

nature neuroscience

Brain scam?

Sellers have always spent a great deal of time, money and energy trying to find ways to influence buyers' decisions. Now, thanks in part to the increasing accessibility of functional magnetic resonance imaging (fMRI), marketing executives are hoping to use neuroscience to design better selling techniques. If the media hype is to be believed, then fMRI is being exploited by savvy consulting companies intent on finding 'the buy button in the brain', and is on the verge of creating advertising campaigns that we will be unable to resist.

A more skeptical view of neuromarketing is that cognitive scientists, many of whom watched from the sidelines as their molecular colleagues got rich, are now jumping on the commercial bandwagon. According to this view, neuromarketing is little more than a new fad, exploited by scientists and marketing consultants to blind corporate clients with science.

What is the science behind all this fuss? In one widely discussed (but still unpublished) study, Read Montague, at Baylor College of Medicine in Houston, used fMRI to study cola preferences. Montague found that when subjects rated Pepsi or Coke in a blind test, activity in the ventral medial prefrontal cortex correlated with their stated preferences. However, if subjects were told that one of the samples was Coke, they were more likely to prefer it, and this change in preference was accompanied by increased activity in other brain areas thought to be involved in reward. When the sample was identified as Pepsi rather than Coke, however, this produced neither a behavioral shift nor a change in brain activity. These results have been interpreted as reflecting neural correlates of Coca-Cola's brand effect, which, as marketers know, can powerfully affect consumer choice.

In another experiment, sponsored by carmaker DaimlerChrysler at the University Clinic of Ulm, Germany, researchers used fMRI to scan men as they looked at pictures of cars and rated their attractiveness (Erk, S. *et al.*, *Neuroreport* 13, 2499–2503; 2002). Predictably, the subjects were more attracted to sports cars than to limousines or small cars, and the sports cars elicited greater activity in brain reward areas. Other groups are applying similar techniques to movies and even political advertisements; for example, another unpublished study at the University of California, Los Angeles recently reported that Democrats and Republicans differ in their neural responses to campaign commercials showing images of the 9/11 terrorist attacks.

It should come as no surprise that some companies have seen a business opportunity in these studies and others like them. Neuromarketing advocates argue that brain activity is a much better measure of how people feel about products than are traditional focus groups or surveys, which are notoriously unreliable. People's stated responses may not reflect their actual buying patterns, and it is difficult for a survey to capture the emotional reasons underlying consumer preferences. Brain imaging offers the promise of overcoming

these limitations by measuring people's direct responses to products, and—at least in theory—allowing companies to adjust the advertising strategy or the product itself to maximize its appeal to consumers.

One of the first to jump on this bandwagon was BrightHouse, an Atlanta-based marketing consultant firm, which recently set up the Institute for Thought Sciences in collaboration with Emory University addiction researcher Clint Kilts, with the intention of harnessing neuroscience for the purpose of market research. Similarly, Neurosense Inc. in Oxford, UK uses a combination of brain imaging and behavioral testing to provide clients with guidance about consumer thought and behavior, according to company chairman Michael Brammer.

The prospect of big corporations or political lobbyists enlisting brain science to manipulate consumer and voter behavior has inevitably raised concerns in some quarters: a watchdog agency founded by consumer advocate Ralph Nader, for instance, has asked the US government to investigate neuromarketing companies on public health grounds. But given the current state of the science, these worries seem premature. Cognitive science is not yet close to explaining or predicting human decision-making in the real world, and even advocates such as Kilts admit that companies need to be more informed about the technology of fMRI if they are to understand its limitations. It is easy to be seduced by colorful pictures of brain activity and to believe that these images are rich in scientific content. But the images are highly processed and cannot be interpreted without a detailed understanding of the analytical methods by which they were generated. Moreover, these images are invariably produced under controlled laboratory conditions, and it is a major leap to extrapolate to a genetically and culturally diverse population of people in an almost infinite variety of real-world situations.

Whether research into consumer decisions will lead to interesting scientific insights remains to be seen, although in the meantime, some scientists in the field may welcome the prospect of corporate funding for their research. From a corporate perspective, however, the key question will be whether the technology is effective in the marketplace. The failure of a major product such as New Coke represents an enormous financial loss to the manufacturer, and it is understandable that companies would welcome any technology that could reduce, even slightly, the risk of another similar debacle.

But they would do well to be cautious. fMRI technology does not come cheap (according to one media report, BrightHouse charged an undisclosed client \$250,000 for its neuromarketing services), and given the sparseness of the current literature, it seems like a highly speculative investment. If companies pour out large sums based on unreferenced claims that have not been published or subjected to the scrutiny of the scientific community, they will have only themselves to blame if the investment does not pay off. ■