

Deciphering Mind Games

BY CATHY SMITH, R.T.(R)(CT)

Functional magnetic resonance imaging intrigues technologists in cutting-edge research center.

ALWAYS KNEW that Winston Churchill was a genius but try as I might, I was destined to be more like Dr. Seuss than Churchill. Take the following examples.

Churchill on the mind:

The empires of the future are the empires of the mind.

Seuss on the mind:

You have brains in your head.

You have feet in your shoes.

You can steer yourself

any direction you choose.

You're on your own. And you know what you know.

And YOU are the one who'll decide where to go.

So what goes on at MRN? Well, daily progress toward our mission of discovering and advancing clinical solutions for the prevention, diagnosis and treatment of mental illness and other brain disorders. That's a pretty tall order, but MRN is up to the challenge. Working with renowned research centers in Colorado, Massachusetts and Minnesota and the two national laboratories in New Mexico, MRN has the support, infrastructure and brain power to conduct multimodal imaging and comprehensive neurocognitive and psychiatric assessments. These allow us to understand normal brain structure and function, as well as the changes that occur in the brain affected by a variety of illnesses, injuries and chemical exposures. Our research includes studies of schizophrenia, fetal alcohol syndrome, traumatic brain injury, adult and teen chemical dependence, forensics, post-traumatic stress disorder, accelerated learning, creativity and the teenaged brain on video games, to name a few.

The imaging component at MRN is unique as well. Research subjects undergo structural, functional and spectroscopic MR imaging evaluations depending on the needs of the particular study. For the functional imaging sequences, the MR scanners are fitted with projection and audio systems that allow us to deliver visual and auditory stimuli to our subjects. Subjects are fitted with an MRN-patented hand-input device that allows them to respond to what they see and hear without moving. Other equipment allows subjects to smell or taste stimuli. All of these allow MRN's research scientists to observe the brain's reaction to the stimulus.

We technologists combine our clinical skills with the research protocol

Well, I suppose they are both right. I do have a brain in my head and I decided to go to The Mind Research Network, where the empire clearly belongs to the mind and the future.

MRN is unique among imaging and research facilities, as it is one of a very few that is focused on using imaging technology as an integral element of investigative neuroscience. Lucky for me, MRN is located here in Albuquerque, N.M., and I am one of three registered technologists working alongside some of the foremost neuroscientists in the world. For a brain nerd like me, the opportunity is a dream come true.



IMAGES: THE MIND RESEARCH NETWORK

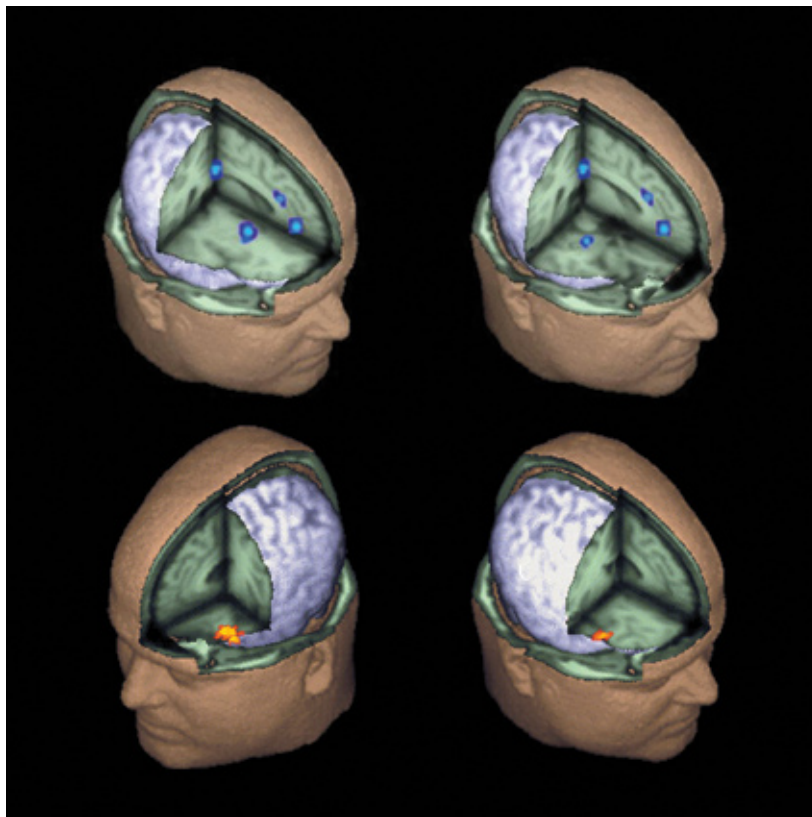
MR facilities at The Mind Research Network.

“Recently, our research scientists discovered that they can differentially diagnose schizophrenia from bipolar disorder with a single fMR scan.”

requirements to help our subjects be as comfortable as possible during the scan, which can last anywhere from 30 minutes to more than one and one-half hours. Keeping our subjects comfortable, still and alert over the long haul is vitally important. Our ultimate goal is to provide the best data possible, while providing the best care for our subjects. The technologists, engineers and research assistants are master problem solvers and must work quickly to solve any equipment malfunctions or subject-related problems to make the most of the allotted scan time.

Each research protocol is developed specifically for the illness, injury or part of the brain being investigated. For instance, one of the widely held perceptions about nicotine is that smokers crave it at times of high stress. Part of our smoking protocol includes a math quiz intended to invoke a stress response to see whether the subject craves nicotine more as determined by self-reporting and brain activation noted on the fMR scan. Other stimuli include tasks that determine a subject's ability to delay gratification, to discriminate between visual and auditory cues and tasks designed to measure impulsivity.

Depending on the research protocol, technologists collect structural sequences to act as the roadmap for the post-processing of the functional images. When combined with the results of neurocognitive and psychiatric testing, the fMR results give researchers a much broader data set to work with than was previously possible.



Blue on these fMR images indicates areas of increased brain activation using a blood-oxygen-level dependence technique.

The results of research conducted at The Mind Research Network have been simply astounding. Recently, our research scientists discovered that they can differentially diagnose schizophrenia from bipolar disorder with a single fMR scan and with a 93 percent accuracy rate. This type of research and subsequent findings will allow better and earlier diagnosis and more relevant treatment for patients suffering from these mental illnesses.

As technologists, we use our clinically based patient care and imaging skills to provide for the best care and imaging possible in combi-

nation with cutting-edge technology and research that will play a vital role in the development of diagnostic tools and treatment options in the very near future. Being a part of that type of solution is rewarding beyond measure. §

CATHY SMITH, R.T.(R)(CT), has been an ASRT member since 1985.

SIDE NOTE

To learn more about The Mind Research Network and its ongoing research, visit www.mrn.org.