

Neurobiology of Typical and Atypical Cognition and Language Development
Psychology 5470 (current topics)/5445/COGS 5140 Spring 2014
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The goal of the course is to survey and critique current research on language acquisition in developmentally delayed/pathological populations, including autism, Williams Syndrome, Down Syndrome, fragile X syndrome, maltreatment, Specific Language Impairment, dyslexia, and post-natal brain damage. We will examine what do the language delays & deficits reveal

- About each disorder? For example, is the language deficit central to the disorder? Do other deficits “follow” from the language one?
- About the processes of language acquisition? For example, which aspects of language development proceed similarly to the typical case? Are some aspects of language development delayed because of deficits in other aspects that need to be acquired first?
- About the representation & organization of language? For example, do the delays/deficits adhere to/follow the subcomponents of language? To what extent do the delays/deficits reveal how language relies on non-linguistic cognition?
- About the biology/neuropsychology/genetics of language? For example, What is the relationship between the timing of typical and atypical language development and different aspects of brain development? How can we tie together processes at the gene, neural, and behavioral levels?

All participants will be required to read the papers for each class. Students will lead/facilitate the discussions of the readings (1-2 per student) each week, beginning with Week 3. Class leadership and class participation each comprise 20% of your final grade. Class participation requires, at minimum, that you raise at least two questions during each class. Please send the questions to us via e-mail by 5pm each Thursday evening: letitia.naigles@uconn.edu, inge-marie.eigsti@uconn.edu.

Instructions for class leadership/presentations: Your job is to describe the issue of the day, and then describe and critique the evidence that ‘your’ article brings. Please bring a 1-2 page handout (already copied) to distribute to the class, which outlines the evidence. You are NOT to read from the articles as you present them, although you may refer to and quote specific passages and/or data.

Outreach project (15%): You will design/create a webpage /blog for our (under development) ‘Child Research at UCONN’ website, in which you present information on an issue concerning atypical language development to members of the wider community, such as parents, teachers, policy makers or professionals. This will be due mid-semester. Website design info for UCONN, and training, can be found at <http://aurora.uconn.edu>. For additional technical assistance, contact Professor Eigsti.

Group project (45%): Triads of students from different departments/divisions will team up to design a ‘Special Issue’ of a journal such as *Journal of Child Language*, *Journal of Speech, Language, & Hearing Research*, *Journal of Autism and Developmental Disorders*, that is focused on atypical language development. You choose the more specific area (e.g., brain and . . . /genes and . . . /phonology and . . . /semantics and . . . / etc.), select the papers from those already published (or in press), and then write the introduction. The intro should be more than a summary of the papers included; it should also provide a framework for organizing this subfield, critiques of methods/participants/findings as well as future directions for this specific area.

Week 1: Introduction to the course, selection of presentation week, primer on language development

Please read before the first class, if not already familiar with linguistics:
Pinker, S. (1994) *The language instinct*. Chapters 1, 2, 3, 4, 5, 9

Week 2: Introduction to language pathologies

- Finestack, L. H., Richmond, E. K., & Abbeduto, L. (2009). Language Development in Individuals with Fragile X Syndrome. *Top Lang Disord*, 29(2), 133-148.
- Miller, C. A. (2011). Auditory processing theories of language disorders: past, present, and future. *Lang Speech Hear Serv Sch*, 42(3), 309-319. doi: 10.1044/0161-1461(2011/10-0040)
- Musolino, J., & Landau, B. (2012). Genes, language, and the nature of scientific explanations: the case of Williams syndrome. *Cogn Neuropsychol*, 29(1-2), 123-148. doi: 10.1080/02643294.2012.702103
- Volkmar, F. R., & McPartland, J. C. (2013). From Kanner to DSM-5: Autism as an Evolving Diagnostic Concept. *Annu Rev Clin Psychol*. doi: 10.1146/annurev-clinpsy-032813-153710

Week 3: Methods of studying developmental language pathologies

- Shaked M, Yirmiya N. (2004) Matching procedures in autism research: evidence from meta-analytic studies. *J Autism Dev Disord* 34(1):35-40.
- Ellis Weismer, S., Lord, C., Esler, A. (2010) Early Language Patterns of Toddlers on the Autism Spectrum Compared to Toddlers with Developmental Delay. *J Autism Dev Disord* (2010) 40:1259–1273
- Dennis, M., Francis, D., Cirino, P., Schachar, R., Barnes, M., & Fletcher, J. (2009) Why IQ is not a covariate in cognitive studies of neurodevelopmental disorders. *Journal of the International Neuropsychological Society* (2009), 15 , 331 – 343 .
- Spaulding, T. (2012) Comparison of severity ratings on norm-referenced tests for children with specific language impairment. [Journal of Communication Disorders 45 \(2012\) 59–68](#)

Week 4: Auditory and working memory processes

- Pierpont, E. I., Richmond, E. K., Abbeduto, L., Kover, S. T., & Brown, W. T. (2011). Contributions of phonological and verbal working memory to language development in adolescents with fragile X syndrome. *J Neurodev Disord*, 3(4), 335-347. doi: 10.1007/s11689-011-9095-2
- Riches, N. G., Loucas, T., Baird, G., Charman, T., & Simonoff, E. (2011). Non-word repetition in adolescents with specific language impairment and autism plus language impairments: a qualitative analysis. *J Commun Disord*, 44(1), 23-36. doi: 10.1016/j.jcomdis.2010.06.003
- Skoe, E., Krizman, J., & Kraus, N. (2013). The impoverished brain: disparities in maternal education affect the neural response to sound. *Journal of Neuroscience*, 33(44), 17221-17231. doi: 10.1523/jneurosci.2102-13.2013
- Tyson, K. E., Kelley, E., Fein, D. A., Orinstein, A., Troyb, E., Barton, M., . . . Rosenthal, M. (2013). Language and verbal memory in individuals with a history of autism spectrum disorders who have achieved optimal outcomes. *Journal of Autism and Developmental Disorders*.

Week 5: Social contributions to language acquisition

Gliga, T., Elsabbagh, M., Hudry, K., Charman, T., Johnson, M., The BASIS Team* (2012) Gaze Following, Gaze Reading, and Word Learning in Children at Risk for Autism. *Child Development* 83, 926–938.

Goodwin, A., Fein, D., & Naigles, L. (in press) The role of maternal input in the development of wh-question comprehension in autism and typical development *Journal of Child Language*.

Chevallier, C., Huguet, P., Happe', F., George, N., Conty, L., (2013) Salient Social Cues are Prioritized in Autism Spectrum Disorders Despite Overall Decrease in Social Attention. *J Autism Dev Disord* 43:1642–1651.

Watson, L., Roberts, J., Baranek, G., Mandulak, K., Dalton, J. (2012) Behavioral and Physiological Responses to Child-Directed Speech of Children with Autism Spectrum Disorders or Typical Development. *J Autism Dev Disord* 42:1616–1629 DOI 10.1007/s10803-011-1401-z

Week 6: Speech perception

Chonchaiya, W., Tardif, T., Mai, X., Xu, L., Mingyan, L., Kaciroti, N., Kileny, P. R., Shao, J., & Lozoff, B. (2013). Developmental trends in auditory processing can provide early predictions of language acquisition in young infants. *Developmental Science*, 16, 159-172.

Hazan, V., Messaoud-Galusi, S., & Rosen, S. (2013). The effect of talker and intonation variability on speech perception in noise in children with dyslexia. *Journal of Speech, Language, and Hearing Research*, 56, 44-62.

Ramus, F., Marshall, C. R., Rosen, S., & van der Lely, H. K. (2013). Phonological deficits in specific language impairment and developmental dyslexia: Towards a multidimensional model. *Brain*, 136, 630-645.

Ziegler, J. C., Pech-Georgel, C., George, F., & Lorenzi, C. (2011). Noise on, voicing off: Speech perception deficits in children with specific language impairment. *Journal of Experimental Child Psychology*, 110, 362-372.

Week 7: Word learning and lexical/semantic organization

Bani Hani, H., Gonzalez-Barrero, A., & Nadig, A. (2013) Children's referential understanding of novel words and parent labeling behaviors: similarities across children with and without autism spectrum disorders. *Journal of Child Language* 40, 971-1002

de Marchena, A., Eigsti, I-M, Worek, A., Ono, K., Snedeker, J. (2011) Mutual exclusivity in autism spectrum disorders: Testing the pragmatic hypothesis. *Cognition* 119, 96–113

Tek, S., Jaffery, G., Fein, D., & Naigles, L.R. (2008) Do children with autism show a shape bias in word learning? *Autism Research* 1, 202-215.

McDuffie, A., Kover, S., Hagerman, R., Abbeduto, L. (2013) Investigating Word Learning in Fragile X Syndrome: A Fast-Mapping Study *J Autism Dev Disord* 43:1676–1691.

Week 8: Pragmatics and theory of mind

- de Marchena, A., & Eigsti, I. M. (in revisions). Executive and nonverbal contributions to pragmatic language in autism spectrum disorder. *Journal of Child Language*.
- John, A. E., Rowe, M. L., & Mervis, C. B. (2009). Referential communication skills of children with Williams syndrome: understanding when messages are not adequate. *Am J Intellect Dev Disabil*, 114(2), 85-99. doi: 10.1352/2009.114.85-99
- Norbury, C. F., Gemmell, T., & Paul, R. (2013). Pragmatics abilities in narrative production: a cross-disorder comparison. *J Child Lang*, 1-26. doi: 10.1017/s030500091300007x
- Taylor, L. J., Maybery, M. T., Wray, J., Ravine, D., Hunt, A., & Whitehouse, A. J. (2013). Brief report: do the nature of communication impairments in autism spectrum disorders relate to the broader autism phenotype in parents? *Journal of Autism and Developmental Disorders*, 43(12), 2984-2989. doi: 10.1007/s10803-013-1838-3

Week 9: Grammatical acquisition and representation

- Levy, Y. & Eilam, A. (2013) Pathways to language: a naturalistic study of children with Williams syndrome and children with Down syndrome. *Journal of Child Language* 40, 106-138.
- Musolino, J., Chunyo, G. & Landau, B. (2010) Uncovering Knowledge of Core Syntactic and Semantic Principles in Individuals With Williams Syndrome. *Language Learning and Development*, 6: 126–161.
- Allen, M., Haywood, S., Rajendran, G., & Branigan, H. (2011) Evidence for syntactic alignment in children with autism. *Developmental Science* 14:3 540–548.
- Rakhlin, N., Kornilov, S., & Grigorenko, E. (in press) Gender and agreement processing in children with Developmental Language Disorder. *Journal of Child Language*.

Week 10: Brain 1: Functional connectivity and language deficits

- Barttfeld, P., Wicker, B., Cukier, S., Navarta, S., Lew, S., & Sigman, M. (2011). A big-world network in ASD: dynamical connectivity analysis reflects a deficit in long-range connections and an excess of short-range connections. *Neuropsychologia*, 49(2), 254-263. doi: 10.1016/j.neuropsychologia.2010.11.024
- Hall, S. S., Jiang, H., Reiss, A. L., & Greicius, M. D. (2013). Identifying large-scale brain networks in fragile X syndrome. *JAMA Psychiatry*, 70(11), 1215-1223. doi: 10.1001/jamapsychiatry.2013.247
- Stevenson, R. A., Siemann, J. K., Schneider, B. C., Eberly, H. E., Woynaroski, T. G., Camarata, S. M., & Wallace, M. T. (2014). Multisensory temporal integration in autism spectrum disorders. *Journal of Neuroscience*, 34(3), 691-697. doi: 10.1523/jneurosci.3615-13.2014
- Verly, M., Verhoeven, J., Zink, I., Mantini, D., Oudenhove, L. V., Lagae, L., . . . Rommel, N. (2013). Structural and functional underconnectivity as a negative predictor for language in autism. *Hum Brain Mapp*. doi: 10.1002/hbm.22424

Optional:

- Shen, M. D., Shih, P., Ottl, B., Keehn, B., Leyden, K. M., Gaffrey, M. S., & Muller, R. A. (2012). Atypical lexicosemantic function of extrastriate cortex in autism spectrum disorder: evidence from functional and effective connectivity. *Neuroimage*, 62(3), 1780-1791. doi: 10.1016/j.neuroimage.2012.06.008

Week 11: Brain 2: Neural underpinnings of language deficits

- Eigsti, I. M., Schuh, J., Mencl, E., Schultz, R. T., & Paul, R. (2012). The neural underpinnings of prosody in autism. *Child Neuropsychol*, 18(6), 600-617. doi: 10.1080/09297049.2011.639757

- Joseph, R. M., Fricker, Z., Fenoglio, A., Lindgren, K. A., Knaus, T. A., & Tager-Flusberg, H. (2013). Structural asymmetries of language-related gray and white matter and their relationship to language function in young children with ASD. *Brain Imaging Behav.* doi: 10.1007/s11682-013-9245-0
- Kuhl, P. K., Coffey-Corina, S., Padden, D., Munson, J., Estes, A., & Dawson, G. (2013). Brain responses to words in 2-year-olds with autism predict developmental outcomes at age 6. *PLoS One*, 8(5), e64967. doi: 10.1371/journal.pone.0064967
- Williams, D., Botting, N., & Boucher, J. (2008). Language in autism and specific language impairment: where are the links? *Psychological Bulletin*, 134(6), 944-963. doi: 2008-14745-006 [pii] 10.1037/a0013743

Week 12: Motor processing and imitation

- Botting, N., Riches, N., Gaynor, M., & Morgan, G. (2010). Gesture production and comprehension in children with specific language impairment. *Br J Dev Psychol*, 28(Pt 1), 51-69.
- Corriveau, K. H., & Goswami, U. (2009). Rhythmic motor entrainment in children with speech and language impairments: tapping to the beat. *Cortex*, 45(1), 119-130. doi: 10.1016/j.cortex.2007.09.008
- Silverman, L. B., Bennetto, L., Campana, E., & Tanenhaus, M. K. (2010). Speech-and-gesture integration in high functioning autism. *Cognition*, 115(3), 380-393. doi: S0010-0277(10)00015-6 [pii] 10.1016/j.cognition.2010.01.002 [doi]
- Watson, L. R., Crais, E. R., Baranek, G. T., Dykstra, J. R., & Wilson, K. P. (2013). Communicative gesture use in infants with and without autism: a retrospective home video study. *Am J Speech Lang Pathol*, 22(1), 25-39. doi: 10.1044/1058-0360(2012/11-0145)

Week 13: Genetic influences

- Mills, D., Dai, L., Fishman, Y., Yam, A., Appelbaum, L., St George, M., Galaburda, A., Bellugi, U., Korenberg, J. (2013) Genetic mapping of brain plasticity across development in Williams syndrome: ERP markers of face and language processing. *Dev Neuropsychol.* 38, 613-42.
- Geschwind, D. (2011) Genetics of autism spectrum disorders. *Trends in Cognitive Sciences* 15, 409-416.
- Rice, M. (2012) Toward epigenetic and gene regulation models of specific language impairment: looking for links among growth, genes, and impairments *Journal of Neurodevelopmental Disorders* 4:27.
- Graham, S. A., & Fisher, S. E. (2013). Decoding the genetics of speech and language. *Current Opinion in Neurobiology*, 23, 43-51.

Week 14: Computational modeling

Elman, J.L. (2005). Connectionist models of cognitive development: Where next? *Trends in Cognitive Science*, 9, 111-117.

Lewis, J.D., & Elman, J.L. (2008). Growth-related neural reorganization and the autism phenotype: A test of the hypothesis that altered brain growth leads to altered connectivity. *Developmental Science*, 11(1), 135-55.

Munakata, Y. and McClelland, J. L. (2003). Connectionist models of development. *Developmental Science*, 6, 413-429.

One of these, TBD:

Chang F, Janciauskas M, Fitz H (2012) Language adaptation and learning: Getting explicit about implicit learning. *Language and Linguistics Compass* vol 6 issue 5 pp 259-278.

Chang. F, Dell, G. S., Bock, K. (2006) Becoming syntactic. *Psychological Review* 113, 234-272.