

# Ad response tests show how attention connects to memory

Biometric research into consumers' reactions to commercials can pinpoint the moments that will remain in the memory, says **Charles Young**, Ameritest

**A**TENTION AND MEMORY are the alpha and the omega of advertising effectiveness. The first thing an advertisement has to do is to attract the attention of the consumer, or else nothing you have to say matters. And if an ad does not leave some kind of lasting trace behind in the long-term memory of a consumer, it is difficult to argue that it had any kind of effect. But connecting the dots between attention and memory has not been easy for ad researchers to do.

Most biometric firms involved in ad testing today are focused on the issue of attention or 'engagement', usually with an emphasis on understanding the emotional and unconscious drivers of attention. Less work has been done on understanding the neuroscience behind advertising's long-term memory effects, which is a critical step in understanding how brands are constructed in the mind.

## Brainwave research

To help complete the picture, Ameritest recently teamed up with a brainwave measurement firm, Sands Research, to study the connection between short-term attention and long-term memory.

We studied 36 fast food commercials that had aired in the past year, half for McDonald's and half for other brands. Dr Sands used state-of-the-art EEG equipment technology, which he also sells to the National Institute of Health, to measure the electrical activity of the brain while respondents watched the ads.

We used our standard online pre-test, which includes performance metrics such as attention-getting power, brand linkage and motivation, as well as our picture sorting techniques, which are a set of diagnostic tools widely used by our blue chip, multinational clients. What we learned was interesting, not only because of where the two measurement approaches were in agreement, and so validated each other, but because the differences in our findings led to genuinely new insights into how advertising works.

First of all, both methodologies agree that commercials that do an above-average job of breaking through clutter to

attract attention are characterised by a greater number of peak moments of attention during the 30-second flow of the commercial. For the 20 high-attention ads in our sample, brainwaves peaked an average of 3.7 times versus only 2.3 times for the 16 low-attention ads. Similarly, when we looked at the first Picture Sort in our diagnostic toolkit, the Flow of Attention, we found 4.6 peaks for high-attention ads versus 3.4 peaks for low-attention ads. So, not surprisingly, we conclude that the rate at which a commercial – or film in general – produces moments of excitement is predictive of engagement overall.

What was surprising was that when we compared the two kinds of data ad by ad, we discovered that brainwaves and Picture Sorts don't usually peak on the same moments. In fact, there were more Picture Sorts peaks than brainwave peaks. All together, the 36 commercials generated 113 brainwave peaks and 149 Picture Sorts peaks, but only 61 of these peaks were common to both.

We can gain new understanding of how advertising works by analysing the actual content of the ads at these different points in time. Let's start by looking at the moments where the two systems agree.

Double peaks, or moments that are peaks on both the brainwave and the Picture Sorts Flow of Attention graphs, are by far the most strongly predictive of the overall attention score for the ad. They occur four times as often in high-attention ads as in low-attention ones. The convergence of the two systems, therefore, helps us to identify the hardest-working parts of a commercial. Analysis revealed that double peaks were most likely to contain the following content:

- Important news, such as the announcement of a strong price promotion
- Inciting incidents, typically involving a moment strongly charged with negative emotion to set up a joke or storyline
- Surprising moments or turning points in stories
- Climactic moments or punchlines for jokes.

In other words, double peaks can be used to identify the dramatic highlights of the ad from the audience's point of

view. If we were talking about movies instead of TV commercials, these would be the scenes that would most likely make it into the movie trailer.

What about the peak moments that one diagnostic technique identifies, but the other does not? One part of the answer is quite simple. With brainwaves, we are measuring audience response to the total multi-channel experience of the commercial – the pictures plus the words plus the music – while the Picture Sorts focus on the vision part of the TV commercial. In many instances, brainwaves peak at a moment in the ad identified with a strong line of copy – an effect we can see in our Copy Sorts, but not in our Picture Sorts.

In short, while brainwaves measure the total, multi-channel experience a respondent has with a commercial, our diagnostic sorting techniques help to peel back the different layers of that experience, as you can see in Figure 1.

## Primitive drives

However, this is not the whole story. For example, why did we find more Flow of Attention peaks than brainwave peaks in these fast food commercials? When we analysed the content of the peak experiences in these ads, it turned out there were nearly the same number of Picture Sort and brainwave peaks in the 'story' part of an ad – but the Flow of Attention produced more than twice as many peaks in the 'product' part of the ad, particularly when product images were on-screen that would activate our basic senses, such as taste, touch or smell.

Our hypothesis for this finding was that these images tap into the oldest, deepest parts of the brain – the 'reptilian' brain or amygdala – which sits in the anterior temporal lobe and is where our primitive drives, such as hunger and sex, originate.

Because these parts are deep in the centre of our brains, they're harder to read with EEG machines that only pick up electrical activity closer to the surface of the brain. In fact, this limitation of EEG monitors is a major reason why some neuroscientists these days are using the

**Charles Young** is founder and chief executive of Ameritest, an international advertising and brand research company based in New Mexico, USA. He has spent 20 years in the business, working in categories including packaged goods, retail, fast food and automotive. [chuck@ameritest.net](mailto:chuck@ameritest.net)

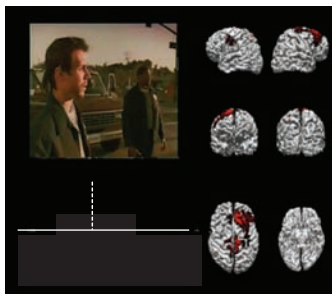


FIGURE 1

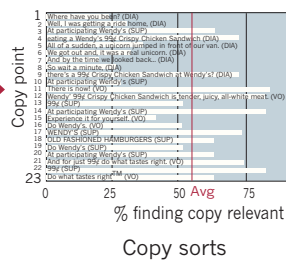
## Measurement of total engagement – Wendy’s commercial

Brainwaves measure total engagement. Picture Sorts (Flow of Emotion and Flow of Attention) and Copy Sorts peel back layers of engagement

### Total physiological responses

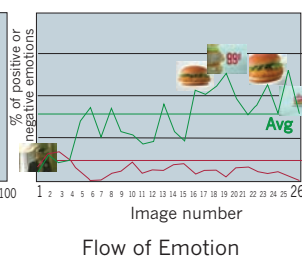


### Rational response

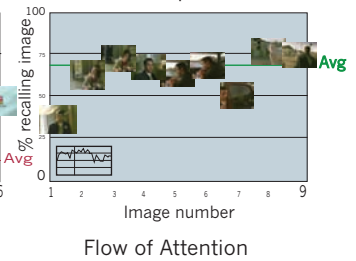


### Drivers of response

#### Conscious feelings



#### Unconscious emotional response



Source for all charts: Ameritest

much more expensive and cumbersome fMRI machines to pinpoint advertising's impact on the deeper activity centres of the brain.

But the most intriguing finding of our joint research project was one that helps explain the rhythmic structure of visual communication. As we analysed these fast food commercials scene-by-scene, we observed that the brainwave pattern would sometimes peak at the beginning of a scene, where it was unclear what was going on. This would be a low spot in the Flow of Attention. Then the brainwave arousal would fade at the end of the scene, just as the Flow of Attention was peaking. In some of the storytelling parts of the ad, the brainwave curve and Flow of Attention curve would be moving in opposite directions.

This makes sense if we consider the differences between our two measurement techniques. Brainwaves measure the amount of energy being produced by the brain moment-by-moment in real time, as a consumer watches an ad. The first picture sort is called the Flow of Attention because it is a measure of selective attention and is, in fact, most predictive of the attention score of an ad. But the name for this picture sort is also a bit of a semantic misnomer. Because visual recognition is collected after the fact, 20 minutes after images have been sorted out by the brain

and encoded into long-term memory, the Flow of Attention graph can also be interpreted as a map of remembering and forgetting. The higher a picture is plotted on the graph, the more a consumer audience remembers that image 20 minutes after seeing the ad.

### Remembering meaning

Memory researchers have long established that what the brain remembers is the meaning of what happens, not simple, sensory inputs. With that in mind, the difference between what brainwaves are peaking on and what the Picture Sorts are peaking on gives us a new insight into how long-term brand memories are created by advertising.

This is how the process works from a storytelling perspective: scenes in stories open by arousing curiosity, engaging the audience with a change in the direction of the film. In response, the brain releases electrical charges to alert the mind to the new situation: 'Pay attention! Something new is about to happen here!'

Brainwaves peak as neurons fire away. As the scene unfolds and then resolves, the important information in the scene is sorted out. Finally, the brain can return to a state of rest and neuronal activity settles down.

As a result, the mind may only store the end of the scene – when the meaning

of the scene is resolved – as a memory. This is the part of the scene that would generate a peak in the Flow of Attention. In the context of advertising, it would be these meaningful memories that comprise the set of visuals encoded into long-term memory that we would expect to be most strongly associated with the brand image.

Of course, brainwaves may also peak on a resolution scene. Because a commercial is a chain of meaningful moments, the resolution of one scene may be the beginning of another as involvement is ratcheted up with the build in audience engagement in the flow of the film from the beginning to the end of a strong commercial. But, in general, this back and forth between curiosity and resolution is what helps to give rise to the rhythms of visual storytelling.

One of the other things that researchers have learned about memory is that there is a hierarchy to how our memories are stored. Not all memories are created equal. Our minds don't store all the information about an experience we have, but only the essential parts – the gist of it – enough so that we can reconstruct the original experience.

An easy way to think about this is to consider the children's game where you try to figure out a word or phrase by guessing the first few letters the words

FIGURE 2

Peak moments from a Wendy's commercial (out of 26 frames)

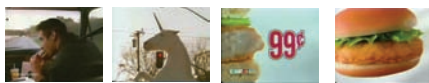
Brainwave peaks



Picture Sorts: Flow of Attention peaks



Branding moments (peaks of attention and emotion)



Brainwaves and Picture Sorts identify a hierarchy of memorable moments in a commercial

the commercial might be enough to win an advertising version of *Wheel of Fortune*. But which of these visual summaries comes closest to describing how this commercial might actually be stored in consumer memories? To find out, we did a follow-up experiment with images from the 20 high-performing ads in our brainwave experiment.

Almost a year after these commercials aired, we interviewed 200 consumers online and showed them a large number of individual images, like those from the Wendy's ad, taken from these 20 commercials. After showing each image one at a time, in randomised order, we asked respondents if they remembered seeing it on TV and which brand of fast food they associated with each image.

Our findings confirm the images from TV commercials do indeed follow a hierarchy – not all the images in an ad are equally important for our remembrance of the advertising (Figure 3). Many of the images in a commercial play only a supporting role, which may be important for continuity and fluidity of the storytelling, but they are less essential for mentally reconstructing the overall meaning of the ad. As a result, we found that these types of images were only slightly better recalled than control images that were used in our experiment.

Memorable images

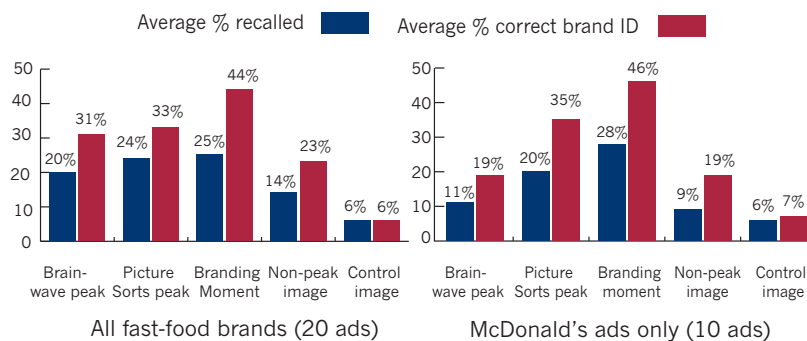
However, images that stood out in consumers' attention as they watched the ad, whether identified from brainwave peaks or Picture Sorts peaks, were significantly better recalled over the long-term. When we look at correct brand linkage, the hierarchical pattern is similar. The set of images that had by far the strongest association with the brand were those high attention plus high emotion images that we call branding moments. This finding held true across all the fast food commercials, but could be seen most clearly from the 10 McDonald's commercials.

Our conclusion is that, for any given commercial, the subset of images stored in consumers' long-term memories are relatively small in number. On average, a branding moment occurs only about once every seven seconds in a typical 30-second commercial, which adds just four images to consumers' long-term memories of a brand. Importantly, pre-testing can identify what those long-term memories will be by measuring what peaks consumers' attention in their first viewing of an ad.

FIGURE 3

Long-term brand imagery

Both brainwaves and Picture Sorts peaks are correlated with long-term brand associations, but the best predictor of long-term brand memories are the Branding Moments



contain. In the US, this is the basis for the long-running gameshow *Wheel of Fortune*. If you're lucky enough to guess a few essential letters right off, you can quickly figure out the whole word. But if you pick the wrong letters at first, it takes longer to figure out the word.

One trick to understanding how a TV commercial might be stored in our memories is to identify a minimal set of images that could be used to describe the whole ad. Figure 2 shows some variations on how this might be done from one of the high-performing Wendy's fast food commercials we tested.

Altogether we needed 26 images to describe the total visual content of this commercial, but they can be condensed into the seven images, shown in the first row, that are the key moments in the ad identified by brainwave peaks. The commercial is about a man telling his girlfriend that he was late coming home because he and a friend saw a unicorn on the street. The girlfriend was not moved by his tall tale, but was surprised by an offhand remark he makes about a 99 cent

chicken sandwich on sale at Wendy's.

If we look at the seven key frames identified by the Flow of Attention picture sort, we get a slight variation on the story. Now we learn that the man was actually eating the chicken sandwich when he saw the unicorn. The two images – reaction shots of the men, which set up the unicorn visuals – are gone, and instead we get an additional image of a tasty chicken sandwich to add appetite appeal to the 99 cent message.

Finally, we can identify an even smaller set of only four images if we look at the pictures that score high on our Picture Sorts, the Flow of Attention and the Flow of Emotion. These images, which we interpret as the essential brand-building moments, or 'branding moments' of an ad, are, by definition, images that 1) the consumer focused their attention on, and 2) that are also highly charged with emotion. According to these four visuals, the gist of the creative idea is the news that 99 cent chicken sandwiches at Wendy's are as rare and remarkable as unicorns.

Any of these small sets of images of