

## BRAIN IMAGING: WHAT DOES IT TELL US ABOUT READING

By: Joy Simpson

*Interview with Guinevere Eden  
Georgetown University Medical Center*

**Interviewer:** At the Center for the Study of Learning – that you direct in Washington, D.C. – you use brain scans to learn more about dyslexia. How does this technology help you see what’s going on in the brain when someone is reading? Is it safe?

**Guinevere Eden :** Functional Magnetic Resonance Imaging, or fMRI, is a fairly new way of looking at the brain, and it is safe for children. Positron Emission Tomography, or PET, was the technology of choice for brain imaging in the early 1990s. Because PET involves a radioactive tracer, healthy children could not participate in these studies. With fMRI technology, we don’t need to use radioactive tracers. We can safely use fMRI to

learn how sensory and cognitive processes are represented in a child’s brain.

**Interviewer:** How does brain imaging work?

**Eden:** When the nerves in the brain are active, they require more glucose and oxygen. This is delivered through an increase in blood flow to that specific region. It is the increase in blood flow that we are able to capture, and from this image, we infer which parts of the brain are actively involved in a given task.

**Interviewer:** If you can see a change in the pattern of brain activity, does that mean the person is learning?

**Eden:** Brain imaging is a good tool for assessing how a person learns -- when it is used in the context of an appropriate study design. What we do at Georgetown is evaluate reading interventions – so we compare the brain activity of persons who

have received special instruction with those who have not or who were taught math instead of reading. We look for greater brain activity caused by the reading intervention.

**Interviewer:** What should parents know?

**Eden:** They have the right to ask about research-based evidence on any program that claims to help children with dyslexia. Just as we know that certain medications help to treat specific diseases, we now need to provide the evidence – using ran-



Guinevere Eden

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## TALK TO YOUR BABY

### It will make a difference

Talking and listening to children from the moment they’re born helps them develop good language and communication skills. This enables them to listen and express themselves well. It also helps them to learn and develop good relationships. Most brain development occurs from birth to age two, so babies and toddlers need stimulation as much as they need nourishing food. The best way to stimulate babies’ brains is to talk to them more. Talking and listening to your child will benefit you both. Your child will feel valued and loved, and the two of you will form a close bond with each other. You don’t need to be an expert to help your child develop good communication skills. All

you need is a listening ear and the willingness to chat to your child whenever you can.

### When do I start?

It’s never too early to start talking to your child. Babies can communicate before they start talking and want to interact with people, especially family. By moving their mouth or limbs, cooing, babbling or smiling, your baby is sharing experiences with you and looking for a response. Whenever possible, try to respond by making eye-contact, smiling and talking back. Toddlers will use some words to communicate with you, but they understand far more than they can say. By talking and listening to them you will motivate them to

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## BRAIN IMAGING, CONT.

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domized controlled studies – that reading intervention programs have been proven effective.

**Interviewer:** Before we go any further, tell me, what exactly is dyslexia?

**Eden:** Children with dyslexia have difficulty reading. They usually have severe problems in understanding the relationship between letters and their sound representations, and this impacts their ability to decode words. The condition is not caused by low IQ, and it happens despite adequate classroom instruction.

**Interviewer:** How do you collect data about reading that is meaningful?

**Eden:** It isn't enough to ask someone to read parts of a book while lying in the scanning machine. As scientists, we need to dissect the components of reading and narrow down the relationship between these components and the brain regions being used by the person. That's why it is useful to have very specifically designed tasks.

**Interviewer:** What kinds of things do you

ask the person to do?

**Eden:** We may ask children to repeat a word, and then in another brain scan, we ask them to repeat the word but delete the first sound. When we subtract the data from those two tasks, we should be able to identify the areas of the brain that were involved in manipulating the sound structure of the word.

**Interviewer:** Which components of reading do you look at to decide if the intervention is successful?

**Eden:** Reading accuracy, reading rate and reading comprehension.

**Interviewer:** What other factors should be considered?

**Eden:** After an intervention has taken place, you have to make sure that the child spends a significant amount of time reading and building up sight word vocabulary. Hopefully the child will continue to make gains, and this could be measured in follow-up studies.

*(For full interview, please visit [http://www.merrill.ku.edu/IntheKnow/sciencearticles/Eden\\_interview.html](http://www.merrill.ku.edu/IntheKnow/sciencearticles/Eden_interview.html))*

## BNCD Notables

- Dr. Mabel Rice, director of the BNCD, has received a renewal of her grant for her studies in Australia. Dr. Rice has launched a study of twins that overtime could help lead to additional clues about the genetic factors of Specific Language Impairment (SLI).
- John Colombo, Professor of Psychology, director of PARC core for the Center for BNCD, and Life Span Associate Director for Cognitive Neuroscience has been named Associate Editor of the journal, *Child Development*, the top journal for developmental science. His term begins in July 2007.

*(Previously published in the LSI Lifeline Newsletter.)*

- Steve Warren, BNCD Investigator and LSI Director, appeared in the *Lawrence Journal World* and the *Wichita Eagle*, supporting increases in newborn screenings. Currently, the state of Kansas only screens for four disorders, and the Kansas Legislature is considering legislation increasing screening for the 29 treatable disorders.

*(Previously published in the LSI Lifeline Newsletter.)*

## INVESTIGATOR PROFILE: HUGH CATTS

Research conducted by BNCD Investigator, Hugh Catts, focuses on the relationship between developmental spoken and written language impairments (LI). Most recently, he and his colleagues are conducting a large-scale longitudinal study. In this project, which is funded by NIDCD, approximately 600 children are being followed from kindergarten through high school. This study allows for the examination of the reading-speaking relationship from several perspectives. In one perspective, a large group of children with LI were identified in kindergarten and their reading achievement is being examined during the school years. This work not only has documented the high incidence of reading disabilities in these children, but has identified factors related to reading achievement in this population. In other studies involving the same

sample of children, Dr. Catts and his colleagues have identified children with reading disabilities at different grades and examined their oral language development. This research has been instrumental in showing that the language problems associated with reading disabilities extend beyond phonological processing to higher levels of language processing. These data have also been useful in the development of procedures for the early identification of children at risk for reading disabilities. Finally, this research has suggested a classification system for poor readers that captures individual differences on several language-based dimensions of reading.



## Upcoming Events for Parents and Kids!



### KU Summer Camps

KU is offering numerous summer camps this year including academic camps, including debate, journalism, music, and math and sciences, and also athletic camps for baseball, basketball, track, football, golf, soccer, swimming, tennis, volleyball, and dance and cheer. For a complete list of the camps, as well as dates and costs, visit:

[www.news.ku.edu/2007/february/16/07summercamps.shtml](http://www.news.ku.edu/2007/february/16/07summercamps.shtml)

### Fun 2, 3, 4 : All About a Number of Things

An interactive children's exhibit on loan from the Sciencenter of Ithaca, NY. Best suited for 5-12 year olds and their families, the exhibit shows the fun of applying math to everyday activities. More than a dozen cool learning stations, like "Math Bloopers," "Measurement Factory" and "Super Bowl." Located near Crown Center in KC, it goes from June 2 - Aug. 19 and admission is free! For more information:

Call: (816) 274-8444 or

See: [www.crowncenter.com](http://www.crowncenter.com)

### Day Out with Thomas & Friends

Day Out with Thomas the Train is an exciting way for children and grown-ups to enter the world of Thomas & Friends. Kids can ride on board a train lead by Thomas and have their picture taken with Sir Topham Hatt! From June 1 - June 3, Thomas and friends can be found at Midland Railway in Baldwin City. Times are 8 a.m. - 6 p.m. and there is an admission fee.

See: [midland-ry.org/](http://midland-ry.org/)

### Annual Kite Festival

From June 8 - June 10, head over to Northern Hills Middle School in Topeka to be a part of this year's annual kite festival.

Call: John Marr at (785) 246-0836 or

See: [www.kitefarm.com/tkf](http://www.kitefarm.com/tkf)

### July 4th

A picnic, music and fireworks extravaganza! Located at 2nd and Indiana in Lawrence. Admission is free and fireworks begin at dusk.



### Douglas County Fair

Live music, carnival, 4-H exhibits, demolition derby, antique tractor pull and a variety of races and contests. July 29 - Aug. 5 (times are TBA) at the Douglas County Fairgrounds, admission is free.



### Clown Day

On Aug. 4, Crown Center becomes "Clown Center" for this all-smiles event. Bring the kids and see performances by area clown groups guaranteed to tickle your funny bone. Enjoy balloon animals, face painting and general clowning around. Admission is free. For more information:

Call: (816) 274-8444 or

See: [www.crowncenter.com](http://www.crowncenter.com)

### Lawrence Parks & Recreation Camps

Summer camps just for kids! Including water activities, gymnastics, and other activities to make the days of summer more fun! Dates and prices vary, for more information, visit:

<http://www.lprd.org/sum07/sum07.shtml>

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keep talking, which will improve their language skills.

### Talk about what you and your child are doing throughout the day

Talking to your child can fit easily into your daily routine. Talk about the things you see when you're on the bus or walking to the shops. Chat to your baby during bath time, or recite a nursery rhyme while changing their diaper. The supermarket is a good place to talk to your toddler and introduce new words, as your child is sitting in the cart facing

you. Gain their attention and then describe some of the items as you put them in the cart. Try not to ask your child too many questions. Instead, tell them about things, especially the things they show an interest in, like a favorite toy.

### Talking to your baby matters

1. It will help your child learn to talk, as it is from listening to your voice that babies learn to use language.
2. It will stimulate your baby's brain, helping to strengthen the connections that make learning possible.
3. It will help your child become a

- good reader and writer, as language skills form the foundation for literacy.
4. It will help your child develop social skills and good relationships.
  5. It will show that you love and respect your child, enhancing self-esteem.
  6. It will help the two of you form a close bond, as communication is the basis of your relationship with each other.

(From the leaflet *Talk to Your Baby*. **Talk To Your Baby** is a campaign by the National Literacy Trust to encourage parents and carers to communicate with their children from birth to three. For information visit [talktoyourbaby.org.uk](http://talktoyourbaby.org.uk).)

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### About this Newsletter:

The BNCD newsletter is designed to keep you informed about the ongoing research projects that are being conducted by BNCD researchers at the University of Kansas. Participants who have been part of recent research projects conducted by BNCD researchers, parents who have expressed interest in participating in future research, and individuals from organizations such as schools and daycare centers that have an interest in BNCD studies will receive this newsletter from time to time to keep them up-to-date about the research activities at the BNCD. If you do not wish to receive future newsletters, please call or e-mail the BNCD to have your name removed from our list. Research at the BNCD is supported in part by grant number 5 P30 DC05803 from the National Institute on Deafness and other Communication Disorders (NIDCD) at the University of Kansas.

### 10 Recommended Websites for Children

(Websites range from PreK ages to Middle school ages)

<http://kids.discovery.com/fansites/readyssetlearn/readyssetlearn.html>

<http://www.HighlightsKids.com>

<http://www.kidsclick.org/>

<http://www.nasa.gov/audience/forkids/home/index.html>

<http://pbskids.org/>

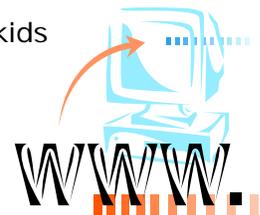
<http://www.peepandthebigwideworld.com/>

<http://www.scholastic.com/kids/>

<http://www.snoopy.com/>

<http://www.timeforkids.com/TFK/kids>

<http://www.usmint.gov/kids/>



For more information or complete list visit the Association for Library Service to Children at <http://www.ala.org/greatsites>