Our brains react to our world in milliseconds—faster than we’re consciously aware. And much of what drives our everyday decisions are the emotional responses that can’t be measured through self-report methods.

Brand associations are being formed every day, whether it is when interacting with the brand (e.g. in store, by word of mouth, consumption, seeing others use the brand etc.) or indirect exposure such as in TV or print advertising. People are simply unaware of the effects of these interactions as emotions associated with brands are triggered unconsciously. Emotions condition our choices, regardless of whether we can articulate them or not, even when we justify our brand decisions with rational reasons such as price, quality and likeability. These emotional reactions provoke a biological change in the neural pathways that can be measured with specific tools.

Insights provides an overview of the latest consumer neuroscience findings, on a global scale. The quarterly targets a wide range of business people, like consumer insights professionals, CMO’s and general management, to help them to better understand their customer.

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Brian Knutson interview
Eye tracking internet advertising
How Fabrics Affect Consumers
Designing Better Cars
Love what you read?
Implicit Measures: What is It and How to Use it?
The Neuroscience of Candy Preference
Habits, Neuroscience and Marketing
Opinion: Cognitive Dissonance in Marketing
Media Testing: Home Media in Colombia
Brian Knutson: Scientific Digging into Emotions

By Mirjam Broekhoff

Contrary to his fellow countrymen, Brian Knutson pronounces his name with a sharp ‘K’, as in ‘Knudsen’. This is typical of the man who started as an investigative scientist and has climbed to the position of a leading professor in the field of neuroscience. He has developed an extensive curriculum vitae listing impressive clients and sponsors, performing innovative research (see biography - next page). His track record also includes the famous experimental design known as the monetary incentive delay task that powerfully elicits emotions in brain scanning. It has been used in hundreds of neuroimaging studies.

Brian Knutson visited Europe in September, lecturing at a satellite of the annual congress of the Society for Neuroeconomics. I observed his behavior from the sidelines: enthusiastically taking notes during all the talks, participating in discussions and spending a lot of time with many students after the presentations. He told me that he appreciates the recent increase in peoples’ interest in neuroscientific studies of the brain basis of emotions. This is in sharp contrast to the state of affairs when he finished his PhD in 1993. “During my psychology training, I was seized by the topic of how emotion works in the human brain. I was convinced that there were truths waiting there to be uncovered by research. However, most neuroscientists were not interested in studying emotion. My area, psychology, began with people like Freud, who was interested in emotion but did not conduct research. After that, psychologists adopted more rational metaphors for the mind, starting with behaviorists, who viewed the mind as a mechanism, and leading to cognitive psychologists, who viewed the mind as a computer. These scientists largely limited their research to what could be seen and measured.

Emotions: a difficult topic for science
Laypeople naturally discuss and reflect on their own and others’ emotions, such as anger, fear, sadness, or joy. Yet, scientists find it difficult to define and measure these fleeting experiences. The challenge intensifies if one aims to understand how the brain generates emotions. Before the rise of neuroimaging, general lore suggested that emotions dwell deep in the brain - under the cortex in the limbic system. That intuition is not completely wrong, since emotional experience does seem to correlate with the function of subcortical structures. For instance, if you remove most of the cortex of rats, they can still show social emotional behaviors including fighting, fleeing, mating, and even playing. Activity in different subcortical circuits seems to be associated with these adaptive behaviors. On the other hand, some subcortical regions seem more implicated in cognition than emotion. For example: the hippocampus plays a critical role in remembering explicit facts. On the other hand, the ancient cortical region of the amygdala plays a central role in fear learning. Neuroimaging will help us to understand more about the brain basis of human emotion.”

Starting emotional research
When we talk about his training, Brian Knutson reflects that he was a very lucky guy. “I acquired post-doctoral positions with people who dared to do research on emotion in the mid-nineties, which was really adventurous at the time. My tutor Jaak Panksepp coined the term affective neuroscience to describe a field that studies the neural mechanisms of emotion. Paul Ekman developed
Brian Knutson visited Europe in September, lecturing at a satellite of the annual congress of the Society for Neuroeconomics. I observed his behavior from the sidelines: enthusiastically taking notes during all the talks, participating in discussions and spending a lot of time with many students after the presentations. He told me that he appreciates the recent increase in peoples’ interest in neuroscientific studies of the brain basis of emotions. This is in sharp contrast to the state of affairs when he finished his PhD in 1993. “During my psychology training, I was seized by the topic of how emotion works in the human brain. I was convinced that there were truths waiting there to be uncovered by research. However, most neuroscientists were not interested in studying emotion. My area, psychology, began with people like Freud, who was interested in emotion but did not conduct research. After that, psychologists adopted more rational metaphors for the mind, starting with behaviorists, who viewed the mind as a mechanism, and leading to cognitive psychologists, who viewed the mind as a computer. These scientists largely limited their research to what could be seen and measured. They can still show social emotional behaviors including fighting, fleeing, mating, and even playing. Activity in different subcortical circuits seems to be associated with these adaptive behaviors. On the other hand, some subcortical regions seem more implicated in cognition than emotion. For example: the hippocampus plays a critical role in remembering explicit facts. On the other hand, the ancient cortical region of the amygdala plays a central role in fear learning. Neuro imaging will help us to understand more about the brain basis of human emotion.”

**Starting emotional research**

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**Rats are social and playful mammals.**

When we talk about his training, Brian Knutson reflects that he was a very lucky guy. “I acquired post-doctoral positions with people who dared to do research on emotion in the mid-nineties, which was
A short biography

Brian Knutson studied comparative religion and psychology at Trinity University in Texas. He took his PhD in Experimental Psychology at Stanford University in California. After that, he worked as a post-doctoral fellow with Dr. Paul Ekman and Dr. Jaak Panksepp. Subsequently, he has worked on several research projects and received research grants from the National Institute of Mental Health, the National Institute of Drug Abuse, the National Institute of Aging, the National Science Foundation, and other parties. In 2001, he joined the Psychology Department of Stanford University, where he became an Associate Professor in 2008. To get a better impression of the way Brian works and presents, watch this video in which he explains the science of desire: http://youtu.be/CUK8D-kX0fE.

Playing with rats

Knutson reflected on his animal research and how it inspired his human neuroimaging research: “Generally, rats have a bad reputation. People associate them with dirt, disease, and dark smelly spaces. However, my experience with them has been quite different. In fact, laboratory rats are quite intelligent and inquisitive, which makes them great subjects. Moreover, rats are quite social since they live in groups. Like other mammals, including humans, to survive and reproduce they must bond to others. You can see signs of this bonding behavior at different stages of development, including distress cries when infants are separated from their mothers, and juvenile play. Just as rats play with their littermates, they will also play with familiar and friendly humans. One accidental discovery I made when working in Panksepp’s laboratory was finding out that rats don’t just play with each other, but that they also vocalize at ultrasonic frequencies -i.e., 50 kHz- while playing, which seems to stimulate the play. We went on to show that anticipation of many different social and nonsocial rewards can elicit these 50 kHz vocalizations, suggesting that they mark a positive and aroused affective state. And, remarkably, one of the most potent ways to stimulate these 50 kHz vocalizations is to inject dopaminergic drugs directly into subcortical regions of their brain associated with gain anticipation. This led me to target the deep subcortical region in humans with fMRI after moving to the National Institute of Health.”

Whether they would then indicate that they wanted to buy or not. What’s interesting about this finding is not only that different affective circuits push you in different directions, but also that we can predict choice solely based on that brain activity - even without us knowing who you are, what you saw, or what price you considered. Currently, we’re trying to improve our ability to infer affect from neuroimaging data. For instance, we need a way to link brain activity and emotional self-report to the same second-to-second timescale. This may seem obvious, but it presents a real methodological challenge. It is difficult to interpret the meaning of brain activity. Self-report is not so useful in this. For example, you might want to measure how people affectively respond to a 30-second advertisement. You could ask them afterwards ‘how did you feel during the ad?’. In the best-case scenario they might be able to tell you how they felt in general afterwards. However, they may not even be able to report this for a number of reasons: they might report how they think they should feel after seeing the ad, or responses they had in the past to other ads, or simply might not remember what happened. Another strategy would be to stop them at specific points during the ad and ask ‘how do you feel right now?’. But this has other costs - it is disruptive, you can’t measure emotion as extensively, and the very act of measurement may change the emotional impact of the ongoing experience. With fMRI, you get everything happening all over the brain all the time on a certain timescale. One of our challenges then is to figure out the best and most robust way to decode that rich data into affective experience.

I hope this is not only useful for predicting individual choice, because I would also like to predict behavior on group level.”
Neuromarketing provides marketers with tools to answer these questions. More and more research is being performed, mostly commissioned by large, international companies. Naturally, the owners of these studies are not particularly inclined to share the outcomes of their precious research. An exception is Ian Everdell, the market research specialist of Canadian digital marketing agency Mediative. He conducted several in-house eye tracking studies with the purpose of creating and sharing knowledge. We also consulted the experienced Belgian eye tracking specialist Olivier Tilleuil about his research-insights.

Understanding the leaderboard

Ian Everdell compared the impact of different types of internet advertising on both the desktop PC and the tablet [1]. He selected the advertising formats leaderboard, skyscraper and big box because they are often used and generally popular. The leaderboard is the classic ‘banner’ and is usually placed in the middle and top of the screen. Ian found that this advertising format performs best in capturing the attention of website visitors. Leaderboards can also evoke engagement, but this will only happen when they appear in a relevant environment. The surrounding website should thus be relevant to the leaderboard content. This may seem like stating the obvious, but in practice this is often overlooked, especially when the payment for placement is on a pay per view basis. This may happen when working with AdSense placements. As a result, the banner is relevant to the target group as such, but bears no relation to the particular site that is being visited at the time. While writing this article, I (MB) paid extra attention to the leaderboards I encountered. It was surprising to discover so many completely irrelevant banners on professional, informational and shopping sites.

Handling the non-relevant environment

However, displaying advertisements in a non-relevant environment is not always ‘wrong’. Ian Everdell explains that people who are surfing on internet often do perceive the brands that are shown. Therefore showing a picture of the brand symbol, logo or name may contribute to the visitor’s brand awareness. It can influence the brand recognition and may even lead to more positive feelings about the brand. This occurs when visitors experience a good feeling as a result of the webpage he has visited. As an example, Ian mentions studies on the impact of YouTube ads. These ads are often intrusive, because they appear before the requested video is shown and force the user to wait a few seconds before it starts. Generally people understand the necessity of this intrusion. But there’s more: most visitors are open and even sympathetic towards the advertisement. This is probably a consequence of the fact that the person is usually quite relaxed and enjoying watching YouTube. “The important lesson is that a company can communicate in a non-relevant environment, but that the purpose of the communication should be to increase recognition and brand affinity. People surfing on the internet, will seldom engage with non-relevant advertising. In which case they will not read a slogan or consult information that is offered about the product. Therefore, click through rates will be very low,” Ian Everdell explains.

The use of mobile devices to access the internet is exploding. People’s habits are changing due to wider availability of WiFi, better smartphones and the growing use of tablets. Home shopping develops into couch-shopping, news updates are followed on the phone and we catch up on Facebook during the break at work. But be aware: the effect of advertising can differ widely on the desktop PC or the mobile device. In his study, Ian Everdell found that the leaderboard is the most effective...
format in capturing attention on each platform and is slightly more effective on the tablet. Moreover, once it has been seen on the tablet, people spend a longer time looking at a leaderboard advertisement. This may be due to the amount of space the leaderboards occupy on a tablet when used in landscape format (see adjoining picture). When leaderboards are compared with other formats, such as skyscraper and big box, it was found that leaderboards have a shorter time to first fixation, that they achieve many more fixations and that they are viewed more frequently. This can lead to the conclusion that the leaderboard is the most effective format for both platforms.

### Using the skyscraper and big box

In comparison with the leaderboard format, the skyscraper and big box capture attention less effectively. However, if the leaderboard format is not available, or too expensive, these formats can be useful. The skyscraper capture attention better on the tablet compared with the desktop PC. However, once the attention has been captured, skyscraper ads perform much better in retaining user attention on the PC. The method of navigation on a tablet is a serious, practical obstacle to using the skyscraper, as the fingers are used to navigate and this obstructs the view of the skyscraper (see picture). The big box performs the least effectively of the formats, being difficult to notice and receiving little attention, especially on a tablet. Marketers forced to choose this format should devote extra effort to creating a truly catchy advertisement with the right design to appeal on the screen.

### “Brands are also recognized from a peripheral view”

Olivier Tilleuil also has extensive experience with eye tracking research relating to internet advertising. “Leaderboards appear to be the best format for evoking attention: they are the real eye-catchers. But I also notice that people usually spend very little time looking at their content. I think visitors look at the skyscraper frequently because of its central location. They expect to find navigational information about the website, but when they fail to find this, they are not very interested in the ad. They are only prepared to devote time to the ad if they immediately recognize it as being relevant to their current needs and interests. They usually fail to be captured and rapidly leave the site. On the other hand, the skyscraper, particularly when placed on the right
side of the screen, can hold attention for a relatively long time. I suggest that marketers adjust the format to suit the advertising goal. Is the objective recognition, providing information or click through and conversion to sales? Recognition can be a split second matter. In eye tracking studies we observe that people may even be aware of a certain brand or brand image without really looking at it. Brands can be recognized from a peripheral view and leaderboards are very suitable for this purpose. The right hand skyscraper may be more effective when marketers want to communicate profoundly and provide information about the products."

**Adjust advertising design**

“Many of our clients are interested in a high percentage of click throughs. One of my studies revealed that the design of the advertisement in combination with the website has a huge influence on this. When marketers use aggressive colors, or a design that is very different from the background site, the advertisement will often be ignored. In the interviews with respondents after the actual eye tracking, we found that a very aberrant use of colors, pictures or style sends a signal ‘this is a commercial and intrusive message’ to the website visitor. He or she decides, often unconsciously, to exclude the message. This can be very frustrating to the marketer because no results are achieved! In studies on print advertising we found that advertising is best seen when the content is experienced as being more or less equivalent to the surroundings. I think this also applies to advertising on websites.blurry images, a lot of text or a message that does not fit the consumer’s needs do not work either. I do not know if this applies to internet advertising, but it might be worth studying. And last, but not least, it has been demonstrated convincingly that any internet advertisement is much more effective when shown ‘above the fold’. Visitors will not scroll down the screen just to see your offer! Reaching a clear agreement on placement when buying advertising space is crucial.”

1) The effectiveness of display advertising on a desktop pc vs a tablet device. Mediative.ca, August 2012.
Both downloads are free and can be found on: http://mediative.com/resources/white-papers

**Promoting your business in Google Places**

Appearing on Google maps is vital for companies in the hospitality sector as customers increasingly use this app to source information about dining and recreational activities. Local services should also be aware that rapidly growing numbers of customers use Google to find local plumbers, painters and even physicians and therapists. “Currently, almost 50% of all searches on Google are aimed at finding local providers.” says Ian Everdell. “We lead busy lives and favor convenience. We’d rather visit a local restaurant than drive for half an hour. So why not check first? Rating services is now an accepted activity. Our study found that the majority of participants consult opinions posted on Google Places and judge them as generally trustworthy. Another trend is the rise of smart phones. Many people can consult the internet 24/7, so we ran an eye tracking study to see how Google Places is used on smart phones. [2].”

“Google Places is looked at identically to Google search results. The ‘golden triangle’(F-pattern MB) applies, with people looking at the list of search results on the left of the page first, starting at the top and moving down. Companies with ratings, especially positive ones, attract more attention. After studying the text, customers may glance at the map and make a second consideration. The outcome confirms that marketers and managers of service companies must work hard to rank highly in natural search results – this means developing a website, regular SEO optimization, a good business description and profile and regular activity on the site. Encouraging your customers to give flattering reviews is also vital. Google penalizes enterprises that use incentives for ratings, but offering business cards, inviting people to write reviews and actively engaging in social media is wise.”

1) The effectiveness of display advertising on a desktop pc vs a tablet device. Mediative.ca, August 2012.
Both downloads are free and can be found on: http://mediative.com/resources/white-papers
How Fabrics Affect Consumers

By Dr. Adrian Attard Trevisan, Angelica Micallef Trigona, Bertram Farrugia, Frederick Attard and Nicole Caruana

Shopping for clothes can be a real headache. We’ve all been there, trying to mix and match different styles and colors while seeking the right pair of shoes that looks good with that new leather belt you just had to buy. And what about the precious minutes spent picking an outfit that works before dashing out the door to get to the office or an appointment on time? Yet these commonplace scenarios are often accompanied by the stinging realization that the impeccable-looking outfit you’ve strewn together lacks one key thing: comfort.

When we come into contact with different materials, our bodies react in different ways. Office wear, gym clothes, party gear, pajamas, bed linen and towels are just a handful of different fabrics and materials that we come into contact with on a daily basis. The question is, how do these different materials affect us? And are different materials suited to different types of activities?

Cotton Inc.
Cotton Incorporated - a trade organization headquartered in North Carolina, USA, that aims to increase the demand and profitability of cotton through research and promotion - has worked together with AAT Services - a company within the AAT Research Group that focuses on executing research projects especially within the consumer neuroscience and neuromarketing sector - to develop a study that analyzed how comfort levels fluctuate as a test subject undergoes different activities. AAT's research established which material is deemed to be the most comfortable when undertaking different activities, enabling the company to provide Cotton Inc. with an unprecedented outlook on how different fabrics affect consumers under different circumstances. Using this data the client could now specifically pinpoint the unique advantages of cotton as opposed to other materials and showcase the benefits of cotton.

The Experiment
To understand how different materials affect us, we tested four different materials, one of which was cotton. Testing of these materials was done in two test modes to specifically record feedback during different states of motion.

The first part tested the materials when test subjects were in contact with them (by wearing them) while exercising. The Motion Stress Test required participants to maintain contact with a material whilst walking on a treadmill at different speeds. The second part was to test the materials while subjects were asleep. By conducting the Sleep Quality Test, we were able to analyze the different effects that different materials have on the quality of sleep. This way, we were able to find out how different materials change our neurophysiological states and also how responses to the same materials differ between one activity and another.

This study featured a random sample of 33 subjects, which were divided into three groups. One group featured participants aged 30 and under, another featured participants over the age of 30, while the third group acted as a control and was made up of participants from both age groups. The stimuli in both the Motion Stress Test and Sleep Quality Test, namely the fabrics, were tested among test subjects in a random order to minimize changes in emotional states such as boredom, tiredness, weariness and more.

Three different tools were used to gather data, including a 128-channel high density electroencephalography (HD EEG), thermal imaging and a questionnaire that allowed for the comparison between participants’ subjective opinions to the objective data collected.

The data gathered using the HD EEG allowed us to produce highly accurate heat map images of the brain processes that occurred during different activities and for different fabrics. We were then able to associate brain activity in different parts of the brain with different
states of emotions and feelings, providing an insight into
the comfort of test subjects when in contact with these
four different materials.

We also used thermal imaging to complement the data
gathered from our HD EEG recordings. A thermal image
of a scene refers to an image made entirely by detecting
the thermal radiation emitted by all that is captured in
that scene. We were able to measure skin temperature
changes while subjects were exposed to the different
materials. This allowed us to produce heat maps that
changed over a specific period of time for each fabric.

Results
The data analyzed from thermal imaging showed us
which materials were associated with test subjects
maintaining a constant body temperature, and which
materials were not. Maintaining a constant body
temperature would indicate that a material allows
transpiration of sweat, thus helping test subjects to cool
down as the exercise progressed.

We were also able to establish which material would
be most ideal to be worn during sleeping. This was
done by identifying which material caused a gradual
increase in body temperature. This gradual increase in
body temperature allows for a better onset of NREM and
REM sleep; a regular NREM/REM sleep interlude allows
a person to fully benefit from a healthy sleep cycle. For
example, Figure 1 provides a comparison between test
subjects’ body temperature when in contact with two
different materials during the Sleep Quality Test. The
results indicate a greater increase in body temperature
for Material 4, meaning a better sleep interlude.

An analysis of HD EEG data provided an indication of
which material was most comfortable during both tests.
We were provided with an indication of which material
presented the highest degree of alpha brainwaves
during exercise; alpha brainwaves are associated with
relaxation. Moreover, the results of the Sleep Quality
Test provided insight as to which materials recorded
the highest level of delta waves, delta waves being an
indication of deep sleep. This shows us which materials
are best suited for different activities and, by quantifying
this data, we were able to reveal which material ranked
highest overall. For example, Figures 2 and 3 show
results for HD EEG for one group during the Sleep Quality
Testing. The results for Material 2 show an increase in
beta waves in the central-frontal region, which indicate
possible discomfort during sleep as participants were
more alert.

Figure 2: HD EEG for
Material 2 during Sleep
Quality Test

Figure 3: HD EEG for
Material 4 during Sleep
Quality Test

Furthermore, the results of a questionnaire provided
after the two tests allowed us to compare the
participants’ subjective opinions to the objective data
collected.

Final Conclusions
After analyzing and comparing all the gathered data, we
were able to establish which material had the highest
overall score while test subjects were exercising and
while they were asleep.

Going a step further, this study depicts just how
profoundly neuromarketing can affect an organization’s
product, at the first stage of the traditional four
‘marketing Ps’, that is the product itself, before going
into production. Thanks to the results of this study,
our clients may choose to modify the products that
they offer. Moreover, they now also have a solid, data-
centered representation of cotton’s unique advantages
and benefits that they can use in the marketing of this
product.
Designing Better Cars

Haystack uses neuroscience to understand emotional engagement

By Mirjam Broekhoff, Nele Van der Elst, Wim Hamaekers and Ronny Pauwels

Buying a car is a highly emotional process. Most consumers start the process from a general preference: they prefer a brand or type of car. Other people work from an evoked set of preferred models and brands. However, the final decision depends on the real experience: how does the car actually feel when you use it, how does it look, smell and sound? In 2013, haystack international, a market research company, explored this question in cooperation with Toyota Motor Europe.

Nele Van der Elst is a research director at the Belgian setting of haystack international. She explains: “Our client, Toyota Motor Europe, observed that people evaluate new cars by the way the design was realized in practice. However, during the development process, the attention of technicians and designers is usually focused on the fundamental choices in the structure, design and lay-out. Our client would really like to know what drives the customer at the beginning of this development process. This study is a methodology test, designed to find out what insights neuroscientific methods can add to the traditional methods.”

Research set-up

We started this project with the general research objective of developing a better understanding of the emotional engagement of customers with cars. We had three goals: finding out which cars are emotionally engaging on the overall level, identifying the specific elements of each car that evokes emotional engagement and explaining the user’s emotional engagement with the specific elements that we identified in the context of verbal feedback. The research design should be effective, practical and affordable.

We worked in two stages. In the first stage, forty people watched a carefully made video of the exterior and interior of three different cars. These were all four-door sedans: a Ford Focus, a Volkswagen Jetta and a Renault Fluence. We chose those models for a very practical reason: Toyota could provide us with a short, beautifully made, studio film of each model’s exterior. To do the research properly, it is important that all participants have basically the same degree of knowledge and experience with the models. If, for example, this Volkswagen Jetta is on the market but the Renault Fluence is not, that will influence the results. We therefore showed these videos to a Polish audience: in that country all three models are quite common.

In this set-up, we used seven different cars. The respondents performed specific tasks during this stage.

Evaluating the cars’ exterior and interior

In the first stage, the video showed the cars’ exteriors by circling around the car from normal height, in a 360-degree approach. This means that the respondents saw the front first, then the side, back, side, front, and side. The film also showed the interior of the cabin from five points of view. During this task, the respondents were equipped with three devices: comfortable TOBII eye-tracking glasses, a small EEG-headset and two Shimmer finger straps to measure the galvanic skin response. In figure one you see an overall report of the persons looking at the cars’ exterior and the cabin. The pictures with the blue patches, on top and at the bottom, show what people are looking at (eye-tracking). The top line shows the relevance of what they see (EEG) and the lower line shows their activation (skin response). In this case, we see that the participants reacted negatively to the Ford’s rear, side and front view. They reacted positively to the alloy wheels and the radio vent. This is indicated by the red arrows that connect a specific picture to a blue, below the line, evaluation through EEG. The test consisted of two parts: it started with the respondent watching the video. After that, he watched the relevant frames of the video and we delved into his feelings at that specific point.
In figure two, we explain the outcomes of this study. Participants often reacted negatively to the Ford’s rear, side and front view. At the same time, the measurement also shows that the alloy wheels were evaluated very positively. This is important information for a car manufacturer, because the fundamental design of this car is not strong. Elements such as alloy wheels can be changed easily. However, redesigning the line of the car requires a fundamental new design, investing a lot of money, effort and time.

Further analysis of the three cars shows that the Volkswagen has the most appealing design. There are no parts that evoke negative experiences: it is a “safe bet”. Also, both the front view and ¼ front view are a success. Such results could not have been derived from a questionnaire or in-depth interview: concerning the exterior, the Volkswagen and the Renault gain exactly the same liking score. This does not reveal which aspects are essential for the overall evaluation. In addition, the participants were unable to identify the relevant aspects on their own. However, when they watched the relevant moments in the video, which are indicated by neuromeasurement, they were able to give relevant verbal input.

Entering the car: the “live” experience

In the second stage of the research, we asked eight participants to enter the car and to perform a number of tasks. For example: to look at the gearshift and handbrake and then feel and touch these items. This was very interesting as it shows how the product experience changes the participants’ evaluation. Figure three shows that in all three cars, experiencing the product increases verbal liking. This clearly doesn’t correspond with their actual experience. Looking at the Renault, we see that the emotional engagement decreases during the task and the attention drops too. Four items were evaluated negatively and only three positively. However, the verbal evaluation went up slightly. On the other hand, we see that the Volkswagen received a somewhat lower liking score, but offered a much more positive experience. Here only the gearshift and the handbrake were evaluated negatively: all other elements did well. This part of the test shows that verbal scores do not give adequate results.
Wim Hamaekers is a managing partner and Nele Van der Elst is a research director at haystack Belgium. Haystack International is an established international market research company www.haystack-international.com. This project was developed and executed in cooperation with Ronny Pauwels, Product Research Manager at Toyota Motor Europe.

Experiencing fabrics
After this first stage, we specifically evaluated the dashboard fabric. Here, circumstances allowed us to do research on seven different cars. The participants were asked to evaluate several pieces of dashboard fabric, putting them at different places on a board. This “experience” research is highly relevant, because “just verbal” research gives unclear results. For example, a shiny piece of fabric, i.e. one that reflects a lot of light, will be rated as modern by one person and as “giving unpleasant light reflections” by another. Now we could look at the real experience. The test strongly suggests that people like dashboard fabric that has a faint resemblance to human or animal skin. The fabric should not be utterly realistic nor completely artificial, but somewhere in between.

Research conclusions
Studying the emotional engagement of consumers with cars with the help of neuroscientific instruments gives robust and explainable results. They clearly outclass the outcomes of traditional qualitative and/or quantitative research: neuroscience shows which aspects are really relevant and evoke experiences. The team at haystack thinks that this can be done for a reasonable price: approximately 30% higher than traditional research costs. This methodology test shows that neuroscience provides a good insight into both the what and the why of research questions. That is important in the automotive industry, but also for other businesses that supply products and services. To establish long-term success, it is not the verbal overall evaluation but also the actual product experience that counts.
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Implicit Measures

What is it? How to use it?

By Femke van Zandvoort, NMSBA

If you explicitly ask people about their attitudes, personality or other characteristics you are not necessarily going to get a true answer. This is partially because people will distort the truth to paint themselves in a better light, and partially because people are often unable to accurately reflect on their attitudes and behavior. Duncan Smith of Mindlab says the validity of self-report is also compromised because many people are completely oblivious to their characteristics and do not always have conscious access to what drives their decision-making. With implicit measures these problems can be bypassed.

Implicit measures are a range of techniques that aim to capture people’s underlying associations, motivations, beliefs and attitudes. The techniques were originally developed in academia, largely as a way to measure social attitudes, such as underlying prejudices and stereotypes that people are either not consciously aware of, or not willing to articulate, as they don’t want to appear prejudiced, says Darren Bridger of Neurostrata.

Smith explains that we constantly sort, categorize and link concepts; black/white, male/female, hot/cold. This is done very quickly, efficiently and automatically in our brains. Smith: “Essentially, we build a map of the world in our brain that allows us to make judgments and decisions without having to use as many resources. Implicit testing allows direct insight into this map of representations, and how they can be influenced by the outside world.”

Different implicit paradigms

In general the research techniques that have been adopted by the marketing and advertising community have been those based on reaction times. These techniques are based on two key principles. Firstly, whenever we see a word or image, all the things that we associate with it (whether we are conscious of these associations or not) become primed. That is to say that they will come to mind more quickly and easily given the opportunity. Secondly when a person is given a task that involves them recognizing a word or image, they will recognize it quicker if they are first shown a word or image that they mentally associate with it. Bridger: “In other words if they are primed, it speeds up their recognition reaction speed. Hence in these tasks reaction speed becomes a measure of the degree of association between two things, such as a word and a brand logo.”

There are many different implicit testing models but the main ones used in the context of neuromarketing are semantic priming, where a briefly presented word or image is presented, and the Implicit Association Test (IAT). The IAT is primarily used for brand positioning, brand tracking and pre/post ad evaluation. In a typical semantic priming test, a visual word or “prime” (for instance a possible brand attribute word such as “fashionable”) will appear on screen for a few milliseconds. After this prime, one of two randomized targets (for instance “Burberry” or “Louis Vuitton”) will follow.
Gemma Calvert of Neurosense explains that the tests are performed by means of computerized web-based applications that force respondents to react extremely quickly to words or images flashed up on the computer screen. Calvert: “The method exploits the fact that subconscious and conscious brain responses (referred to by Daniel Kahneman as “System I” and “System 2” respectively in his popular book “Thinking Fast and Slow”) occur within different timeframes. So by requiring respondents to respond very quickly, typically less than a second, it is possible to capture the literal strength of association between different concepts and emotions that they have stored in their memory.”

Phil Barden of Decode Marketing stresses that “implicit” is not the same as “unconscious”. Barden: “The main point is to distinguish between (a) the type of process being measured (automatic versus controlled) and (b) the type of measurement (direct versus indirect). The distinction between automatic and controlled processes is more meaningful than the indirect/direct distinction regarding measurement techniques. The key is to prevent adjustments of responses through controlled (system 2) processes.”

History of implicit measures
Unconscious bias and stereotyping have been known since the 19th century but implicit memory was only studied in more detail in the 1980s. The most popular IAT was developed in the 1990s by a team led by psychologist Anthony Greenwald.

Sarah Walker of Millward Brown mentions the Implicit Association Test (Greenwald et al. 1998) is a social psychology measure designed to detect the strength of automatic association between concepts. A quick answer means a strong association towards a subject. The stronger the association, the more closely the ideas are connected in memory”. It was originally introduced by Greenwald, McGhee, & Schwartz (1998) and is still widely deployed by psychologists as a method to understand intuitive responses.
Benefits of implicit measures

Thom Noble of Neurostrata believes implicit measures are extraordinarily powerful as a neuro-tool: “As a hard core marketer, I would say it is the single most useful tool in the neuro-verse.”

According to Walker, implicit testing allows the assessment of attitude/cognition without requiring people to introspect and deliberate over their responses; in doing so, implicit measures address some of the limitations of explicit measures. For example, they are less susceptible to response biases such as social desirability (Fisher, 1993; Steenkamp, de Jong, & Baumgartner, 2010), and can help measure responses that may be introspectively inaccessible (Wilson, 2002).

The tests have evolved over time and research can now take place on tablets or smartphones, so participants can take the test in their own time and environment of choice. This is an advantage for the participant, but it also makes it an affordable and quick option for the researcher, as you do not need to invite groups to a central location.

Another advantage, according to Rafal Ohme of NEUROHM, is that clients are much more ready to use implicit technology than “hard neuro” technology. Ohme: “It is a very good starting point for inviting clients to the world of neuromarketing. Sometimes clients are still quite afraid of micro volts and brain waves, or even more scary; fMRI images. Instead, implicit gives you something that is quite familiar to you. It gives wonderful opportunities to give insight in implicit subconscious, without the heaviness of brain waves.” Ohme mentions another benefit in that you can reach groups that you would never be able to invite to a central location. Ohme: “For instance, top private banking executives will never visit you for a focus group, because it takes too much time. With implicit reaction times, they just have to sit in front of a computer or smartphone, and give you five minutes of their time.”

Limitations of implicit measures

There are, however, also some limitations to the tests, besides some general market research limitations. One limitation, as Smith explains, is that the outputs are not 100% accurate on an individual basis. A high implicit score does not mean that a person will definitely behave one way or another, but there is research showing that implicit scores can be used to better predict things such as voting behavior, than using explicit questions alone.

A limitation according to Calvert is that implicit measures only capture responses to the attributes you choose to include, as opposed to, for example, fMRI which measures activity across the entire brain. In other words; implicit measures will give you answers to the questions you think are important. The results therefore can be misleading.

Ohme believes the most important thing about reaction times is to control the noise. Ohme: “For instance, you would have to control for the length of expressions, because when using longer expressions, it takes longer to answer the question. For instance the expression: ‘understand my needs’, take longer to process than the expression ‘fun.’” There are also many individual differences. Some people are fast and some people slower to respond in general. These issues can be solved by including a calibration phase in the test. You can then compare reaction “units” of one person with “units” of someone else. Walker supports the opinion that “because of these differences in reading and comprehension times, the validity of this technique is really limited to single words, contrary to the claims of many vendors. Meaning, there are limitations on the types of associations that can be measured in this way.”

And, finally, although implicit measures provide valuable insights that were invisible before, it does not replace existing methods. As Ohme puts it: “It just provides the second layer. The first layer being explicit, the second being implicit. I would like to think of implicit as the sound that was introduced in Hollywood movies. Before, you had silent movies. And now, you have movies with sound.”

Applications

According to Bridger, implicit measures are of particular use in some areas that have been traditionally hard to investigate, including testing early stage creative concepts for their ability to evoke desired feelings and associations, multi-sensory stimuli (such as sound and music), and experiential areas such as simulations of website experiences.

The use of implicit measures is surely no longer limited to applications in marketing departments. As Ohme explains: “It creates completely new opportunities for us, neuromarketers, because so far 99% of our clients were marketers. With reaction times you can open doors for HR and sales departments, as with this you can, for instance, measure the level of satisfaction of your employees.”
Noble goes further to say they have commercialized and extended it into recruitment, cost-optimization programs, premiumization, service design, multi-sensory, experiential, politics, government negotiation tactics / arbitration, auditions, casting, TV and film scripting and pilot projects, gaming and box office prediction, amongst others.

There are a lot of companies worldwide offering implicit testing, for example Decode Marketing, NEUROHM, Neurosense, Neurostrata, Mindlab, Millward Brown, and Sentient Decision Science to name just a few.

One of the largest implicit studies run to date was conducted by the NMSBA (neuro against smoking project). This study involved testing 4996 respondents across 24 countries (heavy and light smokers) in their first 3 years of legal age for purchasing cigarettes in a given country. A neuropsychological implicit association test was conducted with its audience to uncover new valuable insights to the existing discussion on cigarettes warnings. The study found that pictorial health warning messages are more effective than text messages only and communication oriented toward harm done to self and others is more effective than warnings focused only on smokers’ health. More on this study can be found on the NMSBA website.

Future

“We are at the breakthrough stage with neuromarketing research”, recons Ohme, “where we stop being fascinated with the possibilities of the equipment, and we are more and more fascinated with the insights and expertise we receive from neuro tools.” If you compare the neuropresentations we had at the Neuromarketing World Forum in Amsterdam with the ones in Sao Paulo, New York and Barcelona, you see a growing number of presentations focusing on the insights and on how to help your clients, not on what type of electrodes you are using, says Ohme. “So for the next Forum I hope we will be providing more and more solutions to our clients instead of questions. Those are for the academia; business wants solutions,” he concludes.

Contributors:

Phil Barden is Managing Director of decode marketing and author of ‘Decoded. The Science Behind Why We Buy’ (Wiley, 2013)
Darren Bridger is the author of the forthcoming ‘Decoding the Irrational Consumer’ (Kogan Page, August 2015)
Professor Gemma Calvert is founder of Neurosense Group
Thom Noble is founder and CEO of Neurostrata, a global, independent mind-science consultancy.
Rafal Ohme is founder of Neurohm
Duncan Smith is Managing Director of Mindlab
Sarah Walker is Global Neuroscience Practice Director at Millward Brown

Suggested Literature:
De Houwer and Moors, 2010
Fazio et al., 1986
Fisher, 1993
Greenwald et al. 1998
Greenwald, McGhee, & Schwartz, 1998; Gregg, 2008
Kahneman, 2011
Lane, Banaji, Nosek, & Greenwald, 2007
Ranganath et al., 2008
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Wilson, 2002
The Neuroscience of Candy Preferences

By Paul J. Zak, PhD and Jorge A. Barraza, PhD
ZESTxLabs and Claremont Graduate University

Consumer neuroscience has been applied to understand preferences for a wide variety of goods, including foods. Food is particularly intriguing for neuroscientists because it involves touch, taste, smell, sound, and sight. Most food preferences are set by our twenties and evolve only slowly after that. Could neurophysiology predict food preferences? And if so, what foods would one test?

Candy
Candy is an interesting food to test because of its manufacturing consistency, familiarity, and positive regard by most people. Eating candy is a joyful experience, but articulating why we like one candy over another is difficult. As a result, confectioners struggle to forecast the demand for existing and new candies. Market research typically uses self-report on taste alone, ignoring the larger consumption experience: opening the package, pulling out the candy, putting it in the mouth, chewing it, and (of course) tasting. Because these senses have common pathways in the brain, the entire experience impacts on candy preferences and ultimately purchases.

Study Description
ZESTxLabs partnered with a US-based candy company to conduct a pilot study designed to capture the brain responses of the entire candy experience, and to use these measures to predict consumption preferences. Data were collected on ten study volunteers aged 20-55, both males and females. Eight types of hard candies and licorices, along with one chocolate candy, were used in this study.

After being connected to wireless sensors to measure peripheral neurologic activity, the volunteers were asked to watch while the candy package was opened. They were then invited to place the candy in their mouths and chew it slowly for 60 seconds. Neurologic data were collected during the entire experience, including during the post-consumption period as the taste faded away. Participants then answered questions regarding the candy’s taste, familiarity, and their intent to purchase. To cleanse their palates, participants were given a cracker and some water before tasting the next candy.

As in all ZESTxLabs studies, we included behavioral measures to assess candy preferences. The first measure was whether the participant swallowed the candy she or he tasted (rather than spit it into a cup). The second measure tracked the candies chosen for future consumption (participants were allowed to take home a handful of two of the candies tested).

Neural Predictors. Six measures of peripheral neural activity were collected during the consumption...
experience, including cardiac and electrodermal activity as in our previous studies. We used this data to calculate our proprietary ZEST (Zak Engagement Statistic) measure of experience immersion for each candy. The ZEST algorithm evaluates multiple measures of attention and emotional resonance to produce a linear measure of neurologic engagement in a consumer experience or ad. After a decade of academic and government research, ZEST has been shown to predict consumer responses with 82-95 percent accuracy, including charitable donations after watching public service announcements and changes in mood during shopping experiences. For this study, ZEST took into account the entire experience of candy consumption: opening the package, taking out a piece of candy, chewing the candy, and enjoying its taste. We related each candy’s ZEST to the intent to purchase it.

Findings
We estimated a statistical model of intent to purchase each type of candy using ZEST and taste ratings as explanatory factors. The statistical model predicted the intent to purchase. We found a 0.73 (partial) correlation between ZEST and intent to purchase, a very strong result for such a small sample. Moreover, the model predicted intent to purchase with 78 percent accuracy. The accuracy would likely improve as the sample size reached 30, the minimum sample we use in our complete studies. Including familiarity, eating the candy, and candies taken home did not improve the model. This pilot study suggests that immersion in the candy consumption experience is more than just eating sweets.

Conclusion
This pilot study demonstrates the power of neuroscience to capture a wide range of consumer experiences. All aspects of product interactions can be studied, from ads, to packaging, to product design, to product use. In doing so, consumer experiences will be improved, as will companies’ bottom lines.

So why do we like some foods more than others? Of course, this is depends on our life experiences, exposure to various foods during travel, and taste sensitivities. Counting on self-report to identify “why” is asking too much of the brain’s valuation and language centers, physically distinct regions with almost no direct connections to each other. But it is not asking too much when we measure neurologic activity during these experiences. People may not know why they like what they like, but the brain can tell us.

Additional Reading

References
2 We thank our collaborators at SalesBrain for introducing us to the candy company.
Habits, Neuroscience and Marketing: An Introduction

By Neale Martin

Each squeeze of the toothpaste tube puts you one step closer to running out. Each piece of toilet paper or paper towel that comes off the roll marks one step closer for the need to resupply. The same is true of your soap, shampoo, laundry detergent, diapers, beer, wine, coffee, soda, chips, bread, lettuce, tomatoes, hamburger, chicken, cheese, orange juice and bottled water. Running out of any of these common products is likely to launch a set of behaviors, largely automatic, that quickly and efficiently brings your home back into balance. Most of the time, you will purchase not only the same product, but the same brand of product as last time. And usually, you will make this purchase at the same place you bought from last time, be that a grocery or big box store, a pharmacy or an online merchant. We are creatures of habit, and the habitual customer represents the majority of most brands’ revenue and profit.

The modern consumer touches dozens of brands every day before even leaving the house: soap, shampoo, cream rinse, shaving cream, razor and blade, deodorant, maybe five or more makeup items including blush, eyeliner and lipstick, toilet paper, orange juice, coffee, creamer, cereal, milk, plates, cups, silverware, table, chairs, bags, toaster—the list goes on and on. The success these brands have in our lives is largely based on their ability to allow us to accomplish tasks without having to think about them. The more harried we are, the more we rely on our automatic routines to get us out the door quickly and efficiently.

This type of process, reaching automatically for a paper towel to wipe up a spill or an iPhone to text your friend, is a habit—a mental process of great power and efficiency. Habits are critical for the modern consumer to navigate the overwhelming complexity of the industrialized world. Without habits, a trip to the grocery would take hours, and every online purchase would begin chaotically and expand exponentially.

Over the last decade, numerous top CPG companies, including P&G, Coke, Kimberly-Clark, and Eli Lilly, have dipped their toes into consumer habits. But the uptake has been uneven and lacking in coherency. Yet, as research from numerous areas, including neuroscience, cognitive, behavioral and social psychology indicates, the critical role of habits is central to understanding consumer behavior.

Consumer habits explain most of marketing’s persistent shortcomings and failures. The fundamental mistake of most marketing theory is the assumption that consumers are rational, logical, and conscious decision-makers. While readers of Neuromarketing Theory & Practice are well versed in the influence of unconscious mental processes, the particular role of habits may surprise.

The idea of habit goes back at least as far as ancient Greece. Aristotle contended, “We are what we repeatedly do. Excellence, then, is not an act, but a habit.” And Hippocrates entreated his followers, “Make a habit of two things: to help; or at least to do no harm.” And the idea of habits, good and bad, is seen throughout the popular culture around the globe, including countless articles and self-help books. But not until recently did we understand the neural structure of habits and habit formation, or grasp the psychological underpinnings of automatic habitual behavior.
The neuroscience of habits

The neural structure of habits was discovered by Ann Graybiel and others at MIT who began looking at the striatum, a region then thought to be a primitive part of the forebrain lurking underneath the elegant neocortex. Instead of finding an undifferentiated ball of neurons, Graybiel discovered sophisticated structures primed for learning. Excited by her findings, Graybiel switched from staining cadaver brains to studying neural activity in living animals as they learned new tasks.

In early experiments, as rats were learning a maze, Graybiel discovered there was a significant amount of neural activity in the sensorimotor striatum, which is part of the basal ganglia. But as the rats mastered the maze, neural activity changed. Where an assembly of neurons had been firing throughout the maze run, after habitual learning the neural activity in this part of the brain was active at the beginning and at the end of the run but quiet in the middle. Habits can then be seen as stored neural patterns, where neural firing at the beginning and end brackets the learned behavior into chunks. “Thus, through the stream of behavior, episodes could be marked as scripts ready to be called up,” according to Graybiel.

Understanding that habits are neural structures in the basal ganglia is critical for marketers, who often confuse habitual behavior with customer loyalty.

The process by which behaviors become habitual includes repetition and reinforcement. When the reward is removed, the neural firing patterns revert to ensemble firings throughout the behavior. But when the reward is brought back, the habit-encoded firing pattern immediately returns. This goes a long way toward explaining why so many marketing campaigns fail to change behavior—a promotion may get a one-time trial, but customers typically revert back to their existing habits.

The psychology of habits

Habits are a type of neural learning that creates cognitive efficiency, but how prevalent are they? Wendy Wood has done much to improve our understanding of the behavioral structure of habits. A social psychologist, Wood did a series of experiments while at Duke University that indicate that roughly 45% of behavior consists of daily habits. People reported doing the same thing, at the same time, in the same place while consciously thinking about something else.

“Habits emerge from the gradual learning of associations between an action and outcome, and the contexts that have been associated with them. Once the habit is formed, various elements from the context can serve as a cue to activate the behavior independent of intention and absent of a particular goal,” Wood explained. Once a habit is formed, “very often, the conscious mind never gets engaged.”
There are several concepts in that paragraph that need to be unpacked. The first is context. Graybiel noticed that habits were bracketed by neural spikes indicating the beginning and the ending of chunked behavior. The mind begins to unconsciously recognize familiar situations that have been successfully navigated before. This is what allows the neural networks formed in the basal ganglia to execute behavior without the need for conscious intervention.

The power of contexts can be seen in virtually all aspects of consumer behavior. Watching shoppers go through a grocery store shows them entering and exiting highly contextualized zones. Walking down the juice aisle might see a mom automatically reach for the Tropicana, but then spend five minutes closely examining the melons and tomatoes. Trying to change behavior inside a context is incredibly difficult for the person, much more so for a marketer trying to intrude on a successful behavior that has been repeated hundreds of times in a stable context.

The next concept that needs to be addressed is cue development. A cue triggers the habitual behavior. Cues can be external or internal. Millennials raised on mobile phones react to a text message cue faster than conscious thought allows, while an internal hunger cue might cause them to grab a Snickers bar without even being aware that they had done so. Tropicana famously erased the buying cue when it changed the package of its leading product—sales declined more than 20% in a month. Marketers need to understand what cues trigger automatic purchase of their brands and their competitors.

Lastly, the process of habit formation needs to be understood. When a behavior is repeated in a stable context the neurons in the basal ganglia learn the pattern. The original behavior might have been conscious and goal directed, but as the behavior is repeated and etched into the basal ganglia, it becomes unconscious, automatic, and no longer requires goal direction. Because of this, Wood describes habits as pre-potent—more powerful than other types of thought—persistent, and resistant to change.

Habits and marketing
The power, persistence, and prevalence of habits go a long way to explaining many of marketing’s most persistent challenges, including the failure of traditional marketing metrics to predict future customer behavior. Customer satisfaction measures, including net promoter score, are conscious measures that often cue post hoc rationalization of unconsciously driven behavior. As such, they are all weak measures of what customers will do next. Once a behavior has become a habit, it is no longer available for conscious introspection.

Habits are far better predictors of future behavior than attitudes, intentions and prior satisfaction. Indeed, creating habitual customers is a more profitable strategy than pursuing the mythical goal of customer loyalty. After all, Blackberry users reported extraordinary loyalty to the Canadian manufacturer right up to the point Steve Jobs introduced the iPhone.

Can contexts, cues, feedback loops and repetition till habit formation become the language of marketers? Ironically, it is marketing’s existing habits that are keeping this from happening. Market research still relies heavily on questionnaires and other forms of conscious-level feedback. This misinformation then goes into product development, pricing and loyalty programs. Advertisers still rely on traditional recall measures to judge ad effectiveness, though unconsciously processed ads may be more effective.

However, a new generation of marketers brought up on neuroscience and the addictive nature of mobile, social and digital is likely to see the world differently. And the popularity of books like Nir Eyal’s Hooked: How to Build Habit Forming Products indicates the audience for habit-based marketing is building.

Neale Martin is founder of Sublime Behavior Marketing and author of Habit: the 95% of behavior marketers ignore.
We should help consumers to protect their beliefs
This practice of rationalizing behavior is of significant importance to firms and brands that want to market their products and brands efficiently. In their fascinating book *Mistakes were made (but not by me)*, Carol Tavris and Elliot Aronson propose that cognitive dissonance happens because we want to keep our self-esteem intact. I will mention three examples of how this idea might present itself in practice.

**Protecting the Self-esteem**

Let’s start with the confirmation bias. Suppose that you have believed for many years that Apple’s iPad is a superior product to Samsung. In that case, new research stating that the Apple iPad indeed is a superior product to the Galaxy will be music to your ears. On the other hand, you will probably ignore a subsequent study that finds evidence to the contrary. Nassim Taleb, the bestselling author of *The Black Swan*, summarized this bias perfectly: we confuse the absence of evidence with the evidence of absence. Secondly, we are self-serving. This means you may attribute the success of, for instance, a marketing campaign to personal factors (e.g. superior skill and experience) whereas you attribute a failure to external factors (e.g. lack of funds). Lastly, there is the concept of in-groups and out-groups, “us” and “them.” We are all part of various groups at any given time. You might be part of the “American” in-group if you are an American citizen, “a husband” in-group if you are married or “a father” in-group if you have children. Companies such as Apple spend millions of dollars annually on creating a brand image of Mac owners as being “smart, elegant and hip” while seeing other PC users as “losers”. The average human wants to remind himself or herself that he belongs to the “in”-group; that he has made the right decisions and that he is living a meaningful life by self-justifying his decisions. In fact, a recent study identified a neural basis for in-groups and out-groups. The conclusion was that we “derive our self-image from the groups we belong to.”

**The Importance of Cognitive Dissonance**

A neural base for cognitive dissonance was discovered in fMRI studies in the past. Neuroscientists have known for years that the neurotransmitter dopamine in the brain is involved in predicting events. This is the way, at least in part, we learn to associate a familiar jingle with a specific radio advert, because dopamine neurons will begin firing in response to the right cues (in this case, the jingle). However, if the brain expects something to happen based on past experience, and it does not happen, a unique brain signal, known as error-related negativity (ERN) is produced. This error signal originates in the Anterior Cingulate Cortex (ACC) and its functioning helps to control what we know versus what we feel. Previous fMRI studies have confirmed that the more conflict there is in ACC signals, the more dissonance a person experiences. In a study to determine the brain areas that are active during...
dissonance, half of the subjects were also told to lie and say how much they liked being in the scanner. It was later determined that the greater the activity in the ACC, the more participants later mentioned that they really felt, in fact, that it was a pleasurable experience. The way you think changes your attitude. Another region also affected by dissonance is the insular cortex, which monitors the disparities between beliefs that are mentioned and those that are actually believed. 8]

There is a condition known as anosognosia which causes a patient to experience a deficit in self-awareness and to become completely ignorant of their own disabilities, such as paralysis. In other words, they are in complete denial that they cannot walk, climb stairs etc. They might declare that “I used to have paralysis.” Most importantly, they are not able to predict consequences of their own behavior. Anosognosia is asserted as a physiological condition which typically involves the parietal lobe or a diffused lesion on the fronto-temporal-parietal area in the right hemisphere. 9] As António Damásio discusses in his book, Decartes’ Error “When one’s own self-image is so compromised [as a result of anosognosia], it may not be possible to realize that the thoughts and actions of that self are no longer normal.” 10]

Questions for Future Research

It would be interesting to see whether the ACC is indeed involved in the symptoms of anosognosia sufferers, what role cognitive dissonance plays in these patients as a result of a compromised self-image, and what the implications might be regarding purchasing decisions. I suspect that research on anosognosia sufferers will cement and provide further insights into the importance of “selling to consumers’ self-image,” thereby providing a new angle as a competitive advantage to companies. Given the distinct neural basis of cognitive dissonance, seeing the role a person’s self-image plays in neuromarketing would provide further enlightenment. I expect that consumers with a better self-image will experience less cognitive dissonance.

Marketers: Be Aware

Marketers like to vary their campaigns and their central campaign messages. This can be successful because it helps to attract or redirect the public’s attention to the brand. However, they should be aware that dissonant signals from the ACCs will lead to an interpretation of the message as “wrong” and therefore it may be ignored. If the message is no longer consistent with a person’s views and opinions, it can even result in the brand being perceived as wrong, and therefore being discarded. When marketers plan to profoundly change their communications it is advisable for them to have their marketing messages analyzed by independent scientific testing to make sure they avoid dissonance. Campaigns should serve to remind consumers that they will receive consistent quality products.

We should also consider the additional role of the ACC in decision-making. Driving the point home that your company’s product is of superior value relative to that of a competitive product will enhance the probability of a purchase. Brand management efforts could implicitly position their brands as “selling confidence” or as “contributing to a positive and healthy self-image.” When advertising confirms consumers’ beliefs about themselves or justifies reasons why they deserve to have a product, their self-image will receive a boost. Furthermore, since cognitive dissonance is often involved in consumer post-purchase regret, a key goal should be to provide consumers with confirmatory information of having made the right choice and in so doing reduce the anxiety and tension that accompanies cognitive dissonance.

References

Eye-Tracking Out Of Home Media in Colombia

By Luis Fernando Rico Navas

As a businessperson without any formal training in neuroscience, I became aware of the power of neuromarketing seven years ago. At that time, I explored the different alternatives for measuring the effectiveness of media spending in more than fifty countries for the bank that I was working for. This led me to found Mindmetriks in 2011. We provide neuroscientific consultancy services that support our clients in optimizing their use of media. This case shares the outcomes of a study we conducted in Colombia to establish the effectiveness of Out of Home media.

In this project, we formed a partnership with MEC and Mindshare, two companies that belong to the world-leading media company Group M. We wanted to measure the consumers’ response to so-called ‘Out Of Home’ media, with the aim of helping our clients to increase the revenue of media spending. Out of Home was a relevant topic because spending on this type of media was rapidly increasing at the time of the study: in Colombia, it grew roughly 30% during the previous three years. At the time, there was no up-to-date information available to report on its effectiveness.

This study used eye-tracking glasses. We focused on consumer behavior and attitudes to Out of Home (OOH) media while people were traveling from one district of the city to another. In total, a group of 84 people aged between 25 and 35 years old wore eye-tracking glasses while traveling. The group was split into three subgroups according to the type of transportation being used. Group A (27) traveled using the Transmilenio, an integrated, government-organized public transportation bus system in Bogotá. It allows passengers to use different buses with just one ticket. Group B, consisting of 31 persons, used public buses, which are privately owned and operate on different routes. The third group, C with 26 persons, traveled in individual cars. This last group was divided into two subgroups: the driver and the passenger.

We took photographs along each route and marked on a map what and where the Out of Home advertising was during each journey. We calibrated the data immediately after every journey.

The participants were able to see different OOH advertisements on their journeys. In total it was possible to see 128 billboards along the route, 42 posters at bus stops and eight posters at the Transmilenio station. The advertisements were split into different products/categories, of which the most important were personal care, fashion, beverages, communication and automotive.

Research findings

This study revealed that an average of 84% of the participants observed one or more forms of outdoor advertising. As expected, the result depends on the means of transport and the way it was used. Of group B, people sitting on a bus, 100% observed outdoor advertising. Car passengers returned the equivalent response. Of group A, people using the Transmilenio, only 81% saw advertising, while only 38% of the car drivers were able to look at the advertisements. We also noticed that on average 32% of the advertisements received attention. Bus passengers saw 61% of all possible adverts, passengers on the Transmilenio and car passengers saw 17% and car drivers saw 6%. The gaze...
was fixed on the advert for an average of 0.85 seconds with bus passengers taking a longer look than car drivers. The longest fixation time lasted up to three seconds.

We asked people before the study how often they observe ads. The results show that there is a noticeable difference between what participants report and their actual behavior. For example, 100% of the car drivers answered that they usually observe outdoor ads while they are driving. In our study, only 38% of them actually did.

Remembrance
Additionally, we wanted to understand what level of the advertising remembrance the participants had after they completed their journey. It is important to note that the participants were informed prior to commencing the study that the purpose was a mobility study - there was no mention that we were assessing the effectiveness of advertising. The results in relation to advertising remembrance were positive. Although on average the participants observed only one third of the adverts, they had a high level of awareness. The accuracy of awareness was quite good: normally when people are asked to give details of ads, they mix up messages or give wrong answers. In this study, 64% of the participants gave the right answers when they were asked about the brands and message that they saw. The study showed that the short time they spend on each fixation (0.85 seconds on average) was enough to provide us with an open (not aided) recall of 64% of the images and 25% of the texts. This confirms that it is easier to remember images than text, especially when there is only a short exposure time. One other interesting result was that, in general, the women were able to remember more information and were more aware of the Out of Home advertising. According to the results, the automobile industry is the only sector in which men have a significant level of remembrance.

Advice to our clients
We explained to our clients that the brain leads our eyes, not the other way round. So, if there is an element that captures the brain’s attention, it will be remembered, but if there is no connection or link with the brain’s expectations, that information will not be retained. In relation to this study, we explained that the brain’s attitude is the key factor determining the effectiveness of any type of media. In the case of the non-driving participants, high levels of awareness were obtained with, on average, just 0.93 seconds of fixation. They were also able to remember high levels of accurate information about the adverts. By contrast, the car drivers were not only unable to observe the adverts, but also their levels of accurate awareness were very low. If we compare this result with traditional TV commercials, Out of Home media is more effective as it will lead to a high average of accurate awareness, even when the advert is given a very short time of exposure.

Out of Home media do entertain people’s brains while they are traveling. Many travelers are open to OOH media: their brain is looking for entertainment. When someone is watching a TV program that is interrupted by a TV commercial, the viewer tends to switch to another channel. The brain is aware that it is being confronted with advertising and often does not want to accept this. This makes it more difficult for companies to be effective in TV commercials compared with OOH media. Out Of Home media provide an effective way to generate brand awareness in people while they are traveling, especially if they are not doing the driving.

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