

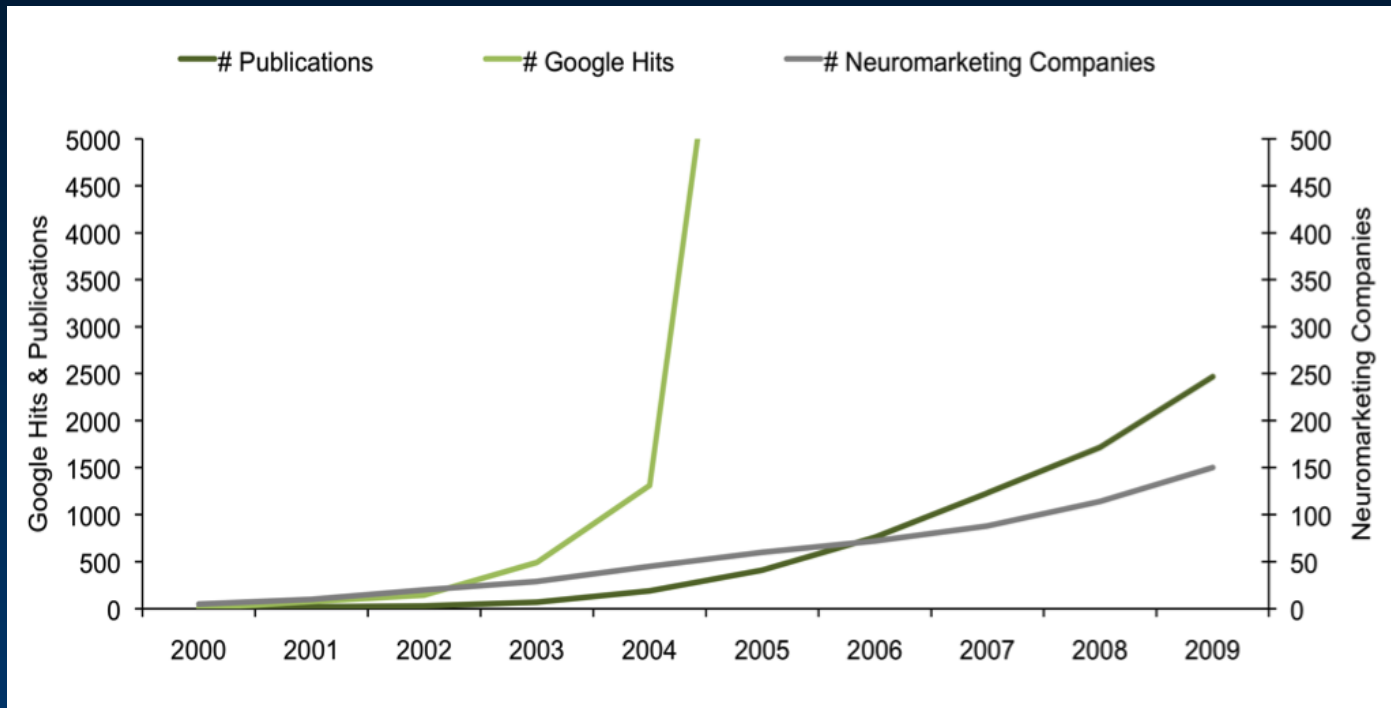
Neuromarketing



Neuromarketing in the Press



History of Neuromarketing



- # Google hits “Neuromarketing”:
12 in 2000; 320,000 in 2010
- # Marketing Publications (articles, books etc.):
10 in 2000; >2600 in 2010
- # Neuromarketing companies:
5 in 2000; >150 in 2010

H. Plassmann et al. (2012) *Journal of Consumer Psychology*, 22: 18–36



Commercial Alert Letter to Congress



What would happen in this country if corporate marketers and political consultants could literally peer inside our brains, and chart the neural activity that leads to our selections in the supermarket and the voting booth? What if they then could trigger this neural activity by various means, so as to modify our behavior to serve their own ends?

We Americans may find out sooner than we think. Orwellian is not too strong a term for this prospect. Yet this research is happening right now, conducted by neuroscience and marketing professors affiliated with some of this nation's most prestigious universities, such as Harvard, Baylor, CalTech, Penn State and Emory. They are using medical technologies such as functional magnetic resonance imaging (fMRI) not to heal the sick but rather to probe the human psyche for the purpose of influencing it.

This new field is called “neuromarketing,” and those involved are near-euphoric in the possibilities for the marketing industry. ...



Nature Neuroscience Editorial

nature
neuroscience

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...**

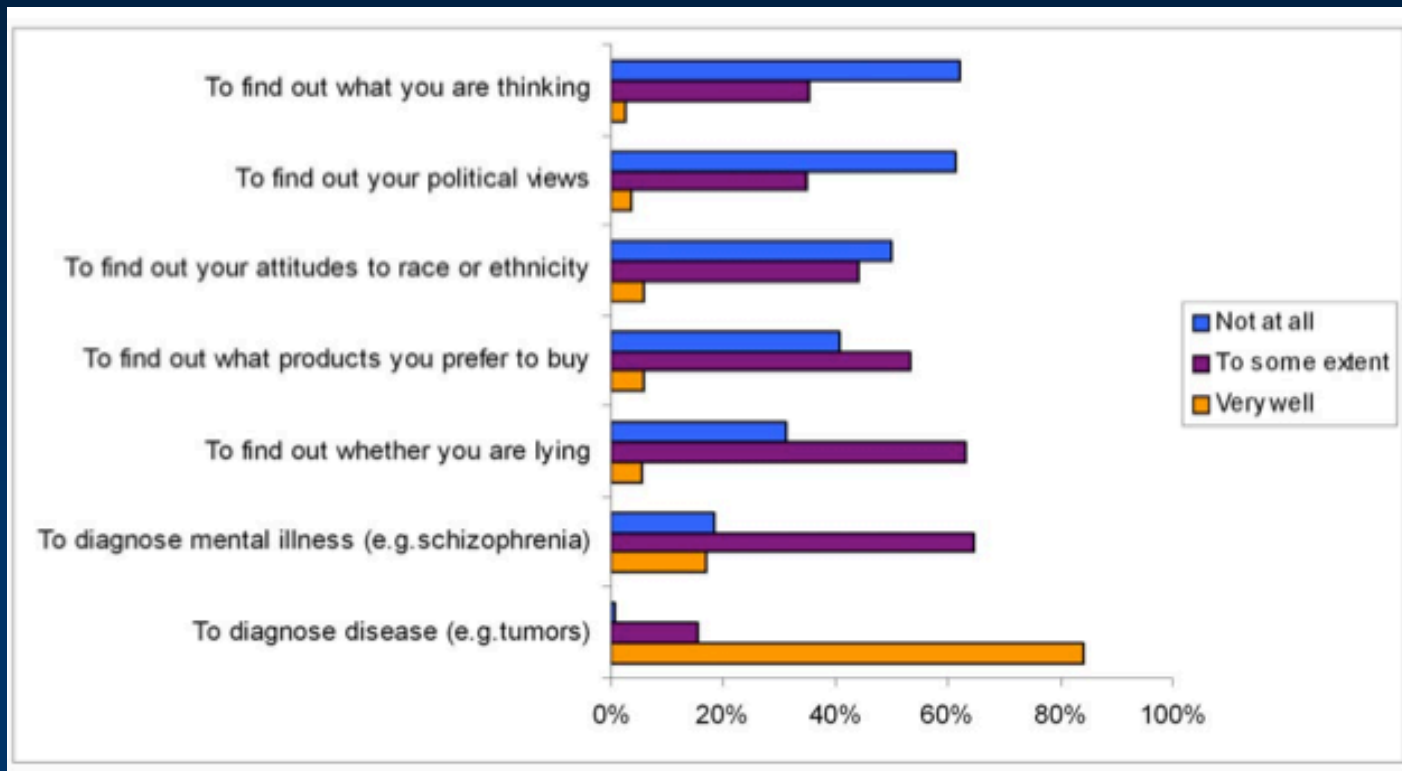
If the media hype is to be believed, then fMRI is being exploited by savvy consulting companies intent on finding 'the buy button in the brain', and is on the verge of creating advertising campaigns that we will be unable to resist. A more skeptical view of neuromarketing is that cognitive scientists, 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.

Nature Neuroscience 7, 683 (2004)

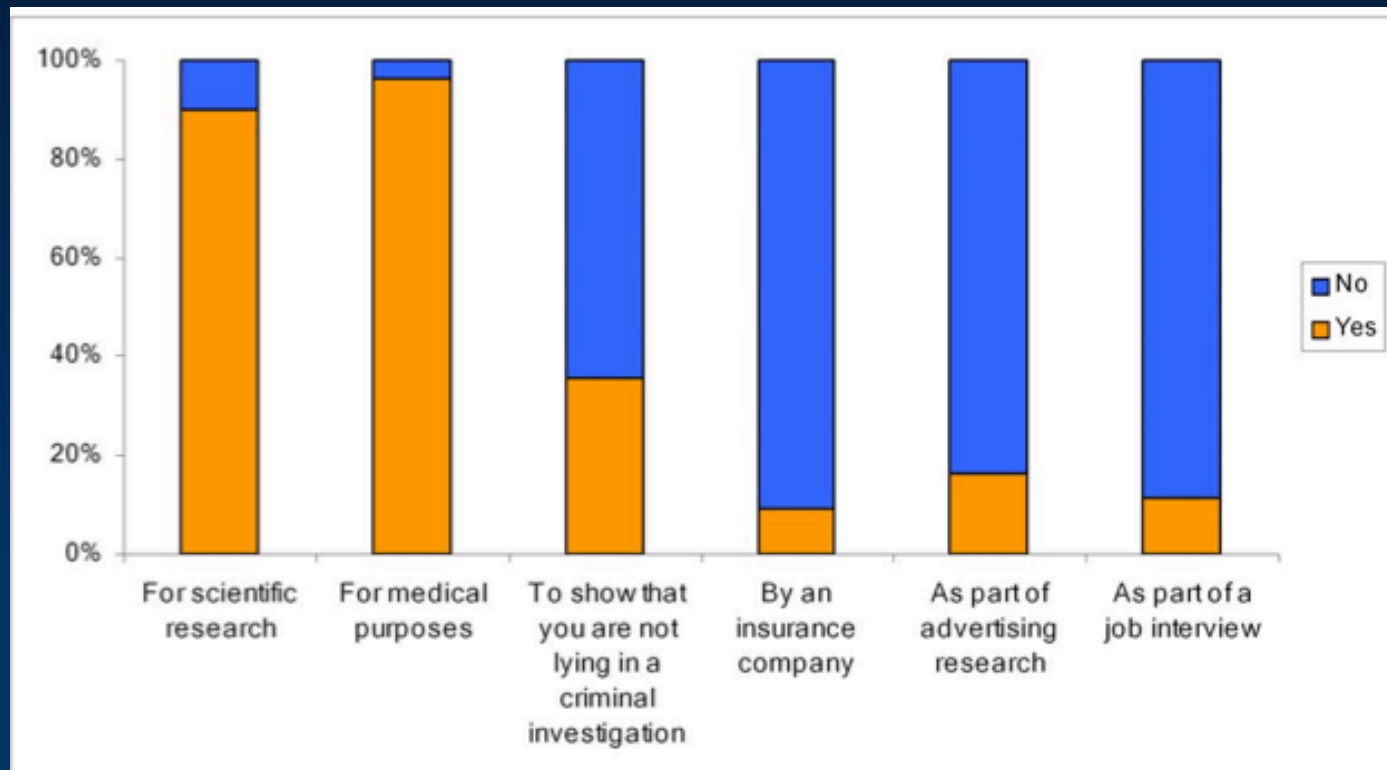


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What Does the Public Think Neuroscience Can Do?



What Does the Public Think Neuroscience Should Do?



“This Is Your Brain on Politics”

OP-ED CONTRIBUTORS

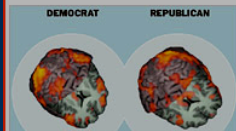
This Is Your Brain on Politics

Published: November 11, 2007

This article was written by Marco Iacoboni, Joshua Freedman and Jonas Kaplan of the University of California, Los Angeles, Semel Institute for Neuroscience; Kathleen Hall Jamieson of the Annenberg Public Policy Center at the University of Pennsylvania; and Tom Freedman, Bill Knapp and Kathryn Fitzgerald of FKF Applied Research.

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Multimedia



Slide Show

This Is Your Brain on Politics

IN anticipation of the 2008 presidential election, we used functional magnetic resonance imaging to watch the brains of a group of swing voters as they responded to the leading presidential candidates. Our results reveal some voter impressions on which this election may well turn.

Our 20 subjects — registered voters who stated they were open to choosing a candidate from either party in November — included 10 men and 10 women. In the summer, we asked them to answer a list of questions about their political preferences. In the fall, we observed their brain activity for nearly an hour in the scanner at the Ahmanson Brain Mapping Center at the University of California, Los Angeles. Afterward, they filled out a second questionnaire.

While in the scanner, the subjects viewed political pictures through a pair of goggles; first a series of still photos of each candidate was presented in random order, then video excerpts from speeches. Then we showed them the set of still photos again. On the before and after questionnaires, subjects were asked to rate the candidates on the kind of 0-10 thermometer scale frequently used in polling, ranging from “very unfavorable” to “very favorable.”

We then compared the questionnaire responses with the brain data, and here’s what we found:

1. Voters sense both peril and promise in party brands. When we showed subjects the words “Democrat,” “Republican” and “independent,” they exhibited high levels of activity in the part of the brain called the amygdala, indicating anxiety. The two areas in

2. Emotions about Hillary Clinton are mixed. Voters who rated Mrs. Clinton unfavorably on their questionnaire appeared not entirely comfortable with their assessment. When viewing images of her, these voters exhibited significant activity in the anterior cingulate cortex, an emotional center of the brain that is aroused when a person feels compelled to act in two different ways but must choose one. It looked as if they were battling unacknowledged impulses to like Mrs. Clinton.



Neuroscientists Respond...

“As cognitive neuroscientists who use the same brain imaging technology, we know that it is not possible to definitively determine whether a person is anxious or feeling connected simply by looking at activity in a particular brain region. This is so because brain regions are typically engaged by many mental states, and thus a one-to-one mapping between a brain region and a mental state is not possible.”

...

“As cognitive neuroscientists, we are very excited about the potential use of brain imaging techniques to better understand the psychology of political decisions. But we are distressed by the publication of research in the press that has not undergone peer review, and that uses flawed reasoning to draw unfounded conclusions about topics as important as the presidential election.”



“You love Your iPhone. Literally.”

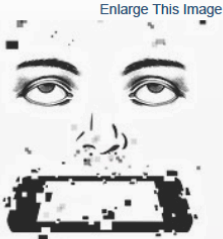
OP-ED CONTRIBUTOR

You Love Your iPhone. Literally.

By MARTIN LINDSTROM

Published: September 30, 2011

WITH [Apple](#) widely expected to release its [iPhone 5](#) on Tuesday, Apple addicts across the world are getting ready for their latest fix.



Enlarge This Image

Mark Allen Miller

But should we really characterize the intense consumer devotion to the iPhone as an addiction? A recent experiment that I carried out using neuroimaging technology suggests that drug-related terms like “addiction” and “fix” aren’t as scientifically accurate as a word we use to describe our most cherished personal relationships. That word is “love.”

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Times Topic: iPhone

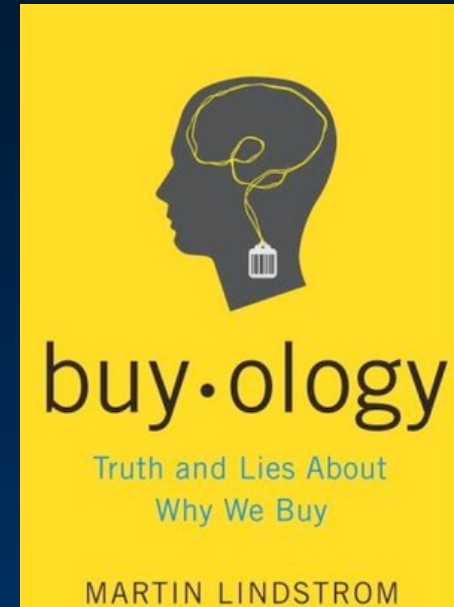
years back, I conducted an experiment to examine the world’s strongest brands and the world’s greatest resonance imaging (fMRI) tests, my team looked at consumer images involving brands like Apple and a photo of the pope. We found that the brain activity was similar when viewing both types of imagery.

This past summer, I gathered a group of 20 participants and I handed each one a BlackBerry. No sooner had they swiped their little fingers across the screens as the screens to come to life. It appears that a whole generation has learned to navigate the world of electronics in a ritualized, Apple-approved way.

As a branding consultant, I have followed Apple from its early days as a cult brand to its position today as one of the most valuable, valuable brands in the world.

But most striking of all was the flurry of activation in the insular cortex of the brain, which is associated with feelings of love and compassion. The subjects’ brains responded to the sound of their phones as they would respond to the presence or proximity of a girlfriend, boyfriend or family member.

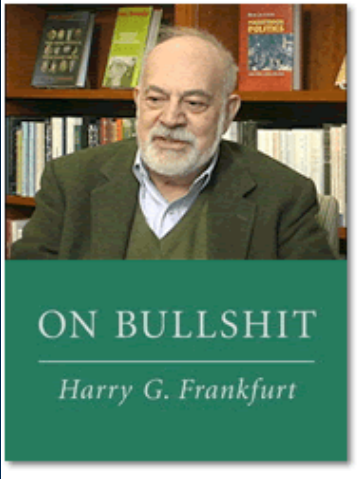
In short, the subjects didn’t demonstrate the classic brain-based signs of addiction. Instead, they loved their iPhones.



Neuroscientists Respond (Again)...

“The kind of reasoning that Lindstrom uses is well known to be flawed, because there is rarely a one-to-one mapping between any brain region and a single mental state; insula activity could reflect one or more of several psychological processes. This same point [was made by some of us](#) regarding a [similar Op-Ed piece in 2007](#). We are disappointed that the Times has published extravagant claims based on scientific data that have not been subjected to the standard scientific review process, especially considering how often its pages exhort policy makers to pay more attention to peer-reviewed scientific evidence and disregard specious claims.”

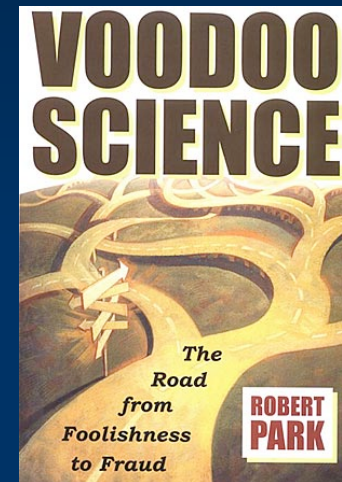




“It is impossible for someone to lie, unless he thinks he knows the truth. Producing bullshit requires no such conviction.”

“...bullshit is a greater enemy to the truth than lies are”

“[P]racticitioners [of pseudoscience] may believe it to be science, just as witches and faith healers may truly believe they can call forth supernatural powers. What may begin as an honest error, however, has a way of evolving through almost imperceptible steps from self-delusion to fraud. The line between foolishness and fraud is thin.”

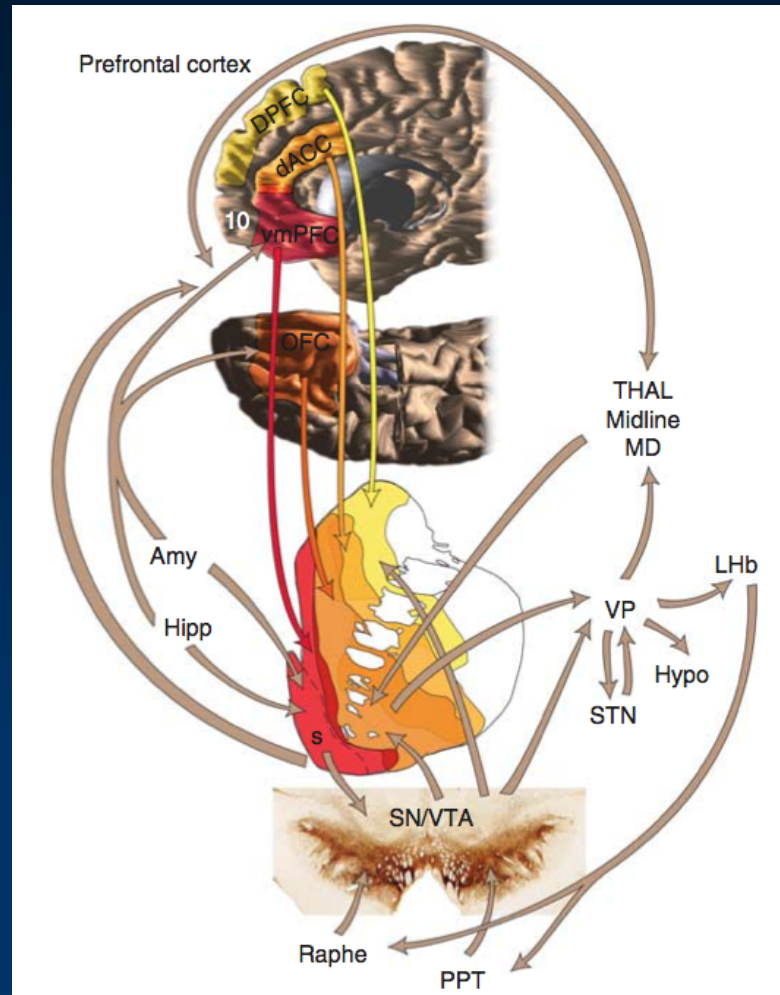


Neuromarketing in Academia

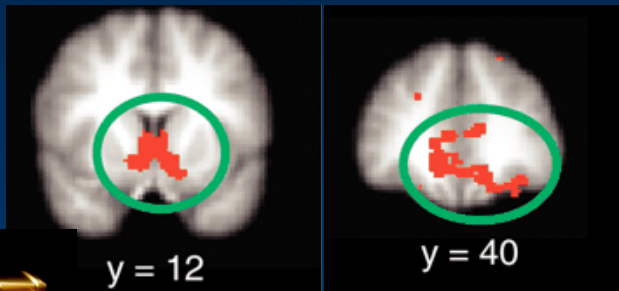
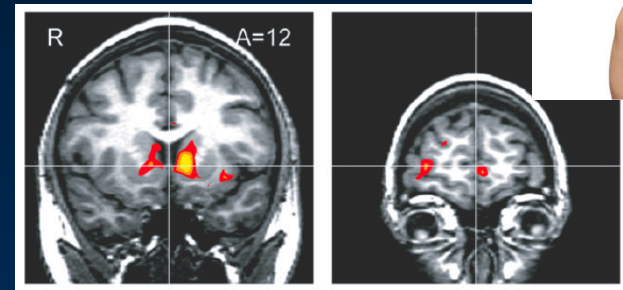
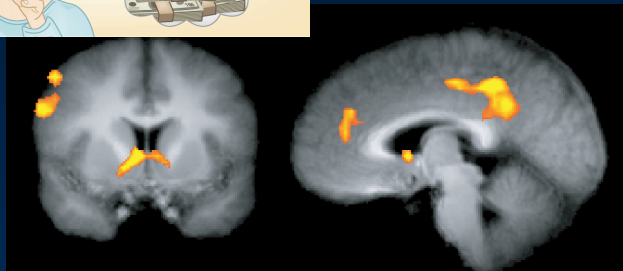
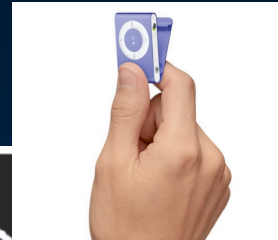


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Cortico-Striatal Loops



Neural correlates of preferences



Kable & Glimcher (2007) *Nature Neuroscience*
Tom et al. (2007) *Science*

Knutson et al. (2007) *Neuron*
Harbaugh et al. (2007) *Science*



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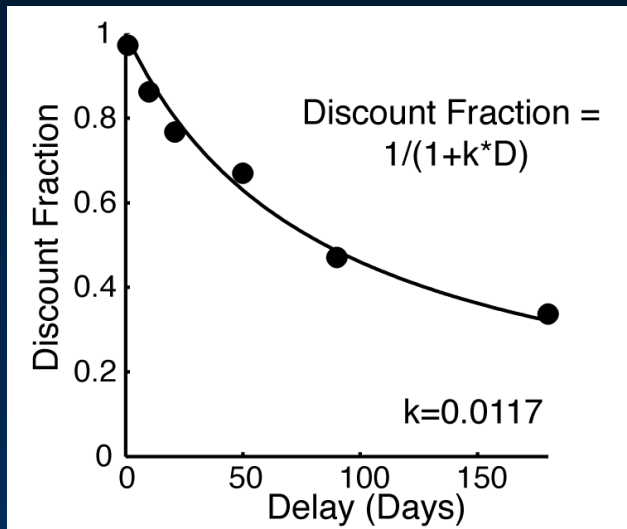
Meta-analysis of preference signals



Bartra et al. (2013) *Neuroimage*, 76: 412



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Preference

Brain Activity

???



Beware Reverse Inference!



Opinion

TRENDS in Cognitive Sciences Vol.10 No.2 February 2006

Full text provided by www.sciencedirect.com

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Can cognitive processes be inferred from neuroimaging data?

Russell A. Poldrack

Department of Psychology and Brain Research Institute, UCLA, Los Angeles, CA 90095-1563, USA



Does Ventral Striatum Activity Provide Strong Reverse Inference?

Probability of NAc activation given a reward task = $27/68 = 0.397$

Probability of NAc activation given no reward task = $59/1283 = 0.046$

Assuming the prior probability of reward = 0.5, then

Probability of a reward task given NAc activation = $\frac{0.397}{(0.397 + 0.046)} = 0.90$

	Reward task	No reward task
NAc activated	27	59
NAc not activated	41	1,224

Ariely & Berns (2010). *Nat Rev Neuro* 11: 284-292.



MPFC Activity Predicts Choices

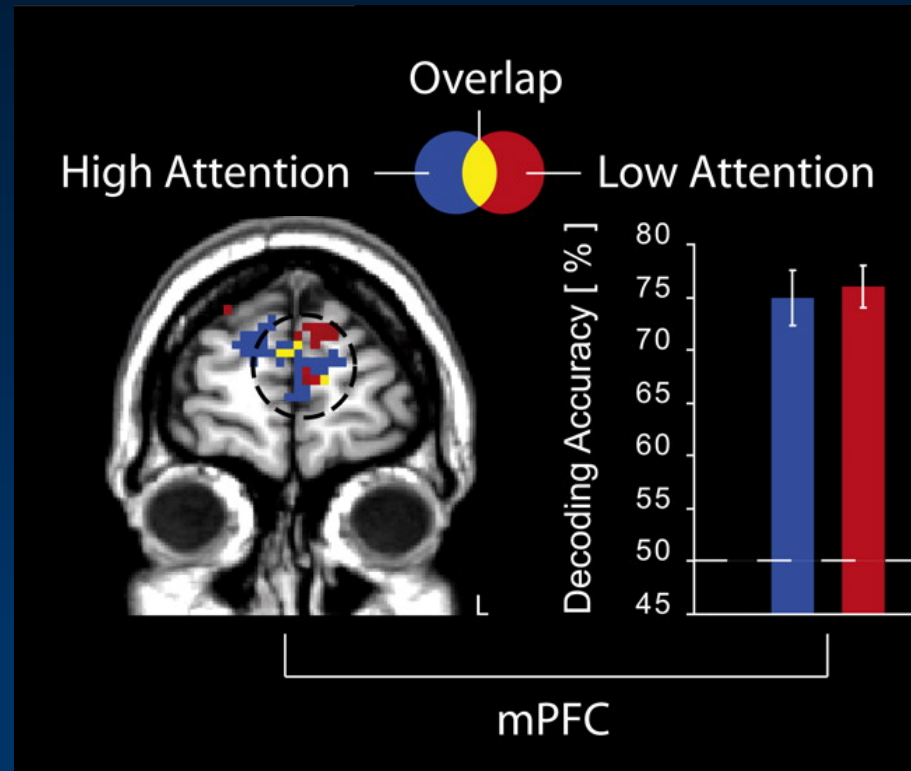


Tusche, A. et al. (2010) *J. Neurosci.*, **30**: 8024-8031



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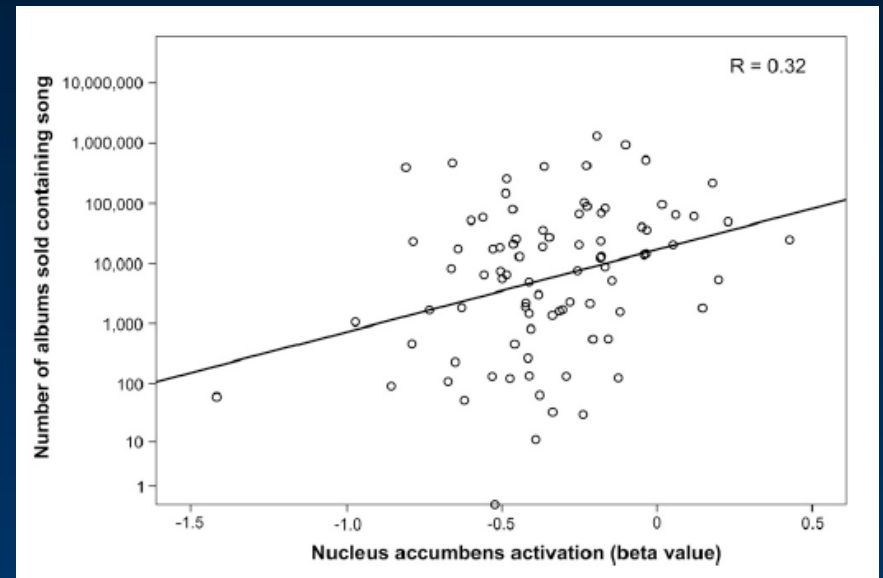
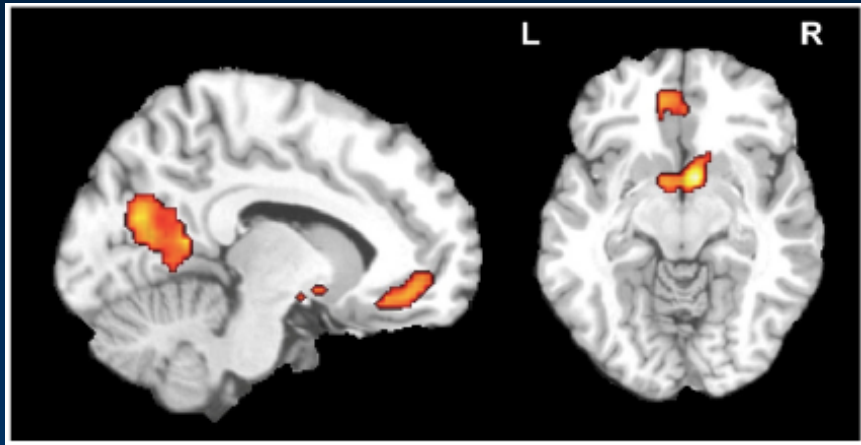
MPFC Activity Predicts Choices



Tusche, A. et al. (2010) *J. Neurosci.*, **30**: 8024-8031



Ventral Striatal Activity Predicts *Future* Cultural Popularity

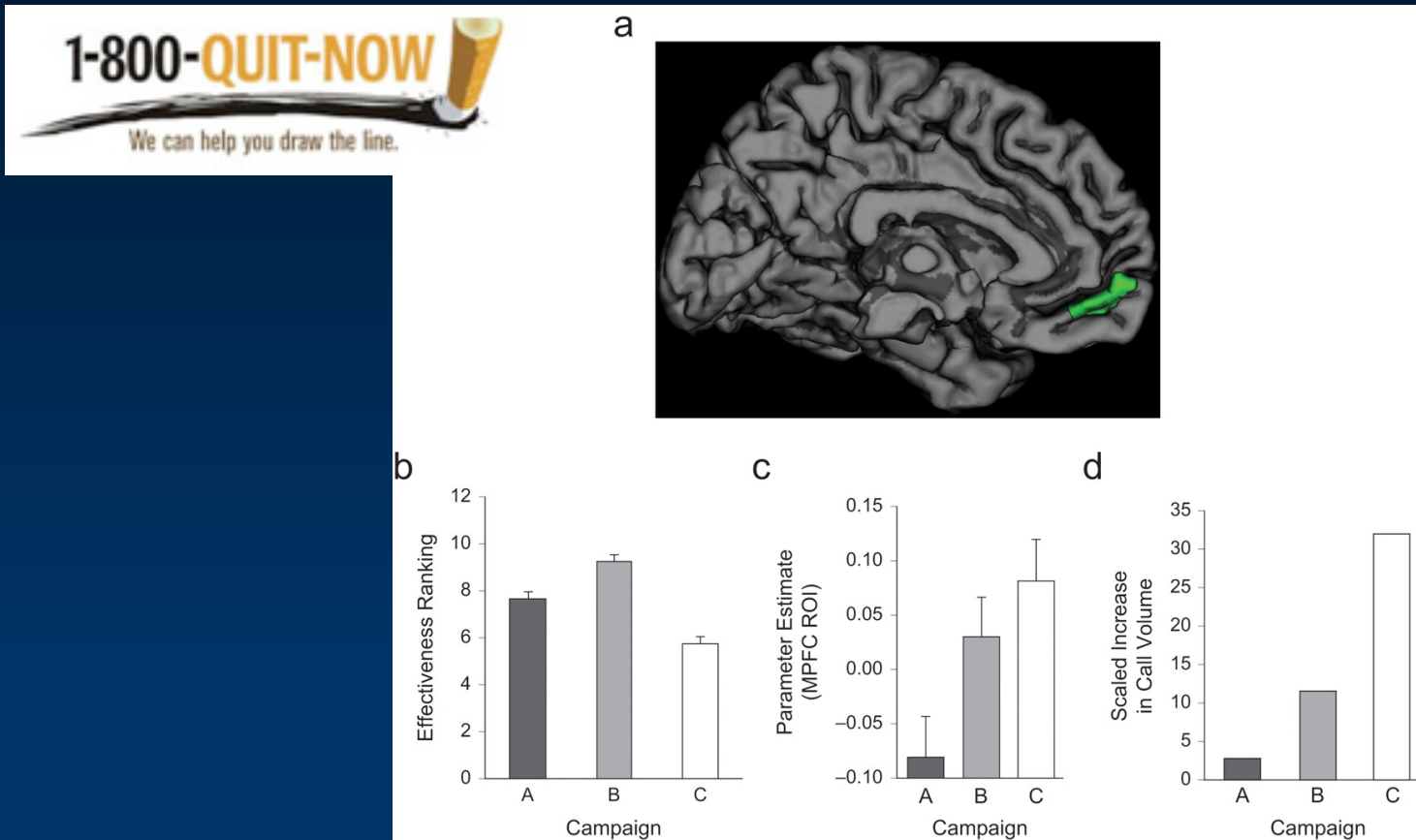


Berns & Moore (2011) *Journal of Consumer Psychology*



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MPFC Activity Predicts Ad Success



Falk E et al. (2012) *Psychological Science* 23: 439-445



Neuromarketing in Practice

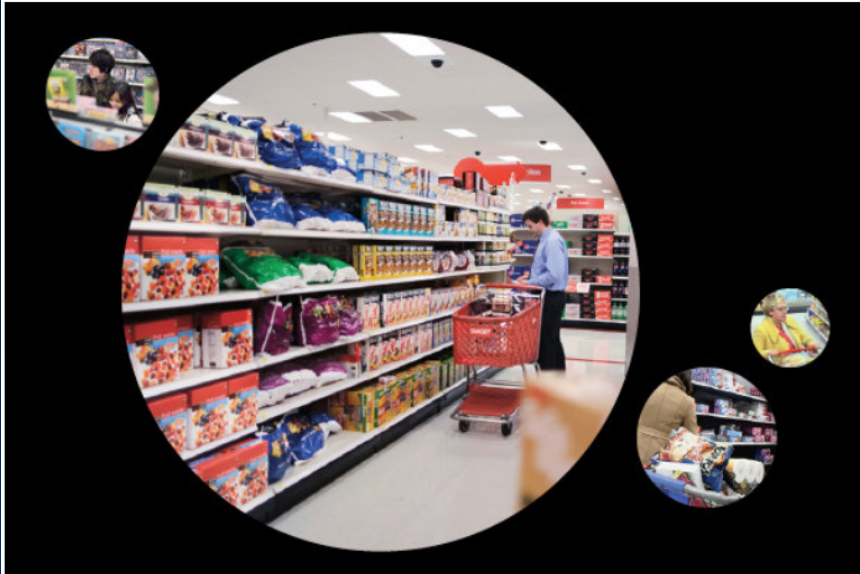


Global View of Neuromarketing Firms



Is There An Issue Of Privacy?

How Companies Learn Your Secrets



Antonio Bolfo/Reportage for The New York Times

By CHARLES DUHIGG
Published: February 16, 2012 | 570 Comments

Andrew Pole had just started working as a statistician for Target in 2002, when two colleagues from the marketing department stopped by his desk to ask an odd question: "If we wanted to figure out if a customer is pregnant, even if she didn't want us to know, can you do that? "

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Obama's Moneyball Strategy

In Jake on May 24, 2012 at 11:21 am

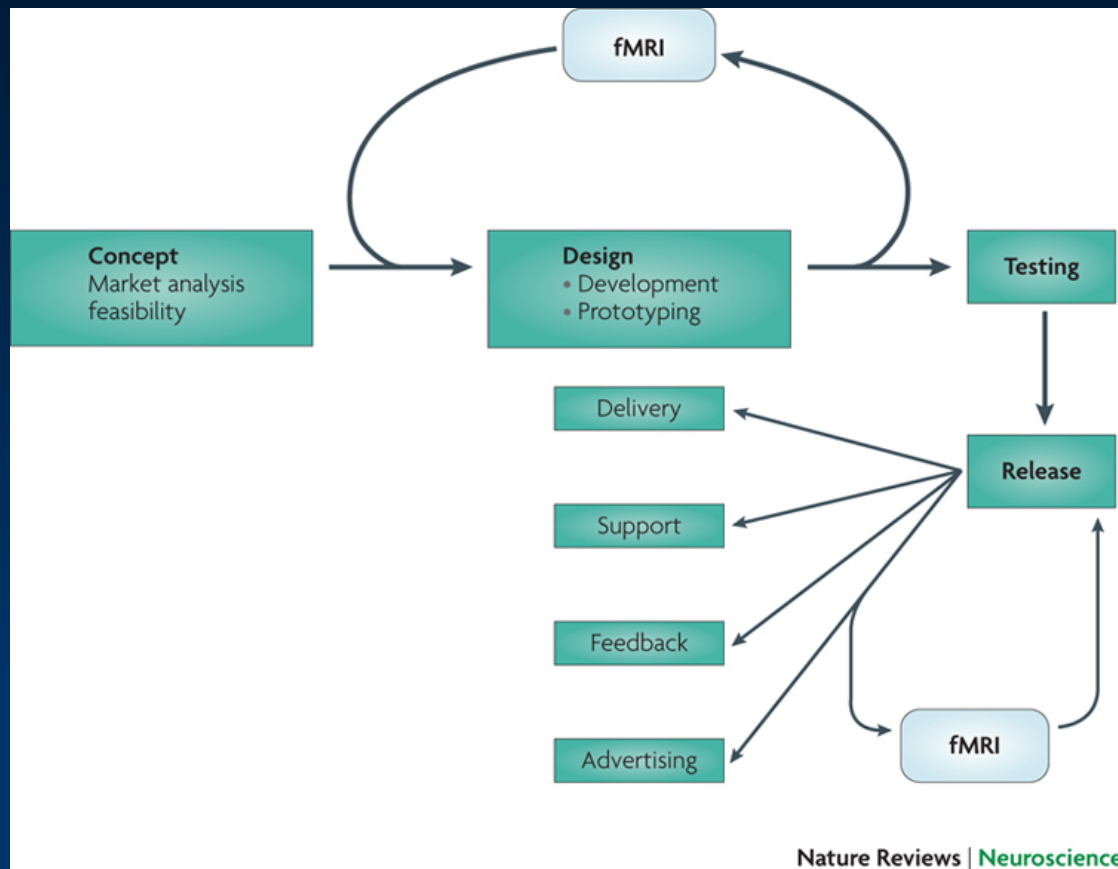


Brad Pitt in a room of Romney voters
Source: Columbia Pictures



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How Might Marketers Use Neuro?



Ariely & Berns (2010). *Nat Rev Neuro* 11: 284-292.



How Might Marketers Use Neuro?



Questions?
Discussion?

