

# Remapping the brain's neuroconnection superhighway

By JANICE YOUNGWITH

Imagine being able to understand, image and remap the brain's extensive superhighway system of neurological connections — finding faster, more expedient routes to enhance processing, communication, and messaging.

It's already possible, say scientists, researchers and trained clinicians using a newer type of brain training called connectivity guided neurofeedback to aid those with autism and other neurophysiologic conditions in remapping and rebuilding the brain's neuroconnections.

"It's an advanced form of neurofeedback based on brain imaging research," explains Ann L. Rigby, a licensed social worker who uses connectivity guided neurofeedback to help clients form new connections in regions of the brain where they have not been formed

previously due to the epigenetic nature of autism.

"Autism is a neurodevelopmental disorder characterized by deficits in social interaction, communication, and restricted repetitive behavior," Rigby says.

Through mutations of specific autism related genes, communication between neurons is disrupted inhibiting the healthy development of synapses that are responsible for specialized functions such as speech, sensory integration and social/emotional awareness.

Individuals with an autism spectrum disorder may be unable to recognize or respond to nonverbal cues and may be prone to outbursts.

"Studies show an autistic brain is not able to communicate with itself effectively due to problems resulting



Ann L. Rigby, director of The Neuroconnection, uses connectivity guided neurofeedback to help clients form new connections in regions of the brain where they have not been formed previously.

from abnormally developing neuroconnections," says Rigby, who has more than 25 years' experience in the mental health arena and currently serves as director of The Neuroconnection — a neurofeedback practice in Glen Ellyn and Naperville. "Connectivity guided neurofeedback can act as the agent to help form and shape these deficient neuropathways."

#### How it works

The connectivity guided neurofeedback process involves the use of specific brain mapping tools that provide three-dimensional statistical computations which show how the brain is communicating with itself. The specific tool that provides a quantitative metric for EEG and measures regions of the brain for connectivity is called NeuroRep, developed by Dr. William Hudspeth.

"These tools take into account the geography and structure of the brain and an understanding of the pathways in the brain that allow information to flow back and forth," Rigby explains; it is only with these tools that trained clinicians accurately know where and how to do

the correct type of neurofeedback training.

"Until recent years, the maps that we used only allowed us to look at the brain as if it were flat and did not account for the distance between the sites that we were evaluating," she says. "State-of-the-art brain mapping today enables us to evaluate regions of the brain looking at areas that are too loosely or too tightly connected and aims to make changes to these abnormalities in functioning."

#### Training the brain

The sophisticated training is particularly effective for clients with autism, she says, as it trains regions of the brain — where neuropathways were supposed to have formed during early development and did not — for better communication and timing.

Based on the latest research, connectivity guided neurofeedback focuses on brain waves produced by electrical signals as the brain's neurons fire.

"It's a noninvasive, non-medication and painless intervention which enhances neuroregulation and can improve the ability of the brain to function optimally,"

says Rigby, who is a board member for the Autism Society of Illinois.

Measured using an electroencephalogram amplifier and computer to show when optimum functioning is present, neurofeedback training sessions induce change by rewarding the brain with sounds and visual images from a movie or game which is played when the correct brainwaves are produced.

Because of the brain's lifelong neuroplasticity, the brain can change and form new connections at any age, says Rigby who currently sees clients ranging in age from 3 to 77. Training takes an average of 60 sessions for moderate autism and the effects shown in studies over time show that improvements are lasting.

Connectivity guided neurofeedback also makes the changes in the brain that allow other therapies to be absorbed faster.

"When you have the neuroconnections that allow you to now perform the tasks, improvements are seen more quickly," Ribgy says. Speech therapy can be enhanced, children are able to pay more attention and get more out of tutoring, become socially



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aware and engaged and often need to join a social skills group to catch up due to their new awareness and interest in peers.

"The new interest in others, improvement in eye contact and empathy can be an amazing thing to watch," she says. "A child at the beginning of training, who had no interest in others, will suddenly come into the office engaging with others in the waiting room or carrying on reciprocal conversations with staff when they were not able to do this before. We see changes in receptive and expressive language, social and emotional awareness, attention and focus, improvements in cognitive functioning, lowered anxiety and general improvement in the children's ability to transition and adjust to change."

Rigby cites the research of Robert Coben, Ph.D., a neuropsychologist who reported results of a large scale 2009 study of 85 children in an experimental group trained using connectivity guided neurofeedback and which showed a 57 percent decrease in autistic symptoms.

### For more information

Neurofeedback has been used for more than 20 years in the treatment of attention deficit, anxiety, chronic fatigue, substance abuse and mood disorders. It meets the American Academy of Child and Adolescent Psychiatry's clinical guidelines for recommending evidence-based treatment.

For information on neurofeedback and connectivity guided neurofeedback, call the Neuroconnection at (630) 858-5015 or visit [www.theneuroconnection.com](http://www.theneuroconnection.com).

For support, information and resources relating to autism, contact the Autism Society of Illinois, (630) 691-1270 or visit [www.autismillinois.org](http://www.autismillinois.org).

### Retraining the brain at home

Connectivity guided neurofeedback now can be completed at home through a special outreach program offered by some providers, including practitioners at The

Neuroconnection.

"Parents learn in clinic how to use the neurofeedback instrument, loaded with our protocols, to train their children at home with us monitoring them online," explains Ribgy, who says the practice saves time and travel as most of today's children have busy schedules packed with many therapies.

It also enables clients from as far away as India to tap into the highly specialized technology available in suburban Chicago.

During each home-based 30-minute session, participants are connected by two sensors to their scalp and ears, and monitored by trained clinicians via Skype technology. Auditory and visual feedback is provided in the form of a computer game.

When producing the correct brain waves, the brain seeks out sights and sounds and becomes conditioned to produce correct brain waves patterns more often. Over time, the unconscious process makes changes in brain wave activity, decreases symptoms and begins producing optimal functioning.

### Autism Society of Illinois Calendar of Events

**Feb. 25:** Strikes for Autism bowling event, noon to 4 p.m., Poplar Creek Bowl, 2354 W. Higgins Road, Hoffman Estates. Reserve a bowling team for this inaugural event.

**March 24:** Eighth Annual Parent and Professional Networking Conference, Tinley Park Convention Center, 18451 Convention Center Drive, Tinley Park. The event will feature five tracks plus 20 speakers and exhibitors.

**March 31:** WIU Walk for Autism, Western Illinois University. To register, call ASI: (630) 691-1270

**April:** Autism Awareness Month events.

**Second annual Taking the Edge of Autism** skating tournament. For more information, visit [www.autismillinois.org](http://www.autismillinois.org)

**Pennies for Autism Statewide event:** Schools across the state collect pennies and change to raise awareness and funds. To participate, contact the Autism Society of Illinois at [info@autismillinois.org](mailto:info@autismillinois.org).

**April 29:** Fourth Annual Breaking the Silence Concert for Autism, Noon to 7 p.m., Austin Fuel Room, 481 Peterson Road, Libertyville. For more information, visit [www.autismillinois.org](http://www.autismillinois.org).

**May 23-27:** 2012 AutismOne/Generation Rescue Conference, Lombard. This five-day conference features more than 20 content areas; three keynotes, including a Nobel Prize-winning scientist; and five featured speakers, including a stem cell researcher and a best-selling author. There is Spa Night for moms, Dads' Night Out for dads, and a red carpet gala dinner. The Unity & Community Mixer reception on May 24, welcomes nonprofit groups that help parents with both younger and older children. With more than 2,000 attendees, parents get valuable ideas from professionals and from each other in an incomparable experience of camaraderie and warmth. From culinary classes on Wednesday through to the last lectures Sunday afternoon, registration is free at [www.autismone.org](http://www.autismone.org).

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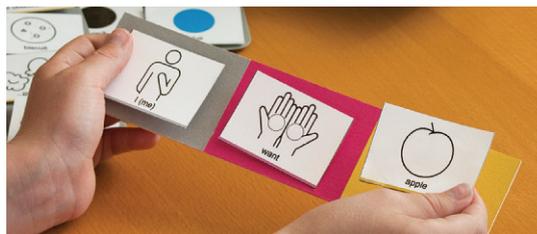


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