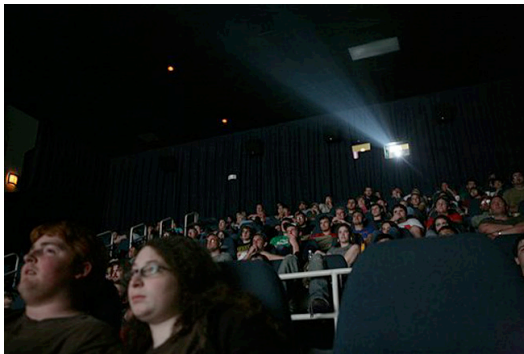


Hollywood Gets Inside the Minds of Moviegoers

By **Jeremy Hsu**, Staff Writer

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"Carl, let me in," whispered actor-director Ben Stiller, grasping at empty air near a sullen teenage boy. "I want to know what makes my little nephew tick."



Fans watching the first showing of "Indiana Jones and the Kingdom of the Crystal Skull" after midnight on Thursday, May 22, 2008, in the Carmike Theater in Tyler, Texas. Credit: AP Photo/Dr. Scott M. Lieberman

The sketch at the 2008 MTV Movie Awards showcased Stiller's self-mocking attempt to promote his new comedy "Tropic Thunder" and get inside the head of his potential

audience. But in reality, both Hollywood studios and neuroscientists are increasingly using technologies such as brain scans to peer inside the minds of moviegoers.

That alliance promises to do more than just sell Hollywood's movies to the masses — it may revolutionize how filmmakers create movies to begin with.

The film school and the psychologist

New York University's Film School has produced renowned directors ranging from Oliver Stone and Joel Coen to Martin Scorsese and Spike Lee. But perhaps the most interesting film development at the university today is unfolding inside the psychology department.

"In the last four years or five years, we used movies in our experiments,"

said Uri Hasson, a neuroscientist at NYU, "but we used movies basically to understand about the brain."

Hasson and other NYU researchers examine how people's brains lit up while watching certain movie scenes while lying inside a brain scanning device. Their technology of choice is functional Magnetic Resonance Imaging (fMRI), which detects magnetic signals marking changes in blood flow to different parts of the brain.

Some experiments compare clinically ill people's responses with healthy people's responses — for instance, a television series directed by famed master of suspense Alfred Hitchcock became a useful way to test anxiety responses.

However, the researchers began to see a striking pattern among some film sequences they used. The Hitchcock episode caused similar responses among viewers in more than 65 percent of the neocortex, or part of the brain that bears responsibility for both perception and thinking.

Sergio Leone's spaghetti Western "The Good, the Bad and the Ugly" provoked a similarly strong response among viewers in 45 percent of the neocortex. The similar brain patterns

suggest that both Hitchcock and Leone's films demonstrate a certain level of control over the experience of viewers.

Hasson's group also measured the gaze of test subjects to see where their eyes looked at any given time. The gaze maps appeared almost identical, with different-colored crosshairs representing the left and right eyes of different subjects sitting almost on top of each other.

"You can think about it as control by the director," Hasson explained.

"Hitchcock managed to take each main area and cause it to respond in a similar way, so he basically controlled what's going on in the brain."

To control or not control

Not all visual sequences have such a high level of control over our brains. When viewers watched 10 minutes of people coming and going in Washington Square Park on NYU's campus, people's brain scans and eye movements fell all over the map.

"You can think of it as real life, or the most boring movie ever," Hasson joked.

However, Hasson pointed out that some independent or art film directors might not want to cause a similar

response in moviegoer's brains.

"They like to leave things open-ended and ambiguous for different kinds of feelings, so if director sees a strong correlation, maybe he or she thinks they failed," Hasson told *LiveScience*. "But then if you think about other movies, they don't leave anything open. They want to control as much of the brain as possible."

Such research does not answer the question of whether greater control over the brain means that a movie is better. But many directors clearly pride themselves on the way that their movies uniquely shape a viewer's emotional and cognitive experience in the movie theater.

The director's toolbox

The NYU researchers envision directors using such techniques to tweak and edit their movies during production. Is the musical score failing to arouse from viewer's brains in the climactic scene? Change it. People aren't connecting so strongly to the main character? Maybe it's time to rethink the character's lines.

"You've got many dimensions in the movie," Hasson noted. "You can go to the area that processes the soundtrack, see any correlations, and then go to the lighting, and then the

plot, and so forth."

Hasson continues to examine the brain's responses to the many stimuli present in movies. But for now, brain scan technologies such as fMRI remain less practical for widespread use beyond the lab.

"We're up on the research aspects of fMRI, but we decided that it's not a viable technology for neuromarketing," said Bob Knight, a neurologist at the University of California-Berkeley and scientific advisor to the company Neurofocus.

People have to lie perfectly still inside fMRI machines without moving their heads, which seems unnatural for participants in marketing surveys. However, companies such as Neurofocus have found other ways to get results for Hollywood.

Marketing movies

Knight has worked with Neurofocus to survey people's responses to everything from movie trailers to ads that run with television shows. The company's methods have turned heads — a big investment came earlier this year from the Nielsen Company, which tracks viewership to generate TV ratings and other media information.

"We bring people into the laboratory,

depending on whichever demographic a company wants examined," Knight said. "We show them material, we wire them up, we put electrodes on their head, and we precisely measure where their eyes are looking, their galvanic skin response and their heart rate."

Neurofocus relies on those electrodes on people's heads to read the brain's electrical activity, using a method known as Electroencephalography (EEG). A computer algorithm gives the most weight to the EEG reading, but also factors in the eye gaze map, skin response and heart rate of test subjects to figure out a viewer's response.

The assessments allow Knight and Neurofocus to figure out whether a film sequence captures the viewer's attention, whether it emotionally engages the viewer, and whether viewers will remember what they saw a day or week later.

The company's algorithm can even take the most interesting parts of a movie or TV show and compress them into an eye-catching trailer.

"If we're analyzing a two-hour movie, we can extract the most salient parts for a trailer automatically," Knight noted. "The most salient parts fit together into a very nice story."

Crowd control

Researchers have also started looking beyond the individual brain to entire groups of viewers.

"Most kinds of experiences are socially consumed," said Suresh Ramanathan, a marketing researcher at the University of Chicago. "When people are consuming an experience together, there's a form of emotional contagion."

Ramanathan's study in late 2007 found group think affects people watching a movie together. Smiles or laughter at some scenes reinforced each other, and opposite reactions from nearby people led viewers to adjust their own mood.

The Berkeley, Calif.-based Neurofocus plans to turn its sights on precisely gauging the influence of a movie-going crowd.

"The next thing is we're building a small movie theater," Knight said. "The crowd effect is going to be important for certain things. We're definitely moving in that direction."

Moving into the future

Despite its attractions, pitfalls can appear when reading too much into brain scans and other technologies. Hasson voiced concern about people conducting sloppy science under the

guise of neuromarketing.

"With the market and the companies that approached me, the clients simply don't care if it's reliable or not," Hasson observed. "No one cares, because it's a sticker on the product."

However, both Hasson and Knight share a vision of neuroscience playing an ever-bigger role in how movies are made, and inevitably marketed.

"I think it's a natural evolution," Knight said. "People we work with keep asking us to look at things at an earlier creative stage."

Clients have already asked Neurofocus to look at storyboards, or illustrations of each scene that will eventually get filmed in a movie or advertisement. Their hope is to create finely tuned products that excite as many brains as possible.

Future research could even test whether a box office smash such as this summer's "The Dark Knight" reflects a tightly controlled thrill-ride experience for moviegoers. If so, directors ranging from Christopher Nolan to Ben Stiller might increasingly find new reasons – and tools – to ensure that our brain responses reflect their cinematic vision.

"We never tested whether we can tell

if a movie will succeed in the box office and whether there's a strong correlation or not, but maybe that's the case," Hasson said.