

Neuroscientists can predict your behavior better than you can

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Matthew Lieberman

(PhysOrg.com) -- *"Half the money I spend on advertising is wasted; the trouble is I don't know which half."* — John Wanamaker, 19th-century U.S. department store pioneer

In a study with implications for the advertising industry and public health organizations, UCLA [neuroscientists](#) have shown they can use brain scanning to predict whether people will use sunscreen during a one-week period even better than the people themselves can.

"There is a very long history within psychology of people not being very good judges of what they will actually do in a future situation," said the study's senior author, Matthew Lieberman, a UCLA professor of psychology and of [psychiatry](#) and biobehavioral sciences. "Many people 'decide' to do things but then don't do them."

The new study by Lieberman and lead author Emily Falk, who earned her doctorate in psychology from UCLA this month, shows that increased activity in a brain region called the [medial prefrontal cortex](#) among individuals viewing and listening to public service announcement slides on the importance of using sunscreen strongly indicated that these people were more likely to increase their use of sunscreen the following week, even beyond the people's own expectations.

"From this region of the brain, we can predict for about three-quarters of the people whether they will increase their use of sunscreen beyond what they say they will do," Lieberman said. "If you just go by what people say they will do, you get fewer than half of the people accurately predicted, and using this brain region, we could do significantly better."

"While most people's self-reports are not very accurate, they do not realize their self-reports are wrong so often in predicting future behavior," Falk said. "It is surprising to find out that some technique might be able to predict my own behavior better than I can. Yet the brain seems to reveal something important that we may not even realize."

The study, the first persuasion study in neuroscience to predict behavior change, appears June 23 in the *Journal of Neuroscience*.

For the study, Falk, Lieberman and their collaborators sought people who did not use sunscreen every day. The study group consisted of 20 participants, mostly UCLA students, 10 female and 10 male. The participants had their brains scanned using functional magnetic

resonance imaging (fMRI) at UCLA's Ahmanson-Lovelace Brain Mapping Center as they saw and heard a series of public service announcements. They were also asked about their intentions to use sunscreen over the next week and their attitudes about sunscreen.

The participants were then contacted a week later and asked on how many days during the week they had used sunscreen.

Lieberman and Falk focused on part of the brain's medial prefrontal cortex, which is located in the front of the brain, between the eyebrows. This brain region is associated with self-reflection — thinking about what we like and do not like and our motivations and desires.

"It is the one region of the prefrontal cortex that we know is disproportionately larger in humans than in other primates," Lieberman said. "This region is associated with self-awareness and seems to be critical for thinking about yourself and thinking about your preferences and values."

The researchers developed a model based on 10 people and tested it on the next 10. They shuffled the 20 people in different ways to test the model. There are more than 180,000 ways to divide the 20 people into groups, Falk said.

"We ran a simulation of the 180,000 combinations, developed our model on the first 10 subjects on each of the 180,000 simulations, and tested it on the second 10," Falk said. "We saw a very reliable relationship, where for the vast majority of the 180,000 ways to divide the group up, this one region of the brain, the medial prefrontal cortex, does a very good job of predicting sunscreen use in the second group."

This finding could be relevant to many public health organizations, as well as the advertising industry, Lieberman and Falk said.

"For advertisers, there may be a lot more that is knowable than is known, and this is a data-driven method for knowing more about how to create persuasive messages," said Lieberman, one of the founders of social cognitive neuroscience.

Neural focus groups

While 19th-century department store pioneer John Wanamaker (quoted at the beginning of this release) advertised effectively for his stores in newspapers, he still said he was wasting half his advertising budget — only he didn't know which half.

"We're learning something about which half," Lieberman said.

While advertising agencies often use focus groups to test commercials and movie trailers, in the future they and public health officials perhaps should add "neural focus groups" to test which messages will be effective while monitoring the brain activity of their subjects.

"A problem with standard focus groups," Falk said, "is that people are lousy at reporting what they will actually do. We have not had much to supplement that approach, but in the future it may be possible to create what we are calling 'neural focus groups.' Instead of talking with people about what they think they will do, a public health or advertising agency can study their brains and learn what they are really likely to do and how an advertisement would be likely to affect millions of other people as well."

"Given that there are emerging technologies that are relatively portable and approximate some of what fMRI can do at a fraction of the cost, looking to the brain to shape persuasive messages could become a reality," Lieberman said. "But we're just at the beginning. This is one of the first papers on anything like this. There will be a series of papers

over the next 10 years or more that will tell us what factors are driving neural responses."

"We hope to build a sophisticated model of persuasion that may incorporate multiple brain regions," said Falk, who studies the neural basis of persuasion and attitude change. She has been hired by the University of Michigan-Ann Arbor as an assistant professor of communication studies and psychology and a member of the university's Institute for Social Research, starting in September.

While some people have emphasized reasoning and emotion as key areas on which to base advertising campaigns, a key question may be whether messages and advertisements can be produced that "make people feel, "This is about me and is relevant to my preferences and motivations," Falk said. "Perhaps effective messages reinforce our values, our self-identity, what motivates us. We will learn much more as we continue this line of research over the years."

Neuroscientists will learn whether they can predict behavior better and are likely to obtain a more nuanced understanding of the roles played by different parts of brain regions, said Falk, who this March received UCLA's Charles E. and Sue K. Young Award for outstanding research and teaching. She is interested in how to make more effective health and other public service messages aimed at young adults.

"There is still much we do not know about how to get people to make healthier choices," Falk said. "We hope to learn much more about what makes messages more or less persuasive."

Different brain regions may be important for persuading people to tell or e-mail their friends about a health message, product or service; Lieberman and Falk are studying this issue of "creating buzz" as well.

However, the implications of the research go far beyond advertising, Lieberman said.

"There are many applications beyond how you make a good 30-second commercial," he said, "including how teachers can communicate better so their students won't tune out or how doctors can convince patients to stick to their instructions. We all use persuasion in some form or another every day."

Beware of hucksters

Some people are already offering "neuro-marketing," purporting to help businesses sell their products and help candidates run their advertising campaigns, Lieberman noted. They may, for example, recommend what colors and sounds to use in commercials. Is this effective, or are they claiming expertise they do not possess?

"In general, they are taking simple views of how different parts of the brain work and are saying it is important to turn a particular part of the brain on when advertising, and therefore you should do more of this or that," Lieberman said. "For instance, they will say you want to activate the amygdala because that is the brain's emotion center. Typically they are not looking at the relationship between what happens in the [brain](#) when someone is exposed to an advertisement and what actually are the outcomes that you care about. For example, do people change their behavior? Does someone spread the message to others? Instead, they are giving generic analysis, and my guess is that the vast majority of the advice they are giving is not accurate.

"To really understand the relationship between the brain's responses to brands and persuasive materials and desirable outcomes, you actually have to measure the outcomes that are desirable and not just say what should work," he said. "There are many folks claiming to be

neuroscientists who have read a little introductory neuroscience, and that is not enough expertise. It's almost infinitely more complicated than that."

Provided by University of California - Los Angeles

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