Eye-tracking is one of the most useful tools for understanding how people understand and produce language. In an eye-tracking experiment, the participants see sets of pictures or individual pictures as they listen to or produce sentences (see sample pictures), and a special camera records where they are looking. For example, a participant might hear or produce a sentence about a woman lifting a man and the eye-tracking system records when they look at the picture that goes with the sentence (to test understanding) or look at the people in the picture (e.g., the woman, the man) to test sentence production. This tells us how people understand and produce sentences.

What does eye-tracking tell us about language recovery in aphasia? We recently published two papers that highlight changes in eye-tracking patterns resulting from language treatment in people with aphasia (Mack, Nerantzini, & Thompson, 2017, Frontiers in Human Neuroscience; Mack & Thompson, 2017, Journal of Speech, Language, and Hearing Research). This research is part of our National Institutes of Health-funded Clinical Research Center, the Center for the Neurobiology of Language Recovery (http://cnlr.northwestern.edu/).

The participants in these studies received 12 weeks of language treatment that focused on comprehension and production of complex sentences (passive sentences such as The man was lifted by the woman). In the lab, we train complex sentences because they are often difficult for people with aphasia, and our research has shown that training complex sentences often results in improvements in simple sentences as well (e.g., Thompson & Shapiro, 2005, Aphasiology). Before and after language treatment, participants took part in two eye-tracking experiments, one on sentence comprehension and one on sentence production. In the sentence comprehension experiment, participants heard sentences and viewed two pictures (e.g., a man lifting a woman, a woman lifting a man) and were asked to select the matching picture. In the sentence production experiment, participants produced sentences to describe individual pictures (e.g., a man lifting a woman).

After language treatment, participants with aphasia were much better at understanding and producing passive sentences accurately. Their eye movement patterns changed as well – after language treatment, eye movements were more similar to those we observe in people without aphasia. In sentence comprehension, after treatment eye movements showed successful thematic integration, which refers to the ability to understand “who did what to whom.” In sentence production, eye movements after treatment also showed normal-like patterns of structural planning, meaning that participants initially planned the structure of the sentence, and then retrieved the individual words (e.g., man, lift, woman).

In ongoing research, we are relating changes in eye movement patterns to changes in brain activation (using functional magnetic resonance imaging (fMRI)), to better understand how recovery of language processes in aphasia is supported by the brain.

This research is ongoing and we are still looking for participants! Please contact the Aphasia Lab if you are or know a person with aphasia who might be interested in participating. Future eye-tracking research in the lab will be conducted using a new Eyelink 1000 Plus eye-tracking system. The system records the eye’s position 1000 times per second, which will allow us to examine the time course of language processes in even finer detail than before.
CONGRATULATIONS to Jiayi Lu, sophomore at Northwestern and a member of the Aphasia and Neurolinguistics Research Laboratory, for receiving the prestigious Fletcher award for 2017 from the Office of Undergraduate Research. Dr. Cynthia Thompson was also presented with the Karl Rosengren Faculty Mentoring Award for her role in the project as Jiayi’s advisor, and Dr. Matthew Walenski also was recognized for his mentoring contribution. Drs. Peter Civetta and Neil E. Blair from the Office of Undergraduate Research presented the award in a surprise meeting with Drs. Thompson and Walenski in the lab on June 8, 2017.

Jiayi’s research project, entitled “Syntactic Expectations in Parsing Chinese Subject-Extracted and Object-Extracted Relative Clauses: An EEG Study” examines sentence comprehension in Chinese speakers using electroencephalography (EEG), which measures electrical activity in the brain. This project is a precursor to the lab’s work on sentence processing in Chinese speakers with aphasia. His project was chosen by Northwestern faculty researchers as the best from a pool of 96 undergraduate research grant awardees. This marks the first time that a student project conducted in the department of Communication Sciences and Disorders has won this award. Jiayi will continue his research in the lab next year during his 3rd year at Northwestern.

LAB MEMBER, JIAYI LU, WINS THE FLETCHER AWARD FOR UNDERGRADUATE RESEARCH

Community Events

Downtown Evanston and Main-Dempster Mile Sidewalk Sale  
July 28th to July 30th, 2017
Independent retailers and national chains will set up shop with too-good-to-resist deals on the sidewalks.

Kite Festival  
August 12th to 13th, 2017
Make a kite in a workshop and fly it, watch stunt kites perform to music, and buy lunch at the Chicago Botanic Gardens in Glencoe.

Evanston Art & Big Fork Festival  
August 18th to 20th, 2017
Food, live music, and an art festival, all beginning Friday at 4pm.

Chicago Jazz Festival  
August 31st to September 3rd, 2017
Promotes awareness and appreciation for all forms of jazz through free, quality live musical performance.

Expo Chicago  
September 14th to September 17th, 2017
The International Exposition of Contemporary and Modern Art (Expo Chgo) has museum-quality curated art and design by 140 exhibitors at Navy Pier.

Oktoberfest Chicago  
September 29th to October 1st, 2017
Enjoy beer, bratwurst, pretzels, live music, arts & crafts, and a weekend-afternoon kids’ fest on Lincoln Avenue at Southport Avenue. Free admission on Sunday.

Halloween Gathering  
October 21st, 2017
Includes a daytime festival at Millennium Park (2 to 5 p.m.) and a parade on Columbus Drive from Balbo to Monroe (6 to 8 p.m.)

Chicago International Movies & Music Festival (CIMMfest)  
November 9th to 12th, 2017
“Where movies and music meet.” See films with a music connection by day, and hear live music with a film connection by night at Wicker Park and Logan Square.

Christmas Around the World and Holidays of Light  
November 16th, 2017 to January 7th, 2018
At the Museum of Science & Industry, see trees decorated to represent many cultures plus weekend ethnic song-and-dance performances. Closed Nov. 23rd and Dec. 25th.
Newest Lab Members

Sarah Holstrom

Sarah is a new Research Technician in the Aphasia and Neurolinguistics Research Lab. She graduated from Northwestern with a B.A. in Linguistics and Radio/Television/Film in 2016 and began working in the lab in January 2017. As an undergraduate, Sarah worked as a research assistant in the Speech Communication Research Group studying Spanish-English bilingualism, which sparked research interests in sentence processing and sociolinguistics. In the future, she hopes to eventually earn a Ph.D. in linguistics. She is originally from the south side of Chicago and has recently moved to Evanston. Outside of work, she enjoys writing, playing the piano, riding her bike, and learning how to cook.

Tiffany Brooks

Tiffany is a new Research Technician at the our Lab. She is originally from Hoffman Estates, Illinois. She moved back to the suburbs of Chicago after attending school at The University of Illinois at Urbana-Champaign. She graduated with a Bachelor's of Science in Psychology and concentration in Behavioral Neuroscience in 2016. While at U of I, she worked as a research assistant in a Culture and Social Behavior lab which sparked her research interest in language and more specifically cultural differences within language. In the future, she hopes to use all the valuable research experience she gained from the U of I and NU as a learning opportunity to better explore professional graduate school options. In the meantime, she enjoys spending her free time swimming, doing yoga, and playing with her eleven-month-old golden retriever puppy, Casper.

Patricia Pastoriza Domingez

Patricia comes from Spain and studied English and Linguistics at the Universidade de Santiago de Compostela, in the Northwest of the country. She is currently working on a PhD degree at the University of Barcelona. She started working the lab last March as part of a lab rotation, required to complete her PhD. Her main work in the lab is to translate two tests we developed in English to test Spanish-speaking people with aphasia: the Northwestern Assessment of Verbs and Sentences and Northwestern Anagram Test. The major focus of her research is on Primary Progressive Aphasia in bilingual speakers, since there are several official languages in Spain and many people are bilingual...as are most people in the world! She loves traveling, especially to destinations where she can go hiking and enjoy nature. She also really enjoys concerts and music festivals, and cooking (always trying new recipes).

Support Group Meetings

General Information:

Aphasia Support Group Meetings are held the first Thursday of each month (except for January and August) from 12:00pm to 1:00pm in Room 1-530 of the Center for Audiology, Speech Language, and Learning Building - 2315 Campus Drive. Please contact Mary Cosic for more information at 847-467-7591 or m-cosic@northwestern.edu.

Public Transportation:

The lab is located three blocks east of the Noyes Stop on the Purple Line.

CTA: 1-888-968-7282
www.transitchicago.com

RTA: 1-312-836-7000
www.rtachicago.com

Upcoming Meetings:

- September 7th
- October 5th
- November 2nd
- December 7th

Do you have a story to tell? We’d like to know!

If you would like submit a piece to be featured in an upcoming ANRL newsletter, please contact Kathy or Brianne at 847-467-7591. Possible topics include: tips and advice, hobbies (e.g. cooking, crafts, etc.), health, research, and your personal experience with aphasia.
Word Games

Find a 4-letter word for each blank below so that when added, two new words (sharing the same middle word) are created. What is each word?

1) POST_________DOWN
2) FAIR_________PEN
3) CAKE__________WAY
4) BASE__________GAME
5) BACK__________WAY
6) BROKE_________TOWN

Visual illusion

Are the lines parallel?

Brain Hieroglyphics

Your job here is to “read” the pictures to make a single word or phrase. Each word or phrase has something to do with the nervous system.

Sleep shrinks the brain—and that’s a good thing.

Researchers from the University of Wisconsin-Madison have found that the brain’s synapses shrink back by 20 percent during sleep. Synapses are the connections between neurons, and during rest they are able to renormalize and prepare to learn new things during the day. (https://www.scientificamerican.com/article/sleep-shrinks-the-brain-and-thats-a-good-thing)

Brain’s “helper” cells turn toxic in injury and disease.

Researchers from Stanford University have shown that astrocytes, or non-neuronal cells found in the brain, may contribute to brain damage caused by injury or disease. Astrocytes are important for healthy brain function since they help nourish and protect neurons, among other things. However, in some conditions, astrocytes can become toxic and kill other types of brain cells, leading to neurodegeneration. Understanding the role astrocytes play in neurodegeneration may lead to treatments for degenerative diseases, such as Alzheimer’s. (https://www.scientificamerican.com/article/brains-helper-cells-turn-toxic-in-injury-and-disease/)

Spider venom may offer stroke therapy.

Australian researchers from the University of Queensland and Monash University injected rats with a protein in spider venom. This protein changes the behavior of the brain’s ion channels, which are key drivers of brain damage after stroke. Although this treatment is long ways away from treating human patients, the researchers are optimistic about its use in the future. (http://www.bbc.com/news/health-39335367).

Being a musician is good for your brain.

New research from the University of Montreal shows that musicians have faster reaction times than non-musicians. These findings suggest that learning to play a musical instrument could help sharpen your brain, which could help prevent aspects of cognitive decline in older adults. Past research has demonstrated other beneficial aspects of musical training, including improving long-term memory and sensory integration. These findings suggest a learning to play a musical instrument could help sharpen your brain, which could help prevent aspects of cognitive decline in older adults. (http://www.huffingtonpost.com/entry/playing-music-brain-benefits-aging_us_58765d35e4b03c8a02d4713b)