AAA INSTRUCTIONS ON PREPARING SPECIAL TOPICS SESSIONS FOR THE PROCEEDINGS
(Updated November 26, 2008)

Instructions:
Please use this sample as a template for setting up your SPECIAL TOPICS SESSION for the AAA Proceedings. Special Topics Sessions can be up to 6 pages in length total. If you have references, use Journal of Advertising style and put all references together at the end of the Conclusions (see below). Follow this formatting exactly. Special Topics Sessions that do not conform to this formatting will be sent back to the authors(s) to be modified. Refer all questions to the Vice President.

EXAMPLE: SPECIAL TOPICS SESSION
(Formatting starts below)

SPECIAL TOPICS SESSION:
HOW THE CONSUMER'S BRAIN FUNCTIONS: WHERE MARKETING MEETS NEUROSCIENCE

Moderators: Milica Milosavljevic, California Institute of Technology, Pasadena, CA
Baba Shiv, Stanford University, Stanford, CA
Rafal K. Ohme, Polish Academy of Sciences, Warsaw, Poland
Hilke Plassmann, California Institute of Technology, Pasadena, CA

Overview

Although it is known that "ads greatly impinge on consumers' awareness and have the potential of greatly affecting their thoughts, attitudes, feelings, and decisions (Tellis 2004)," our understanding of these effects is still limited. This is in large part due to the use of inappropriate methods for assessing consumer behavior. Zaltman (2003) warned us that "a great mismatch exists between the way consumers experience and think about their world and the methods marketers use to collect this information."

Other scientific fields, specifically neuroscience, made much progress in increasing our understanding of how we function by examining the brain. In fact, "more may have been learned about the brain and the mind in the 1990s – the so called decade of the brain – than during the entire previous history of psychology and neuroscience (Damasio 2002)." More specifically, advancement of brain imaging techniques brought about a revolution in how we study and explain human behavior. Indeed, Posner (2004) advised that "imaging is not just a new tool for studying the human brain it is an appropriate tool for understanding how our brains control our behavior." In assessing the utility of these methods for advertising researchers, Plassmann and colleagues (2007) conclude that "technological innovations in the field of neuroimaging appear to override the methodological problems of the former approaches."

Many neuroimaging methods are used to study the brain. For the present session, the focus is on two methods: electroencephalography (EEG) and functional magnetic resonance imaging (fMRI). Electroencephalography (EEG) uses electrodes placed on the scalp to record changes in electrical activity

of different brain parts over time. EEG has poor spatial resolution (about 2 centimeters), but excellent temporal resolution (1/1000 of a second). For EEG, the level of invasiveness and purchase/use cost is low.

An interesting extension is combining EEG findings with electromyography (EMG) (Ohme 2006). EMG is a technique for evaluating physiological properties of muscles, in this case of three facial muscles: corrugator supercilii (a small muscle at the inner end of the eyebrow), zygomaticus major (a muscle that raises the corner of the mouth), and orbicularis oculi (a muscle that closes the eyelids, but also pulls the cheeks up thus creating slight wrinkles at the corners the eyes). EMG has been considered a powerful instrument to test voluntary (zygomaticus major) and involuntary (corrugator supercilii and orbicularis oculi) facial muscle movements which respectively may reflect conscious and unconscious expression of emotions (Larsen, Norris, and Cacioppo 2003; Dimberg, Thunberg, and Elmehed 2000).

Next, functional magnetic resonance imaging (fMRI) measures changes in blood oxygenation as a metabolic consequence of changes in brain activity (the so-called blood oxygen-level dependent or BOLD fMRI). This method has excellent spatial resolution (3-5 millimeters) to localize where changes in brain activity correlate with a certain mental activity, such as choosing between brands A and B. However, its temporal resolution does not reach the one of EEG, it is typically about one second. fMRI is a non-invasive technique, but purchase cost is high and use cost is medium (Smith and Kosslyn 2007). An interesting extension of findings from fMRI and other physiological studies (such as eyetracking) is to combine this knowledge with the computing power available to simulate neural systems on a computer. This effort occurs within the field of computational neuroscience and is discussed later in this summary.

Thus, the objectives of this special session are to (1) provide information about the new methods available from neuroscience for studying consumer behavior, (2) introduce means to validate existing and propose new theories of how advertising works, (3) demonstrate how advertising practice can benefit from increased understanding of consumer behavior and underlying cognitive processes, (4) discuss currently conducted research at the intersection of advertising and neuroscience, and (5) provide directions for future research.

TV COMMERCIAL SECOND BY SECOND: APPLYING EEG AND EMG TO TRACK DOWN CONSUMERS' EMOTIONS AND ATTENTION

Rafal Ohme, Laboratory, Polish Academy of Sciences, Poland

Summary

Ohme began the session by discussing the utility of EEG and EMG for advertising research. In 2007, NIVEA Poland received a 60 second TV spot created for the "*Beauty is…*" image campaign. The question arose about whether to use the full version of the ad or to have it shortened to a 30-second version. We were asked to help NIVEA decide how to shorten the original 60-second ad (Stage 1 – neuro copy pre-test). We were also to examine whether the new 30-second spot is as effective as the original 60-second version (Stage 2 – verbal and behavioral copy pre-test).

In the Stage 1, EEG (electroencephalography) together with SC (skin conductance) analyses were conducted on 45 females (NIVEA target group). The former reveals which emotions are experienced during exposure to each second of the ad, while the latter informs how intense the respondents' level of arousal is. Thanks to the neuro-approach we were able to reliably identify six best scenes, which produced highest positive levels of emotions and arousal. The scenes consequently produced a new 30-second version of the ad.

In the Stage 2, the pre-campaign TV test was conducted on 240 NIVEA target female respondents. It was run in *experimental model* (i.e. with a control group – not exposed to TV commercials) and in *low-involvement mode* (i.e. participants were unaware that the objective was to test TV commercials). It

measured both the conscious evaluations (ranging from "strongly disagree" to "strongly agree") as well as the automatic, impulsive reactions (reflected by *reaction times* [RT], i.e. latency of respondent's responses on the response box pad). Finally, a shelf-test was conducted, in which all participants were given a complimentary gift - a discount coupon for any product from NIVEA or its major competitor's brand range.

The *ad impact* (Δ) metrics were calculated – i.e. the difference between experimental and control group. The results were clear. The measures of brand, product, users, and c2a evaluations, as well as the shelf-test, were very consistent across the tested groups and were significantly higher in the 30-second version than in the 60-second version. As a result NIVEA Poland decided to air the 30-second version and to spend (quite significant) savings on complimentary marketing mix activities.

HOW FUNCTIONAL MAGNETIC RESONANCE (fMRI) CAN BE APPLIED TO MARKETING RESEARCH

Hilke Plassmann, California Institute of Technology, U.S.A.

Summary

In the second presentation, Plassmann gave an overview about methodological aspects of the currently most popular brain imaging technique called functional magnetic resonance imaging (fMRI). After a methodological primer she presented two of her fMRI studies that investigate questions in marketing research.

The first study (Kenning et al. 2007) was based on findings from neuroscience that suggests that we have different neural representations of memory for negative stimuli as compared to positive stimuli, while both are better recalled than neutral stimuli. The purpose of the study was to investigate whether these findings also hold for advertising stimuli by scanning the brains of 22 subjects with fMRI while they made judgments about their ad liking of 30 print ads. The results indicate different neural correlates for liked, disliked, and neutral ads, similar to those of basic emotions with different valence, that offer interesting implications for advertising research. In addition, the results show that the neural correlates of ad liking predict ad recall.

In the second study (Plassmann et al. 2008), the findings about the neural mechanisms through which marketing actions affect the decisions made by individuals were presented. The main hypothesis was that marketing actions, such as changes in the price of a product, can affect neural representations of experienced pleasantness. Human subjects were scanned using functional magnetic resonance imaging (fMRI) while they tasted wines which, contrary to reality, participants believed to be different and sold at different prices. The results show that increasing the price of the wine increases subjective reports of flavor pleasantness as well as BOLD fMRI activity in medial orbitofrontal cortex (mOFC), an area that is widely thought to encode for experienced pleasantness during experiential tasks. The study provides novel evidence for the ability of marketing actions to modulate neural correlates of experienced pleasantness and for the mechanisms through which the effect operates.

COMPUTATIONAL MODELING OF ATTENTION IN ADVERTISING CONTEXT

Milica Milosavljevic, University of Miami, U.S.A.

Overview

In the final presentation, Milosavljevic introduced computational neuroscience and computational modeling of attention. Computational neuroscience attempts "to understand mental activity so well that you could program a computer to mimic the way the brain functions when we perform tasks (Smith and Kosslyn 2007)." The emphasis for this session was on demonstrating the utility of simulating early visual attention on a computer for advertising theory and practice.

The importance of attention for marketers is well know; for example Sacharin (2000, p. 2) points out that "Marketers can't persuade people unless they have their attention first. Marketers can't earn customers' loyalty unless they have their attention first. Attention is a prerequisite for all marketing efforts." However, marketing studies of attention are rare (Rosbergen, Pieters, and Wedel 1997). This is most likely due to inherent difficulties in measuring attention which may be discouraging to many researchers. Especially troublesome is the measurement of preattention, which is known to precede focal attention.

As was already pointed out, cognitive and computational neuroscience attempt to simulate early vision on a computer. Thus, any visual image can be analyzed by the computational algorithm and most salient objects in the scene can be identified. These are the objects that will be preattentively, automatically processed by a viewer. Improved measurement of preattention can greatly benefit advertising discipline.

For example, Milosavljevic (2007) assessed the utility of one of the computational models of early visual attention, the model of bottom-up attention and saliency (Itti, Koch, and Niebur 1998), in an on-line advertising context. The results indicate that even when people do not remember seeing a banner ad on the Web site, their attitude toward that ad improves the longer they are exposed to the Web site when that ad is deemed salient by the computational model, but not when exposed to a very similar banner ad that the model a priori characterized as nonsalient. Further studies are needed to examine the utility of the computational modeling of attention in other advertising contexts such as magazine cover design, brand placement, point-of-purchase environment, etc.

Conclusion

As Zaltman (2003) points out, marketers are using outdated and biased methods to assess the effects of advertising on consumer behavior. Similarly, Braidot (2005) concludes that a large portion of human motivations are below our level of consciousness, thus "none of the traditional techniques, by itself, can discover what really leads a consumer toward certain behaviors."

With the advancement of methods for studying the brain, advertising discipline can finally improve its understanding and measurement of many aspects of consumer behavior. Kenning, Plassmann, and Ahlert (2007) point out that "conscious emotional information processing and perception have been studied extensively in consumer research… [however] little is known about how marketing stimuli… are processed by the human brain. The main benefit to both marketing research and practice of observing the brain *in vivo* during information processing procedures is that such subconscious processes as the intuitive integration of emotions can be investigated."

The research that combines knowledge and methods from neuroscience and marketing is still rare. Braidot (2005) hints at a range of issues to be addressed by future studies (1) importance of thoughts and emotions in consumer decision-making, (2) impact of attributes of a product on acceptance or rejection of the product, (3) how well consumers remember TV commercials, (4) how much of mental processing is unconscious versus conscious, (5) how consumer memories develop and change, and (6) what is the relationship between a brand and consumers' emotional reactions, etc.

Thus, neuroscience and its techniques provide a way for marketing researchers to test many theories of advertising and consumer behavior and increase understanding of factors that influence this complex behavior. However, "it is important that market researcher keeps in mind that various research techniques are still in their infancy and basic research is necessary to facilitate an application of these techniques to marketing (Plassmann et al. 2007)." The ultimate utility of such research is envisioned by Zaltman (2003): "the intellectual products of the knowledge society that have implementable validity for

marketing managers can also widely benefit individual consumers and society in general;" more specifically, "neuroimaging techniques will likely serve as helpful tools in bringing better and more meaningful goods and services to consumers."

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