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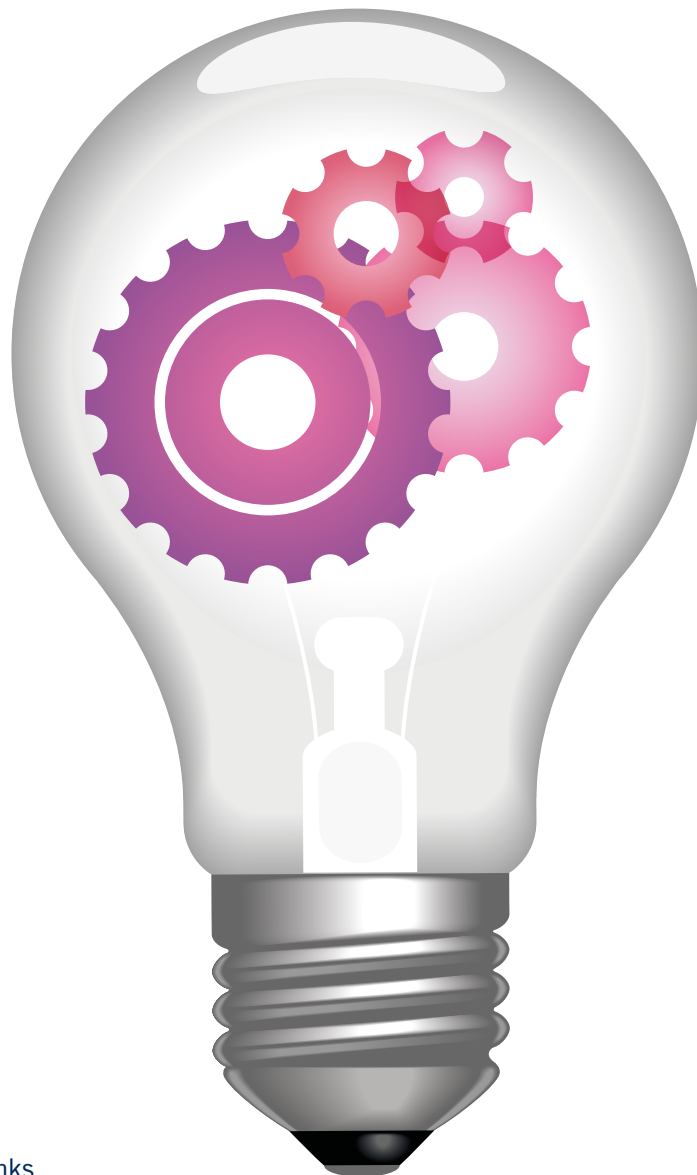
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Can brain responses to movie trailers predict success?

By Maarten A.S. Boksem

Decades of research have shown that much of our mental processing occurs at the subconscious level, including the decisions we make as consumers. These subconscious processes explain why we so often fail to accurately predict our own future choices. Often what we *think* we want has little or no bearing on the choices we actually make. Now a new study provides the first evidence that brain measures *can* provide significant added value to models for predicting consumer choice.



Neuroeconomics and its offspring neuromarketing are emerging academic fields that use brain-imaging techniques such as electroencephalography (EEG) to bypass the “noise” of self-reporting and observe the brain activity that underlies particular consumer behaviour. These techniques allow scientists to see what happens within the brain when people are exposed to certain product or advertising stimuli.

What has remained unknown – until now – has been the extent to which these techniques can actually help marketers to *predict* choice behaviour. Can neural measures add value to conventional methods in predicting an advertisement’s or a product’s commercial success?

Neuromarketing companies have long laid claim to the predictive powers of neural markers, using EEG to help clients decide on products and marketing campaigns. Companies rely heavily on market research – focus groups and large customer surveys form the basis of many corporate and marketing decisions. Often neuromarketing companies claim that self-reporting measures are inaccurate, while EEG techniques provide objective data on, for instance, the memorability of a commercial message, the respondent’s emotional arousal, and the extent to which the advert captures attention and focus, information which can then be used to more effectively predict future consumer choice.

Yet while this data is of definite marketing relevance – granular brain response is helpful in optimising stimuli, ►

Can brain responses to movie trailers predict success? *(continued)*

By **Maarten A.S. Boksem**

the core benefit of ad testing by means of EEG – its predictive power in relation to choice has never been scientifically validated. An ad may induce a strong and positive emotional response, but there is no proof that this will generate sales.

We designed a research project at the Erasmus Centre of Neuroeconomics that specifically aimed to test the claims of neuromarketing companies. Can neural measures provide unique information above and beyond conventional methods in predicting consumer choice?

the DVD. They were then asked to sort 18 DVDs on a table into descending order of preference.

Movies are advertised pre-dominantly through trailers and are a primary influence for consumers in determining which movie they will see. The study also depended on obtaining population end result measures, which is more readily available for movies (ie, the US box office results), and sales data directly related to the ad, which is difficult to obtain with other products, where sales can be driven by other factors such as product placement.

the amplitude of EEG oscillations in the beta frequency range (16-18Hz) during viewing, the higher participants ranked the movie. Previous research has linked increased beta power with reward processing while lower frequencies have been related to losses and other negative outcomes. The stated preferences of participants also proved to be a strong predictor of the final choice individual's made in terms of their choice of DVD to take home.

Interestingly, when we added the EEG data to the stated preferences data, the predictive fit of the model increased compared to the model including the stated preference only. This implies that there is unique information to be found in EEG measures that cannot be captured by self-reports alone – and that perhaps a combination of EEG and self-reporting measures might produce the best predictive model.

The results were more profound when it came to population preference. While the model that included only stated preferences was not a significant predictor of the movie's box office success, the EEG data was a good predictor of box office success – or population preference. A clear correlation could be found between the movie's box office success and very high frequency oscillations in the gamma range (>60Hz) in participants' brain activity. Basically, the higher the frequency of oscillations during the viewing of the trailers, the more money the movie generated at the box office. Gamma band activity has been associated with states of enhanced arousal and focused attention.

“Can neural measures provide unique information above and beyond conventional methods in predicting consumer choice?”

Predicting box office success

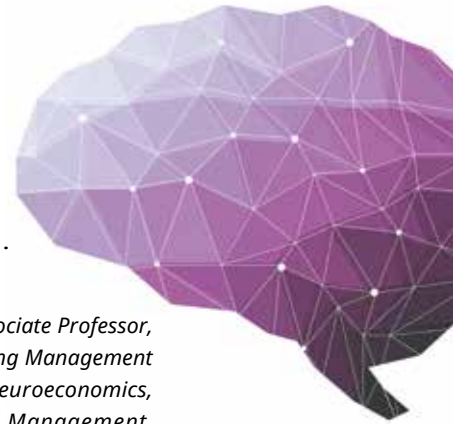
The study designed aimed to gather both EEG and stated preference measures (self-report preferences) – and then compare them to the participants end preference, their individual choice – and the choice behaviour of the population at large.

Using electroencephalography (EEG), the brain activity of 32 participants was recorded during individual viewings of 18 movie trailers. After viewing the trailer, participants were asked to rate the movie and indicate how much they were willing to pay for

With movie trailers, the ad itself is also a sample of the product.

High-density, high-sampling-rate EEG recordings were taken to enable whole-brain, broad-spectrum analyses. As for how we analysed it – we didn't look for spikes in pleasure or things you would think might predict choice. Instead, we examined all the data and looked for distinct correlations between patterns in brain activity and individual preferences.

Both the EEG and stated preferences proved to be strong predictors of individual choice. We found that the higher



In other words, the more participants were engaged in viewing the movie trailer, the more popular the movie – independent of individual preference, which showed no correlation with gamma power. Perhaps the trailers' ability to capture attention increased memorability, which in turn increased the probability of the individual choosing to see the movie. At any rate, gamma activity emerged as a significant measure and should, in principle, be effective in helping to predict a movie's commercial success.

What amazes me is that here is a small sample of individuals based in the Netherlands who could have brain activity that reflects the choices of Americans who went to see these movies in the US. Our testing was stringent, so it is very unlikely that this is an artefact of, 'yeah we just got lucky'.

Neural markers

This study is the first of its kind to provide evidence that EEG measures (beta and gamma oscillations) capture unique and valuable information for predicting individual and population-wide consumer choices. The neural measures we found significantly enhanced the accuracy of the prediction models, which opens up a whole new area for research and replication. The results will be published in a paper entitled *Brain responses to movie-trailers predict individual preferences for movies and their population-wide commercial success*, in the *Journal of Marketing Research*, one of the most prestigious journals in the field.

Currently there is a great deal of interest in this area of research. Neuromarketing companies want this evidence and they want new measures for predicting success, and studies such as this are where they may get their ideas from. This is the first scientific evidence that shows that, yes, neuromarketing companies play a meaningful role in the area of choice prediction. There is also a nice synergy there. Conducting comparative research is not their core area of interest. We do the fundamental academic research, the results of which can be used by them to help companies strengthen their performance.

While the results of this study are significant, it's important that we stay realistic and not over-claim. The sample size was small. We need to replicate this result before we can truly be certain that we have a valuable new tool on our hands. We want to see these results hold across many different types of commercials and populations. Our team has just completed a similar study and is in the process of analysing the data – the outcomes of which again look promising.

But given that even a small increase in accuracy in predicting the success of products or marketing stimuli can result in substantial increases in revenue, the implications of this research for companies are very interesting. We hope these techniques and neural markers can eventually become an extremely useful addition to every company's marketing strategy. ■

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Information about the activities of the Erasmus Centre of Neuroeconomics can be found at:

WEB www.erim.eur.nl/neuroeconomics

The paper *Brain responses to movie-trailers predict individual preferences for movies and their population-wide commercial success*, written by Maarten A.S. Boksem and Ale Smidts, is forthcoming in the *Journal of Marketing Research*.

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