



Engagement, Emotions, and the Power of Radio

Radio Ad Lab, June 2007

*Part One of a New Study of How Radio Affects Consumer
Emotions, Conducted by Gallup & Robinson*

*From the Ongoing Series
"Radio and the Consumer's Mind: How Radio Works"*

Executive Summary

This new Radio Ad Lab study (conducted by Gallup & Robinson) was designed to assess how well radio ads can generate emotional responses and engage with consumers, compared to television ads. And it did so using advanced physiological methods that measure emotional activation in ways that don't require verbal responses.

After evaluating 16 different real ad campaigns within actual programming, one conclusion is clear:

Radio ads have emotional impact on consumers that is equal to that of television ads.

The 16 radio campaigns in this study generated emotional levels just as high as their TV counterparts on average. And at the individual campaign level, there were four radio campaigns showing significantly *higher* emotional impact than their TV counterparts, compared to only one TV spot with higher emotional levels.

That's an extremely important finding, since most advertising researchers now believe that, "Emotions can be considered as the gatekeeper for further advertisement processing."

When these effects are factored into a Return on Investment model, we think the implications are even more striking. If the emotional effects per ad are equal and the spot costs are more efficient for radio (vs. television), then the Emotional Return on Investment must almost certainly be in radio's favor.

There's more to be learned from this study's database. In the very near future, we'll explore how the program environment interacts with the emotional impact of the ads within. And we'd like to better understand the nuances of how radio's emotional impact is *different* from TV's, even when the overall levels are similar. We outline specific plans for additional 2007 analysis in the body of the report.

But in the meantime, we believe these new findings are consistent with the Radio Ad Lab's past research about radio. This medium connects with its listeners in unique ways, and it provides an unusually receptive advertising environment.

In particular, radio listeners do have an emotional bond with their programming, and it's now clearer than ever that radio *advertisers* can benefit from that connection.

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Introduction

The [Radio Ad Lab](#) has independently funded a number of recent research studies that sought better understanding of how radio advertising works. While some earlier projects, including the landmark *Radio's ROI Advantage* study,¹ took a straightforward approach of simply benchmarking radio's Return on Investment against that of television, the Radio Ad Lab is now focused on how to *use* radio more effectively. That's the theme of our 2006-2007 series of studies, "Radio and the Consumer's Mind: How Radio Works"—we're trying to help the industry better understand *how* radio works, more than *whether* it works.

Developing a better understanding of how listeners engage with radio ads seemed like a promising area for new research, especially concerning **how radio commercials affect consumer emotions**. With engagement being actively explored in many research forums, it was time for radio to get more involved.

Of course, this idea of "engagement" is an evolving concept in advertising. A major initiative is underway in the US, supported by such organizations as the Association of National Advertisers (ANA), the American Association of Advertising Agencies (AAAA), and the [Advertising Research Foundation](#) (ARF) to adopt the concept of engagement as a new planning metric, complementing and possibly replacing frequency in media plans.

Whether engagement proves to be an actual new standardized measurement for advertising planning and buying, the idea of engagement for understanding media and advertising performance is an important one. And while developing a single, standard and widely accepted engagement definition is likely to be a difficult and time-consuming undertaking, there are a number of meaningful ways to think about engagement in looking at a medium's ability to communicate and affect advertising within it.

One of the more promising areas of investigation is the idea of Emotional Activation, or the ability of advertising to make an emotional connection with its audience. In fact, much of the discussion about engagement is really about how advertising affects consumers *emotionally*. This is a concept that the research company [Gallup & Robinson](#) has been exploring for television advertising for some time, along with Dr. Richard Hazlett, a Johns Hopkins scientist with whom we had the pleasure of working on this project.²

Of course, the Radio Ad Lab has already published a number of studies about the importance of emotions for understanding *radio* ad effectiveness. See, for example, our recent study *Personal Relevance Two: Radio's Receptive Ad Environment*³ which addresses how radio may be an especially effective medium for advertisers to use in connecting with consumers at an emotional level.

It made sense, then, for the Radio Ad Lab to align with Gallup & Robinson to see how G&R's innovative research techniques might be applied to radio. In addition, we wanted to explore the idea of measuring the emotional impact of advertising when the ad exposure occurs *in the context of programming*. That's why the Radio Ad Lab Research Committee decided to

¹ Radio Ad Lab Inc., "Radio's ROI Advantage," 2005, available for free download at <http://RadioAdLab.org>.

² Hazlett, R. L., & Hazlett, S. Y., "Emotional Response to Television Commercials: Facial EMG vs. Self-report," *Journal of Advertising Research*, 1999, 39(2), 7-23.

³ Radio Ad Lab Inc., "Personal Relevance Two: Radio's Receptive Ad Environment," 2006, available for free download at <http://RadioAdLab.org>.

commission Gallup & Robinson to apply its unique systems for measuring emotional response to a radio context.

To summarize, then: This project is all about emotions—about how radio advertising can affect people emotionally. The challenge, though, is to find a good way to *measure* those effects. That's what we set out to do with Gallup & Robinson.

Gallup & Robinson's Continuous Emotional Response Analysis System (CERA)

Many advertising measurement techniques, especially those that look at emotion using survey research methods, depend at least in part on the cognitive side of the messaging. Without minimizing the importance of these "self-report" metrics, though, recent work in neurophysiology has suggested that much information processing takes place largely outside of conscious awareness.

In plain English: Not everything that consumers are *feeling* about an advertisement can be expressed in words, or even with pictures. We believe that a full understanding of emotional responses to advertising needs to go beyond what a consumer knows how to explain or illustrate.⁴

In more scientific language, sensory inputs, such as those from commercials, can be transmitted directly to the amygdala, the emotional center of the brain, and/or indirectly to areas in the neocortex where complex thought occurs.

Moreover, verbal responses which are cognitive-based (like those in a survey questionnaire) can have clear deficiencies in describing emotion-based response. Emotional stimuli are evaluated pre-consciously and reacted to even before one can think about how one feels. Whether or not *decision-making* is primarily cognitive, various studies reveal that *affect*—feelings and emotions—is a key to human behavior, including purchase behaviors.

In short, a great deal of advertising research now points to a fairly simple conclusion:

"An emotional reaction needs to be established before further cognitive processing of an advertising stimulus takes place. Emotions can be considered as the gatekeeper for further advertisement processing."⁵

For this study, then, we've chosen to investigate emotional reactions to radio (and television) ads at this deeper, pre-cognitive level.

To do that, we used a new testing system to better assess the emotional connection that advertising messaging makes with its audience. Called **CERA (Continuous Emotional Response Analysis)**, this system uses leading edge measures of emotional response, supplemented with traditional validated metrics of advertising effectiveness.

⁴ For an excellent summary of the different methods of measuring emotional responses to advertising, see: Poels, Karolien and Siegfried Dewitte, "How to Capture the Heart? Reviewing 20 Years of Emotion Measurement in Advertising," *Journal of Advertising Research*, vol. 46, no. 1 (March 2006), pp. 18 - 37.

⁵ Ibid.

Emotional activation is gathered in part through the technique of **facial electromyography (EMG)**, and then more traditional cognitive responses about advertising effectiveness were collected through conventional face-to-face interviews.

What exactly is this facial EMG measurement? Bolls, Lang and Potter provide a good technical summary in their 2001 article:

Facial EMG is the modern measurement of ... facial muscle contractions. This physiological method measures the electrical signal generated by the occurrence of action potentials across a group of muscles dedicated to moving particular parts of the face (Cacioppo, Tassinary, & Fridlund, 1990). These electrical signals can be detected by the careful placement of electrodes over specific muscle groups on the surface of the skin.

Facial EMG is commonly obtained from the zygomatic and corrugator muscle groups. The zygomatic muscle is located along the cheek just above the corner of the lips. Contraction of the zygomatic muscle draws the angle of the mouth backward and upward, leading the zygomatic muscle to become known as the smile muscle (Fridlund & Izard, 1983). The corrugator muscle is located on the brow just off the bridge of the nose. Contraction of the corrugator muscle moves the brow downward and inward, associating the corrugator muscle with frowning (Fridlund & Izard, 1983).⁶

For our work, two EMG measures were taken:

- The *positive* zygomatic measure of the smile muscle, and
- The *negative* corrugator measure of the brow frown muscle.

Positive *and* negative emotional activations are measured separately because they're indicative of separate evaluative processes, which are independent motivators of consumer behavior.

In addition, for this study we also included for an additional baseline a more traditional excitement (or "arousal") measure based on skin conductance.

Combined, EMG and skin conductance provide two independent indicators of emotion. EMG provides an indication of the positive or negative *direction* of the emotion, while the skin conductance data provides an indicator of the *strength* of the emotion.

For newcomers to this technique, we acknowledge that it may sound a bit exotic. But this combined measurement technique is well supported in academia and is being used as part of the ARF/AAAA joint study of Emotions in Advertising, where it has demonstrated strong viability and received substantial encouragement.

So far, Gallup & Robinson's CERA work has been tested primarily in the area of television, and also in such areas as human computer interfacing, print, and styling. However, we did have reason to expect that radio ads would demonstrate measurable emotional effects when assessed with this technique. This is based on a 2001 exploratory study by Bolls, Lang and Potter that concluded, "Results of this experiment demonstrate the validity of using facial

⁶ Bolls, Paul D., et al., "The Effects of Message Valence and Listener Arousal on Attention, Memory, and Facial Muscular Responses to Radio Advertisements," *Communication Research*, Vol. 28 No. 5, October 2001, 627-651.

EMG as a physiological measure of the valence of emotional response to radio advertisements.”⁷

But understanding how the aural appeals of radio work relative to the visual/aural appeals of television is an important and new avenue of inquiry. For the Radio Ad Lab, there was strong interest in understanding how radio ads might affect emotions differently than television ads.

It's important to note that this interest wasn't competitive. The [Radio Ad Lab Research Committee](#) consists of as many buyers as sellers of radio advertising, and the long-term goal for this project is to better understand what's *unique* about radio. Ultimately, the Radio Ad Lab wants to help the industry use radio more effectively through better understanding of its nuances and distinctive attributes.

Study Principles

There were several key principles specified by the Research Committee as it worked with Gallup & Robinson on this project. More details on each of these are provided in later paragraphs:

- The matching radio and television ads used for testing needed to be pre-tested in advance with *standard* methods so that all ads (both radio and television) could be said to be average or better by normal copytesting standards. More specifically, we wanted some assurance that when we compared radio and television ads to each other, they were reasonably comparable by conventional methods of copytesting.
- In the new study, both the radio and the television ads should be tested “in context”—i.e., the environment should be one in which respondents were exposed to both programming and advertising. Radio Ad Lab research has shown that a listener's bond with radio programming is a significant component of attitudes toward radio ads.⁸
- That meant providing respondents with a *choice* of programming, so that there would be a reasonable “fit” between respondent and program content.

Ad Selection and Pretesting

To select the ads used in this study, the Radio Ad Lab first retained Gallup & Robinson to create a pool of possible ad campaign candidates. G&R in turn worked with a third-party ad monitoring service to find pairs of radio and TV ads that had aired in approximately the last year that:

- Had similar themes for identical products

⁷ Ibid.

⁸ Radio Ad Lab Inc., “Personal Relevance Two: Radio's Receptive Ad Environment,” 2006, available for free download at <http://RadioAdLab.org>.

- Were of reasonably high audio and video quality
- And were of standard ad lengths

We then retained G&R to subject that set of 24 paired commercials to its standard proprietary [WebCheck©](#) ad pre-testing methods, and then to assess those ads against G&R's norms. That allowed us to narrow the pairs of ads to the final set of 16 such that the radio-TV pairs were the most likely to be "fair" comparisons (radio vs. television) based on comparable pre-testing results, as well as to be congruous in theme and content.

Those pretesting measures included recall, persuasion, brand rating, likability, and purchase intent.

The final 16 ads covered a broad range of product categories, including:

- Auto/Car Brand (2 campaigns)
- Beverages
- Communications
- Discount Dept. Store
- Fast Food
- Financial/Investing
- Grocery/Canned
- Grocery/Deli
- Insurance
- OTC/Headache
- OTC/Hygiene
- Portable Electronics
- Public Service Organization
- Restaurant
- Travel/Resort

Test Methodology

For the main Radio Ad Lab study, respondents were pre-recruited by telephone from a national field service list,⁹ and after being told the nature of the measurement and the purpose of the study—the evaluation of *either* TV or radio programming, depending on the preassigned group—they were invited to a central facility in one of two large cities

⁹ These samples are built using a variety of opt-in sources, including advertising, the Internet, word of mouth, and mall. Potential participants were selected randomly from the list in our two cities, and then screened to meet specific age, ethnicity, and experiment-related criteria. Any respondent who had participated in a mall study of any kind within the past year was screened out.

(Baltimore and Chicago) for a 30-minute interview. The Baltimore site was a standard focus group market research facility located in an office complex in a typical suburban neighborhood about three miles from the downtown area. The Chicago site was a mall market research facility located in a suburban neighborhood approximately ten miles from the downtown area.

Cooperation fees were offered to increase participation rates. Additional appointments were scheduled after the initial round of interviews to ensure that the target number of completes and demographic targets were achieved. See [Appendix A](#) for the final sample distribution.

The sample consisted of men and women aged 18-54 who used television or radio at least two hours per week. The sample size was 80 each for the radio and television groups.¹⁰

The lab setting was designed to simulate a living room with comfortable furniture.

We acknowledge that this single testing environment is a limitation with unknown effects. For example, a significant amount of radio listening occurs in cars, and our testing environment could not simulate that listening condition. We don't know whether that or other environments would yield better or worse results for radio advertising, though speculation is tempting.

Respondents were tested one at a time, and were hooked up to the measurement equipment and asked to listen to or watch a fifteen minute sequence of programming material and commercials. Respondents were able to select programming material of interest to him or to her. As the material was listened to or viewed, continuous EMG and other activation measures were taken (after a brief period of "settling in" to establish a baseline level).

For each medium (TV and radio), two pods of four commercials each were embedded in the programming material. Thus, a total of 16 pairs of radio and TV commercials were tested, with each respondent having been exposed to eight of those commercials for one medium. The order of commercials was rotated such that each commercial had an opportunity to occupy various pod positions.

During the radio exposure, we did not show any other visual stimulus. We decided not to risk introducing any potentially confounding variables by having any visual distractions other than the simulated living-room surroundings.

The Programming Context

As mentioned above, a key component of this study was the embedding of ads within programming. This was not a "copy test" per se; it was a test of ads *in context*, so it's important for readers to understand that context.

We selected five actual recent radio programs, and five actual TV programs, in an effort to provide a reasonable cross-section of choices. While we don't pretend that any given respondent will have found their "favorite" on our list, our hope was that the content types provided a positive environment for each respondent so that we can fairly assess ad engagement in an enjoyable programming context. In addition,

¹⁰ See [Appendix C](#) for some comments about the statistical power of these sample sizes in research of this type.

Gallup & Robinson did measure program engagement before the ads began, so we'll have some opportunity (in later papers) to control for those effects mathematically.

Here then are the types of radio programs provided:

- News Feature
 - Soft Rock
 - Country Music
 - Urban Music
 - Classic Rock
- And for television, we offered the following types of program. We purposely chose programs from less-watched channels, in hopes that these programs were fairly unlikely to have been viewed previously by our respondents. But in our opinion, the quality of the programming was quite high:
- Hard news documentary
 - Soft news biography
 - Female-oriented drama
 - African-American-oriented comedy
 - General-audience comedy/drama

The Analysis Approach

There are a wide range of analysis possibilities in this study, and we anticipate generating a number of research papers from this rich database. In the current paper, we'll examine the following:

For radio and television ads overall:

- Mean positive and negative EMG (emotional) activation levels
- Mean overall excitement (arousal) levels
- Mean brand recall levels

For the 16 *individual* pairs of ad campaigns, by television and radio (masked as to brand and category):

- Mean positive EMG (emotional) activation levels
- Mean overall excitement (arousal) levels

After we've presented this data, we'll offer some suggestions for future papers.

A Few Definitions

In the sections that follow, we present a few measures that require some definition.

EMG Scores (in general): For the EMG measurement, respondents were given a few minutes at the start of each session to settle in and settle down before the program material began. That allowed for the generation of baseline measures to be taken on all physiological data. In all EMG charts which follow, that baseline is set to equal a score of 100. Thus, a “positive EMG score” of 117 for the advertising represents an EMG reading that was 17% greater than the pre-exposure reading of 100.

Positive EMG: When we present Positive EMG scores, those are the readings taken from the “smile muscles,” or more properly, the zygomatic muscles. These are indications of positive emotional responses.

Negative EMG: When we present Negative EMG scores, those are the readings taken from the “frown muscles,” or more properly, the corrugator brow frown muscles. These are indications of negative emotional responses.

Excitement Scores: These represent the overall levels of skin conductance readings during the ads, and are indicators of sympathetic nervous system activity, or arousal.

The Results

Overall Effects: Radio Matches TV in Emotional Impact

As described above, we tested 16 different campaigns, each with a radio and a television ad. One of our goals for the study was a simple one—to see whether radio ads delivered emotional impact that was similar to, less than, or greater than, their television counterparts.

To answer that question, we have three key overall measures:

- Mean Positive Emotion: Positive EMG Scores
- Mean Negative Emotion: Negative EMG Scores
- Mean Excitement Score: Skin Conductance (Arousal) Values

For radio and television overall, the Radio Ad Lab’s past research suggested that radio has a strong *potential* to connect with consumers at an emotional level. But we weren’t quite sure what to expect from these 16 campaigns with this new measurement technique. The results were encouraging.

The radio ads demonstrated positive emotional impact equal to their television counterparts, with an equivalent overall potency (excitement level). See Figures 1 through 3. (Exact scores and significance test data for all charts are provided in [Appendix B.](#))

Figure 1
Positive Emotions
Average EMG Scores, All 16 Campaigns

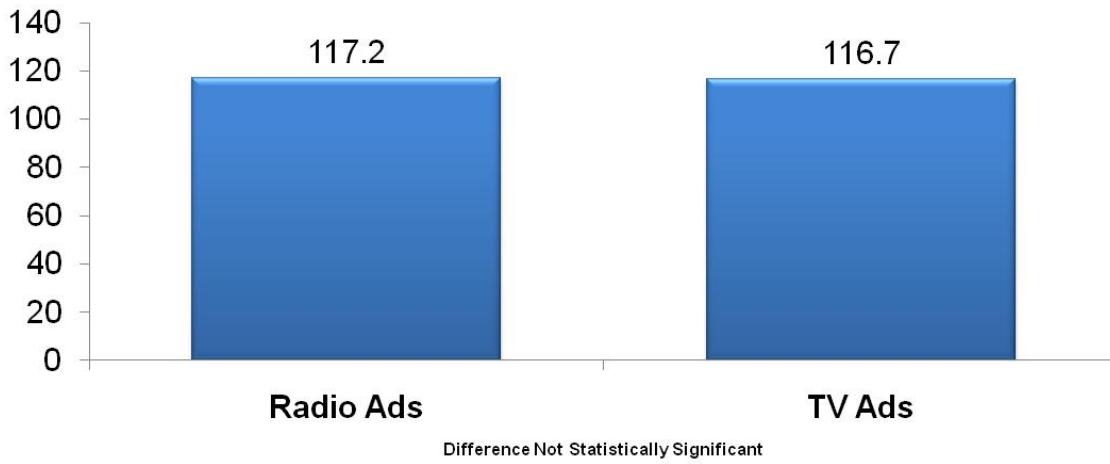


Figure 2
Negative Emotions
Average EMG Scores, All 16 Campaigns

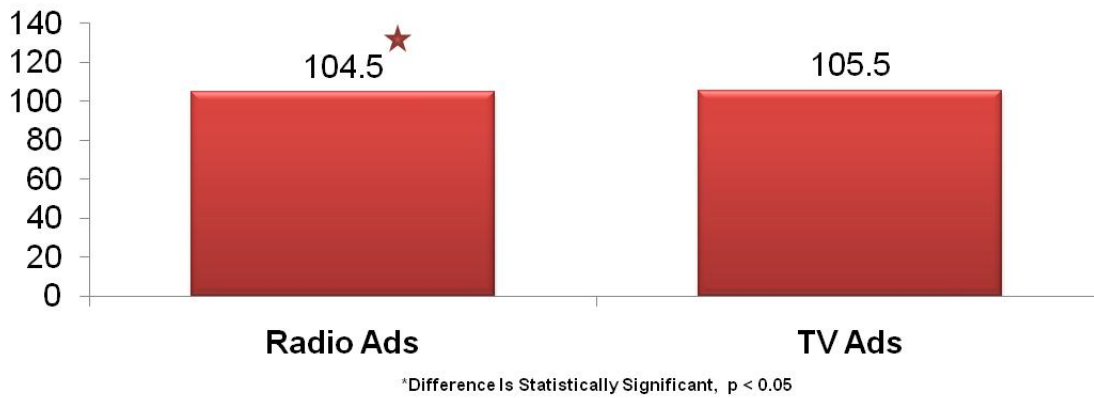
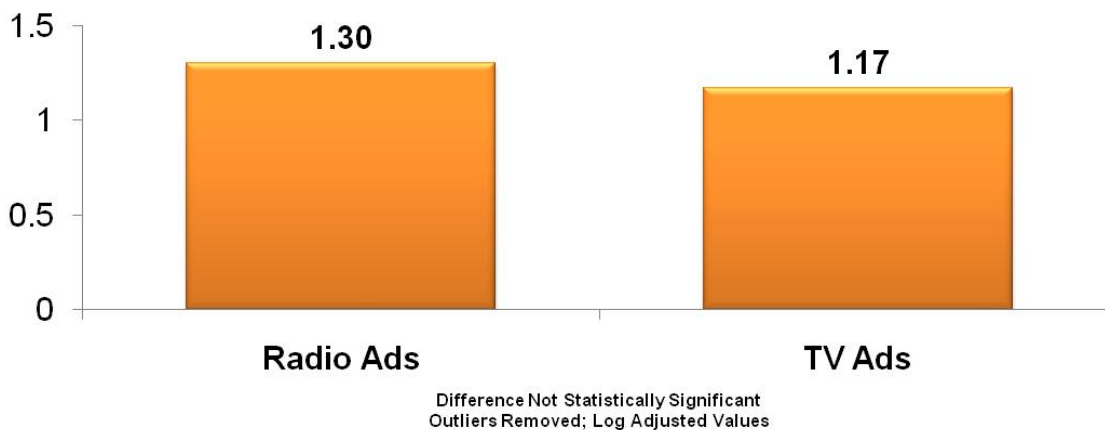


Figure 3
Overall Excitement
Average Skin Conductance, All 16 Campaigns



As you can see, the 16 radio ads in this study delivered an emotional impact that was equivalent, overall, to their television counterparts. The positive EMG scores were just as high, radio performed better on the negative score on average, and the total excitement (arousal) levels were essentially the same. (In fact, the overall excitement levels measured by skin conductance appear to be higher for radio, but the numbers tell us this still isn't quite a statistically significant difference.¹¹)

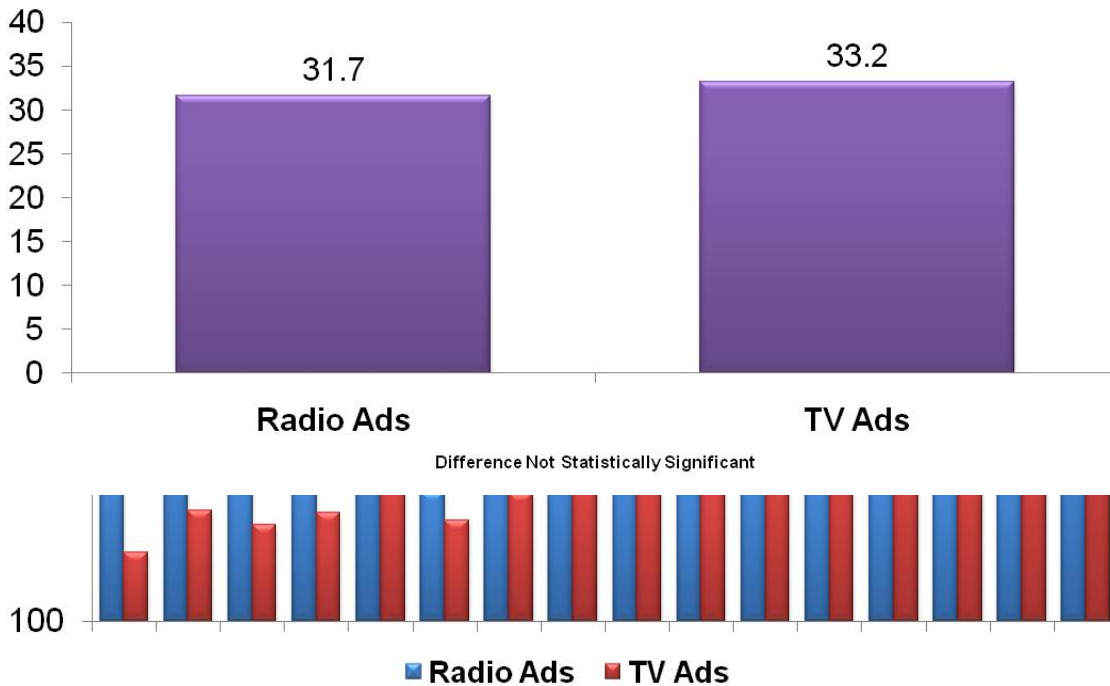
Of course, achieving emotional impact isn't especially useful if there's no benefit to the advertiser. One way to examine that linkage is to see if brand recall occurred along with the emotional activation.

We recognize that brand recall is a limited measure of "advertiser benefit." But across 16 campaigns, we think it's an appropriate tool. Each of these campaigns had a different purpose, so the precise measures of intended impact will vary from advertiser to advertiser. But getting awareness of the brand is a likely precursor for other, more refined consumer effects, and we think it's the one that is reasonable to examine across all these disparate marketing efforts.

Gallup & Robinson uses a straightforward measure of unaided brand recall after these in-person exposures, and as you'll see in Figure 4, there was no statistically significant difference here either: The percentage of people that could recall the advertised brand after these hidden-purpose exposures was essentially the same for radio and television. (Remember again that this was not a traditional copy test; the respondents were asked to evaluate radio or TV programs, and only afterwards were they asked to recall the ads.)

¹¹ That's because there's quite a bit of variance among participants on this skin conductance measure. Therefore, it takes more difference between averages before we can be sure the averages for overall excitement are truly different.

Figure 4
Overall Brand Recall
Pct Unaided Recall, All 16 Campaigns



From this we conclude that the equality of emotional impact for radio and television translates into equality of advertiser benefit, at least as far as we can measure that with unaided recall.

In short: **Radio ads—at least the 16 that we tested here—deliver effective emotional impact for advertisers just as well as the corresponding television ads, when measured with highly sensitive physiological techniques.**

Variations by Ad Campaign: 4 Radio Ads More Positive

Though we observed equality of emotional impact overall, it won't surprise readers that there were some variations across campaigns. Among the 16 different pairs of radio and TV ads, we did see several in which radio delivered stronger emotional impact than television. And we saw one in which the reverse was true.

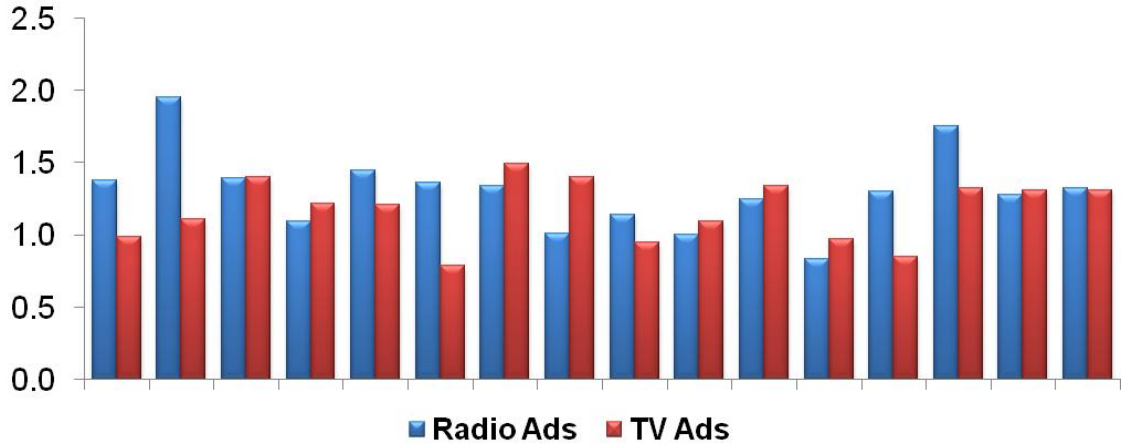
This variation is clear when we examine the data for Positive Emotions—the positive EMG scores for each of the individual ads. As you'll see in Figure 5, there were several campaigns in which there was a meaningful difference between the radio score and the television score.¹² In fact, **four of the radio campaigns showed EMG scores that were significantly higher than the TV campaigns (at $p \leq 0.05$), while only one television ad was significantly higher than its radio counterpart:**

In addition, there was similarity in how those campaigns performed on our other key measures. For example, the radio campaigns which showed significantly better Positive EMG scores compared to TV also demonstrated generally higher excitement (arousal) scores for

¹² Keep in mind that there were about 40 respondents for any given radio or TV ad, since each of the 160 participants was first assigned specifically to radio or TV, and then each participant was exposed to half of the 16 ads for that medium.

radio vs. television, although the correlation wasn't perfect (Figure 6, significance test data in [Appendix B](#)):

Figure 6
Overall Excitement by Campaign
Skin Conductance Scores



Thoughts for Future Analysis

Clearly, we've only scratched the surface. The more we work with this study's database, the more we appreciate what a deep resource we have at our disposal.

Therefore, we fully expect to generate more white papers and analyses over the rest of 2007. Among other topics, the following ideas seem like logical next steps:

1. **An evaluation of the effect of program environment.** This study was designed to have ads evaluated in a programming context, but we have not yet *controlled* for that environmental effect. We accomplished our original objective—to make sure that participants were reacting to ads within a more realistic environment of a reasonably well-liked program. But it's fair to ask whether variations in that environmental effect had any impact on the ad scores.

Fortunately, we do have EMG and skin conductance scores available for the time periods immediately before the ad pods ran. That will allow for a new analysis of how "program engagement" immediately before the ad clusters may relate to the ad scores themselves.

2. **More granular effects.** So far, we've only examined the individual campaigns at the level of overall averages. But we seek more learning about how radio and TV ads work *differently*. To do that, we need to examine the moment-by-moment traces of each commercial's emotional responses, to see where each is affecting viewers and listeners, and to understand how the two media are really working at a more granular level. Yes, there are caveats about generalizing from these 16 campaigns; nevertheless, we want to keep learning about "how radio works."
3. **Some assessment of demographic variations.** While sample sizes in this study aren't huge, our design did ensure that at least forty people saw each ad. That may allow for *some* assessment of whether our findings varied by, for example, young adults (18-34) vs. older (35-54).
4. **Linking of emotional peaks to branding moments.** With similar caveats about the number of campaigns, we think it's important to make sure that "emotional impact" and "branding impact" are linked to each other. We saw broad evidence of that in the current analysis by measuring emotions and recall simultaneously; but to make sure that this type of research on emotions is truly useful, it's important to know that when emotional impact occurs, that impact is somehow of value to the advertiser's brand. That requires a more granular analysis which we could explore in subsequent reports.

Those are some of our thoughts about where to go from here. We welcome readers' thoughts and suggestions as well.

Conclusions

This study was designed to assess how well radio ads can generate emotional responses and engage with consumers, compared to television ads. And it did so using advanced methods that measure emotional activation in ways that don't require verbal responses.

After evaluating 16 different real ad campaigns within actual programming, one conclusion now seems clear:

Radio ads have emotional impact on consumers that is equal to that of television ads.

The 16 radio campaigns in this study generated emotional levels just as high as their TV counterparts on average. And at the individual campaign level, there were four radio campaigns showing significantly *higher* emotional impact than their TV counterparts, compared to only one TV spot with higher emotional levels.

When these effects are factored into a Return on Investment model, we think the implications are even more striking. If the emotional effects per ad are equal and the spot costs are more efficient for radio (relative to TV), then the Emotional Return on Investment must almost certainly be in radio's favor.

We think there's much more to be learned. During the rest of 2007, we'll explore how the program environment interacts with the emotional impact of the ads within. And we plan to better understand the nuances of how radio's emotional impact is *different* from TV's, even when the overall levels are similar. We outlined some specific ideas for additional analysis above.

But in the meantime, we believe these new findings are consistent with the Radio Ad Lab's past research about radio. This medium connects with its listeners in unique ways, and it provides an unusually receptive advertising environment. In particular, radio listeners do have an emotional bond with their programming, and it's now clearer than ever that radio *advertisers* can benefit from that connection.

Appreciation

The Radio Ad Lab would like to acknowledge the innovative work of Gallup & Robinson on this project. In particular, we'd like to recognize the following:

- Scott Purvis is President of Gallup & Robinson, Inc. With twenty years experience in advertising research, he works directly with leading companies in packaged goods, technology, pharmaceuticals, automotive and financial services. He is the principal researcher on many published and proprietary studies about advertising effectiveness and attitudes towards advertising. He is also the author of *Which Ad Pulled Best?*, now in its ninth edition, and a patent-pending holder on CERA, a physiological technique for measuring emotions-based response to advertising.
- Richard L. Hazlett, Ph.D., is Senior Scientist at Gallup & Robinson. Dr. Hazlett is also an Assistant Professor at Johns Hopkins University School of Medicine where he conducts research on the development of advanced techniques for measuring emotion and is extensively published in the field. He also maintains a private consulting practice and has applied his emotion measures to help companies understand how the consumer is affected by their products and advertising. Dr. Hazlett received his Ph.D. in Clinical Psychology from Illinois Institute of Technology in Chicago, and completed a two-year fellowship in psychophysiological and emotion research at Johns Hopkins.

As always, we're grateful to the members of the Radio Ad Lab Research Committee for their volunteered time and expertise for this and all of our projects. The outstanding advertiser, agency, and broadcast researchers who were members at the time of this paper are listed on the following page, and current members are always posted at our website at <http://RadioAdLab.org/committee.html>.

The funders and Board of the Radio Ad Lab should receive special acknowledgement for all our research. Continuation of this research program represents a major investment and a very public commitment to quality research about this medium, and we're grateful for their ongoing support. The Funding Partner companies are listed in the following section, and the current Board is listed at <http://RadioAdLab.org/board.html>.

Finally, the Radio Ad Lab would like to acknowledge the contributions of research consultant Jim Peacock of Peacock Research, Inc. His direction, insight and guidance have been a critical asset to this project. Among other things, Mr. Peacock is the primary author of this report. More information about Mr. Peacock and his work are available at <http://PeacockResearch.com>.

Radio Ad Lab Research Committee as of June 2007

Agencies

Alyce Abbe (Carat)
Judy Bahary (GM Planworks)
Shari Anne Brill (Carat)
Michele Buslik (TargetCast tcm)
David Ernst (Initiative)
Matt Feinberg (Zenith Media)
Janice Finkel-Greene (Initiative)
Paul Hunt (Burrell Communications)
Lucilla Iturralde-Rachev (The Vidal Partnership)
J. P. James (UniWorld Group)
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Helen Katz (Starcom MediaVest)
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Michael Orgera (Universal McCann)
David Shiffman (Starcom MediaVest)
Natalie Swed Stone (OMD)
Kim Vasey (mediaedge:cia)
Jeff Voigt (Mindshare-Team Detroit)
Matthew Warnecke (MediaCom)

Advertisers

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Jeni Cramer (At-Large)
Mark Dorrill (Home Depot)
Kaki Hinton (At-Large)
Betsy Lazar (General Motors)
Ramon Portilla (Wal-Mart)
Glenn Roginski (GlaxoSmithKline)
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Kathleen Bohan (Univision Radio)
Jess Hanson (Clear Channel Radio)
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Charlotte Lawyer (Consultant)
Jerry Lee (WBEB-FM, Committee Chair)

RAB

Mary Bennett (Committee Vice-Chair)
Sean Clark
Andy Rainey

Networks

Paul Bronstein (Westwood One Radio Networks)
Barry Feldman (American Urban Radio Networks)
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Funding Partners

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Beasley Broadcast Group
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Buckley Broadcasting Corporation
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CBS Radio
Citadel Broadcasting Corporation
Clear Channel Communications
Commonwealth Broadcasting
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Greater Media, Inc.
Hall Communications
Hubbard Broadcasting Corporation
Inner City Broadcasting
Interep
Jones MediaAmerica
Katz Radio Group
Morris Network, Inc.
Premiere Radio Networks
Regent Communications, Inc.
Renda Broadcasting
Saga Communications
Univision Communications, Inc.
WBEB-FM
Westwood One Radio Networks

Appendix A: Sample Characteristics

Demographic	Radio Sample Pct	TV Sample Pct
Gender		
Male	51	48
Female	49	52
Age		
18-34	52	49
35-54	48	51
Hh Income		
Under \$40K	26	29
\$40K-74K	40	35
\$75K+	34	33
Race/Ethnicity		
Black/African-American	14	12
Hispanic/Latino	12	6

Appendix B: Specific Data Values

Positive Emotion Scores (Zygomatic EMG)				
	<u>Radio</u>	<u>Television</u>	<u>Difference</u>	<u>Signif. Level</u>
Average:	117.18	116.67	0.51	0.754
Campaigns:				
1	117.76	107.50	10.26	0.000 *
2	120.21	112.08	8.13	0.001 *
3	115.78	110.52	5.26	0.045 *
4	116.74	111.78	4.96	0.005 *
5	120.36	116.14	4.22	0.178
6	114.02	111.02	3.00	0.182
7	114.88	113.91	0.97	0.532
8	117.19	116.54	0.65	0.745
9	116.74	116.23	0.51	0.707
10	115.12	115.37	-0.25	0.848
11	117.03	119.59	-2.56	0.331
12	116.37	119.12	-2.75	0.188
13	116.53	120.34	-3.81	0.074
14	116.62	120.56	-3.94	0.215
15	117.71	122.59	-4.88	0.143
16	121.88	133.43	-11.55	0.023 *

Negative Emotion Scores (Corrugator EMG)				
	<u>Radio</u>	<u>Television</u>	<u>Difference</u>	<u>Signif. Level</u>
Average:	104.48	105.51	-1.03	0.038 *
Campaigns:				
1	104.02	103.17	0.85	0.526
2	104.49	104.64	-0.15	0.908
3	104.39	103.31	1.08	0.576
4	104.59	107.58	-2.99	0.082
5	105.12	106.07	-0.95	0.695
6	105.95	103.08	2.87	0.163
7	105.19	103.25	1.94	0.302
8	103.26	107.01	-3.75	0.035 *
9	105.86	105.69	0.17	0.969
10	103.65	105.43	-1.78	0.216
11	104.18	105.32	-1.14	0.413
12	104.44	106.60	-2.16	0.175
13	106.30	106.16	0.14	0.955
14	102.32	106.71	-4.39	0.003 *
15	103.54	106.54	-3.00	0.084
16	104.37	107.56	-3.19	0.195

Overall Excitement (Skin Conductance) Levels

	<u>Radio</u>	<u>Television</u>	<u>Difference</u>	<u>Signif. Level</u>
Average:	1.30	1.17	0.13	0.144
Campaigns:				
1	1.38	0.99	0.39	0.151
2	1.95	1.11	0.84	0.005 *
3	1.39	1.40	-0.01	0.810
4	1.09	1.22	-0.13	0.288
5	1.45	1.21	0.24	0.450
6	1.36	0.79	0.57	0.048 *
7	1.34	1.49	-0.15	0.474
8	1.01	1.40	-0.39	0.166
9	1.14	0.95	0.19	0.684
10	1.00	1.09	-0.09	0.739
11	1.25	1.34	-0.09	0.776
12	0.83	0.97	-0.14	0.633
13	1.30	0.85	0.45	0.107
14	1.75	1.32	0.43	0.027 *
15	1.28	1.31	-0.03	0.823
16	1.32	1.31	0.01	0.979

*Asterisks denote differences that are statistically significant at the 95% confidence level (or greater).

(Outliers removed. Scores are Log adjusted.)

Appendix C: A Note About Sample Sizes

A note about the sample sizes involved in this study:

Gallup & Robinson and other research scientists have found that EMG measures are relatively sensitive, and that smaller sample sizes can yield high statistical precision.

For example, in this study, even samples of $n = 40$ were sufficient to detect statistically significant differences between individual campaigns at the 95% confidence level when the EMG scores differed by only 5 percentage points (above the baseline of 100).

Now let's contrast that with typical questionnaire survey results.

Suppose we had two hypothetical simple random samples, and we asked each group a question with a simple yes/no response. Let's say our hypothetical survey resulted in one group showing 15% saying "Yes" to that question, and the second group indicated 10% saying "Yes," also a five percentage point difference.

Again, assuming true simple random samples, those two groups would have to have been slightly over 300 people in size for us to be 95% confident that the five percentage point difference in responses was "statistically significant" (i.e., that the difference was something other than sampling error).

How can our groups of 40 people in the current study be more powerful than simple random samples?

Part of that is the effect of "repeated measures." Our EMG scores are actually averages of repeated EMG measures taken over many moments in time. Even the single-commercial scores represent the averages of many moments of measurement during the duration of each commercial. That has a stabilizing effect on these data. (For users of Arbitron data, you may remember that Average Quarter Hour ratings benefit from a similar statistical effect.) And of course, EMG measures are not simple yes/no questions; these are continuous variables, which have different statistical properties.

The bottom line is that these sample sizes are quite reasonable for this type of research, and readers should feel comfortable with the conclusions drawn from it.

We do of course continue to state caveats about the number of *campaigns* in the study; these 16 pairs of ads obviously can't represent all of advertising. But for each campaign, and for the averages across campaigns, we believe these samples provide reasonable statistical power for our measures.