Chapter 7
Virtual Reality and Neuroimaging Technologies: Synergistic Approaches in Neuromarketing

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ABSTRACT
Marketers have long been fascinated by the possibility of understanding how consumers think and what factors stimulate favorable reactions to marketing stimuli. Marketers are now beginning to utilize neuromarketing techniques to map patterns of brain activities to ascertain how consumers evaluate products, objects, or marketing messages. Neuromarketing is relatively a new field of marketing that utilizes computer-simulated environments, such as Virtual Reality (VR) or Immersive Virtual Reality (IVR) technologies combined with neuroimaging technologies, such as Functional Magnetic Resonance Imaging (fMRI), Quantitative Electroencephalography (QEEG), Magnetoencephalography (MEG), and other means of studying human neurological responses. Marketers need this information to help gain favorable reactions to their marketing stimuli and to predict which product designs and marketing messages will appeal most and be on consumer’s minds when the prospects are ready to buy.

INTRODUCTION
Marketers spend billions of dollars each year on relatively crude methods such as focus groups, questionnaires, and measurements of eye movements in an attempt to understand how the human brain makes decisions and what motivates consumers to spend. However, with advances in the fields of virtual reality and neurosciences, marketers can now predict with relative accuracy which design or marketing message will appeal most to consumers by mapping out which parts of the brain are active when consumers look at certain products or marketing messages. These relatively new field is aptly termed as ‘neuromarketing’, which has stimulated significant innovations in marketing in general and in marketing research in particular. Neuromarketers combine virtual reality technologies with neuroscience, brain scanning, or neuroimaging technologies to help predict which

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marketing stimuli or marketing messages will appeal most to consumers by mapping out which parts of the brain are active when respondents look at certain stimuli or marketing messages. However, critics of this approach are concerned with the ethical and philosophical issues related to marketers’ ability to probe mechanisms behind people’s decision-making processes coupled with the dilemmas these advances in brain science present and who should be allowed to peek into consumers’ brains.

This chapter reviews neuromarketing technologies such as computer-simulated environments combined with neuroimaging technologies utilized in neuromarketing. This chapter gives an overview and focuses on the advances in the fields of virtual reality and neuroimaging and the ability to use brain responses to ascertain how consumers evaluate marketing stimuli.

**NEUROMARKETING**

Marketers in the past relied on traditional market research methods such as surveys and focus groups, indirect and often inaccurate methods such as observing how consumers behave in stores, or tracking how purchases rise or fall in response to promotional campaigns or changes in pricing. However, these methods are often fraught with bias and imprecision and fail to predict consumers’ thoughts and feelings. Although brain-scanning devices have been available for decades, new scanning technologies and computer processing algorithms can pinpoint more precisely which brain regions are active as people respond to products, makes, and brand choices, or are exposed to marketing stimuli such as advertisements. Neuromarketing, according to Sutherland (2007) is relatively a new field of marketing that utilizes neurosciences, computer-simulated environments, medical technologies, and other scientific means of studying human consumers’ neurological, sensorimotor, cognitive, and affective responses to marketing stimuli. Lesley Stahl, a 60 Minutes correspondent recently reported on neuroscience research into how we think and what we are thinking is advancing at a stunning rate, making it possible for the first time in human history to peer directly into the brain to read out the physical make-up of our thoughts, some would say to read our minds (Columbia Broadcasting System (CBS), 2009). Some of the medical technologies used in neuromarketing include functional magnetic resonance imaging (fMRI), magnetoencephalogram (MEG), and quantitative electroencephalogram (qEEG). Of the three, according to Kenning et al. (2007) and Kenning, Plassmann, & Ahlert (2007), fMRI, to try to figure out what we want to buy and how to sell it to us, has captured the greatest interest among market researchers and enjoyed the widest publicity.

Marketers need this information to help gain favorable reactions to their marketing stimuli and to predict which product designs and marketing messages will appeal most and be on consumer’s minds when the prospects are ready to buy. With breakthroughs in neuroscience, neuromarketers can hope to see what goes on inside consumers’ minds when they shop by hooking people up to functional magnetic resonance imaging (fMRI) machines to map how their neurons respond to products and pitches (Carr, 2008). The relatively new approach that combines neurosciences with marketing techniques is aptly termed neuromarketing. Gemma Calvert, co-founder of a London company called Neurosense told Leslie Stahl, a CBS’s 60 Minute correspondence, that companies such as Unilever, Intel, McDonald’s, Proctor & Gamble, MTV, or Viacom are already using neuromarketing techniques to predict what consumers want to buy and how to sell their desired products to them (Columbia Broadcasting System (CBS), 2009).

Some of the roots of neuromarketing go back to neuroscientist Damasio’s (2005) assertion that human beings use the emotional part of the brain when making decisions, not just the rational part,