

Consumer Neuroscience: The use of neuroscience techniques to create better advertising



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Consumer neuroscience is a growing field that incorporates neuroscience-based research methods to meet the specific needs of different companies. While some companies utilize psychological and neuroscientific information to create an effective product, others choose to use such in

any wondering how far is too far when using science to make sales. Analysis of the techniques, their effectiveness, and what exactly they can do is important in determining where the boundaries of consumer neuroscience should lie.

One of the easiest ways for neuroscientists to study consumers is through the use of eye tracking techniques. Eye-trackers will monitor both the participant's eye movements and pupil size throughout the time that they are engaged with the marketing material (Harris et al., 2018). Eye-tracking monitors will record both a person's saccades (quick jumps in visual fixation) and smooth pursuit (slower, more continual visual fixations along one object). Tracking eye movement is useful in determining which parts of the advertisement the prospective consumers will be most attentive to and researchers can use this information to determine where the most interesting parts of the advertisement are. This is shown by Image 1, in which the circle demonstrates where consumers were fixated within the webpage, and the lines show their saccades between fixations (Gidlöf et al., 2012). Further information can be gathered by examining the ways in which a person's pupils dilate while they are engaged with the material. If a participant is looking at something intriguing or startling, their

autonomic nervous systems will automatically cause their pupils to dilate in an effort to take in more of the scene. Dilation can also be caused when a participant is engaged in something that they perceive as challenging or puzzling. On the other hand, participants' eyes will constrict upon seeing something displeasing or after having figured out something difficult (Harris et al., 2018). As a result of how easily eye tracking can be used across several types of advertisements (including but not limited to billboards, TV commercials, in-store promotional displays, and website ads), it has become an increasingly popular tool.

Another way for marketers to gauge how their advertisement will be perceived by the target audience is to perform an electroencephalography (EEG) analysis (Harris et al., 2018). Put simply, EEGs use electrodes to measure the electrical currents in different areas of the brain. Scientists can analyze the recorded electrical activity and use information about the relative location and timing of the currents to accurately estimate a person's emotional and cognitive responses to what they just viewed. For example, if a marketer

Table 1: Companies that use Neuromarketing		
Company	Industry	Purpose of using Neuromarketing
GMTV*	Television	Conduct a study to track advertisers how viewers' brains act during morning hours
VIACOM*	Media =	Study reactions to advertising
BAKUHOBO*	Advertising	Observe responses to products, brands, advertising and video content
PHD**	Media planning =	Measure the relative effectiveness of advertising
Martin Lindstrom* (NeuroSense)	Author	NeuroSense designed and analyzed all the fMRI studies used for Lindstrom's book research
Yahoo**	Media =	Study consumers reaction to a television commercial
Hyundai**	Automotive =	Study consumers reactions when viewing a sports car
Microsoft***	Technology/Software	Understand consumers' interactions with computers including their feelings of surprise, satisfaction and frustration
Microsoft**	Technology/Software =	Study how engaged consumers are when using an XBOX
Ebay**	Online Auctions =	Adapted all campaigns on the basis of neuromarketing research
Frito-Lay**	Food	Adjusted commercials, products, and packaging on the basis of neuromarketing based research
NeuroFocus** (Conducted Neuromarketing research for, among others, Google, Chevron, and Walt Disney Company)	Neuromarketing Research =	Consulting based neuromarketing research
The Weather Channel***	Television =	Study viewers reactions to promotions
Daimler**	Automotive =	Study consumer reactions to car headlight characteristics

Figure 1. List of major companies using neuromarketing and their reasons for doing so. (Flores et al. 2014)

formation in order to create persuasive advertisements. The three most common techniques used are eye tracking, EEG analysis, and fMRI imaging. Each technique exists as a valuable tool to gather specific information that helps build an accurate representation of what goes on in a potential consumer's mind. While these techniques are useful in improving the effectiveness of an advertisement, they are limited by their ethical concerns, thus leaving m-



Fig 2. The use of eye-tracking and retrospective interviews to study teenagers' exposure to online advertising (Gidlöf et al. 2012)

wants to convey feelings of personal relevance between the and the consu-

mer, they may look for activity in Broddman's area 10, as this is the region that commonly shows activity when a subject engages with personal content. Another important aspect to keep in mind when creating effective advertising is that the consumers should be actively engaged and attentive to the content they are viewing. For this reason, it's also important for the EEG recordings to show activity in Broddman's areas 10/11, as activity here will demonstrate cognitive engagement. Furthermore, left hemispheric activity in the prefrontal cortex is thought to be associated with positive reactions that result in behavior that is approach-focused, as opposed to withdrawal-focused behavior (Ohme et al., 2010). EEG recordings are able to reveal how miniscule changes to advertisements can change the way in which the consumers' brains will respond to the information. A famous commercial for Sony Bravia flat screen TVs involves an enormous amount of bouncy balls traveling down the streets of a small city; the commercial briefly shows a frog jumping out of a gutter while all of the balls are falling around it (shown in Figure 3). While this moment was unplanned for and was not even very memorable, it made a big difference in the efficacy of the commercial conducted an EEG study which showed that the version of the commercial with the frog gave rise to more positive emotions (shown by more left hemispheric dominance) than the version without the frog (Figure 3). This goes to show how EEGs are used to determine how even the smallest of fragments from an advertisement may make a big impact (Ohme et al., 2010).

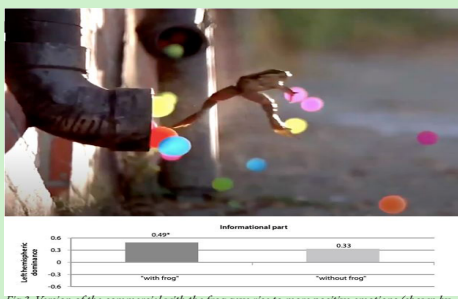


Fig. 3. Version of the commercial with the frog gave rise to more positive emotions (shown by more left hemispheric dominance) than the version without the frog (Ohme et al. 2010).

In contrast to the simplicity and convenience of eye tracking and EEG methods, fMRI analyses go deeper into the brain to explore the meaning of patterns of blood flow. For example, Stillman et al. conducted studies to test whether or not black and white images provoked the same levels of future-focused activities as those in color. (Stillman et al., 2020). The results of both psychological and fMRI testing suggest that a difference between the two does exist. When visualizing events 5 years into the future, the fMRI scans of participants will show activity in the same regions which activate when looking a black and white images. In contrast, imagining events for the near future activates the same regions associated with colored images (Stillman et al., 2020). These findings could prove useful to researchers who want to create an advertisement for products meant for the near future versus one that will be valuable to the consumer later in life (such as warranties or investments). Another example of fMRI being used for market research was shown in a study by Plassman et al., participants were given two bottles of the same wine, but one was marked with a high price tag and one with a low price tag (428). Despite these bottles of wine being exactly the same, the one with a higher tag was preferred by most participants. Researchers analyzed participants' brain scans during the experiment and discovered that putting a higher price tag literally makes the brain perceive the wine as tasting better, thus showing how neuroimaging can be used to measure the implicit processes that a consumer's mind engages in.

Although many marketers may be interested in new techniques to create the most appealing products or advertisements, others have ethical concerns about using neuroscience to make a profit. Questions must be asked about where to draw the line between harmless advertising techniques and intrusive techniques designed to scientifically convince the brain into

purchasing a product it truly does not want nor need. In her book *Ethical Dimensions of Commercial and DIY Neurotechnologies*, Kimberely Clark brings up the point that some demographics (typically adolescents) are disproportionately susceptible to the tactics of marketers. fMRI research has shown that the brains of adolescents are increasingly vulnerable to activating their reward pathways, while being less susceptible to activity in inhibition pathways (Clark, 42). This could have negative implications when marketers use aggressively accurate neuroscience tactics to persuade young consumers into buying potentially dangerous products, such as alcohol or trendy e-cigarettes. fMRI imaging also shows that by pairing an already valued stimuli, for example the musical intro to a participant's favorite TV show, with a novel product, the participant may transfer their positive feelings about the original stimulus to the new product. This is called the Halo effect, a largely unconscious process, and can be used to persuade consumers into liking the product solely because of its connection to something they already enjoy, thus leading to worries that consumers may be manipulated into wanting to spend money on a product they'd otherwise find invaluable (Clark, 2020). Some critics also call into question the morality of using neuromarketing techniques for a profit. According to Flores et al., neuromarketing is perceived by 68.7% of people as favorable when it is used by a for-profit business, but when used by a non-profit organization 84.2% of people think it's favorable. This may be because non-profit organizations are typically viewed as more trustworthy and aim to help the public rather than use them to gain wealth (Flores et al., 2014).

All in all, consumer neuroscience is a broad and growing field that incorporates different research techniques in order to successfully market a product. Different types of neurological/physiological studies can be done

to draw conclusions about how well an advertisement will be perceived by its target audience. While there are accuracy benefits involved with consumer neuroscience, there are also possible ethical drawbacks in employing this type of research. In order to avoid crossing such ethical boundaries, careful consideration needs to be used when determining whether or not it is appropriate to use neuroscience in advertising.

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