UNCOVERING EMOTION

USING NEUROMARKETING TO INCREASE AD EFFECTIVENESS

by Dr. Horst Stipp & Robert P. Woodard

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INSIGHTS FROM THE NEUROSTANDARDS COLLABORATION PROJECT

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Foreword

The ARF NeuroStandards Collaboration Project: The Beginnings of a Landmark Journey

by Robert Barocci, ARF President/CEO

October 2011

Last year, the ARF undertook what I will call an "innocent" initiative designed to bring some clarity to the application of the burgeoning field of neuromarketing research. Our advertiser members were asking about it in increasing numbers—Is it valuable? Whom should I hire? What can it add to what I am doing now? Am I losing competitive advantage if I don't use it?

Frankly, we were pleased to see and hear the high level of advertiser interest in using the field of neuroscience to help make better advertising. Pleased, but not surprised.

I have spent 30-plus years in the advertising industry and was asked literally hundreds of times by advertiser clients, "What do I need to do differently to take my advertising from good to great?" There was no formula, no magic bullet. Just the recognition that less than 20 percent of advertising created can be classified as "great"—pretty grim, I would say, but not true of the Leo Burnett Company during its Golden Age of the '50s, '60s, and '70s (we thought that close to 100 percent of the ads we did were great!)

All good stuff, but what really excites me about this learning is the high degree of hope that this first-phase initiative has given me about the possibility of intelligently and creatively using neuroscience and neuromarketing measurement companies to unlock insights that will greatly improve your company's rate of success in creating great, not merely good, advertising.

And that is what is so exciting about the first phase of this ARF NeuroStandards initiative, which this white paper will introduce to you. We learned a lot of useful things that will help advertisers tackle this new opportunity for learning how to make more effective ads.

The eight intelligent, thoughtful neuromarketing measurement companies that participated in our initiative are truly onto something—but harnessing this potential and unlocking the creative insights that will lead to greatness is not easy. They are well within reach, however, if you study and apply the learning approaches not just from this white paper and the companies that made it possible, but also from the literature, such as the seminal "How Customers Think" by Gerald Zaltman.

And pay attention to—or, better yet, participate in—the ARF's follow-up initiative, "How Advertising Works Today" (NeuroStandards 2.0), which will clarify the roadmap by evaluating all types of methods, not just neuromarketing approaches, that can help us improve advertising effectiveness.

Here's to great advertising! We strongly believe it is still the most powerful and ROI-effective way to build sales and profits.

Introduction and Overview

The ability to evoke an emotional response from an ad is one of the most prized arrows in the creative department's quiver. To measure this effect, brand managers have long sought better ways to understand emotion in their advertising effectiveness research. Recent years have brought huge advances in the study of the brain and have demonstrated that emotion is not merely an arrow in the advertiser's quiver, a color in a palette, or some kind of mysterious patina on an otherwise functional piece of furniture. It is the foundation for thought and action. It is clear that emotion plays more than a cameo role in driving consumer response and delivering marketing impact.

The human mind is not well equipped to probe its own depths, nor to explain itself to itself, let alone to others. **Many of the approaches used in traditional advertising research are focused on rational, conscious processes and are, therefore, not well suited to understanding emotion and the unconscious.** Regardless of our comfort level, we have to explore approaches that are fundamentally different—indirect or passive approaches to measuring and to understanding emotion and its impact.

Today it is clear that in order to understand and actually manage all drivers of ROI in advertising creative, marketing organizations must go beyond traditional ways of testing creative and begin the long and sometimes uncharted journey to explore the elusive yet decisive force of emotion. There is simply no choice. In the long run, any significant and lasting improvement in ROI for advertising and brand-equity development depends on it.

It is this realization that made the ARF's NeuroStandards Collaboration a must-participate initiative for major advertisers and media companies. For some, traditional advertising research and tracking measures had not been successful in explaining the variation in advertising-driven incremental sales across varying executions and campaigns. For others, the opportunity for finding new, even better ways to improve marketing messages is an exciting prospect.

With its broad range of neuromarketing technologies and its multiple levels of evaluation by objective experts in the relevant disciplines, **the NeuroStandards Collaboration Project was designed to help the industry learn how best to apply the capabilities of neuromarketing to real marketing issues and decisions.**

The experts identified some sound capabilities and promising directions in, as well as some limitations and areas of disagreement with, the neuromarketing approaches, reports, and interpretations that they reviewed. The project addressed users' high expectations of precision and certainty, resulting largely from the elaborate technologies and sophisticated vocabularies of neuromarketing, as well as some strong claims. The experts counseled that, in order to qualify as bona fide advertising science, neuromarketing approaches—like any emerging research methodologies—generally required further validation, clearer definitions, more documentation, and more statistical precision. Of course, this is also true for many other established methodologies.

While the ARF did not conclude that researchers should abandon traditional measures, we did conclude that it would be competitive folly for advertisers to defer learning about neuromarketing research "until things in neuromarketing settle down a bit." The payoff from great advertising is simply too big, and the potential contribution that neuromarketing could make toward great advertising is too significant.

Even without tests of statistical significance and with key debates unresolved, advertisers should not be afraid to use neuromarketing measures qualitatively, especially early in the creative process, to identify opportunities and pitfalls in storylines, messaging, and key branding moments. Conducting studies that combine neuromarketing with deep qualitative interviews will only augment the rewards. Does this kind of research provide definitive answers with known error ranges? Not yet. Can it provide deep, useful understanding—not available through traditional techniques—of the otherwise elusive world of consumer emotion? Absolutely.

It is in this spirit that we present this white paper, an overview of the first phase of this project. We strongly encourage you to read the entire paper to gain the greatest benefit from this evaluation of neuromarketing research. The following two charts summarize some of the key insights from this project and are provided as a guide for users of the research.

The summit of great advertising is becoming more clearly visible in the distance. The follow-up ARF project, NeuroStandards 2.0, is an exciting initiative that puts both traditional and neuromarketing methods to the test in search of the real drivers of advertising success in the marketplace. We encourage you to become involved in the initiative. In the meantime, find some constructive way to engage with neuromarketing methods.

Do what you can, but, by all means, do something!

Summary of Research Objectives and Suggestions for Research Methods

Research Objectives	Methods
Comprehension/ Understanding of Messages	Traditional methods assess conscious comprehension well. Neuro measures of arousal and valence can complement and identify potential problem spots in story and message.
Purchase Intent	Traditional methods can be sufficient if properly framed and validated. Some neuroscience methods (e.g., fMRI) might provide useful complementary measures on emotional response.
Focus of Visual Attention	Eye tracking appears to be the best method.
Memory (Recall, Recognition, Implicit Memory, Long-term Memory)	Traditional methods good at measuring explicit (conscious) recall/recognition. Some neuroscience methods can assess implicit and long-term memory and provide more detail (identify key moments that were not processed explicitly).
Arousal, Strength of Emotional Response, Emotional Intensity	Biometric and neurological methods generally have advantage over traditional methods.
Direction of Emotion/Valence	Neurological methods/facial coding can be more accurate than traditional methods, especially in assessing "branding moments" (however, expert reviewers emphasize limits of some methods).
Engagement/Personal Relevance/ Emotional Engagement	Concepts need to be clearly defined. With appropriate definition, many (if not all) neuroscience methods have advantage.
Social Desirability	Neuroscience methods generally avoid potential cognitive biases (like social desirability) that are problematic for many traditional methods.

Establishing Neurostandards: Summary of Issues for Discussion between Vendors and Data Users

Issues	Key Questions
Sample	What number of respondents is adequate for the research purpose? What is the best way to draw the sample? Are there limitations/biases regarding sample composition?
Design	Which is the best design, given the specific purpose of the research? Are experimental features incorporated into the design? Should the research be based on only one measure, or should it use a multi-measurement approach?
Data Collection	Who is supervising and conducting the research and measurement? How are the researchers (or coders) trained? Which equipment/software is being used, and is information on quality, maintenance, and reliability available?
Documentation	Is information on data collection and interpretation procedures provided, or are these "black boxes"?
Validation	Exactly how are the constructs (e.g., "attention," "memory") defined? Are both the research approach and constructs validated through neuroscience or through marketing studies? Are reliability studies being conducted?
Statistical Significance	Which statistical-significance tests are performed? Is it clear which findings are significant, which are directional, and which are neither?
Reporting of Findings	Which aspects of the findings are directly derived from neuroscience research, and which are interpretations and hypotheses? Who interprets the data?

PART I
Neuromarketing and the ARF NeuroStandards Collaboration Project

1.1 ARF NeuroStandards Project Summary

This white paper reports on the first phase of the Advertising Research Foundation's (ARF's) NeuroStandards Collaboration Project, which was conducted in 2010 and early 2011.

The NeuroStandards Collaboration Project (Neuro 1.0) was initiated by the ARF in response to inquiries from many of its members about the role of biometric and neuroscientific methods in marketing research. While many advertisers and media providers are excited at the prospect of finding new methods that promise a better understanding of unconscious processes and the emotional drivers of responses to their messages, the complexity of the science underlying these methods makes it difficult to assess their validity and decide which approach would be best for their objectives.

After consultation with its members, the ARF developed a proposal to conduct a collaborative project designed to meet the advertising industry's need for an independent assessment of the issues surrounding the application of neuroscience to marketing research. The project's main goal was to increase transparency, and thereby help members become more informed users of these methods. In fact, we decided not to offer a typical executive summary in this report, because we feel that condensing the complexities of the issues into a few bullet points would not serve ARF members well.

The ARF invited vendors of neuromarketing research to take part in the project, and ARF member companies were invited to sponsor it. **In short, the project contained three elements: a research study, a scientific review, and a "NeuroStandards Retreat," at which the findings of the evaluation were discussed with vendors and sponsors. The project's goal was described as developing "neurostandards" that would support the development of this new marketing research discipline.**

The reports of the expert reviewers, the evaluations of the Senior Review Panel, and the ARF's recommendations for users and vendors of neuromarketing research are detailed in this report.

. . . the ARF wishes to express gratitude for the openness and the spirit of collaboration shown by the participating vendors, the support of the sponsors, and the help of all those who have contributed to the project and this report. . . .

- The project's research study was designed to compare the various vendors' methods and research reports. Vendors were asked to obtain data on a number of commercials for a variety of product categories using the design and the procedures they would normally use in a study of this type.

- The scientific review process involved independent academic reviewers chosen for their special expertise in the specific methods used by the vendors. The expert reviewer reports were provided to a Senior Review Panel. The Senior Review Panel consisted of academics with general expertise in cognitive neuroscience, communications, and marketing.

- At a NeuroStandards Retreat in January 2011, the senior reviewers discussed their assessment of the critical issues of neuromarketing with both vendors and sponsors.

Eight vendors from across three continents agreed to take part in the project. These vendors incorporate a wide range of biologically based methods, including biometrics, facial coding, EEG/SST, fEMG, and fMRI; they are: Gallup & Robinson, Innerscope Research; Mindlab International; MSW/LAB; NeuroCompass; Neuro-Insight; Sands Research, and Sensory Logic.

This phase of the NeuroStandards project was supported by eight Gold Sponsor brands: American Express, Campbell Soup Company, Clorox, Colgate-Palmolive, General Motors, The Hershey Company, MillerCoors, and JPMorgan Chase. There were four media Gold Sponsors, each major TV networks: ESPN, MTV Networks (now Viacom Media Networks), NBCUniversal, and Turner; and four Silver Sponsors: Dentsu (agency), Publicis Groupe (agency), A&E (TV network), and Warner Brothers (media company).

Preliminary insights from this phase of the project were presented and discussed at the ARF Re:think conference in March 2011. On the one hand, it was agreed that neurological and biometric marketing research has the potential to provide important and valuable new insights for the evaluation of commercials, TV programming, and other visual stimuli regarding attention/involvement, emotional reactions, and implicit memory. Still, it is important to be clear about both the strengths and the limitations of the research and to what extent findings are based on direct neurological science evidence or on interpretation. Both the measurement (especially when moving images, rather than static images, are analyzed) and the human brain are quite complex, as is the relationship between the two. As a result, data require expert interpretation.(1)

The academics recommended—and vendors agreed—that neuromarketing research should complement, not replace, established methods that have been found to be valid and predictive of in-market business results. At the same time, the ARF pointed out that a critical evaluation of methods, procedures, and findings should not be restricted to neurological research: Quality issues apply to traditional methods in the same way they apply to neuromarketing research. **Standards and best practices are essential for all research projects, no matter which methods are used.**

Some of the trade press reports and blogs about the Re:think presentation ignored the complexity of the issue and misinterpreted its conclusions as discouraging the use of neuromarketing research, despite the fact that this project was clearly designed to provide information that would help apply neuroscience and biological methods to marketing communication issues more effectively. Many ARF members, as well as sponsors and vendors, have since expressed the opinion that this project is helping neuromarketing research produce more valuable insights for advertising, branding, and other marketing research projects. As a result, the ARF has formed a forum to support advances in neuromarketing research and continue the exploration of the role of emotion in advertising. Further, the ARF is developing a second phase of this project, Neuro 2.0: How Advertising Works Today, to continue the exchange of ideas and insights that will help advance advertising research and benefit users as well as vendors. That is also the purpose of this white paper.

(1) Because activity in the human brain is so complex, especially when moving images are being processed, measurement of such activity is likewise complex. In order to simplify this complexity, many vendors apply proprietary algorithms that yield new composite measures. Developing such algorithms requires interpretation and judgment on the part of the vendor. Likewise, the application of these measures to issues surrounding consumers' processing of advertising requires interpretation and judgment by the vendor. Finally, the vendor must synthesize all these data and interpret their implications for the specific marketing issue at hand. (See also section on "Validation of Measures and Constructs" in this paper.)

1.2 The Evolution of Neuromarketing

The application of biometric and neurological science and research to marketing research is not a new or recent development. Ever since marketers employed research to assess and increase the power of their messages and communications, there was a desire to go beyond verbal reports and find out what consumers were thinking and, even more intriguing, what their unconscious reactions might be.

While there were always occasional reports on the use of research tools to measure brain activity for marketing purposes, the topic gained prominence in 2003 when Read Montague, then a neuroscientist at Baylor College of Medicine, conducted a series of experiments—known as the "Pepsi Challenge"—using neuroscience technology to study brain activity to explore consumers' beverage preferences. Since then, there has been a large increase in the application of biometric and neurological research methods to marketing objectives. The number of companies doing such research has increased, and many have seen substantial growth. Further, the variety of methods used by neuromarketing companies has increased. Finally, there have been a number of books and papers addressing marketing and neurological research.

It appears that this rapid increase in interest and use of biometrics and neurological methods is fueled by five developments:

- *Advances in neurological science*
- *Technological advances in neuroscience methods and tools*
- *Marketers' growing interest in consumers' unconscious and emotional reactions to marketing messages and better measures of emotion, arousal, and implicit memory*
- *A competitive marketplace in which more effective advertising and more accountability of marketing performance are demanded*
- *Growing evidence for successful applications of neuroscience methods to marketing*

Neuroscience Advances

The last decade has seen tremendous advances in neuroscience and related fields, such as social psychology, psychiatry, and experimental psychology. Neuroscientists are conducting more studies on issues of interest to marketers, such as the regulation of emotions, the understanding of reward systems, and decision-making processes. At the same time, there are still ongoing debates and lack of agreement among neuroscientists about many aspects of this discipline and its research methods. As detailed in the next section, the methods used for neuromarketing research are (or should be) based on science, but they also need to be applicable in the marketplace. The advances in the field have made it possible to achieve more conclusive insights, but neuromarketing research is not free from debate and controversy about which method is more accurate, more valid, or best suited for a given research objective.

Advances in Technology

Technological advances in methods, equipment, and computational tools are another important factor promoting the growth of neuromarketing research, as they allow less intrusive studies, as well as more detailed information about the brain's response to stimuli. These technological advances are continuing. For example, several neuromarketing companies are developing more portable measuring instruments that allow research in a variety of locations—beyond laboratory and focus group settings.

Role of Unconscious Processes and Emotions in Advertising

Despite all these advances in theory and research practices, neuromarketing research would not be growing as much as it has if marketers were satisfied with their existing methodologies and felt that verbal reports about recall, liking ads, and purchase intent provided the whole story about consumer reactions.

The importance of emotional reactions and emotional engagement has been a major topic at ARF conferences and workshops over the last decade. (For example, an AAAA/ARF Task Force issued a white paper on emotional responses to advertising in 2007: "On the Road to a New Effectiveness Model: Measuring Emotional Responses to Television Advertising"). It seems safe to say that most marketers believe that emotions play an important role in purchase decisions and in determining the value of a brand to consumers. In fact, many marketers would probably agree that emotional processes are often more important than rational decision-making processes. Verbal reports can be poor descriptors of emotions, since people can rarely explain their emotions accurately and may not even be aware of them.

As a result, there is a lot of interest in new methods that promise to shed light on unconscious processes and emotional drivers of consumers' decisions and attitudes. Similarly, neuromarketing research provides new—and potentially more accurate—ways to assess arousal and "nonconscious" or implicit processing of information.

Competition and Accountability

Another factor enhancing the importance of neurological methods in marketing is the competitiveness of the marketplace. One can still make a pretty safe bet that someone, during the course of a marketing conference, will use the more-than-a-century-old "half of my advertising money is wasted" quote. Even if most marketers think that they are doing much better than that, their bosses may not. As a result, there is pressure to optimize advertising effectiveness and accountability. Again, neuromarketing research provides new ways to contribute to those goals.

Neuromarketing Case Studies

Finally, as neurological and biometric methods are now being used in marketing research quite frequently, there has been growing evidence for successful applications. Some of these reports are anecdotal, but there were a number of presentations at ARF conferences in which research companies and their clients reported on projects that used neuromarketing research methods to gain learning that marketers find useful for a variety of objectives, such as identifying superior creative executions and documenting the impact of program environment on attention to and evaluation of commercials.(2)

(2) Interest in neuroscience is not limited to marketing. There is also a lot of discussion—and controversy—about the role of emotions in voting behavior and the role neuroscience might be playing in that field. Further, neuroscience methods are also entering the field of lie detection, and there is a debate about the reliability of those methods.

1.3 Origin of the ARF NeuroStandards Collaboration Project

As stated, a wide range of biometric and neuro-scientific methods have found applications in media, marketing, and advertising research. Advertisers and media providers are clearly excited at the prospect of more thoroughly understanding the unconscious and emotional drivers of their content through new tools and methods that transcend verbally dependent response data. Despite that these claims of successful applications of neurological and biometric methods have further stimulated interest in and uses of such methods, ARF members identified an issue they regarded as problematic: With the complexity of the science underlying these methods, it is difficult for marketers to decide which approach is best for their objectives.

Moreover, despite the reported successes, there are also substantive questions associated with the use of these methods. Vendors often make strong claims about the measures they use, but client researchers cannot validate such claims. In contrast to established research methods, most client market researchers do not have the training or background to assess the vendors' quality and compare the scientific basis of the various methods. In addition, the academic reviewers pointed out that many vendors have not published either explanations of their methods or descriptions of their results in peer-reviewed journals examined by independent experts.(3) This makes it difficult—even for those familiar with the science—to properly evaluate the claims of such vendors.

In short, the ARF was asked by advertising, media, and market researchers who lack expertise in the neuroscience domain to help them evaluate the opportunities that the new neuromarketing methods offer. The NeuroStandards Collaboration Project was initiated by the ARF in response to questions, concerns, and frustrations voiced by ARF members. The project was designed to add a level of transparency to the growing landscape of "neuro-methods". In effect, the project presented an open invitation to all vendors in the neuromarketing space to submit their work for critical peer scrutiny.

(3) The Literature section of this white paper lists papers published in peer-reviewed journals by vendors participating in this project.

1.4 Project Design

The ARF invited vendors of neuromarketing research and ARF member companies, both marketers and media companies, to take part in the NeuroStandards Collaboration Project. The project's goal was to conduct a study that allowed a comparison of different neuromarketing research methods and to have independent academic experts evaluate the methods and claims about the findings.

The marketers who joined the project as Gold Sponsors were asked to supply finished TV commercials to be tested in the study, and they were able to review the findings on their commercial with the participating vendors. On the basis of sponsor feedback requesting that results about specific commercials be treated confidentially, it was decided that such data would not be shared with other sponsor participants. All participants signed a nondisclosure agreement (NDA).

The project took place over a nine-month period, following its launch on September 28 during Advertising Week 2010. To assist with the project—especially the recruitment of independent scientists—the ARF recruited Duane Varan, Ph.D., executive director of the Interactive Television Research Institute at Murdoch University in Australia and chief research officer of the Disney Media and Advertising Lab in Austin, Texas. In January 2011, Horst Stipp, Ph.D., joined the ARF team as a leader of this project.

The ARF's NeuroStandards team, in collaboration with the Gold Sponsors, designed an original research study with the goal of comparing the various vendors' methods, claims and research reports. The vendors were asked to sample 18- to 49-year-olds (the main target demo in U.S. TV) and try to match the Census regarding sample composition. Since vendors were asked to otherwise use the design and procedures they would normally use in a study of this type, and chose the sample size to be used for their particular methodology.

Research suppliers collected and analyzed data on the TV ads and developed reports, which were submitted to the ARF in early December 2010. Those initial reports were given to a number of independent academic experts in appropriate subjects, the "expert reviewers". The evaluations of all the vendor reports by these reviewers were given to the Senior Review Panel, a panel of expert reviewers in the field of cognitive neuroscience, communications, and marketing. In mid-January 2011, the Senior Review Panel met at the NeuroStandards Retreat to go over the reports and question the vendors individually.

Initial insights from this phase of the project were presented and discussed at the ARF Re:think conference in March 2011. After discussions with all stakeholders, each vendor was given the report of the expert reviewers about the vendor's study report, and the outline of the white paper was prepared. This white paper summarizes the experts' and reviewers' findings as well as the ARF's point of view on the first phase of the NeuroStandards Collaboration Project. A draft was completed in August 2011 and given to the vendors and sponsors for additional comments.

1.5 Sponsors

The ARF contacted member companies with an invitation to become a sponsor of the project. Two levels were offered, Gold and Silver. There were eight Gold Sponsor brands: American Express, Campbell Soup Company, Clorox, Colgate-Palmolive, General Motors, The Hershey Company, MillerCoors, JPMorgan Chase. There were four media Gold Sponsors, all major TV networks: ESPN, MTV, NBC, and Turner; and four Silver Sponsors: Dentsu (agency), Publicis Groupe (agency), A&E (TV network), and Warner Brothers (media company).

The profiles submitted by the sponsoring companies, their comments on why they participated in the project, and details on sponsorship conditions and benefits are presented in the Appendix. The ARF thanks the sponsors for their participation in this project and their support.

1.6 Participating Research Suppliers and their Methods

Eight neuromarketing research companies from three continents took part in the project. The methods employed by these companies—detailed in their profiles below, in alphabetical order—represent the leading applications of neuroscience-based methods to marketing: biometrics, EEG and SST, facial coding, and fMRI.

The ARF would like to express its gratitude to these research companies for their participation and their support of this project. While the companies represented here include most of the leading companies in this field, it must be noted that not all of the vendors in this field chose to participate.(4) Therefore, the ARF and the project sponsors very much appreciate those companies who did take part in this collaborative process and did expose themselves to critical evaluations by independent academic experts. As said, the project was designed to advance the field of neuromarketing, and we are pleased that several of the participating research companies have stated to the ARF that concepts learned from participating in the project have helped them further advance their methods, procedures, and reporting.

The figure opposite shows a summary of the vendors and their methods. In addition, the following section presents profiles of the participating vendors with descriptions of their methods, as written by the vendors.

(4) To avoid confusion, it should be noted that one vendor who did not participate in the project did use the term "Neuro Standards" in some publications and presentations.

1.7 Reviewers and the Evaluation Process

As discussed, **evaluation of neuromarketing research methods by independent academic experts in the field was deemed to be the key element of this project.**

For the review and evaluation of the research, the methods, analyses, and interpretations of the data, we engaged academic experts (expert reviewers)—experts in each of the methods. Further, four scientists with broad expertise in cognitive neuroscience as well as communications and marketing were recruited (the Senior Review Panel).

Well-regarded published authors in their respective fields, **the reviewers were selected because of their academic expertise and their lack of affiliation with any vendors of neuromarketing services.** The reviewers all have expertise in the specific methods used by the various vendors, and they evaluated the reports based on the methods of their field and their expertise. For example, Electroencephalography (EEG) experts looked at EEG and SST reports; Functional Magnetic Resonance Imaging (fMRI) experts looked at fMRI reports; etc. In an effort to make the evaluations as fair as possible, we asked the vendors if there were any scientists they wanted to exclude from the process without providing the names of reviewers we had identified. In cases in which vendors nominated scientists for exclusion, we excluded reviewers from evaluating those vendors' studies.(5)

Each of the first-round evaluations, conducted by the expert reviewers, was then provided to the Senior Review Panel. The members of this panel were: Patrick Barwise, London Business School; Christopher Chabris, Union College/MIT Center for Collective Intelligence; Annie Lang, Indiana University; and René Weber, University of California, Santa Barbara. (See pages 32–33 for full biographies.) The panel evaluated both the vendor reports and the first-round evaluations. Their conclusions were discussed at a retreat in January 2011, where the senior reviewers were able to speak with all the vendors to clarify any outstanding questions about methodology or application.

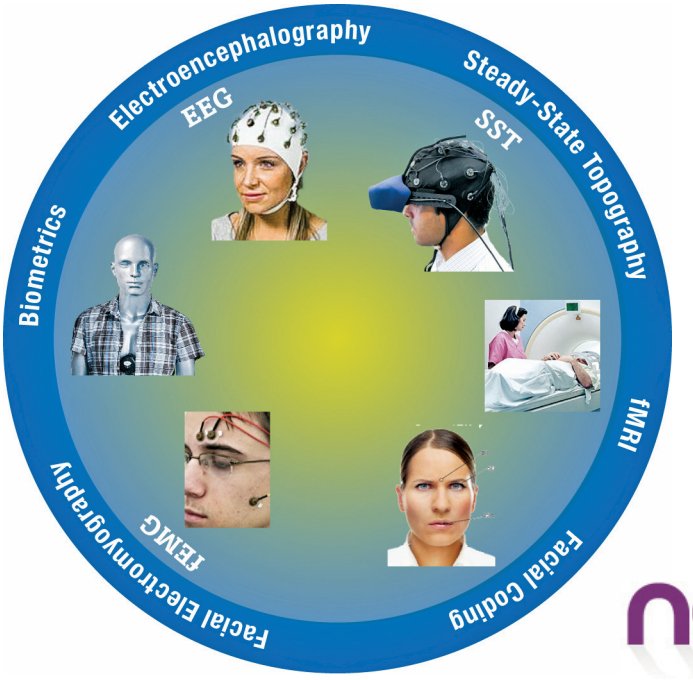
(5) All these scientists were recruited by the ARF with the help of Duane Varan, Ph.D., executive director of the Interactive Television Research Institute at Murdoch University in Australia and chief research officer of the Disney Media and Advertising Lab. The expert reviewers were: Robert Barry, University of Wollongong, Australia; Rajeev Batra, University of Michigan; Steven Bellman, Murdoch University, Australia; Mark Frank, University at Buffalo, The State University of New York; Bill Gehring, University of Michigan; Scott Huettel, Duke University; Steve Luck, University of Calfornia, Davis; Russell Poldrack, The University of Texas at Austin; Rob Potter, Indiana University; Leonard N. Reid, University of Georgia; David Stewart, The University of California, Riverside; and Dawn Sweet, Iowa State University. (See page 34 for more details.)

Summary of Vendors and Methods

SANDS RESEARCH

MINDLAB INTERNATIONAL LTD

MSW LAB Biometric Insights



NEUROINSIGHT

innerscope® research

NeuroCompass Deeper Brain Insights

G&R GALLUP AND ROBINSON *Advertising & Marketing Research*

SENSORY LOGIC®

Continuous Emotional Response Analysis (CERA) is **Gallup and Robinson's** (G&R) proprietary neurophysiological tool for measuring pre-conscious, emotions-based response to advertising. Using state-of-the-art science, CERA measures noncognitive, instantaneous, emotional response to advertising messaging on a second-by-second basis.

A variety of physiological measures (heart rate, skin conductance, breathing) have been around for years to track gross reactions to advertising and newer ones (brain waves, brain blood flow) are being applied.(1) What is important about CERA is its unique focus on emotional valence, unlike other neurophysiological measures, which are mostly about arousal. Valence has to do with how one feels toward something. It forms in an instant, before one has time to think, and is the basis of preferences and attitudes.

CERA uses Facial Electromyography (EMG) to distinguish between the dual systems of positive and negative effect. The face has evolved over time to signal emotional response; it is the most naturally occurring marker of emotion. Small electrodes placed on the proper muscle groups can distinguish and track positive and negative emotional reactions to a stimulus as they occur, nearly simultaneously. This is a more precise and reliable technique than observation and detects response that is not visible to the naked eye. Many researchers now consider Facial EMG to be the gold standard for measuring emotional valence, and CERA results have been shown to be predictive of proven advertising performance measures like recall and ad-liking.

The CERA methodology invites target respondents to a facility where they watch a 15-minute television program that contains pods of commercials. As they watch, a computer calibrates specific emotional ranges, and tracks and graphs positive and negative reactions to what they are viewing. Other physiological measures, including eye tracking, skin conductance, and EEG may be included. Traditional survey measures like recall, persuasion, and ad-liking, as well as diagnostics and IDI probing, are standardly obtained to further enhance understanding of reactions to specific commercial elements.

Because CERA measures coincidental response and is not subject to cognitive filtration by language or thought, it pinpoints specific elements that elicit positive or negative viewer reactions, permitting better optimization of commercial effectiveness. It can be quite actionable in understanding response to key elements of a commercial (e.g., emotional enhancers, communication of key selling messages, connection with personal and belief, support credibility, and key branding moments), and in explaining overall performance results that are often not ascertainable by conventional copy-test analysis.

(1) Gallup and Robinson used Facial EMG for this project.

Innerscope Research uses unobtrusive scientifically proven medical grade, biometric data-collection technology of its Biometric Monitoring System™ to passively assess unconscious emotional response and measure emotional engagement across all media channels. The System uses a biometric belt that passively measures four channels of biologically based data related to the autonomic nervous system: skin conductivity (a measure of pure emotional arousal from the sympathetic nervous system); heart rate and heart rate variability (an integrated measure of both the sympathetic and parasympathetic nervous system); respiratory response (breathing rate, changes in patterns of breathing), and motion (changes in body posture). Innerscope often combines this with eye tracking as a measure of visual attention and low-level cognitive processing for deeper diagnostic detail and insight. The biometric belts are small, wireless, and nonintrusive devices that are easy to apply and comfortable for participants to wear for short durations (15 minutes) or longer durations during testing (multiple hours). Their size and portability allow Innerscope to test anywhere in the world. These results are frequently complemented by conscious self-report from surveys, focus groups or in-depth interviews.

Innerscope defines emotional engagement as attention to a stimulus that triggers an emotional response. This is functionally defined as an aggregated measure of audience synchrony, combined with the intensity of moment-to-moment response across the biometric channels time-locked to the stimulus. Using patent-pending algorithms based on the mirror neuron system as well as more than a decade of scientific research at Harvard Medical School and the

MIT Media Lab, the System assesses the level of emotional engagement moment-by-moment to a target stimulus. Monitoring the aggregated response of a target audience as they experience media and marketing messages allows an in-depth look at the unconscious processing of the target communications, providing unique insights for diagnosing problems and optimizing strengths in creative executions. For a more complete description and definition of emotional engagement, please see: Marci, C.D. (2006). "A Biologically Based Measure of Emotional Engagement: Context Matters." Journal of Advertising Research 46 (4): 381-387. Innerscope follows strict ethical practices and uses the standards set by the healthcare community for informed content and safety.

Prior to this project, Innerscope worked with the ARF to conduct a methodological research review, conducted in 2009. "Innerscope Research, An ARF Research Review." (Sept. 11, 2009) is available upon request.

MINDLAB INTERNATIONAL LTD

Mindlab is a leading UK-based neuromarketing company offering solutions to clients in a variety of industries by recording metrics that are easy for our clients to interpret, such as emotion and attention.

At Mindlab, we believe in offering a client-focused consultancy service that allows us to create bespoke experimental designs that get to the root of every research question. Every study we carry out, therefore, uses a different combination of technologies and often involves designing a novel behavioural task based on traditional psychometric tests, with outcomes that incorporate neurometrics. We therefore never offer an off-the-shelf solution, but will utilise the expertise of our staff from different disciplines to best answer the questions posed.

The technologies we commonly use include eye tracking, measures of skin conductance, and EEG. We believe that using EEG offers benefits beyond those of fMRI, allowing us to analyse ongoing brain activity without interrupting the stimulus experience. This can provide us with an unfiltered step-by-step picture of how messages are being received in a naturalistic environment, although we are working with an fMRI company to develop a full neuromarketing offering. We recently rolled out automated facial emotion recognition.

Our proprietary software efficiently synchronises hardware and we have a unique approach to analyzing EEG data, based upon a method of pattern recognition. We calibrate to distinguish opposing patterns of neural activation and later use these patterns to predict whether a participant is paying high/low attention or emotion when interacting with stimuli. The calibration exercise for emotional valence is not fixed—it depends on the stimulus and can include images of faces and scenes, emotionally valent adjectives, or film clips that differ in emotive content. This process of calibration on a participant-by-participant basis, when standardized, allows us to compare data sets from each individual under different circumstances. We believe this offers the most reliable insight into individual differences and preferences in the field.

There is no black box at the Mindlab. There is full transparency in what we do. This is key to our success. We don't aim to be the biggest player in the neuromarketing field—just the best, providing unrivalled service to all of our clients.

MSW LAB Biometric Insights

MSW/LAB is a partnership built to bring the tools of modern neuroscience to the field of communications research. MSW Research was founded 40 years ago on the basic belief that brands define a business. Knowledge gained through results achieved with the world's leading brand marketers helps MSW clients know if their brand promise will successfully grow their brand before executing a marketing plan. MSW develops research systems aimed at providing a thorough understanding of consumer response at each point of interaction with a brand. MSW/LAB was founded in 2009 as a result of a collaboration between Professor Rafal Ohme from the Warsaw School of Social Sciences and Humanities and Renmin University of China. MSW/LAB implements the tools of modern academic brain science that offer marketers new research paradigms to explore unconscious, nonverbal stages of consumer behavior. MSW/LAB integrates academically accepted neuroscience measures with traditional sales-validated survey information to yield new insights into consumer responses that take place intuitively, automatically, and without any conscious control or effort.

MSW/LAB's tools, which include EEG, EMG, GSR, ET (eye tracking) and RT (reaction time), rely on methods widely accepted in academic circles and have been systematically published in peer-reviewed academic journals. The major measurements include: EEG-based Relevance (long-term engagement and identification); GSR-based Activation (short-term excitement); ET-based visual Attention (which elements

draw attention and cause positive/negative reactions; RT-based Memory (conscious/subconscious learning).

The Relevance index reflects approach vs. avoidance motivation toward a message or a brand. It is interpreted as an emotional engagement and/or relevance. It predicts whether an ad conveys messages, ideas, or values that are self-relevant to consumers, and whether they identify with depicted persons or situations. The Activation index reflects the arousal level that is produced by a product offer or promise.
It predicts whether consumers got energized and excited by an ad and eventually driven to action. The Attention index monitors consumers' visual spotlight and predicts how much attention they pay to each critical element of an ad. Most importantly, it predicts which specific words, graphics or other visual objects have produced which specific Relevance and Activation reactions. The Memory index reflects how much consumers have learned consciously and subconsciously from an ad. It predicts to what extent they will cognitively resonate with a brand or product, both before and after watching the ad. It reveals implicit and explicit consumers knowledge.

During data processing, MSW/LAB always applies special procedures and algorithms to control individual differences in the speed of the CNS & PNS neurotransmission, as well as to clean the raw EEG and GSR signal from the external noise (e.g., respondents initial mood and arousal, or motoric artifacts).

NeuroCompass
Deeper Brain Insights

NeuroCompass utilizes fMRI technology, coupled with proprietary methodologies and algorithms, to ascertain emotional arousal and valence, and to predict both preference and willingness to purchase. Based in Stanford, California, our team is composed of world-renowned neuroscientists, market researchers, psychologists, mathematicians, and statisticians. Our offerings focus on branding, packaging, pricing, and promotions. In addition to a detailed analysis report, every NeuroCompass project deliverable includes a high-impact senior executive summary containing key insights, meaningful hypotheses, and actionable recommendations. We are determined to bring scientific rigor, ethics, and transparency into all that we do and to drive the industry to similar high standards. As such, NeuroCompass researchers are fully accredited by an Institutional Review Board.

NEURO|NSIGHT

Neuro-Insight is a research company that uses Steady-State Topography (SST), a unique brain-imaging technology, to measure how the brain responds to communications in areas like consumer neuroscience, neuromarketing, media and entertainment research. Neuro-Insight holds the exclusive worldwide rights to the SST technology and has undertaken global studies through offices in the United States, United Kingdom, Germany, and Australia. In a typical study, SST is used to determine second-by-second changes in a number of scientifically validated psychological parameters, including long-term memory encoding (includes implicit memory—more than just recall), engagement (sense of personal relevance), motivational valence (whether the material attracts or repels the viewer), as well as emotional intensity (arousal) and visual attention. Taken together, these parameters yield a unique insight into the cognitive, emotional, and motivational dimensions of the consumer's response to different forms of brand and product communication, such as brand iconography; television, Internet, and mobile device advertising; product placement; and sponsorship.

SANDS RESEARCH

Sands Research Inc. is a pioneer and global leader in applying cognitive neuroscience technology for unique insight into the consumer's response to a wide variety of advertising and marketing media, both in the lab as well as the retail (in-store) environment. Sands Research conducts in-lab and mobile market research services utilizing EEG and eye tracking neuromarketing technology. We also provide optional pre-/post-behavioral testing and MRI studies.

Each Sands Research study is customized to meet our clients' market research objectives. Detailed analysis and action items—including SRI's Neuro-Engagement Score (NES)™ and Emotional Polarity Timeline (EPT)™—are provided in each report.

Sands Research Inc. specializes in testing consumer response to television (video) and print advertisements, product packaging, digital media, and sensory stimuli. Other specialties include exploratory research into brand values, product design, and usability. Due to nondisclosure agreements, Sands Research does not release a client list but can provide references upon request.

Sensory Logic's specialty is helping companies measure and manage emotions through facial coding. A scientific, non-invasive technique entirely free of sensors, facial coding involves a careful, second-by-second review of video of a test participant either being exposed to a stimulus (TV spot, packaging, positioning statement, product/Web site usability, etc.) or responding to questions (purchase intent, price elasticity, brand preference, etc.). The video is analyzed down to 1/30th of a second, as necessary, by trained facial coders who take into account 43 facial muscles and their movements. In accordance with Dr. Paul Ekman's Facial Action Coding System (FACS), those 43 muscles and their activity corresponds, in turn, to 23 action units (AUs) that reveal one or more of the following core emotions: happiness (multiple levels), surprise, sadness, fear, anger, disgust, and contempt. Sensory Logic's patented methodology augments FACS by providing a proprietary scoring system, such that every AU has its own impact (intensity) and appeal (valence) score. The technique captures engagement in real-time, and unlike any other scientific tool available, can diagnose whether advertising is not just on-message, but also on-emotion (i.e., evoking the right emotion at the right time).

Other strengths of facial coding include its universality (even a person born blind emotes the same way), the fact that it is Internet-compatible (allowing large sample sizes and other logistical advantages), and that the lack of sensors means it can capture emotional response during interview questions (rather than resort only to traditional measures to capture the whys). Sensory Logic often uses facial coding in conjunction with eye tracking (for which it owns the U.S. patent), as well as with verbatims, ratings, probes, and other common inputs. In analyzing verbatims more fully, facial coding enables us to color-code the verbatims according to which emotions get evoked—and when—in conjunction with comments made. In that way, it is possible to discriminate between comments made without emotion (lacking motivation or saliency) and those that deserve more attention because either the participants feel what they are saying or a say/feel gap exists, exposing a lack of authenticity in participants' responses.

PART II
The NeuroStandards Collaboration Research Study

2.1 Study Design and Deliverables

This original research study was designed to achieve the key objective of the project: a comparison of the various vendors' methods and the quality of their research reports.

The ARF NeuroStandards team designed the study in collaboration with the Gold Sponsors. The vendors were asked to sample 18- to 49-year-olds (the main target demo in U.S. TV) for a test of commercials and try to match the Census regarding sample composition. As vendors were asked to use the design and the procedures they would normally use in a study of this type, each chose the sample size.(1)

The eight vendors were provided with the same stimulus materials—eight commercials (one from each Gold Sponsor advertiser) and a 30-minute episode of the "George Lopez Show" (a situation comedy) that they could use to embed the commercials, if that was part of their methodology. As noted earlier, it was important to the project both that there be standardization wherever possible and that vendors conduct a "typical" study and provide the same kind of report they would when a company employs them to research their commercials.

Because of the involvement of Gold Sponsors from various industries, the research study was able to assess commercials for a variety of product categories, including credit cards, cars, and toothpaste. It should be reiterated, however, that the intention of this research study was not to determine which commercial is the most effective based on neurological and biological methods, but rather, the project used reports on the ad tests conducted with the various methods, including the methodological documentation provided by the vendor, as a basis for evaluating the scientific foundations of each method, its execution, and the interpretation of findings.(2)

Finally, it should be noted that for various reasons, including cost, the studies were not done in the same locations with closely matched samples. As a result, differences in the findings produced by the various vendors' studies cannot be interpreted as the result of different methods alone, as sample composition could have played a role. Clearly, this is an area for additional research..

The eight vendors were given a creative brief and a list of learning objectives from the advertisers to assist them in framing the research, as is characteristic of a typical study of this kind. As mentioned, the advertisers asked that specific findings about the commercials not be shared with the other sponsors. Still, despite those limitations and even though the project's focus was on the methodology, the sponsors found the insights about their own commercials valuable.

The vendors were told that reviewers would assess research design, the data-collection process (including sample size), supporting documentation of the procedures, the presentation and interpretation of results, as well as assess all aspects of the research in light of accepted scientific facts.

In sum, then, each vendor was provided with all eight commercials and a program to embed commercials in. In addition, they were given creative briefs and learning objectives. As noted, vendors could choose if those ads were to be tested embedded in program content or not. Also, they had the option—again, if consistent with their typical methodology—to rotate those ads. Vendors were asked to sample 18- to 49-year-olds, and they were alerted that the beer ad should only be tested among 21- to 49-year-olds. They were asked to match the Census if possible and use the same sample for all ads, but they were not required to conduct the study in the same location. Vendors had the option to include specific target subgroups in their research, but were not required to do so.

Most vendors conducted the research in November 2010 and submitted their reports to the ARF and the two review teams in December 2010.

(1)The ad submitted by MillerCoors was tested only on respondents 21 years of age, in accordance with regulations. Further, the age group 18-49 was deemed well suited for this study because older and younger demographics can have different neurological and biometric reactions that could complicate the research and the interpretation of the results.

(2)There was some thought about designing a study that would reveal optimal insights about each of the brands' commercials and tailoring them to the specific objectives and target groups of each brand. That would have meant testing almost every commercial with a different target group and, thereby, increasing the cost of the project severalfold.

2.2 Evaluation by Reviewers

After careful evaluation and discussion with project stakeholders, the expert reviewers, the Senior Review Panel, and the ARF team developed a list of criteria that provided a framework for the evaluation of the vendors' methods and reports. The experts were asked to use this list as a guide for conducting their reviews. In this way, it was assured that their evaluations would touch on all key issues as well as facilitating comparisons between methods:

Sample. Does the sample construction support the conclusions and established scientific practices?

a. Sample size and composition (rationale for sample size, etc.)
b. Subject recruitment (refusal rate, limitations, etc.)

Research Design. Are the methods used appropriate for answering the questions posed? Has the research been designed in a way that conforms to the accepted standards in the field?

a. Methods proposed/chosen for answering research questions
b. If multi-method approach: role of neurological/biometric methods in combination with other methods, interplay of methodologies

Data Collection Process. Have the data been collected in a scientifically rigorous and replicable manner?

a. Venue of research (choices of venues, limitations)
b. Method used to collect data (equipment, etc.)
c. Any additional information relevant to quality of methodology, such as reliability, test-retest consistency, etc.

Data Analysis and reporting. Does the interpretation conform to the available data? Are the conclusions drawn from the data consistent with the established body of scientific literature and knowledge on this topic?

a. Methods of analysis
b. Documentation of method
c. Interpretation of data/presentation of results
d. Basis in accepted scientific fact
e. Relevance to research questions (usefulness)

2.3 The NeuroStandards Retreat and Re:think Conference

The evaluations of the research study and initial insights were presented at two ARF events:

NeuroStandards Retreat: On January 12-14, 2011, at Campbell Soup Company's World Headquarters in Camden, N. J., Senior Review Panel members, research vendors, Gold Brand Sponsors, Gold Media Sponsors, Silver Sponsors, and ARF personnel gathered to discuss the research issues as well as insights and key findings from the NeuroStandards Collaboration Project research study. At the retreat, each research vendor had the opportunity to meet individually with the Senior Review Panel and each sponsor in separate sessions. In addition, each vendor presented an overview of their methods to the entire group. The sponsors were able to ask vendors questions about their methods and their research findings as well as address differences in the findings, interpretations, and recommendations for their own commercials by the various vendors.

Special thanks to Campbell Soup Company for graciously providing meeting facilities, breakfast, lunch, dinner, and a wonderful reception for all retreat attendees.

Re:think Conference: The ARF NeuroStandards Project team made two presentations of initial findings in March at Re:think 2011—the ARF 75th Anniversary Annual Convention. First, Dr. Duane Varan and Dr. Horst Stipp presented an overview of the project to a general session at the conference. They covered the project design, study design, the scientific review process, the NeuroStandards Retreat, preliminary insights and suggestions for best practices, and next steps. They were then joined on stage by Richard Thorogood of Colgate-Palmolive, who presented his experiences as a sponsor of the project.

Later in the conference, Bob Woodard of Campbell Soup Company moderated a panel of vendors, which included Richard Hazlett of Gallup & Robinson, Dan Hill of Sensory Logic, Joseph Hilling of Mindlab, Carl Marci of Innerscope, Karl Rosenberg of MSW/LAB, Steve Sands of Sands Research, and Richard Silberstein of Neuro-Insight. Some of the topics covered in this panel were: how neuromarketing research can produce new insights for advertising, branding, and other marketing research projects; which biometric and neurological methods are best suited for specific research objectives; the advantages and disadvantages of these methods compared to traditional research methodologies; and the best practice recommendations for both users of this research and vendors.

PART III
Reviewers' Evaluations of Neuromarketing Research Methods and Comments by Research Suppliers

3.1 Introduction: Reviews and Evaluation Criteria Overview

The independent subject-matter experts (the expert reviewers) evaluated the vendors' research reports and wrote their comments following a guide that identified the various aspects of the research deemed important both from a science and a marketing perspective. Those evaluations—which are full of technical and methodological details and also contain complex scientific discussions—were shared with the vendors and are summarized here.

An analysis of all the evaluations as well of the discussion topics suggests that they fall into two groups. First, the experts addressed issues surrounding the various neurological methods, the science underlying the methods, the pros and cons of the different methods, and the opportunities and challenges arising from the attempt to measure unconscious responses and brain activity accurately and arrive at scientifically valid insights in market and media research.

The second group of issues applies more or less to all methods represented in this project. In fact, these issues are likely to be relevant in every research project, no matter the method:

Sample Size and Composition
Research Design
Data Collection Procedures (including staff quality & training)
Documentation of Methods and Research Protocols
Validation of Measures and Constructs
Information on Statistical Significance
Reporting of Findings

We think it is important to make two points here. One, these are all issues that should be considered in every research project. These are the basics; they are not unique to neuromarketing research. Further, there is no reason to pay less attention to these issues because neuromarketing research is somehow different. We raise this point because we have found that some users of neuromarketing research did not pay much attention to these issues, and we have seen some reports in this field that some, for example, ignored the question of whether or not the findings were statistically significant.

In the opinion of the ARF, one important piece of learning from this project is that the focus on the new—the application of neuroscience to marketing research—should not distract from issues such as sampling, statistical significance, and clear documentation of methods. Best practices in this field, as in any other, should include these considerations; they are as important as the issues germane to the various neuroscience methods and procedures.

3.2 Reviewer Comments Regarding General Research Issues

This is a summary of the reviewers' comments regarding general research issues that apply to all neurological and biometric research methods as well as other kinds of marketing, consumer, and social research.

Sample Size and Composition

Is the size of the sample appropriate for the research issue at hand? Has the sample been drawn in a way that maximizes the opportunity to obtain a representative sample? What is the refusal rate? These are all questions the researcher must examine for every research project and should examine in the context of neuromarketing research as well.

Both sample size and sampling methods present challenges for biometric and neurological market researchers. Most of their clients use surveys with large numbers of respondents when they want quantitative evidence for the kind of issues that neuromarketing research addresses. Neuromarketing researchers—as well as neuroscience researchers in other fields—tend to work with smaller sample sizes than traditional quantitative market research methods: usually fewer than 100, sometimes as few as 20.(1) Some vendors point out that different people's brain reactions are more similar than is often assumed and that when the target group is very homogenous, sample size is less of an issue. However, the reviewers questioned this argument and emphasized individual variability. Further, while vendors pointed to the large number of measurements taken, the reviewers did not believe this can compensate for small sample sizes. As a result, especially when the objective is to explore reactions among diverse groups, or when an ad includes a spokesperson who might elicit different responses from different consumer segments, a larger sample may be needed.

(1) Some academics have suggested N=30 as minimum sample size per treatment (Ariely and Berns, 2010).

Finally, as in all research studies, small sample sizes increase the chance that outliers (who show extreme reactions) or "professional respondents" distort results. As a result, it is important to check for this and make the appropriate corrections or adjustments.

Obtaining random samples to conduct neuromarketing studies is also more difficult than in survey research. Sample composition may be biased through potential respondents who don't want to expose themselves to what they perceive as invasive procedures. Until recently, most studies were conducted in only one location. Finally, several neurological methods exclude a variety of potential respondents: pregnant women, left-handed people, those with tattoos, the very young, and the very old.

These kinds of sampling challenges can be overcome in most cases, but they should be addressed and discussed with the vendor. As in all other studies, the sample should be designed according to the specific objectives of the research project at hand. In some cases, a study with 20 subjects may be adequate, especially if large effects are expected or the data are used to generate hypotheses and new learning, but are not to be interpreted as quantitative. In other cases, where differences between consumer segments and quantitative insights are important, a larger sample is needed, and saving on sample cost is likely to be the wrong strategy. The development of portable instruments makes it now possible to overcome that limitation for projects that need representation of respondents in different regions.

Research Design

In addition to sample size and sample composition, there are a number of other design features that can spell the difference between a study that produces reliable and valid new insights and one that raises more questions than it answers.

The scientists, both the experts and the Senior Review Panel, expressed concern that most neuromarketing studies do not use experimental designs. To illustrate the importance of proper design features, they pointed out that if a research design is invalid, even large and well-drawn samples will not solve that problem.

As a result, the scientists strongly urged vendors to employ more experimental research designs as well as urged users of the research to encourage such designs, despite the real-world business realities of budget and time limitations. For example, testing a commercial with and without a crucial element (such as a specific scene or a piece of music) is more conclusive than doing just one test and drawing conclusions from the analysis of one version of the commercial. Further, test-retest designs provide a check on the reliability of the measures and, therefore, the findings.

Data Collection Procedures (including quality and training of staff)

While quality of data collection procedures is an important issue in all research, it is absolutely essential in this field in which scientific knowledge and training is the key to accurate and valid measurements. Reviewers stressed this issue in connection with every method and every vendor. As we will see in the next section, each method has complexities and measurement challenges that need to be dealt with under the supervision of highly skilled, well-trained people.

Further, neuroscience methods require sophisticated equipment and software. The quality of the data depends not only on the people who collect the data, but also on the quality and maintenance of the equipment.

Documentation of Methods and Research Protocols

In a report on results from a survey, one expects to find information on how the data were collected, what scales and which coding procedures were used, how unreliable respondents were identified and dealt with, and similar aspects that document the methods and help the user of the data understand the research process and identify possible problem areas that affect how the data should be interpreted.

Given the complexities of neuromarketing research and the science behind it, the reviewers feel that documentation of methods, research protocol, and clarity about what was done are essential. Obviously, there are limits to the amount of information a vendor can provide about proprietary methods, but the reviewers were rather skeptical when they encountered a "black box" that consisted of several measures that had been combined in a manner that had not been validated, or even explained.(2)

Validation of Measures and Constructs

In much of marketing, consumer, and social research, validation is not seen as a major issue because these methods have been around for a long time and use terms and constructs that are widely known and have been tested extensively. That kind of confidence may not always be justified. But attention to validation is certainly required in such a relatively new field as neuromarketing.

(2) The Senior Review Panel pointed out that despite having signed NDAs, several vendors argued that they could not share certain information the reviewers felt was important to properly evaluate the vendor's methods.

Measures and constructs used in studies (for example, "attention") should be carefully defined, examined, and validated, even if they seem clear at first glance. For example, do we mean visual or cognitive attention, implicit or explicit memory? Different vendors sometimes use the same terms for different kinds of measures. Moreover, as neuroscience and marketing are both established disciplines, they define and use concepts and constructs in specific, but not necessarily identical, ways. As a result, when neuroscientists and marketers are starting to work together, a discussion about the definition of terms, about what is being measured, and about validity is important not only to avoid misunderstandings and confusion, but also to support the growth of this new neuromarketing discipline.(3)

The reviewers recommend that users of the neuromarketing research ask about the concepts used by the vendor and not automatically assume that they mean the same things as in marketing. Also, the reviewers think it is important to ask vendors about the scientific basis of the concepts and measures used. Neuroscience theory, concepts, and methodology were not developed in the field of marketing, but, to a large extent, in medicine and in experimental psychology.

As a result, their validity for marketing objectives needs to be established, especially considering the complexities of measuring unconscious and emotional reactions to advertising. The reviewers applauded those vendors who had invested in validation through peer-reviewed publications (see Literature section). They expressed reservations about concepts and measures that are not solidly rooted in neuroscience research.

. . . Measures and constructs used in studies (for example, "attention") should be carefully defined, examined, and validated, even if they seem clear at first glance . . .

The last point was a topic of debate between the reviewers and vendors; the reviewers asked for established scientific validation processes and urged vendors to strengthen their efforts in this area. The vendors who took part in the project agreed with the value of scientific validation, but emphasized that they have found solid correlations between their conclusions and their clients' success metrics. **The scientists, however, stressed that validation requires two things that should be demonstrated in a systematic, scientific manner: peer-reviewed research to establish that methods and conclusions are based on validated neuroscience; and evidence for the reliability of the measures—that is, they repeatedly and accurately measure what is being claimed.** (Note: The ARF also believes that demonstration of predictive validity in the marketplace is a critical validation criterion.) The scientists insisted that there is no substitute for thorough, objective, and scientific scrutiny.

Information on Statistical Significance

If research is intended to be purely qualitative — that is, if results are meant to provide direction and new hypotheses, but not quantitative results — statistical testing is, of course, not required. However, all quantitative research findings, no matter what the method, require statistical tests. If a neuromarketing researcher positions a study as quantitative, users of such research should look for statistical analysis of the findings in order to be able to distinguish among statistically significant findings, directional findings (not significant, but showing evidence for a consistent pattern), and differences between data points that are neither.(4)

(3) This was apparent at the NeuroStandards Retreat, when the sponsors talked to vendors about their methods, about their research findings, and about differences in the findings, interpretations, and recommendations for specific commercials by the various vendors. It became clear in the discussions that only some of the perceived differences were real. Most were the result of the fact that the vendors sometimes used the same—or, in the eyes of the marketers, very similar—terms to describe various techniques measuring different facets of the psychological responses.

(4) There are issues surrounding the power of statistical tests in a neurological research context and which ones are appropriate under which circumstances. (For example, how to test for differences in reactions to individual scenes of the same commercial.) Those issues (and controversies) go beyond the scope of this paper and the expertise of the ARF.

Reporting of Findings

Every user of any kind of research report looks for an accurate, clear presentation of relevant findings and new insights. Reports on findings from neuromarketing studies have to overcome two unique obstacles to achieve this goal. First, as they are based on complex science beyond the experience and expertise of most users, it is more difficult to achieve clarity and communicate the information here than in traditional marketing research reports. (As discussed, many concepts and constructs based on neuroscience have either a different meaning or no meaning in the current marketing vocabulary and need to be clarified to avoid miscommunications.)

The Senior Review Panel pointed to a second obstacle to accurate and clear reporting in this area: Some vendors have marketed their neuromarketing research as providing science-based insights into the unconscious in a way that suggests the absence of any uncertainty or element of interpretation. The reviewers were very critical of those claims and pointed to the irony of such a marketing strategy: Real science is characterized by ambiguity and some degree of uncertainty (that's why it is important to report statistical error margins). Further, all researchers, including neuromarketing research vendors, employ interpretive skills to draw conclusions and provide useful insights to their clients.

Overclaiming the capabilities of neuroscience and of neuromarketing has had unfortunate consequences. First, it has led some observers to dismiss the entire field of neuromarketing as hype. Second, it has revived ethical concerns about neuroscience research. Exaggerated claims have promoted the belief that people are entirely driven by emotion and that neuromarketers can manipulate consumers' subconscious desires against their will. We did not find support for such beliefs in this project.(5)

Given these circumstances, the reviewers as well as the ARF think that it is important for vendors to clearly distinguish between science-based findings and interpretation in their neuromarketing research reports. This serves the providers as well as the users of the research. At the same time, it is worth remembering that interpretation of data is not only legitimate and necessary, but also a crucially important element of a research report; it is very rare for research findings to be useful to the marketer without interpretation.

(5)This issue is not new. For example, in the 1950s, there were debates about "Hidden Persuaders" and "subliminal" methods (Vance Packard, 1957; Chabris and Simons, 2010).

3.3 Reviewer Comments Regarding Specific Methodologies

In this section we summarize the expert reviewers' and the Senior Review Panel's comments that are specific to the various methods represented in the NeuroStandards Collaboration Research Study.(6)

Biometrics

A consistent theme in the comments by the independent reviewers of the studies, and also in discussions with vendors, was that each method has advantages and disadvantages, and that a decision on which method is optimal for potential users of this kind of research depends on a large number of factors, ranging from research objectives to financial considerations. Case in point, biometric methods. They are among the easiest to administer, can employ larger samples, and biometric studies are much less expensive than, for example, fMRI research. Still, they are not ideal for all research questions.

Biometric measures—such as eye tracking, skin conductivity, and heart rate—can assess visual attention and arousal/emotional intensity with great accuracy on a continuous basis and, thereby, provide more detailed assessments than traditional measures. Another advantage is that the research can employ a relatively natural viewing experience that is less intrusive than those employed in most neuromarketing research.

With regard to insights on direction of emotion (emotional valence) and emotional engagement, there is some debate among scientists and vendors. The reviewers felt that neuroscience suggests that neurological methods (fMRI) and facial coding are best suited to assess the emotional valence of viewer reactions. However a vendor of biometric research pointed to a large number of academic papers that show correlations between fMRI and biometric data and reports of successful use of data by clients (see Literature section).

EEG (Electroencephalography)

EEG is a widely used method to obtain continuous data on brain activity and is now used by many vendors to explore consumers' reactions to marketing communications. EEG is primarily used to assess cognitive processes like attention and awareness, but some researchers are also using EEG measures to assess the intensity and direction of emotional reactions. Because of its high temporal resolution, EEG researchers often focus on analyses that indicate which specific content elements do or do not support desired outcomes.

(6)Thank you to the vendors for supplying several of the images of neuromarketing techniques.

Scientists as well as vendors debate the pros and cons of EEG compared to other methods, such as fMRI. Supporters of fMRI stress the limited spatial resolution of EEG, which makes identifying specific emotions and measuring emotional valence difficult. EEG researchers stress the high granularity and temporal resolution of their data, thus enabling them to pinpoint reactions with the kind of detail that conventional methods rarely achieve.

The expert reviewers and the Senior Review Panel acknowledged the high granularity and temporal resolution of the measures but warned against ignoring the complexity of the human brain and its reactions to complex stimuli, such as a TV commercial. The technical resolution of the measures is impressive (milliseconds), but the brain's reactions are likely to be slower, and they vary: Reactions to the sudden appearance of a snake are likely to be faster than those to a pretty sunset; further, reactions to specific scenes in a commercial may be affected by anticipation of a forthcoming scene or reactions to the preceding content. Also, interactions between the images, sounds, and words need to be untangled to pinpoint causes of viewer response. Finally, there are still debates about the accuracy of the measurements and some scientists argue about the value of different kinds of EEG measures.

Moreover, many scientists believe that some of the signals identified in EEG studies are "noise"—-that is, they are like an echo of a real reaction to content and should not be interpreted as an actual reaction. Because of these issues, the scientists concluded that pinpointing the value of specific scenes in a commercial is not as easy nor definite, as suggested by some vendors who rely on EEG methods. As said, interpretation is required in these studies as in all others, and, in many cases, the client may provide just as valuable input as the EEG scientist. The reviewers also suggest that marketers discuss with vendors how the various data points are analyzed and how those metrics have been validated.(7)

EEG methods reviewed in this project place some burden on the respondent, even though vendors are making constant progress in lessening that burden. (e.g., A cap with electrodes is attached to the scalp and, in many cases, a gel is applied, which requires a wash after the study.) Sample sizes in EEG studies tend to be relatively small, though larger than those in fMRI research.

(7) As stated, many vendors offer measures and constructs (often using terms like "engagement" or "involvement") that are derived by combining various measurements in a certain, and often proprietary, manner. That kind of approach, according to the scientists, needs to be validated, even if the individual measures have been validated.

Steady-State Topography (SST)

SST was developed to address some of the measurement issues associated with EEG. The reviewers feel that SST provides a good solution to some of those issues, and they applaud the efforts at validation reflected in a large number of the vendor's peer-reviewed publications throughout the last decade. In addition to methodological issues related to SST measurement, these publications have also focused on validating implicit memory measures. Scientists think that this method can enhance the accuracy of the readings and reduce the potential for errors; that is, interpreting spurious signals as real. Compared to EEG, however, SST does place some additional burden on the respondent and makes the viewing situation a bit less normal (in addition to the cap, respondents wear flickering glasses, but the gel that is sometimes used with EEG is not applied).

Functional Magnetic Imaging (fMRI)

Many neuroscientists regard fMRI as the gold standard of neurological research, because of its high spatial resolution and ability to measure deep inside the brain, where many emotions originate and are processed. For example, fMRI can measure the activity of brain regions involved in the dopaminergic system, which has been linked to desire and reward processing (e.g., feelings of wanting that may be triggered by a commercial message). Advocates of fMRI argue that such direct measures are more valid than measures taken closer to the surface, and that this approach is ideal to uncover emotions hidden from traditional methods or distorted by social desirability.

However, these advantages of fMRI research do come at a price—both literally and figuratively. Because of the cost of the equipment and administration of this method, it is the most expensive per respondent. Accurate fMRI measurement requires both top-notch equipment and scientists to carry out the measurement and analyze the data. The reviewers stressed how difficult this measurement is and how much diligence is required to produce accurate insights: The signals are weak and the time lag in the blood flow that is being measured reduces the granularity of the measurement and makes it more difficult to connect reactions to specific scenes. In other words, fMRI has lower temporal resolution than biometrics, EEG, or SST. As a result, fMRI is well suited to the analysis of packaging and logos, etc., in which measurement of quick changes in reactions is not an issue.

In analyses of commercials, fMRI methods can be a powerful way to explore activity in the emotional centers of the brain, in response to the overall communication. If information on reactions to specific scenes is required, experimental designs become a prerequisite to obtaining valid and reliable data. Also, some neuroscientists point

to new methodological approaches and analytical techniques that are advancing fMRI. Many argue, however, that when high temporal resolution is essential, other methods are likely to be superior.

To be affordable, fMRI studies usually use the smallest sample sizes of the methods discussed here and conduct studies in only one location. Therefore, fMRI may not be the best choice for projects that require large groups of respondents in different locations to test regional differences, etc. Also, one might say that compared to the other methods reviewed here, fMRI studies place respondents into the least natural viewing situation and that fMRI researchers have the greatest challenge recruiting representative samples.

Despite these issues, we agree with the vendor who suggests that if the marketer suspects that other methods do not tell the whole story and the goal is to generate new insights and a deeper, albeit qualitative, understanding, fMRI can be extremely valuable. Especially when making the right decisions has big financial implications, a well designed and carefully executed fMRI study, as part of a large research effort, could be a worthwhile investment.

As with other neurological methods, scientists and vendors are in agreement that fMRI should be used in combination with other validated methods to increase the validity and reliability of findings and support the interpretation of the data. Indeed, fMRI and EEG data can be recorded simultaneously with appropriate equipment, and, as with the other methods, scientists stressed the need for more validation—especially to establish that specific analysis methods are valid and that unique insights not revealed by other methods have been uncovered.

Analysis of Facial Expressions

Two kinds of facial-expression analysis were represented in the project: traditional facial coding, in which human coders assess visually apparent changes in facial expressions as a result of exposure to a stimulus, and facial electromyography (fEMG), which measures electrical impulses generated by facial muscles when facial expressions change.(8) Both measures focus on the same objective: measuring emotional valence and understanding which kind of emotional reactions are triggered by a message. Proponents of both approaches argue that measuring facial-muscle movement is well suited to evaluating emotion, despite the fact that no brain activity is measured directly, because research has established that changes in facial expressions reflect emotional response. They also point out that facial expressions are more likely to reveal true feelings than paper-and-pencil methods.

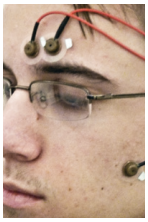
(8) Some scientists think this method should be classified as biometric.

Facial Coding

Facial coding by human coders has been used for well over a decade in marketing and many other fields. It is based on the work of Dr. Paul Ekman, who established that facial expressions of emotional response are universal. He developed the "Facial Action Coding System" (FACS) to analyze facial expressions, initially based on six basic human emotions. One facial coding vendor in the project bases his approach on Ekman's work. The vendor uses a number of different measures and concepts (which he regards as improvements), but reviewers argued that such changes, even if they seem minor, need to be validated.

Compared to many other methods, facial coding is less invasive, and the viewing situation is more natural; respondents can even watch at home. But a key question for human coding, particularly when compared to fEMG, is how well such coders can detect subtle facial-muscle movement, particularly in the context of viewing TV commercials in which viewer reaction is often relatively neutral.

Facial Electromyography (fEMG)



The vendor who participated in the project has developed a system to measure and analyze changes in electrical impulses that are generated when facial expressions change. The company reports on positive vs. negative valence, not on discrete emotions.

The validity and reliability of such measures, as with all methods, depend on the accuracy of the measurement, the training of the people who administer and analyze the data, and on the theory underlying the method, scientific validation, and usefulness in the marketplace. The evaluations of the academics addressed all those issues, many extremely technical. As with all other methods, they asked for more validation. They liked the conservative approach to the data interpretation, reflected in the vendor's focus on just two dimensions of emotional valence. On the other hand, in studies that want to explore specific emotions elicited by a stimulus, this may be seen as a limitation.

Compared to traditional facial-coding methods, this approach is more invasive (electrodes are attached to subjects' faces) and less flexible (measures are taken in a lab environment, whereas methods with human coders can employ webcams), but it can pick up quite subtle changes in facial expressions. As some reviewers pointed out, reactions to advertising are often not very strong; therefore, this could be an advantage for fEMG. Finally, fEMG is not dependent on the quality of the training and diligence of coders, and data can be analyzed more quickly.

3.4 Vendor Feedback

All vendors were given an earlier draft of this white paper and made comments that were reviewed by the ARF and taken into consideration. Two vendors submitted additional comments for inclusion in the final white paper.

Comments by Innerscope

Innerscope Research was founded over five years ago to help address a growing consensus among market researchers that new methodologies are needed to account for limitations in existing research methods —a need made more urgent by the rapidly evolving media landscape. The new science of the brain also confirmed years of speculation that: 1) large amounts of information are processed below conscious awareness; 2) unconscious emotional responses play a critical role in directing attention, enhancing learning, facilitating memory and driving behaviors; and 3) there is no direct connectivity between the brain's emotion centers and its language centers, making it nearly impossible for participants in market research to accurately self-report their nonconscious emotional experiences.

The ARF NeuroStandards Collaboration Project reflects an evolution in the marketplace, where questions are moving from "What advantage is there to using neuromarketing?" to "Which are the best approaches to use?" We agree with this white paper's conclusions that neuromarketing research offers a significant advantage over traditional research in multiple areas, including detailed diagnostics into the "why" behind the "what" of TV advertising. The process of creating new standards is long and multifaceted, and we applaud and support this ARF initiative.

From its inception, Innerscope has always focused on validation. We have written peer-reviewed papers and presented case studies at numerous conferences demonstrating the unique abilities and value that biometrics offer for measuring unconscious emotional responses, while also validating our specific approach across applications. We have tested leading technologies, including fMRI, EEG, biometrics, and facial coding to identify methodologies that are both validated by the academic community and offer the most reliable and robust way of evaluating advertising and predicting consumer behaviors. Thousands of academic studies support the use of heart rate and skin conductance to measure unconscious emotional processing. These biometric channels, combined with measures of respiration, motion and eye tracking, tap into the neural networks linking emotional responses, decision-making and reward centers in the brain.

In 2009, prior to NeuroStandards, Innerscope partnered with the ARF on an intensive review of our biometric methodology. In this extensive review, the ARF evaluated our technology, algorithms, and supporting evidence for our methodological construct's validity, reliability, and predictability. The review went deeper than the scope of NeuroStandards allowed, including an evaluation of sample size, a topic that is mentioned in this white paper. We continue to provide evidence for how we determine sample size based on the estimated effect being measured and the sensitivity of biometrics to detect those effects. The full ARF Research Review is available on request.

We thank the ARF, the experts, and the sponsors for supporting this process and for starting to evaluate vendors with divergent technologies applied to a single domain— TV copy testing. This study begins to answer broad issues related to neuromarketing research and how best to move forward. We are proud to have participated in the NeuroStandards Collaboration Project as a testament to our ongoing commitment to collaboration, transparency, and quality in this evolving field of research.

Comments by Richard Silberstein, Ph.D., of Neuro-Insight Pty Ltd

We at Neuro-Insight are pleased to have participated in the NeuroStandards Collaboration Project and appreciate the scientific reviewers' very positive comments on Neuro-Insight's use of the SST technology as well as the work that has gone into validating the advertising research measures and methodology employed by Neuro-Insight.

In our view, for a neuroscience methodology to make a valid and significant contribution to advertising research, it must satisfy two broad criteria: validity and utility. By validity, we mean specifically scientific validity, which can be paraphrased by the question, "Is it real?" Scientific validity was the principal focus of the NeuroStandards project.

Validity, while a necessary precondition, is not sufficient in itself. A neuroscience or biometric technique may be scientifically valid, yet the findings may yield little or no new insight (low methodological utility), or the findings may be of no commercial significance (low commercial utility). In our opinion, scientific validity must be accompanied by methodological and commercial utility.

Methodological utility can be paraphrased by the question, "Does the neuroscience methodology offer insights that are unavailable through current market research techniques?" (In other words, "Is it telling me something I don't already know?")

Commercial utility can be paraphrased by the question, "Does the neuroscience methodology offer actionable insights that significantly improve advertising and communication effectiveness?" (In other words, "Does it make a real difference to advertising effectiveness and, hence, the ROI?")

While the above criteria have been discussed in terms of neuroscience and biometric methodologies, we believe they are equally relevant when considering traditional market research measures. We thus welcome the ARF's comments suggesting that traditional MR techniques should be subjected to similar rigorous inquiry and agree with their comment that "Standards and best practices are essential for all research projects, no matter what methods are used." Finally we look forward to Neuro 2.0, where one of the goals is to clarify the complementarities between neuromarketing and traditional measures.

PART IV
ARF Summary and Recommendations

As stated, it is the purpose of the ARF's NeuroStandards Collaboration Project to increase transparency and provide information that helps members and those throughout the industry become better-informed users of neuromarketing methods.

The results of the first phase of the project show that providing this kind of information is not easy; these are complex issues. On the one hand, neurological and biometric marketing research has the potential to provide important new insights for the evaluation of commercials and other visual stimuli. **The strength of neuromarketing methods lies in their ability to uncover emotional reactions better than most other methods.** In fact, there are many reports that neuromarketing has helped produce learning that marketers feel enables them to improve advertising and other marketing communications.

On the other hand, the power of such research has sometimes been overstated. Neuromarketing research findings should not be regarded as providing conclusive "scientific" evidence to support marketing objectives. Just like every other kind of research, neuromarketing studies have limitations, and the findings need interpretation. The best data interpretations and recommendations are likely to result from partnerships between vendors and users of the research.

Finally, in contrast to many other methods, the application of neuroscience to marketing is relatively new and, therefore, not all concepts and measures have been adequately validated. Additionally, as it became apparent in this project, neuroscientists are still debating the pros and cons of various methods.

As a result of all these issues, **there are no simple answers to questions like "Which method is best?" or "Which vendor should I use?"** That conclusion itself is, in the opinion of the ARF, an important insight. This project has clearly demonstrated that there are no simplistic shortcuts to the successful use of neuromarketing research. Rather, the project has identified a number of steps that both users of the research and vendors can take to achieve better results and further advance this field.

First, we think that potential users of neuromarketing research should be as clear as possible about their research objectives and carefully consider which kind of neuromarketing method, if any, can best meet those objectives. There is a lot of information on the various methods and the reviewers' evaluations in this white paper. As the field is evolving—and we expect to gain more insights from the continuation of the NeuroStandards initiative—it is important to stress that these suggestions reflect our current thinking at the conclusion of the first phase of the project.

The chart titled **Summary of Research Objectives and Suggestions for Research Methods**, found in the Introduction and Overview section of this white paper, lists a number of research objectives. In a given project, one, several, or all of these may be important. Therefore, depending on the research objectives, the user may decide either to work with a vendor who specializes in one particular research method or choose one that offers a variety of methods.

Second, we think that vendors and users of neuromarketing research should work together to achieve higher standards in this field. As stated, the evaluation process identified a number of issues that, if addressed properly, would enhance the validity and usefulness of the research. The chart titled **Establishing NeuroStandards: Summary of Issues for Discussion Between Vendors and Data Users**, also in the Introduction and Overview section, summarizes the issues that are discussed further in the sections following the introduction.

We hope that marketing research practitioners will find the independent academic evaluation of neuromarketing practice and suggestions by the ARF in this white paper useful. We are aware that some, maybe even many, might find navigating the complex scientific and technical issues—as well as the many caveats and detailed recommendations—a bit daunting. As a result, these practitioners might be tempted to retreat to the security and relative simplicity of traditional methods for measuring advertising effects. But we believe it is well worth making the effort to explore neuromarketing. In fact, we believe this effort is essential in order to maintain or enhance the competitiveness of your advertising in today's dynamic marketplace.

As noted earlier, traditional measures have a well-earned place in the advertising research practice of many firms. However, **the evidence is mounting that unconscious processes and emotions play a significant, if not decisive, role in consumer behavior and choice.** Most traditional methods rely on the consumer's conscious mind and memory—they do not fully capture the important dimension of emotional response. Also, traditional methods often find it difficult to detect or correct for socially desirable responses. Given these constraints, we think that passive and indirect measurement techniques based on advances in neurological science and technology have great potential to advance marketers' insights into consumer behavior.

Further, marketers may be concerned about the cost of adding neuromarketing research studies. Our advice here is simple: Invest what you are prudently able to invest—though we think it is important to gain experience with the neuroscience approach and allow your internal clients (senior marketing managers, etc.) to become familiar with its new metrics and analyses. These metrics may be unlike those your personnel are used to, but they have the potential to reveal valuable, incremental insights.

The ARF believes that if marketing professionals gain more experience with neuromarketing research and continue to ask more questions—and if vendors strengthen their efforts at validation—we will advance our understanding of unconscious and emotional influences on consumer behavior.

To advance the discipline of neuromarketing and guide the completion of the second phase of NeuroStandards, the ARF is establishing a new forum titled, "Neuro 2.0: How Advertising Works Today." If the ultimate goal of advertising research is to increase the productivity of advertising investments, quantitative ad research measures with predictive validity across a broad range of products and services are a must. Frankly, the need for this is as great for traditional measures as it is for the newer ones. The ARF's "Copy Research Validity Project" (published in 1991) was a noble first step in this direction.

With our groundbreaking insights about emotion and the emergence of new research options for understanding it, it is time for a new, robust, and comprehensive evaluation of predictive validity for traditional, neuromarketing, and other implicit approaches. That's what Neuro 2.0 is. The winning measures/technologies will successfully explain variation in actual in-market business results, driven by the specific creative tested. Indeed, we might well find that certain clusters of measures, each containing perhaps a few "traditionals," a few "neuros," and a few "implicits," collectively do the best job. Expect more on all of this shortly from the ARF.

In the meantime, we suggest the following: Where advertisers have traditional methods that they have validated against in-market business results, and in which they have confidence, the ARF encourages the use of neuroscience methods to complement these data and provide additional insights, especially regarding unconscious and emotional drivers of consumer response to advertising. Where advertisers do not have such confidence in traditional methods, we suggest that they consider neuromarketing research and explore its potential to produce new insights, while using all methods, traditional and neuroscience-based, with care. Also, whenever possible, advertisers who use neuroscience methods should conduct a post-research audit as to how well these measures align with in-market business results delivered by specific advertising executions and campaigns.

Above all, find some constructive way to engage with and embrace neuromarketing methods—uncertainties, unanswered questions, debates, and all. Learn from them, while you're also learning more about them, building your own preferences, and helping others in your company get used to this new type of information. Do what you can, but, by all means, do something!

The ARF management and the NeuroStandards Project leaders hope that this report, as well as the initiatives outlined here, will benefit the industry, keep the issues surrounding this promising area of marketing research innovation at the forefront, and lead to the continuation of a dialogue among academics, vendors, and users of this research.

APPENDIX

Reviewer Profiles

Patrick Barwise

(Review Panel) is emeritus professor of management and marketing at London Business School (LBS) and chairman of Which?, the UK's leading consumer organization. He joined LBS in 1976, after an early career at IBM, and has published widely on management, marketing, and media. His book, *Simply Better: Winning and Keeping Customers by Delivering What Matters Most*, co-authored with Seán Meehan (IMD Business School in Lausanne, Switzerland), won the American Marketing Association's 2005 Berry-AMA Book Prize. Their second book, *Beyond the Familiar: Long-Term Growth through Customer Focus and Innovation* (beyond-the-familiar.com), was published in March 2011.

Christopher F. Chabris, Ph.D.

(Review Panel) received his B.A. in computer science and his Ph.D. in psychology from Harvard University, where he was also a lecturer and research associate for many years. He is now assistant professor of psychology at Union College in Schenectady, N.Y.; adjunct assistant professor of neurology at Albany Medical College; and a research affiliate at the MIT Center for Collective Intelligence. His research focuses on two main areas: how people differ from one another in mental abilities and patterns of behavior, and how cognitive illusions affect our decisions. He has published papers on a diverse array of topics, including human intelligence, beauty and the brain, face recognition, the Mozart effect, group performance, and visual cognition. Chabris writes occasionally for *The Wall Street Journal* and other newspapers, and he is also a chess master and amateur poker player.

Annie Lang, Ph.D.

(Review Panel) received her Ph.D. from the University of Wisconsin-Madison, and is currently a professor of telecommunications and cognitive science at Indiana University. Her research seeks to explain how people process mediated messages. To date, this work has produced a general data-driven model of mediated message processing called the Limited Capacity Model of Motivated Mediated Message Processing. Throughout the last 20 years, this research has resulted in more than 100 academic publications and been supported by almost $3 million in grants. She currently serves on the editorial board of the *American Journal of Media Psychology* and is a fellow of the International Communication Association.

Reviewer Profiles

René Weber, Ph.D.

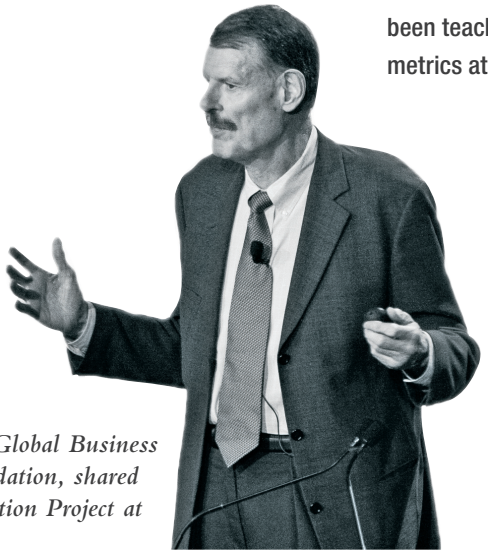
(Review Panel) is an associate professor in the Department of Communication and Cognitive Science Program at the University of California, Santa Barbara. He holds a Ph.D. in media psychology, an M.D. in cognitive neuroscience, and B.A./M.A. degrees in communication and business administration. Prior to his academic appointments, he worked as consultant for media entertainment in the U.S. and in Europe. In his recent research, he focuses on cognitive responses to mass communication and new technology media messages, including video games. He develops and applies both traditional social scientific and neuroscientific methodology (fMRI) to test media-related theories. His research has been published in major communication and neuroscience journals.

Duane Varan, Ph.D.

(Project Leader) is chief research officer and executive director of the Disney Media & Advertising Lab, a role he holds concurrently with his academic appointment as professor and executive director of the Audience Research Labs at Murdoch University. Dr. Varan is the recipient of numerous awards, including the Australian Prime Minister's Award for Australian University Teacher of the Year. For the past seven years, he has led the Beyond Thirty Seconds (beyond30.org) research project, a $7 million program exploring new ad models for television's changing landscape, sponsored by many of the world's leading media networks, advertising brands, and technology enablers.

Horst Stipp, Ph.D.

(ARF Team Member) joined the Advertising Research Foundation (ARF) as EVP of global business strategy in January 2011. Prior to that, he was senior vice president of strategic insights & innovation in the research department of NBCUniversal in New York, where he oversaw strategic marketing and consumer research for NBCU's TV networks as well as the new digital platforms. Stipp received his Ph.D. in sociology from Columbia University and has been involved in media research for over 30 years. His publications, in both English and German, cover a wide range of topics. Recently, he has written in journals and contributed to books on the development of the media in the digital age, and he has presented on these topics at conferences throughout the U.S. and Europe. Since 2000, he has been teaching a seminar on media metrics at Columbia Business School.



On March 22, 2011, Horst Stipp, EVP, Global Business Strategy at the Advertising Research Foundation, shared results from the NeuroStandards Collaboration Project at Re:think, the ARF Annual Convention.

Expert Reviewers

Robert J. Barry is Professor, School of Psychology and Director of the Brain & Behaviour Research Institute at the University of Wollongong, Australia

Rajeev Batra is Sebastian S. Kresge Professor of Marketing and Director of the Yaffe Center for Persuasive Communication at the Stephen M. Ross School of Business, University of Michigan.

Steven Bellman is Associate Professor at Murdoch University, Australia, and Deputy Director of the Interactive Television Research Institute.

Mark G. Frank is Professor, Communication Department at the University of Buffalo and on the Advisory Board for the university's Center for Unified Biometrics and Sensors.

Bill Gehring is Arthur F. Thurnau Professor of Psychology, Department of Psychology, at the University of Michigan.

Scott Huetell is Associate Professor at Duke University and Director of the Duke Center for Interdisciplinary Decision Science, Duke Institute for Brain Sciences.

Steven Luck is Director of the Center for Mind and Brain and Professor, Psychology, University of California, Davis.

Russell A. Poldtrack is Professor of Psychology and Neurobiology, and Director of the Imaging Research Center at the University of Texas at Austin.

Rob Potter is Associate Professor at the Department of Telecommunications, Indiana University.

Leonard N. Reid is Professor of Advertising, Department of Advertising & Public Relations, Grady College of Journalism and Mass Communication at the University of Georgia.

David Stewart is Professor of Marketing at the University of California, Riverside.

Dawn Sweet is Lecturer, Communication Studies Program at Iowa State University

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American Express (NYSE: AXP) is the world's largest card issuer by purchase volume, and operates the world's largest travel network, serving consumers and businesses. With revenues of more than $7 billion, American Express is recognized as the premium network for high-spending cardmembers, and as the most innovative company in their industry. In addition, American Express is also the only company with a strong global presence across the entire payments chain. This unique access gives American Express opportunities to grow business and drive marketplace innovation. American Express has been doing business for more than 160 years, and its superior service has earned five consecutive J.D. Power and Associates awards for highest customer satisfaction among credit card companies. In addition to service, corporate responsibility is an integral part of American Express, and the company is involved in historic preservation, supporting and strengthening leadership in the nonprofit sector, and promoting community service among employees and community members.

Campbell Soup Company* | Gold Sponsor *Campbell's, the world's leading maker of soup, offers 90 different soups across its Condensed Soups, Chunky, Select Harvest, Slow Kettle Style Soups, Healthy Request, and Microwavable Soups categories. Campbell's products are sold in 120 countries around the globe, and, in the U.S. alone, Campbell's accounts for more than 60 percent of the wet soup market. Campbell's sells almost 2 billion cans of soup each year in the U.S., and more than 80 percent of all U.S. households purchase Campbell's soups. Founded in 1869, Campbell's is committed to providing products that meet the daily nutritional and lifestyle needs of consumers. Campbell's also places a large emphasis on social responsibility, and the Campbell Soup Foundation donates $1 million each year to a variety of organizations geared toward positively impacting the lives of residents in Camden, N.J., the birthplace of Campbell's flagship soup business. Outside of Camden, the foundation also supports charitable efforts in more than 20 communities and supports 15 separate United Way campaigns. Last year, the foundation generated more than $1.7 million in donations for the United Way.*

The Clorox Company | Gold Sponsor
is a leading manufacturer and marketer of consumer products, with 8,300 employees and fiscal year 2010 revenues of $5.2 billion. Clorox markets some of consumers' most trusted and recognized brand names, including its namesake bleach and cleaning products; Green Works® naturally derived home care products; Pine-Sol® cleaners; Poett® home care products; Fresh Step® cat litter; Kingsford® charcoal; Hidden Valley® and KC Masterpiece® dressings and sauces; Brita® water-filtration products; Glad® bags, wraps, and containers; and Burt's Bees® natural personal care products. Nearly 90 percent of Clorox Company brands hold the No. 1 or No. 2 market share positions in their categories. The company's products are manufactured in more than two dozen countries and sold in more than 100 countries. Clorox is committed to making a positive difference in the communities where its employees work and live. Founded in 1980, The Clorox Company Foundation has awarded cash grants totaling more than $80 million to nonprofit organizations, schools, and colleges. In fiscal year 2010 alone, the foundation awarded $3.5 million in cash grants, and Clorox made product donations valued at $8.8 million. For more information about Clorox, visit TheCloroxCompany.com. The Clorox Company Global Insights team was highly motivated to participate in the NeuroStandards Project to learn about the variety of vendors in this new space, to obtain feedback and assessment on the same ad by all the vendors, and to understand the progress and linkage between neuroscience and the research world to impact business.

Sponsors

Colgate Palmolive* | Gold Sponsor *began as a small soap and candle business in New York City more than 200 years ago. Now as a global company with brands sold in over 200 countries, Colgate-Palmolive has established itself as a leading consumer products company. Products such as Colgate, Mennen, Palmolive, Ajax, Softsoap, and Hill's Pet Nutrition are among the world's most recognizable household names. Innovation is an integral part of Colgate-Palmolive, as is its commitment to advancing technology in order to improve the quality of life of its consumers. The core corporate values of Colgate-Palmolive—including caring, global teamwork, and continuous improvement —are also reflected in the company's product quality and reputation, and in its dedication to serving consumer communities. Colgate-Palmolive has partnered with various organizations, including the Hispanic Scholarship Fund, the Hispanic Dental Association, the United Negro College Fund, Starlight Children's Foundation, and the American Dental Association, to help promote oral health, higher education, and generally improve people's quality of life. In addition, Colgate has established two programs, Bright Smiles Bright Futures and the Colgate's Women's Games, to promote health and well-being.*

General Motors | Gold Sponsor *is one of the world's largest automakers, traces its roots back to 1908. With its global headquarters in Detroit, GM employs 202,000 people in every major region of the world and does business in more than 120 countries. GM and its strategic partners produce cars and trucks in 30 countries, and sell and service these vehicles through the following brands: Baojun, Buick, Cadillac, Chevrolet, GMC, Daewoo, Holden, Isuzu, Jiefang, Opel, Vauxhall, and Wuling. As one of the leading marketers in the world, GM is constantly looking at improving all of its marketing practices and media platforms. To do so, GM Market Research leverages a tool chest of resources and maintains a bank of the best and new practices in primary research. As one of the industry leaders in market research, and Gold Sponsor of the ARF NeuroStandards effort, we embarked on this effort as a way of helping the industry as a whole move forward in understanding and establishing best practices in the neuromarketing research space. The experience we have had in this effort is helping GM develop applications for using these technologies and has increased our depth of knowledge in this space.*

The Hershey Company | Gold Sponsor *(NYSE: HSY) is the largest producer of quality chocolate in North America and a global leader in chocolate and sugar confectionery. Headquartered in Hershey, Pa., The Hershey Company has operations throughout the world and more than 13,000 employees. With revenues of more than $5 billion, The Hershey Company offers a wide range of confectionery products, including such iconic brands as Hershey's, Reese's, Kisses, Hershey's Bliss, Special Dark, Hershey's Syrup, Kit Kat, Twizzlers, Ice Breakers, PayDay, and Jolly Rancher. The company is also a leader in the premium and artisan chocolate segments, with such brands as Scharffen Berger and Dagoba, offered through the Artisan Confections Company, a wholly owned subsidiary. The company is focused on growing its presence in key international markets in Asia and Latin America, while continuing to build its position in the United States.*

Sponsors

MillerCoors | Gold Sponsor *is the nation's second-largest brewer, marketing a range of 30-plus beer brands in the U.S. marketplace, including such iconic brands as Coors Light, Miller Lite, Miller High Life, Miller Genuine Draft, and Keystone Light. MillerCoors is the U.S.-based joint venture of two of the global leaders in beer: SABMiller (based in London) and MolsonCoors (based in Denver). Through its Tenth and Blake division, MillerCoors is also the country's preeminent craft and import beer marketer, with some of the nation's fastest-growing brands, such as Blue Moon, Leinekugel's, and Peroni. The beer industry is a very marketing-sensitive category, as consumers develop emotional bonds with the brands as well as brand stories that reflect their values and aspirations. As a result, MillerCoors spends a large amount of its marketing budget on communication ideas that must engage and entertain the legal-drinking-age consumer, as well as solidify the unique selling propositions of each beer brand. The research discipline at MillerCoors is robust, and, as such, the company has sought to be experimental and forward-looking in its approach to gaining deeper insights into how adult consumers think and feel when responsibly experiencing the brand. As science advances into a deeper understanding of what makes consumers engage, MillerCoors aims to be a thought leader and industry proponent of advancing that knowledge.*

JPMorgan Chase* | Gold Sponsor
More than 200 years ago, in 1799, the earliest predecessor of the JPMorgan Chase & Co. (NYSE: JPM) firm was established. JPMorgan Chase & Co. is now one of the oldest, largest, and best-known financial institutions in the United States. The company is also a leading global financial services firm, operating in over 60 countries, with assets of $2.3 trillion. With the goal of becoming the best financial services company in the world, JPMorgan Chase & Co. centers its business decisions around three principles: aspire to be the best, execute superbly, and build a great and winning culture. Emphasis is also placed on supplier partnerships. Through relationships with diverse suppliers, JPMorgan Chase seeks to enhance its business and create mutual gain with the communities it serves. Since 1994, JPMorgan Chase has spent more than $7 billion with diverse suppliers in its aim to build a strong and vibrant business community. JPMorgan Chase & Co. is also committed to corporate responsibility through strengthening partner communities, global philanthropy, social finance, diversity, environmental sustainability, and promoting human rights.

ESPN | Gold Media Sponsor, *is the world's leading multinational, multimedia sports entertainment company, featuring a portfolio of more than 50 multimedia sports assets. The company is comprised of seven 24-hour domestic television networks — ESPN, ESPN2, ESPNEWS, ESPNU, ESPN Classic, ESPN Deportes and ESPN 3D. (ESPN, ESPN2, ESPNU and ESPNEWS HD are simulcast services.) Other businesses include ESPN Regional Television, ESPN International (46 networks, syndication, radio, Web sites), ESPN Radio, ESPN.com, ESPN3.com (broadband sports network), ESPN Mobile, ESPN The Magazine, ESPN Enterprises, ESPN PPV, and other growing new businesses, including ESPN on Demand and ESPN Interactive. Based in Bristol, Conn., ESPN is 80 percent owned by ABC, Inc., which is an indirect subsidiary of The Walt Disney Company. The Hearst Corporation holds a 20 percent interest in ESPN.*

Sponsors

MTV Networks | Gold Media Sponsor, *a division of Viacom (NYSE: VIA, VIA.B), is one of the world's leading creators of entertainment content, with brands that engage and connect diverse audiences across television, online, mobile, games, virtual worlds, and consumer products. The company's portfolio spans more than 150 television channels and 400 digital media properties worldwide, and includes MTV, VH1, CMT, Logo, Nickelodeon, Nick at Nite, Nick Jr., TeenNick, AddictingGames, Shockwave, Neopets, Comedy Central, SPIKE, TV Land, Atom, and GameTrailers. We participated in the NeuroStandards Collaboration Project to have access to the comparisons across methodologies. That the assessments were done by experts in the field was also a major driver. It was too good an opportunity to pass up.*

NBCUniversal | Gold Media Sponsor *NBCUniversal is one of the world's leading media and entertainment companies in the development, production, and marketing of entertainment, news, and information to a global audience. NBCUniversal owns and operates a valuable portfolio of news and entertainment television networks, a premier motion picture company, significant television production operations, a leading television stations group, and world-renowned theme parks. Comcast Corporation owns a controlling 51 percent interest in NBCUniversal, with GE holding a 49 percent stake. NBCUniversal is actively participating in the ARF's groundbreaking NeuroStandards initiative so that we can better understand the strengths and challenges of the various neuromarketing research methodologies. We hope that the insights generated by this important industry-relevant project will help inform NBCUniversal and our clients on the best ways to leverage these innovative biometric research tools and techniques.*

Turner | Gold Media Sponsor
Turner Broadcasting System, Inc., a Time Warner company, creates and programs branded news, entertainment, animation, and young-adult media environments on TV and other platforms for consumers around the world. Our motivation for taking part in this project: We've known for a long time that measuring what people actually do is preferable to what they say they do. Neuroscience has shone a light on how so many of our choices are below our conscious thought. In a media environment of ever-expanding options, the more we can understand about how choices are made, the better equipped we'll be to remain both attractive to our viewers and strategic for our advertising partners.

Sponsors

Dentsu Inc. | Silver Sponsor

Founded in 1901, Dentsu Inc. has held the position of the world's largest single-brand agency for almost 40 years. Through its unique "Integrated Communication Design" approach, Dentsu offers multinational clients the most comprehensive range of advertising and marketing services in the industry. While continuing to pursue innovation in the digital arena, Dentsu is active in the production and marketing of sports, movies, anime, and other entertainment content on a global scale. The Dentsu Group has more than 6,000 clients and close to 20,000 employees worldwide. We believe that the fragmentation of consumer lifestyles, a changing sense of values, and progress in digitization have all resulted in diversification in the modes of communication between companies and consumers, as well as a considerable shift in the needs of clients. In response, the Dentsu Group provides integrated solution services, drawing on a deep reservoir of accumulated marketing-relating expertise and solid relationships with leading media companies. Today, however, the emphasis is on the search for innovation in a new era of communication. To that end, we infuse all services provided by the Dentsu Group with leading-edge research techniques, like neuroscience in recent years, to achieve unique consumer insights and perspectives. As early adopters in the space, we were eager to participate in the NeuroStandards Collaboration Project.

Publicis Groupe | Silver Sponsor

As a company in aggressive pursuit of innovation, insights and results, Publicis Groupe is proud to support the ARF NeuroStandards Forum. Publicis Groupe is the world's third-largest communications group, with activities spanning 104 countries on five continents. We offer local and international clients a complete range of advertising services, including digital and media expertise. In 2006, Publicis Groupe anticipated that the consumer landscape would continue to change at a rapid pace, and we decided to reinvent our organization. We recognized that to lead our clients into the future, we would have to respond to the emerging digital world by linking technology to human emotion. We created what we call the Human Digital Agency, and embarked on a journey of investment and change. A major part of this journey is a passionate and persistent hunger for insights. The latest research in neuromarketing provides another window through which we can expand our human understanding, and the ARF's initiative to explore and clarify the complexity of this space is consistent with our pursuit to know people and to engage them with messages, content, and experiences that add value and meaning to their lives.

A+E Networks | Silver Media Sponsor *is an award-winning global media content company offering consumers a diverse communications environment, ranging from television networks to Web sites to home videos/DVDs to gaming and educational software. We've been in the business of reinventing storytelling since 1984. We took history out of the history books and we brought biography to life. We've invented new genres, told untold stories and broken barriers. Led by three iconic brands—A&E®, HISTORY™, and Lifetime®—A+E Networks also includes Lifetime Movie Network, BIO™, History International™, Lifetime Real Women, Military History, HISTORY en ESPAÑOL™, Military History Channel™, Crime & Investigation Network™, and A&E IndieFilms®. A+E Networks is also a leading provider of digital media, consumer products, and educational services. A+E Networks channels and branded entertainment reach more than 250 million households in over 150 countries around the world. A+E Networks is a joint venture of Disney-ABC Television Group, The Hearst Corporation and NBCUniversal. At A+E networks, we are committed to advancing insight around viewer engagement with content and its effects on advertising. As neuroscience research becomes a more prevalent tool in this space, this initiative allows us to evaluate the varying methodologies and gain insight into the optimal ways to apply the capabilities.*

Warner Bros. | Silver Media Sponsor *Warner Bros. Domestic Television Distribution is one of the leading distributors of entertainment programming to the domestic television marketplace, distributing first-run syndicated series, off-network TV programs and theatrical motion pictures to local broadcast TV stations, as well as to pay, cable, satellite, and broadcast networks throughout the U.S. As a NeuroStandards sponsor, the company intends to provide marketers and media producers with a powerful framework to objectively evaluate new research techniques that could lead to more effective and engaging content.*

Gold and Silver Sponsorship Details

Benefits of Participation as a Silver or Gold Sponsor

Invitations to special briefings throughout the research process; one-on-one meetings with vendors during the NeuroStandards Retreat; recognition in NeuroStandards publicity and publications, the opportunity to evaluate and comment on preliminary drafts of the ARFs formal reports on Engagement 3: NeuroStandards Collaboration; a chance to formally discuss the implications of the senior review panel's findings for ARF standards; an invitation to join vendors and gold sponsors at an exclusive sponsor reception during the ARF 75th Anniversary Annual Convention; special offers on testing from select neurostandards vendors.

Added Benefits of Participation as a Gold Sponsor

Ad results from an independent and objective process; the ability to see the results of the tests, using their own creative content across the leading neuroscience vendors, offering a unique comparative view (Gold Sponsor Brands); the ability to see the results of ad testing across vendors (Gold Media Sponsors); an invitation to attend a neurostandards retreat and discuss results with vendors and experts in a personalized setting.

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