years, 11-20 Years, and 20+ Years). These analyses showed there was no significant difference in Sales, but there were significant differences between the Number of Years Since Construction of homes in geographic regions. Homes in the Northeast and Midwest had been built slightly earlier than those of the Northwest and Southwest indicating some differences in need for remodeling.

Demographics for the test market cities appear in Table 6 below.

Table 6: Demographics for Test Market Cities

Test Market City	Region	Sales $1,000/HH	% of Housing		
			0-10 Yrs.	11-20 Yrs.	20+ Yrs.
Seattle	Northeast	.42	13	18	69
St. Louis	Northeast	.34	16	19	65
Rochester	Midwest	.26	17	17	66
Milwaukee	Midwest	.26	17	17	66
Phoenix	Northwest	.18	24	26	50
Denver	Northeast	.16	38	21	41
San Diego	Southwest	.30	48	23	29
Syracuse	Southwest	.13	38	23	39

Effectiveness Analysis

Two separate regression analyses were done using change in proven awareness as the dependent variable. To explore the predictive value of TRPs delivered and change in proven awareness the regression analysis was run and summarized in Table 7. TRPs delivered accounted for 67% of the variance in proven awareness. In addition, advertising level and main market/fringe city classification, as well as the joint effects of these two predictors of proven awareness were used in a dummy variable regression summarized in Table 8. This analysis showed the dummy variables accounted for 81% of the variation in proven awareness change. Both advertising level and main market/fringe city main effects were significant, but their interaction was not.

Table 7: Summary of Regression Analysis Predicting Change in Proven Awareness with TRPs Delivered

Source	DF	Mean Square	F	R-Square
TRPs	1	811	28****	.67
Error	14	29		
Corrected Total	15	81		
**** $p < .00001$				

Table 8: Summary of Dummy Regression Analysis Predicting Change in Proven Awareness with Advertising Level and Test Market/Fringe City Classification

Source	DF	Mean Square	F	R-Square
Advertising Level	1	420	21***	.81
Test Market/Fringe City	1	552	28***	
Interaction	1	1	NS	
Error	12	20		
Corrected Total	15	81		
*** $p < .001$				

CONCLUSIONS

Both H1 and H2 were supported by the results of this field experiment. The results of this experiment are promising in showing that varying levels of TRPs can be measured in single DMAs. The obvious benefit is the ability to simulate numerous levels of advertising with a single media buy. The inclusion of a 0 TRP city (Sacramento, CA) shows there was no increase in Proven Awareness (in fact there was a loss of -2% in that city) with the passage of time.

However, the results are somewhat clouded. While fringe cities and main test market cities show the same rate of change in proven awareness across TRPs, there is a significant difference between main and fringe cities in the level of proven awareness generated for a TRP expenditure. This difference is relatively constant as the test cities generated abut 6% more awareness at any given TRP level up to 2500 TRPs.

What causes this apparent constant difference? Although this experiment was not designed to investigate the cause, several explanations can be suggested.

The first possible explanation is, the quality of reception diminishes with distance from the main test market, causing less effective communication. This does not seem likely since fringe cities varied considerably in distance from main test cities, and the penetration of cable is high. Yet, the differential advantage the main test market cities showed is constant and there is not interaction of test/fringe cities and advertising level.

Secondly, it was found that there is some constant error in TRP deliveries to fringe cities. A constant error is possible and it is further possible that advertising level classifications are too crude to demonstrate relatively subtle changes in proven awareness. The differences could, for example, be caused by lesser advertising frequency in fringe cities. The unavailability of detailed media data by county precludes further investigation of this possibility.

Thirdly, TV viewers in fringe cities somehow differ from those in main test market cities. A demographic difference is possible. The advertising delivered

was 100% day time TV and fringe viewers may be less likely to watch daytime TV. They could be less interested in the advertised product or its category. These are potential psychological differences between viewers in the larger main test market cities and some of the smaller fringe cities, but large differences in populations of test cities do not appear to effect test city results.

Finally, there may be some station advantage in local areas. It is possible that viewers have greater interest in, and pay more attention to the local TV station than a station in another city. They may relate more closely to local programming and spot advertising as well as being more comfortable with familiar stimuli. This advantage could be a differential effect relating only to daytime programming rather than primetime, but is not verifiable.

The cause of the differential main test market/fringe city ads impact could have serious implications for advertising marketing research and the design of media plans. The results of this research raise some serious questions about current methods of evaluating advertising effects on consumer behavior:

- Is the DMA classification of TV coverage areas a meaningful measure?

- Are differences between main test market and fringe cities somehow eliminated by fringe city viewing of stations in an adjacent DMA? If not, are there permanent fringe cities where TV advertising is always less effective?

- Should TV station audience data reflect audience quality by differentially weighting main test market and fringe audiences?

- Can TV advertising accurately be tested in fringe cities? If there are 'home station' advantages, what does this mean for national Cable TV audiences with their greater availability of 'foreign' programming?

These issues have a direct bearing on the questions of where and how to test TV advertising. If one can register a 100% greater increase in proven awareness at 1,000 TRPs of daytime TV simply by measuring in a main test market city rather than a fringe city, there is cause for concern that media effects are overstated.

The investigators here recognize the many potential sources of measurement error in this study and strongly recommend replicating the study. Verification of results such as these is an essential step toward a better understanding of the process of measuring advertising effects. In view of the serious ramifications for advertisers and marketing researchers, a series of verifications might be appropriate. For example, frequently purchased products, different types of products, and more mature products might not produce the observed effects. However, this research suggests that more demographic representativeness of smaller fringe cities is insufficient. To insure an accurate test of advertising

levels, representative reaction to the advertising stimulus is the key issue. If one cannot expect the main test market city to respond in the same manner as the area to which the results are to be projected (U.S., region, DMA), then the projection is clearly invalid.

REFERENCES

HALLYARED, JOHN. ""Make Measurable What is Not So": Consumer Mix Modeling for the Evolving Media World," *Journal of Advertising Research*, 7, September, (2008): 339-351.

HANSSENS, DOMINIQUE, M. "Advertising Impact Generalizations in a Marketing Mix Context," *Journal of Advertising Research*, 8, June, (2009): 127-129.

HU, YE, LODISH, LEONARD M., and KRIEGER, ABBA M. "An Update of Real-World TV Advertising Tests, *Journal of Advertising Research*, 8, June, (2009): 201-206.

NIELSEN TELEVISION, 2009. http://en-us.nielsen.com/tab/measurement/tv_research

PRECOURT, GEOFFREY. "Why Empirical Generalizations Matter," *Journal of Advertising Research*, 8, June, (2009): 113-114.

PRECOURT, GEOFFREY. "The Promise of Mobile," *Journal of Advertising Research*, 8, March, (2009): 1-2.

RUBINSON, JOEL. "Empirical Evidence of TV Advertising Effectiveness," *Journal of Advertising Research*, 8, June, (2009: 220-226.

SHARP, BYRON, BEAL, VIRGINA, and COLLINS, MARTIN "Television: Back to the Future," *Journal of Advertising Research*, 8, June, (2009): 211-219.

STEWART, DAVID W. "How Marketing Contributes to the Bottom Line," *Journal of Advertising Research*, March, (2008): 94-105.

TELLIS, GERARD J. "Generalizations About Advertising Effectiveness in Markets," *Journal of Advertising Research*, 8, June, (2009): 240-245.

WRIGHT, MALCOM "A New Theorem for Optimizing the Advertising Budget," *Journal of Advertising Research*, 8, June, (2009): 169-164.