

# Brain imaging with children at MIT



## What is MRI and functional MRI?

MRI, magnetic resonance imaging, is a technique for viewing the brain's structure and understanding its functions. Two main forms of MRI exist: a) structural MRI provide detailed pictures of the brain's shape and size b) functional MRI allows researchers to visualize and map the parts of the brain used to perform everyday tasks, such as reading and calculation. We use both structural and functional MRI in our studies.

The MRI machine is, in essence, a big magnet. As you lie in its magnetic field, invisible harmless radio waves are released around you. This will result in harmless radio waves bouncing off the different substances that your brain is made up of. These radio waves are then detected by a computer, which transforms the data into images of the brain's structure and activity. [For more info on the procedure please visit: <http://web.mit.edu/gabrieli-lab/kid.htm> more info here: <http://web.mit.edu/gabrieli-lab/participate.htm>]

### **What does the procedure entail?**

Upon arriving at MIT, a researcher of our team will be waiting for you and your child. You will be asked to fill out a MR screening questionnaire for your child (and for you if you decide to go inside the magnet room with your child). This form is meant to screen for items on or within the body that are not safe within the MR environment such as braces, pacemakers, metal implants or ferromagnetic objects.

Next, one of our researches will practice our simple memory games with your child. We will also explain the MR procedure to your child and answer questions. We have scanned over 100 children in our laboratory and have a lot of experience with preparing your child for this experience. We also have pictures and educational material and your child will be asked whether he or she would like to have a stuffed animal friend with them in the MR scanner. Once your child is ready to be scanned he or she will be lying on a bed and will be moved into the MR machine. Her or his legs will be outside of the machine and if you would like to you can sit next to your child and hold her or his legs. Your child will then be watching some child-friendly movie pieces (such as animal documentaries) while we begin with structural scanning. Your child will not have to do anything during this time; we only ask that he or she stays as still as possible. Once this scan is completed we will ask your child to play our memory game in the scanner. Your child will answer simple questions (e.g., 'Have you seen this picture before?') and will indicate his or her responses on a button box that he or she will be holding. The whole procedure will take no longer then approximately 40 minutes.

### **Will my child be uncomfortable?**

We have scanned over 100 children in our laboratory and most of the children really enjoy their visit. At times, some children may be afraid of the loud noises coming from the machine itself. To ensure that your child is as comfortable and prepared as possible, we can play these noises to your child prior to the beginning of the MR session. We will also provide your child with child-appropriate ear plugs in order to protect him or her from the noise. Your child can STOP the MR session at any time he or she chooses - we will emphasize this to your child frequently before we begin. However, in our experience only less than 5% of the children decide a) not to start the session or b) to stop the session during the experiment. Our trained researchers will make sure that your child will still have a great experience visiting our lab.

### **When and where will the study happen?**

We will conduct the study during the months of July and August. If you are interested, please let us know as soon as possible so that we can provide additional information. If you decide to enroll in the study, we will also schedule an appointment. We will perform the scanning during the week in the afternoon or on the weekends. We are located on MIT campus between Kendall Square and Central Square ( a short walk from Kendall/MIT red line T-stop). We need to schedule the appointments a few days in advance to ensure that we have enough time available at the MR suite in order to work with your child. We will certainly provide parking.

### **What will happen to the data?**

Your child will get a certificate of participation and a CD that contains his or her brain pictures. We will store your child's brain data without identifying information that researchers will then analyze using only a code rather than your child's name or any other personal data. After compiling the data of many children we will analyze the data and create group averages. Evaluating the data from several children allows us to improve our understanding of brain functions in children. Our findings, including the pictures of the group averages, may be published in peer reviewed journals.

### **Will we be notified of the results?**

The goal of this study is to develop a practical measure for evaluating the 'brain in action' (e.g., What is the brain doing when we memorize and remember?). Presently, we are unable to draw any conclusions from a single brain set. We will certainly send you the scientific journal publication with the average results if you would like to. The timeline for publication can be as long as one year after completion of the MR sessions due to the long and careful analyses phase, peer reviews of findings and publication time.



If you have further questions or would like to schedule an appointment please email or call Dr. Noa Ofen: [noa@MIT.EDU](mailto:noa@MIT.EDU) , 617-354-3544.

See our website for more details: <http://web.mit.edu/gabrieli-lab/kid.htm>