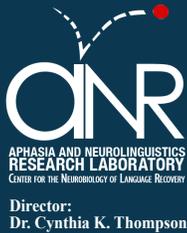


WINTER 2014 NEWSLETTER



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Patterns of electrical activity in the brain reveal how people understand sentences

People with aphasia often have difficulty understanding sentences, which affects the ability to participate in conversations.

Sentence comprehension is a complex process that requires understanding the meaning of the words in the sentence and the relationship among these words (e.g., who did what to whom). One way to explore how people comprehend sentences is by using electroencephalography (EEG). The electrical activity generated by the brain is recorded as people listen to sentences; when the brain detects something wrong with a sentence (i.e., an anomaly) it produces certain “brain waves” called event-related potentials (ERP).

ERPs are recorded using electrodes attached to the head (the electrodes are very small and painless!). In our experiments, we asked participants to sit in front of a computer screen and look at a white cross on the dark screen while listening to sentences that can be either correct, i.e. well-formed according to the English language (e.g. ‘Anne visited the doctor and the nurse’), or can contain an anomaly (e.g. ‘Anne SNEEZED the doctor and the nurse’). (The second sentence is incorrect because people don’t SNEEZE people!) Participants judge each sentence for correctness by pushing a button. As shown by Kie- lar, Meltzer-Asscher and Thompson (2012), people

with agrammatic aphasia are not able to fully detect incorrect sentences like ‘Anne SNEEZED the doctor and the nurse’, and emit different ERPs as compared to control participants. However, people with aphasia show near-normal ERPs when presented with a different type of anomaly, such in ‘Anne visited the doctor and the SOCKS’. These results suggest that sometimes in aphasia only some aspects of sentence comprehension are impaired, while others are preserved. Namely, agrammatic aphasic listeners have difficulty understanding the relationship among words, especially the verb (i.e., the action), who did the action, and/or who received the

action.

We are currently investigating the same processes in people with Primary Progressive Aphasia (PPA), a progressive neurological disease that affects parts of the brain that process language. We seek to understand how progressive brain degeneration affects different aspects of sentence comprehension and how this progresses over time. We also examine regions of brain affected by PPA that are associated with sentence comprehension difficulties. Results from our EEG work will allow a better understanding of the neurological processes underlying sentence comprehension.

The ASHA Convention Comes to Chicago

The American Speech-Language-Hearing Association (ASHA) held its annual convention in Chicago this past November, bringing together speech-language pathologists, audiologists, and speech, language, and hearing

scientists. Members from Northwestern’s Aphasia Lab were among the more than 13,000 attendees. Chien-Ju Hsu presented a poster on the effects of sampling context on agrammatic language production, while Eddie

Europa displayed a poster about the neural connectivity changes associated with sentence processing treatment. The Aphasia Lab’s director, Dr. Cynthia Thompson, received the Honors of the Association, which recognizes

members for their distinguished contributions to communication sciences and disorders and is the highest honor ASHA bestows. For more information about ASHA, visit www.asha.org.

COMMUNITY & CURRENT EVENTS

COMMUNITY EVENTS:

Chicago Auto Show:

February 8th-17th, 10am-10pm @ McCormick Place
- First staged in 1901, the Chicago Auto Show is the largest auto show in North America and has been held more times than any other auto exposition on the continent. This year marks the 106th edition of the Chicago Auto Show.

International Kennel Club Dog Shows:

February 21st-23rd
- The International Kennel Club Cluster of Dog Shows has prize competitions, dog fashion shows, meet the breeds, pet the dogs, and kids' activities at McCormick Place convention center.

Chicago Irish Film Festival:

March 1st-8th
-This film festival focuses on the spirit of Irish culture at Music Box Theatre & Society for Arts

St. Patrick's Day Parade:

March 15th
-The Chicago River flows green at 10 a.m. near Michigan Ave. & Wacker Dr. The St. Patrick's Day Parade begins at noon, rain or shine, at Balbo Ave. and goes north on Columbus Dr. to Monroe St.

Craft & Art Fair:

March 22nd-23rd
-Browse handcrafted goods from 150 juried exhibitors at Shower of Crafts Craft & Art Fair at the DuPage County Fairgrounds.

Robotics Week:

April 5th-13th
-Robot Block Party at the Museum of Science and

Industry celebrates National Robotics Week with demonstrations and hands-on activities.

Gluten & Allergen-Free Expo:

April 12th-13th
-Sample and purchase products from 100 vendors and attend classes at the Gluten & Allergen-Free Expo at the Schaumburg convention center.

Spring Wine Stroll:

April 24th
-Sample 40 wines plus hors d'oeuvres on the Spring Wine Stroll in shops at Lincoln Square and Ravenswood.

Home Improvement & Landscaping Expo:

April 26th-27th
-Find renovation help at The DuPage County Home Improvement & Landscaping Expo at DuPage County Fairgrounds in Wheaton.

Cinco de Mayo Festival:

May 2nd-4th
-The Cinco de Mayo Festival features live music, authentic foods, arts and crafts, and activities for families on W 26th St. at Kostner.

Mayfest:

May 16th-18th @ 3100 N Ashland Ave.
-Mayfest is about bands in a giant tent, festival food, pretzels, and beer. Saturday is kids' day. Sunday is a pet pageant & expo.

Healthy Living Expo:

May 30th-June 1st
The Whole Life Expo offers speakers, workshops, and vendors for remaking your life at the Schaumburg convention center.



IN THE NEWS:

The University of Virginia is using a new mobile telemedicine kit, called iTREAT, to help first responders in rural areas to provide immediate care to stroke patients before they arrive at the hospital. (<http://ehrintelligence.com/2014/01/08/uva-using-telehealth-to-speed-stroke-care-before-hospital/>)

An elementary school teacher creates her own therapy to overcome alexia caused by a stroke. (For the full story, visit: <http://www.dailymail.co.uk/health/article-2535744/Stroke-causes-primary-school-teacher-lose-ability-read-write-understand-speech.html>)

Two researchers are working to create a low cost electroencephalography (EEG) scanner that can be printed with a 3-D printer. The device known as OpenBCI hooks up to a PC computer and can target up to 64 locations on the scalp using 16 electrodes. (<http://www.wired.com/wiredenterprise/2014/01/openbci/>)

The food and beverage company, Nestle, plans to test their products on human brain cells to see how healthy foods and drinks are good for us. (For more info,

visit: <http://business.time.com/2014/01/08/nestle-will-test-health-foods-on-human-brain-cells/>)

Antioxidants in Michigan cherries could help treat brain diseases, according to a recent study by Central Michigan University. (<http://www.wzzm13.com/news/article/278278/2/Mich-cherries-could-help-treat-brain-diseases/>)

Having shingles may increase the risk of stroke later in life, according to a recent study published in *Neurology*. (To see the press release, visit <http://www.news-medical.net/news/20140102/Shingles-may-increase-risk-of-stroke-in-later-life-study-finds.aspx>)

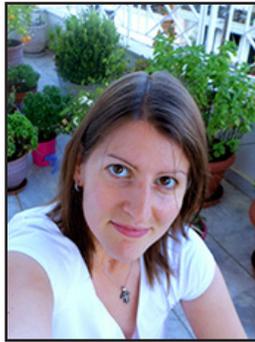
A first-of-its kind study finds that older adults who engaged in brain training drills retained measurable benefits up to 10 years later, suggesting that such interventions may help stave off impairments of aging. (Full story: <http://www.bostonglobe.com/lifestyle/health-wellness/2014/01/13/brain-training-can-help-older-adults-stave-off-aging-impairments-study-finds/QTrB2E6UsXB8hYIeMvb-JII/story.html>)

PEOPLE TO KNOW & SUPPORT GROUP INFO

PEOPLE TO KNOW

Dr. Michaela Nerantzini

Michaela Nerantzini recently joined the Aphasia and Neurolinguistics laboratory as a post-doctoral fellow. She grew up in Greece and she received her Bachelor's degree in Linguistics from University of the Aegean (Greece). Subsequently, she completed the joint European Masters's program on Clinical Linguistics at the University of Groningen (The Netherlands) and University of Potsdam (Germany). During these years she developed an interest in aphasia and language processing in clinical populations. Due to the limited research on Greek aphasia, she then decided to return back to Greece where she obtained her Ph.D. in Neurolinguistics at the University of Athens. Despite her research focus on sentence processing, Michaela is currently very interested in using rTMS as a treatment tool in aphasia. She enjoys travelling, reading, playing tennis and currently, watching american series! She loves music and photography (and various types of art) but she deeply hates snow, storms, tornadoes and being cold in general!



Sladjana Lukic

Sladjana Lukic is a fourth year doctoral candidate in the Aphasia and Neurolinguistics Lab. Coming from the small country of Serbia with a Speech Language Pathology degree, Sladjana gratefully welcomed the great educational opportunities offered at Northwestern University and has excelled as a researcher. Her research focuses on lexico-semantic processing combining linguistic theory and behavioral patterns in patients' deficits (and recovery). Mostly though, she is interested in the right hemisphere involvement in recovery from aphasia. Besides her professional work she leads a very active life, enjoying a variety of activities from rollerblading to biking and skiing, but also traveling and sailing. Being very far from her family, Sladjana highly appreciates all the newly made friends who in many ways became part of her life, and who she is today.



MEETINGS SUMMARIES:

Previous Meetings:

In September, we held a showing of "Aphasia—Hope is a Four Letter Word", followed by a short discussion.

In October, we presented an overview of our current research in the lab. We discussed research/treatment opportunities available in the lab for people who have aphasia. We also welcomed our new post-doc, Michaela Nerantzini, PhD, to our monthly support group meetings.

For our November meeting, being National Caregiver Appreciation month and so close to Thanksgiving we focused our discussion on things we were thankful for and our favorite Thanksgiving foods.

In December we had planned to have a Holiday Potluck. Unfortunately, due to heavy snow and freezing

temperatures no one was able to make it apart from a few local lab members.

There was no support group meeting in January.

Upcoming Meetings:

In February, we are looking forward to having Monica Dougherty, M.A., lead a class focusing on Art Therapy. Monica has a Masters in Art Therapy from the University of Illinois at Chicago. She has worked with varied populations including children, adolescents and developmentally disabled adults. She will present a stress-reducing art experience using watercolors and collage images.

Remember to check out the facebook group for updates about meetings (www.facebook.com/groups/NorthwesternAphasiaSupportGroup).

UPCOMING MEETINGS:

- February 8th
(will be held in 3-380)
- March 8th
- April 12th
- May 10th

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

Aphasia Support Group Meetings are held the second Saturday of the month from 10:30am to 12:00pm in Room 3-417 (3rd floor of the Frances Searle Building - 2240 Campus Drive). Please contact Mary Cosic for more information at 847-491-2469 or m-cosic@northwestern.edu.

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 Stephanie 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.

ACTIVITIES CORNER

ART ILLUSION: WHAT DO YOU SEE?



WINTER WEATHER WORD SEARCH

O	T	H	E	R	M	O	M	E	T	E	R	M	A
L	T	E	M	P	E	R	A	T	U	R	E	S	Q
T	X	E	C	O	L	D	Q	S	L	E	E	T	M
W	Y	F	L	U	R	R	I	E	S	G	U	P	G
W	I	F	R	E	E	Z	I	N	G	R	A	I	N
I	I	N	Q	I	Z	F	O	G	G	Y	W	W	A
N	B	C	T	F	C	S	U	N	N	Y	H	I	V
D	L	R	E	E	O	I	I	O	C	F	I	N	A
C	I	A	C	S	R	R	C	C	E	R	T	D	L
H	Z	I	S	H	T	S	E	L	Y	O	E	Y	A
I	Z	N	S	L	I	O	T	C	E	S	O	H	N
L	A	Y	T	N	U	L	R	O	A	T	U	A	C
L	R	V	M	L	O	S	L	M	R	S	T	I	H
U	D	G	N	U	N	W	H	Y	Z	M	T	L	E

WINTER OLYMPICS BOGGLE GAME

Rules:

- * The letters in the words must be connected to each other.
- * The word doesn't have to appear in a straight line. It can be bent around corners or read diagonally.
- * Each letter in the word must uniquely appear in the grid. For example, if the word is ERASE, the letter E must appear twice in the grid. The word can't just loop back and re-use the same E.
- * Words must be at least 3 letters long
- * Words cannot be a proper noun, such as a name or place.

CAN YOU FIND THESE WORDS?

- | | |
|---------------|--------------|
| avalanche | icy |
| blizzard | rainy |
| chilly | sleet |
| cold | slush |
| flurries | snow |
| foggy | sunny |
| forecast | temperature |
| freezing rain | thermometer |
| frost | whiteout |
| hail | wind chill |
| ice storm | windy |
| icicle | winter storm |

F	E	S	A	T
I	U	R	K	I
H	G	G	N	E
Y	O	C	T	L
E	K	N	O	E

What words can you find?

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2013 RESEARCH PUBLICATIONS

1. Thompson, C.K., Meltzer-Asscher, A., Cho, S., Lee, J., Wieneke, C., Weintraub, S., & Mesulam, M.M. (2013). Syntactic and morphosyntactic processing in stroke-induced and Primary Progressive Aphasia. *Behavioral Neurology*, 26(1-2), 35-54. PMC3591467. DOI:10.3233/BEN-2012-110220.
2. Meinzer, M., Beeson, P., Cappa, S., Crinion, J, Kiran, S., Saur, D., Parrish, T., Crosson, B., & Thompson, C.K. (2013). Neuroimaging in aphasia treatment research: Consensus and practical guidelines for data analysis. *NeuroImage*, 73, 215-224. PMC3416913. DOI:10.1016/j.neuroimage.2012.02.058.
3. Kiran, S., Ansaldo, A., Bastiaanse, R., Cherney, L.R., Howard, D., Faroqi-Shah, Y., Meinzer, M., & Thompson, C.K. (2013). Neuroimaging in aphasia treatment research: Standards for establishing the effects of treatment. *Neuroimage*, 76, 428-435. PMC3552150. DOI:10.1016/j.neuroimage.2012.10.011.
4. Rapp, B., Caplan, D., Edwards, S., Visch-Brink, E., & Thompson, C.K. (2013). Neuroimaging in aphasia treatment research: Issues of experimental design for relating cognitive to neural changes. *Neuroimage*, 73, 200-207. PMC3600065. DOI:10.1016/j.neuroimage.2012.09.007.
5. Crinion, J., Holland, A.L., Copland, D.A., Thompson, C.K. & Hillis, A.E. (2013). Neuroimaging in aphasia treatment research: Quantifying brain lesions after stroke. *Neuroimage*, 73, 208-214. PMC3534842. DOI:10.1016/j.neuroimage.2012.07.044.
6. Mesulam, M.M., Wieneke, C., Hurley, R., Rademaker, A., Thompson, C.K., Weintraub, S., & Rogalski, E. (2013). Words and objects at the tip of the left temporal lobe in primary progressive aphasia. *Brain*, 136(2), 601-618. PMC3572925. DOI:10.1093/brain/aws336.
7. Mack, J.E., Ji, W., & Thompson, C.K. (2013). Effects of verb meaning on lexical integration in agrammatic aphasia: Evidence from eyetracking. *Journal of Neurolinguistics*, 26(6), 619-636. PMC3786589. DOI:10.1016/j.jneuroling.2013.04.002.
8. Catani, M., Mesulam, M.M., Jakobsen, E., Malik, F., Mastersteck, A., Wieneke, C., Thompson, C.K., et al. (2013). A novel frontal pathway underlies verbal fluency in primary progressive aphasia. *Brain*, 136 (8), 2619-2628. PMC3722349. DOI:10.1093/brain/awt163.
9. Mack, J.E., Meltzer-Asscher, A., Barbieri, E., Thompson, C.K. (2013). Neural correlates of processing passive sentences. *Brain Sciences*. 3(3), 1198-1214. DOI:10.3390/brainsci3031198.
10. Thompson, C.K., Riley, E., den Ouden, D., Meltzer-Asscher, A., & Lukic, S. (2013). Training verb argument structure production in agrammatic aphasia: Behavioral and neural recovery patterns. *Cortex*, 49(9), 2358-2376. PMC3759546. DOI:10.1016/j.cortex.2013.02.003.
11. Schuchard, J., & Thompson, C.K. (online). Implicit and explicit learning in individuals with agrammatic aphasia. *Journal of Psycholinguistic Research*. PMC3766481. DOI:10.1007/s10936-013-9248-4.
12. Mack, J.E., Cho-Reyes, S., Kloet, J.D., Weintraub, S., Mesulam, M-M, & Thompson, C.K. (2013). Phonological facilitation of object naming in agrammatic and logopenic primary progressive aphasia (PPA). *Cognitive Neuropsychology*, 30(3), 172-193. PMC3832125. DOI:10.1080/02643294.2013.835717.
13. Lee, J., Kwon, M., Na, H. R., Bastiaanse, R., & Thompson, C. K. (2013). Production and Comprehension of Time Reference in Korean Nonfluent Aphasia. *Communication Sciences and Disorders*, 18(2), 139-151. DOI:http://dx.doi.org/10.12963/csd.13014.
14. Houghton, K., Schuchard, J., Lewis, C., & Thompson, C.K. (2013). Promoting child-initiated social-communication in children with autism: Son-Rise Program intervention effects. *Journal of Communication Disorders*, 46(5-6), 495 – 506. PMID24209427. DOI:http://dx.doi.org/10.1016/j.jcomdis.2013.09.004.
15. Wang, H., Yoshida, M., & Thompson, C.K. (2013). Parallel functional category deficits in clauses and nominal phrases: The case of English agrammatism. *Journal of Neurolinguistics*, 27(1), 75 – 102. DOI:http://dx.doi.org/10.1016/j.jneuroling.2013.09.001.



2013 PRESENTATIONS & AWARDS

National

1. Mack, J.E., Ji, W., & Thompson, C.K. (March, 2013). Effects of verb meaning on lexical integration in agrammatic aphasia. CUNY Sentence Processing Conference, Columbia, SC.
2. Meltzer-Asscher, A., Mack, J.E., Schuchard, J., & Thompson, C.K. (April, 2013). Neural correlates of processing English passive sentences. Cognitive Neuroscience Society, San Francisco, CA.
3. Hsu, C.J., & Thompson, C.K. (May-June, 2013). Analyzing agrammatic narrative production using Northwestern Narrative Language Analysis (NNLA) and Computerized Language Analysis (CLAN): A qualitative and quantitative comparison. Clinical Aphasiology Conference, Tucson, AZ.
4. Mack, J.E., Meltzer-Asscher, A., Dove, S., Weintraub, S., Mesulam, M.M., & Thompson, C.K. (May-June, 2013). Word-finding pauses in primary progressive aphasia (PPA): Effects of lexical category. Clinical Aphasiology Conference, Tucson, AZ.
5. Europa, E., & Thompson, C.K. (June, 2013). Changes in frontotemporal connectivity associated with treatment-induced recovery from agrammatism. American Academy of Clinical Neuropsychology, Chicago, IL.
6. Barbieri, E., Luzzatti, C., Brambilla, I., Rizzi, G., Zonca, G., & Thompson, C.K. (June, 2013). Comprehension of syntactically complex sentences in Broca's aphasia: evidence from the Northwestern Assessment of Verbs and Sentences (NAVS) in Italian. American Academy of Clinical Neuropsychology, Chicago, IL.
7. Catani, M., Mesulam, M.M., Jakobsen, E., Malik, F., Wieneke, C., Thompson, C.K., Thiebaut de Schotten, M., Dell'Acqua, F., Weintraub, S., & Rogalski, E. (June, 2013). A novel frontal pathway underlies verbal fluency in Primary Progressive Aphasia. Organization for Human Brain Mapping, Seattle, WA.
8. Mack, J.E., Meltzer-Asscher, A., Barbieri, E., Fitzmorris, E., & Thompson, C.K. (June, 2013). Neural correlates of processing unaccusative verbs. Organization for Human Brain Mapping, Seattle, WA.
9. Mack, J.E., Meltzer-Asscher, A., Barbieri, E., Fitzmorris, E., & Thompson, C.K. (November, 2013). Dimensions of argument structure complexity: Evidence from fMRI. Society for the Neurobiology of Language, San Diego, CA.
10. Europa, E. & Thompson, C.K. (November, 2013). Interhemispheric connectivity shifts associated with treat-

ment-induced recovery of sentence processing. American Speech-Language-Hearing Association (ASHA) Convention, Chicago, IL.

11. Hsu, C.J., & Thompson C.K. (November, 2013). Effects of Sampling Context on Agrammatic Language Production. American Speech-Language-Hearing Association (ASHA) Convention, Chicago, IL.

International

12. Brambilla, I., Barbieri, E., Thompson, C.K., & Luzzatti, C. (January, 2013). Production and comprehension of verbs and sentences in Italian-speaking healthy subjects: the role of argument number and order. European Workshop on Cognitive Neuropsychology, Brixen, Italy.
13. Mack, J.E., Meltzer-Asscher, A., Dove, S., Weintraub, S., Mesulam, M.M., Thompson, C.K. (October, 2013). Word-finding pauses in primary progressive aphasia (PPA): Effects of lexical category. Academy of Aphasia, Lucerne, Switzerland.
14. Lukic, S., Bonakdarpour, B., den Ouden, D.B., Price, C., & Thompson, C.K. (October, 2013). Neural mechanisms of verb and sentence production: a lesion-deficit study. Academy of Aphasia, Lucerne, Switzerland.
15. Barbieri, E., Alessio, V., Brambilla, I., Rizzi, G., Luzzatti, C., & Thompson, C.K. (October, 2013). The Italian version of the Northwestern Assessment of Verb and Sentences (NAVS): Preliminary data on healthy and aphasic participants. Academy of Aphasia, Lucerne, Switzerland.

Invited Presentations:

1. Thompson, C.K. (February 7-9, 2013). "Patterns of Grammatical Impairment in Primary Progressive Aphasia: Implications for Differential Diagnosis". Illinois Speech-Language-Hearing Association (ISHA) Convention, Rosemont, IL.
2. Thompson, C.K. (February 14-18, 2013). "Teaching the Brain to Speak Again: Neurocognitive Mechanisms of Syntactic Recovery". American Association for the Advancement of Science (AAAS), Boston, MA

HONORS & AWARDS:

Cynthia K. Thompson -- Honors of the Association, American Speech-Language-Hearing Association (2013)

Sladjana Lukic -- Student Paper Award, Academy of Aphasia (2013)

Eduardo Europa -- Council of Academic Programs in Communication Sciences and Disorders (CAPCSD) Leadership Scholarship for 2012