

# COGS 260, Fall 2016

## Auditory learning and plasticity

Prof. Sarah C. Creel

Time: 2-5pm Weds

Location: TBA

### Overview

How do learners young and old form representations of speech sounds, words, music? This course will review classic to modern literature on topics including speech sound acquisition, word-meaning mapping, phonological pattern learning, music acquisition and processing, auditory statistical learning, and the role of variability in auditory category learning. We will explore behavioral, neurophysiological, and computational approaches, turning a critical eye toward differences in investigative techniques (conditioned head turn; (dis)habituation; association learning; eye tracking; ERP) and what each of these paradigms can—and cannot—tell us about development and plasticity.

### Goals

Provide a basic foundation in speech sound acquisition and word learning literature

Increase knowledge of common practices in research on infants and children

Build the ability to think critically about scientific papers

Provide an opportunity to develop a research proposal

### Grading

Course attendance <i>and</i> participation (7+)	14%
Weekly summaries (8)	56%
Final paper	30%

### Deadlines

Summaries are due at the beginning of class. Late work is generally not acceptable; please check with me in advance if an emergency prevents you from attending.

### Absences

I strongly discourage you from missing classes due to the highly discussion-based nature of the course. Please consult me ahead of time if something prevents you from making it to class.

### Summaries

Each week, you should provide a 2-page summary of one of the papers assigned for that week. The following elements should be covered:

- What is the research question?
- What was the specific hypothesis?
- Who were the participants? How many were eliminated?
- What technique was used?
- What was the result?
- How did the authors *interpret* the result?

To what extent are the authors' conclusions supported by the actual data?  
How does the technique affect the outcome?

### **Final paper**

A final 10-page paper is due by the end of finals week. This paper can be a proposal for a research project, or can simply be a review. In either case, your paper should review the literature on a topic that particularly interests you, and that we don't have time to cover fully during the course itself. It should include a reference list of at least 15 papers, at least 10 of which were not assigned for the class itself. A few possible topics:

*Anticipatory eye movements as a measure in language processing*

*Role of consonants vs. vowels in word learning*

*ERP studies of word recognition*

*Functional imaging during language development*

*Music and plasticity*

*Acquisition of signed language*

*Language disorders*

*Acquisition/enculturation of music perception*

### **Paper formatting guidelines**

Please use 1-inch margins and 12-point font, double-spaced. Times font is preferred.

Try to use as little direct quotation as possible; summaries and the final paper should be in your own words. If you are quoting more than 1-2 sentences directly (remember to give citations in the text and "include page number(s);" Creel, 2013, p. 12), it's too much.

The reference list and in-text citations should follow APA style. The papers listed below are examples of reference list format. (DOI numbers can be omitted.)

## **Topics**

Readings will be chosen from this list

### **Week 1: meeting and overview**

(No readings)

### **Week 2: Early language abilities**

Bortfeld, H., Fava, E., & Boas, D. A. (2009). Identifying cortical lateralization of speech processing in infants using near-infrared spectroscopy. *Developmental Neuropsychology*, 34(1), 52–65. doi:10.1080/87565640802564481

DeCasper, A. J., & Fifer, W. P. (1980). Of human bonding: newborns prefer their mothers' voices. *Science*, 208(4448), 1174–1176.

Jusczyk, P. W., Friederici, A. D., Wessels, J. M. I., Svenkerud, V. Y., & Jusczyk, A. M. (1993). Infants' sensitivity to the sound patterns of native language words. *Journal of Memory and Language*, 32, 402–420.

Kisilevsky, B. S., Hains, S. M. J., Lee, K., Xie, X., Huang, H., Ye, H. H., ... Wang, Z. (2003). Effects of experience on fetal voice recognition. *Psychological Science*, 14(3), 220–224.

Krumhansl, C. L., & Jusczyk, P. W. (1990). Infants' Perception of Phrase Structure in Music. *Psychological Science*, 1(1), 70–73. doi:10.1111/j.1467-9280.1990.tb00070.x

Mehler, J., Jusczyk, P. W., Lambertz, G., Halsted, N., Bertoncini, J., & Amiel-Tison, C. (1988). A precursor of language acquisition in young infants. *Cognition*, 29, 143–178.

Nazzi, T., Bertoncini, J., & Mehler, J. (1998). Language discrimination by newborns: toward an understanding of the role of rhythm. *Journal of Experimental Psychology: Human Perception and Performance*, 24(3), 756–66. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9627414>

Partanen, E., Kujala, T., Naatanen, R., Liitola, a., Sambeth, a., & Huotilainen, M. (2013). Learning-induced neural plasticity of speech processing before birth. *Proceedings of the National Academy of Sciences*, 1–7. doi:10.1073/pnas.1302159110

### **Week 3: Basic speech sound discrimination and acquisition**

Eimas, P. D., Siqueland, E. R., Jusczyk, P., & Vigorito, J. (1971). Speech perception in infants. *Science*, 171(3968), 303–306.

Hannon, E. E., & Trehub, S. E. (2005a). Metrical categories in infancy and adulthood. *Psychological Science*, 16(1), 48–55.

Kluender, K. R., Diehl, R. L., & Killeen, P. R. (1987). Japanese quail can learn phonetic categories. *Science*, 237(4819), 1195–1197.

Kuhl, P. K. (1983). Perception of auditory equivalence classes for speech in early infancy. *Infant Behavior and Development*, 6, 263–285. doi:10.1016/S0163-6383(83)80036-8

Kuhl, P. K., Williams, K. A., Lacerda, F., Stevens, K. N., & Lindblom, B. (1992). Linguistic experience alters phonetic perception in infants by 6 months of age. *Science*, 255(5044), 606–8. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1736364>

Narayan, C. R., Werker, J. F., & Beddor, P. S. (2010). The interaction between acoustic salience and language experience in developmental speech perception: evidence from nasal place discrimination. *Developmental science*, 13(3), 407–20. doi:10.1111/j.1467-7687.2009.00898.x

Werker, J. F., & Tees, R. (1984). Cross-language speech perception: Evidence for perceptual reorganization during the first year of life. *Infant Behavior and Development*, 7(1), 49–63. doi:10.1016/S0163-6383(84)80022-3

Winkler, I., Lehtokoski, A., Alku, P., Vainio, M., Aaltonen, O., Raimo, I., ... Naatanen, R. (1999). Pre-attentive detection of vowel contrasts utilizes both phonetic and auditory memory representations. *Cognitive Brain Research*, 7, 157-169.

#### **Week 4: Statistical learning approaches to language acquisition**

Aslin, R. N., Saffran, J. R., & Newport, E. L. (1998). Computation of conditional probability statistics by 8-month-old infants. *Psychological Science*, 9(4), 321–324.

Feldman, N. H., Myers, E. B., White, K. S., Griffiths, T. L., & Morgan, J. L. (2013). Word-level information influences phonetic learning in adults and infants. *Cognition*, 127(3), 427–38. doi:10.1016/j.cognition.2013.02.007

Graf Estes, K., Evans, J. L., Alibali, M. W., & Saffran, J. R. (2007). Can Infants Map Meaning to Newly Segmented Words? *Statistical Segmentation and Word Learning*. *Psychological Science*, 18(3), 254–260.

Marcus, G. F., Vijayan, S., Bandi Rao, S., & Vishton, P. M. (1999). Rule learning by seven-month-old infants. *Science*, 283(5398), 77–80. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9872745>

Maye, J., Werker, J. F., & Gerken, L. (2002). Infant sensitivity to distributional information can affect phonetic discrimination. *Cognition*, 82, B101–111.

Saffran, J. R., Aslin, R. N., & Newport, E. L. (1996). Statistical learning by 8-month-old infants. *Science*, 274, 1926–1928.

Thiessen, E. D. (2007). The effect of distributional information on children’s use of phonemic contrasts. *Journal of Memory and Language*, 56, 16–34. doi:10.1016/j.jml.2006.07.002

Vallabha, G. K., McClelland, J. L., Pons, F., Werker, J. F., & Amano, S. (2007). Unsupervised learning of vowel categories from infant-directed speech. *Proceedings of the National Academy of Sciences*, 104(33), 13273–8. doi:10.1073/pnas.0705369104

#### **Week 5: Development of word recognition**

Creel, S. C. (2012). Phonological similarity and mutual exclusivity: on-line recognition of atypical pronunciations in 3–5-year-olds. *Developmental Science*, 15(5), 697–713. doi:10.1111/j.1467-7687.2012.01173.x

Fernald, A., Perfors, A., & Marchman, V. A. (2006). Picking up speed in understanding: Speech processing efficiency and vocabulary growth across the 2nd year. *Developmental Psychology*, 42(1), 98–116.

Havy, M., Bertoncini, J., & Nazzi, T. (2011). Word learning and phonetic processing in preschool-age children. *Journal of Experimental Child Psychology*, 108(1), 25–43. doi:10.1016/j.jecp.2010.08.002

Mani, N., Mills, D. L., & Plunkett, K. (2012). Vowels in early words: an event-related potential study. *Developmental Science*, 15(1), 2–11. doi:10.1111/j.1467-7687.2011.01092.x

Stager, C. L., & Werker, J. F. (1997). Infants listen for more phonetic detail in speech perception than in word-learning tasks. *Nature*, 388, 381–382.

Swingley, D., & Aslin, R. N. (2002). Lexical neighborhoods and the word-form representations of 14-month-olds. *Psychological Science*, 13, 480–484.

Yoshida, K. A., Fennell, C. T., Swingley, D., & Werker, J. F. (2009). Fourteen-month-old infants learn similar-sounding words. *Developmental Science*, 12(3), 412–8. doi:10.1111/j.1467-7687.2008.00789.x

### **Week 6: Acquisition in multiple languages**

Byers-Heinlein, K., Burns, T. C., & Werker, J. F. (2010). The roots of bilingualism in newborns. *Psychological Science*, 21(3), 343–8. doi:10.1177/0956797609360758

Byers-Heinlein, K., & Werker, J. F. (2009). Monolingual, bilingual, trilingual: infants' language experience influences the development of a word-learning heuristic. *Developmental Science*, 12(5), 815–23. doi:10.1111/j.1467-7687.2009.00902.x

Leonard, M. K., Torres, C., Travis, K. E., Brown, T. T., Hagler, D. J., Dale, A. M., ... Halgren, E. (2011). Language proficiency modulates the recruitment of non-classical language areas in bilinguals. *PloS one*, 6(3), e18240. doi:10.1371/journal.pone.0018240

Sebastián-Gallés, N., & Bosch, L. (2009). Developmental shift in the discrimination of vowel contrast in bilingual infants: is the distributional account all there is to it? *Developmental Science*, 12(6), 874–887.

Sebastián-Gallés, N., Vera-Constán, F., Larsson, J. P., Costa, A., & Deco, G. (2009). Lexical plasticity in early bilinguals does not alter phoneme categories: II. Experimental evidence. *Journal of Cognitive Neuroscience*, 21(12), 2343–57. doi:10.1162/jocn.2008.21152

### **Week 7: Effects of accent variability**

Floccia, C., Butler, J., Girard, F., & Goslin, J. (2009). Categorization of regional and foreign accent in 5- to 7-year-old British children. *International Journal of Behavioral Development*, 33(4), 366–375. doi:10.1177/0165025409103871

Floccia, C., Delle Luche, C., Durrant, S., Butler, J., & Goslin, J. (2012). Parent or community: where do 20-month-olds exposed to two accents acquire their representation of words? *Cognition*, 124(1), 95–100. doi:10.1016/j.cognition.2012.03.011

Goslin, J., Duffy, H., & Floccia, C. (2012). An ERP investigation of regional and foreign accent processing. *Brain and Language*, 122(2), 92–102. doi:10.1016/j.bandl.2012.04.017

Muench, K. L., & Creel, S. C. (2013). Gradient phonological inconsistency affects vocabulary learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. doi:10.1037/a0032862

Nathan, L., Wells, B., & Donlan, C. (1998). Children's comprehension of unfamiliar regional accents: a preliminary investigation. *Journal of Child Language*, 25(2), 343–365. doi:10.1017/S0305000998003444

Van Heughten, M., Krieger, D. R., & Johnson, E. K. (2015). The Developmental Trajectory of Toddlers' Comprehension of Unfamiliar Regional Accents. *Language Learning and Development*, 11, 41–65. doi:10.1080/15475441.2013.879636

### **Week 8: Effects of voice variability**

Bartholomeus, B. (1973). Voice identification by nursery school children. *Canadian Journal of Psychology*, 27(4), 464–72. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/4766153>

Goldinger, S. D. (1996). Words and voices: Episodic traces in spoken word identification and recognition memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 22(5), 1166–1183.

Houston, D. M., & Jusczyk, P. W. (2000). The role of talker-specific information in word segmentation by infants. *Journal of Experimental Psychology: Human Perception and Performance*, 26(5), 1570–1582. doi:10.1037/0096-1523.26.5

Quam, C., & Swingle, D. (2012). Development in children's interpretation of pitch cues to emotions. *Child Development*, 83(1), 236–50. doi:10.1111/j.1467-8624.2011.01700.x

Paquette-Smith, M., & Johnson, E. K. (2015). I Don't Like the Tone of Your Voice: Infants Use Vocal Affect to Socially Evaluate Others. *Infancy*, n/a–n/a. doi:10.1111/infa.12098

Spence, M. J., Rollins, P. R., & Jerger, S. (2002). Children's Recognition of Cartoon Voices. *Journal of Speech, Language, and Hearing Research*, 45(1), 214–222. doi:10.1044/1092-4388(2002/016)

Von Kriegstein, K., Eger, E., Kleinschmidt, A., & Giraud, A. L. (2003). Modulation of neural responses to speech by directing attention to voices or verbal content. *Cognitive Brain Research*, 17(1), 48–55. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12763191>

### **Week 9: Context specificity, flexibility, and relearning**

Au, T. K.-F., Knightly, L. M., Jun, S.-A., & Oh, J. S. (2002). Overhearing a Language During Childhood. *Psychological Science*, 13(3), 238–243. doi:10.1111/1467-9280.00444

Bowers, J. S., Mattys, S. L., & Gage, S. H. (2009). Preserved implicit knowledge of a forgotten childhood language. *Psychological Science*, 20(9), 1064–9. doi:10.1111/j.1467-9280.2009.02407.x

Creel, S. C. (2011). Specific previous experience affects perception of harmony and meter. *Journal of Experimental Psychology: Human Perception and Performance*, 37(5), 1512–1526. doi:10.1037/a0023507

Dilley, L. C., & McAuley, J. D. (2008). Distal prosodic context affects word segmentation and lexical processing. *Journal of Memory and Language*, 59(3), 294–311. doi:10.1016/j.jml.2008.06.006

Dilley, L. C., & Pitt, M. a. (2010). Altering context speech rate can cause words to appear or disappear. *Psychological Science*, 21(11), 1664–70. doi:10.1177/0956797610384743

Remez, R. E., Rubin, P. E., Pisoni, D. B., & Carrell, T. D. (1981). Speech perception without traditional speech cues. *Science*, 212, 947–9.

Rosen, S., Faulkner, a, & Wilkinson, L. (1999). Adaptation by normal listeners to upward spectral shifts of speech: implications for cochlear implants. *Journal of the Acoustical Society of America*, 106(6), 3629–36. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/10615701>

Shannon, R. V, Zeng, F.-G., Kamath, V., Wygonski, J., & Ekelid, M. (1995). Speech recognition with primarily temporal cues. *Science*, 270, 303–304.

Slevc, L. R., & Miyake, A. (2006). Individual differences in second-language proficiency: does musical ability matter? *Psychological Science*, 17(8), 675–81. doi:10.1111/j.1467-9280.2006.01765.x

### **Week 10: Reading and phonological skills**

Bowman, M., & Treiman, R. (2008). Are young children logographic readers and spellers? *Scientific Studies of Reading*, 12(2), 153–170.

Desroches, A. S., Newman, R. L., & Joanisse, M. F. (2009). Investigating the time course of spoken word recognition: electrophysiological evidence for the influences of phonological similarity. *Journal of Cognitive Neuroscience*, 21(10), 1893–906. doi:10.1162/jocn.2008.21142

Olulade, O. A., Napoliello, E. M., & Eden, G. F. (2013). Abnormal visual motion processing is not a cause of dyslexia. *Neuron*, 79(1), 180–90. doi:10.1016/j.neuron.2013.05.002

Pollo, T. C., Kessler, B., & Treiman, R. (2009). Statistical patterns in children's early writing. *Journal of Experimental Child Psychology*, 104(4), 410–26. doi:10.1016/j.jecp.2009.07.003

Ramus, F., Marshall, C. R., Rosen, S., & van der Lely, H. K. J. (2013). Phonological deficits in specific language impairment and developmental dyslexia: towards a multidimensional model. *Brain*, 136(Pt 2), 630–45. doi:10.1093/brain/aws356

Shu, H., Peng, H., & McBride-Chang, C. (2008). Phonological awareness in young Chinese children. *Developmental Science*, 11(1), 171–181. doi:10.1111/j.1467-7687.2007.00654.x

Zorzi, M., Barbiero, C., Facoetti, A., Lonciari, I., Carrozzi, M., Montico, M., ... Ziegler, J. C. (2012). Extra-large letter spacing improves reading in dyslexia. *Proceedings of the National Academy of Sciences of the United States of America*, 109(28), 11455–9. doi:10.1073/pnas.1205566109