

**UNIVERSITY of KANSAS – SPEECH-LANGUAGE-HEARING: SCIENCES
and DISORDERS**



SPLH 764/464 INFANT DEVELOPMENT

Line# 65930 UG

Line # 59806 GRAD

Spring 2007 DOLE 3048 – 1:10-2:50 PM **Tuesdays (2 cr)**

Instructors:

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Text: Development in Infancy (2002). Michael Lamb, Marc Bornstein, Douglas Teti, **Lawrence Erlbaum Associates** ISBN 0-8058-3563-6

Supplemental Readings. Available in *.pdf

Course Objective: To develop a working knowledge of the ontogenesis of perception-action systems in the human infant, including brain-behavioral relations associated with language acquisition and production, visual attention, and sensorimotor control of complex muscle systems. Pertinent literature on the biological basis of these integrative skills and behaviors will be explored among a number of animal models in an effort to expand the student's knowledge of potential mechanisms underlying human behavior.

Course Format: The course will include instructor presentations of key topics and paradigms related to early development including typical and atypical language acquisition, developmental disabilities, attention and perception, cognitive processing, and organization and neurobiological determinants of pattern generation and sensorimotor function. Experimental work will be examined in a number of animal models and where possible, principles underlying the assembly and modification of neural systems will be considered in the context of early human development. Students will gain valuable experience through review and oral presentation of related papers on a topic area each week. A synthesis of key findings will occur at the conclusion of each class session in order to facilitate the student's understanding of the ontogenesis of brain-behavior relations and patterns of skill acquisition in humans. The synthesis will take the form of an individualized personal journal in which students will generate a compendium of observations, summary, and experimental questions that may be of interest for future work (thesis/dissertation).

Assessment: Students are expected to attend each class and actively participate in discussions. Original research journal articles, and/or research reviews will be assigned for critical review to a small group of class participants (2 or 3) on a periodic basis. The student-driven critiques will include a ~10 minute response to a set of questions posed by the

instructor. Student responses will be presented orally using **Powerpoint** for supportive materials. All class participants are expected to complete **required readings** prior to class. Quizzes will be posted to **BlackBoard** ~ every two weeks. These quizzes will be objective, presented in timed format with posted completion dates. These quizzes are designed to assess your knowledge base of key concepts developed in class lecture-discussion and readings. The final exam (due May 15 @ 5 PM) will consist of a 'self-assessment' essay (*Maximum of 5 double space pages in MS Word format, 12 pt Tms Roman or Arial font, 1" margins*) outlining key concepts and pivotal discussions which have influenced your thinking about early human development. This essay is to be submitted electronically to sbarlow@ku.edu, nbrady@ku.edu, jcolombo@ku.edu.

Students with Disabilities

"The staff of Services for Students with Disabilities (SSD), 135 Strong, 785-864-2620 (v/tty), coordinates accommodations and services for KU courses. If you have a disability for which you may request accommodation in KU classes and have not contacted them, please do as soon as possible. Please also see one of the instructors privately in regard to this course."

SPLH 764 INFANT DEVELOPMENT Topic & Readings Schedule –Spring 2007

Line# 65930 UG, Line # 59806 GRAD

1:10 - 2:50 PM

TUESDAYs

DOLE 3048

DATE	Topic Content	*.PPT files	INFANT DEV textbook	Supplemental Readings
Jan 23	Course Overview Secret Life of the Brain: Infant Development PBS video			View PBS video
Jan 30	Brain Development: Evidence from MR and DTI Meredith Estep,			Required Reading: McKinstry et al. (2002). Radial organization of developing human cerebral cortex revealed by non-invasive water diffusion anisotropy MRI. Cerebral

	Neuroscience Doctoral Program			<p>Cortex 12, 1237-1243.</p> <p>Berman et al. (2005). Quantitative DT MRI fiber tractography of sensorimotor white matter development in preterm infants. <i>NeuroImage</i> 27, 862-871.</p> <p>Huppi P, & Dubois (2006). Diffusion tensor imaging of brain development. <i>Seminars in Fetal & Neonatal Medicine</i>, 11, 489-497.</p>
Feb 06	<p>From Egg to Action: Emergent Mechanisms of Rhythmic Motor Behavior</p> <p>Dr. SM Barlow</p>	<p>Barlow, Orofacial Pattern Generation. NIH-ASHA 2005</p>	CH 5	<p>Required Reading:</p> <p>Barlow SM, Estep M. (2006). Central Pattern Generation and the Motor Infrastructure for Suck, Respiration, and Speech. <i>J Communicative Disorders</i>.</p> <p>Marder E, & Bucher D. (2001). Central pattern generators and the control of rhythmic movements. <i>Current Biology</i>, 11, 986-996.</p> <p>Lund JP & Kolta (2006). Generation of the central masticatory pattern and its modification by sensory feedback. <i>Dysphagia</i>, 167-174.</p> <p>Lund JP & Kolta (2006). Brainstem circuits that control mastication: Do they have anything to say during speech? <i>J Com Disorders</i>, 39, 381-390.</p> <p>Related Readings:</p> <p>Grillner S. (2001). From egg to action. <i>Brain Research Bulletin</i> 53(5), 473-477.</p> <p>Swensen AM, & Marder E. (2001). Modulators with convergent cellular actions elicit distinct circuit outputs. <i>Journal Neuroscience</i> 21, 4050-4058.</p> <p>Combes D, Meyrand P, Simmers J. (1999a). Motor Pattern Specification by dual descending pathways to a lobster rhythm-generating network. <i>Journal of Neuroscience</i> 19(9), 3610-3619.</p> <p>Combes D, Meyrand P, Simmers J. (1999b). Dynamic restructuring of a rhythmic motor program by a single mechanoreceptor neuron in Lobster.</p>

				<i>Journal of Neuroscience</i> 19(9), 3620-3628.
Feb 13	<p>Effects of sensory deprivation and motor restriction on brain development</p> <p>Dr. S.M. Barlow</p>	<p>Barlow, Orofacial Pattern Generation. NIH-ASHA 2005</p>	CH 5	<p>Required Reading:</p> <p>Pascual R, Fernandez V, Ruiz S, Kuljis RO. (1993). Environmental deprivation delays the maturation of motor pyramids during the early postnatal period. <i>Early Human Development</i>, 33(2): 145-155.</p> <p>Pascual R, Figueroa H. (1996). Effects of preweaning sensorimotor stimulation on behavioral and neuronal development in motor and visual cortex of the rat. <i>Biol Neonate</i>, 69, 399-404.</p> <p>Pasual R, Hervias MC, Toha ME, Valero A, Figueroa HR. (1998). Purkinje cell impairment induced by early movement restriction. <i>Biol Neonate</i> 73(1), 47-51.</p> <p>Related Readings:</p> <p>Penn AA, Shatz CJ. (1999). Brain waves and brain wiring: the role of endogenous and sensory-driven neural activity in development. <i>Pediatric Research</i> 45(4), 447-458.</p> <p>Pascual R, Hervias MC, Figueroa HR. (1996). Effects of preweaning environmental stimulation on neuronal and behavioral impairment produced by undernutrition. <i>Biol Neonate</i>, 70(3), 165-172.</p> <p>Pascual R, Verdu E, Valero A, Navarro X. (1999). Early social isolation decreases the expression of calbindin D-28k in rat cerebellar Purkinje cells. <i>Neuroscience Letters</i> 272, 171-174.</p>
Feb 20	<p>Symposium</p> <p>Oromotor Development in Neonates: Oral Stimulation & Patterns for the Premature Brain</p> <p>Dr. S.M. Barlow</p>	<p>Barlow, Orofacial Pattern Generation. NIH-ASHA 2005.</p>	CH 5	<p>Required Reading:</p> <p>Sammon MP, Darnhall RA. (1994). Entrainment of respiration to rocking in premature infants: Coherence analysis. <i>Journal Applied Physiology</i> 77(3), 1548-1554.</p> <p>Ingersoll EW, Thoman EB. (1994). The breathing bear: Effects on respiration in premature infants. <i>Physiology &</i></p>

	<p>Meredith Estep, BS Emily Zimmerman, BA Meredith Poore</p>			<p><i>Behavior</i> 56(5), 855-859.</p> <p>Finan DS, Barlow SM. (1998). Mechanosensory modulation of non-nutritive sucking in human infants. <i>Journal Early Human Development</i> 52(2), 181-197.</p> <p>Iriki A, Nozaki S, Nakamura Y. (1988). Feeding behavior in mammals: Corticobulbar projection is reorganized during conversion from sucking to chewing. <i>Developmental Brain Research</i> 44, 189-196.</p> <p>Related Readings:</p> <p>Nozaki S, Iriki A, Nakamura Y. (1986). Localization of central rhythm generator involved in cortically induced rhythmical masticatory jaw-opening movement in the guinea pig. <i>Journal of Neurophysiology</i> 55(4), 806-825.</p> <p>Tanaka et al (1999)</p> <p>Stumm S, Barlow SM, Vantipalli R, Finan D, Estep M, Seibel L, Urish M, Fees M, Poore M, Chu S, Zimmerman E, Cannon S, Gagnon K, Carlson J. (2006) Amplitude profiles of the non-nutritive suck in preterm infants with RDS. <i>J Clinical Nursing</i>.</p> <p>Zimmerman E, Barlow SM, Seibel L, Poore M, Stumm S, Estep M, Chu S, Fees M, Urish M, Gagnon K, Cannon S, Carlson J. (2006). Pacifier stiffness alters the dynamics of the suck central pattern generator. <i>Society for Pediatric Research</i></p> <p>Estep M, Barlow SM, Stumm S, Fees M, Finan D, Seibel L, Poore M, Cannon S. (2006). Non-nutritive Suck Burst Parametrics in Preterm Infants. <i>Dev Med Child Neurology</i> .</p> <p>Poore M, Barlow SM, Wang J, Lee J. (2006). Spatio-temporal index of the non-nutritive suck in premature infants. To be submitted to <i>Dev Medicine & Child Neurology</i></p>
Feb 27	Working with parents to		Ch 9 & 11	<p>MacDonald, J. & Carroll, J. (1992). Communicating with young</p>

	<p>improve child language</p> <p>Dr. Nancy Brady</p>			<p>children: An ecological model for clinicians, parents, and collaborative professionals. <i>AJSLP</i>, 1, 39-48</p> <p>van Kleek (1994). Potential cultural bias in training parents as conversational partners with their children who have delays in language development. <i>AJSLP</i>, 3, 67-79.</p>
Mar 06	<p>Neonatal Outcomes</p> <p>Susan Cannon, PT</p>		CH 1 and 2	<p>Neonatal Outcomes from the NICU</p>
Mar 13	<p>Introduce early language related behaviors</p> <p>Dr. Nancy Brady</p>		Ch. 8 & 9	<p>Required Reading</p> <p>Crais, Day Douglas, & Cox Campbell, (2004). The intersection of the development of gestures and intentionality. <i>Journal Speech, Language and Hearing Research</i>, 47, 678-694.</p> <p>Henning, A. Striano, T. & Lieven, E. (2005). Maternal speech to infants at 1 and 3 months of age.</p> <p>Liu, H., Kuhl, P. and Tsao, F. (2003). An association between mothers' speech clarity and infants' speech discrimination skills.</p>
Spring Break Mar 20	BREAK	BREAK		BREAK
Mar 27	<p>Gestures and ASL and their relationship to speech and language</p> <p>Dr. Nancy Brady</p>		Ch. 10	<p>Required Reading</p> <p>Iverson & Thelen (1999). Hand, Mouth and Brain: The Dynamic emergence of speech and gesture</p> <p>Johnston J. Durieux-Smith A, Bloom K., Teaching gestural signs to infants to advance child development: A review of the evidence, <i>First Language</i> 25(2), 235–251</p> <p>Liszkowski U, Carpenter M, Henning A, Striano T, Tomasello M. (2004). Twelve-month-olds point to share attention and interest.</p> <p>Galloway C, Thelen E. (2004). Feet first: Object exploration in young infants.</p>

				<i>Infant Behavior and Development</i> 27, 107-112.
Apr 03	Atypical development: developmental disabilities and autism Dr. Nancy Brady		Ch. 8 & 9	<p>Required Reading</p> <p>Siller & Sigman. (2002). The behaviors of parents of children with autism predict the subsequent development of their children's communication. <i>Journal of Autism and Developmental Disorders</i>, 32(2), 77-87</p> <p>Baron-Cohen, Allen, & Gillberg, (1992). Can autism be detected at 18 months? The needle, the haystack, and the CHAT. <i>British Journal of Psychiatry</i>, 161, 839-843.</p> <p>Rondal, J. (2003). Prelinguistic training. In Rondal, J. and Buckley, S. Speech and language intervention in Down syndrome (pp. 11-30). London: Whurr publishing.</p>
Apr 10	Dale Walker: Infant Toddler Interventions			
Apr 17	Interventions Dr. Nancy Brady		Ch 7 & 12.	<p>Required Reading</p> <p>Clibbens, Powell, Atkinson (2002). Strategies for achieving joint attention when signing to children with Down's syndrome. <i>International Journal of Language and Communication Disorders</i>, 37(3), 309-323.</p> <p>Nakata & Trehub (2004). Infants' responsiveness to maternal speech and singing. <i>Infant Behavior and Development</i>, 27, 455-464.</p> <p>Brady, N. (in press). Prelinguistic and Early Language Interventions for Children with Down Syndrome or Fragile X Syndrome</p>

<p>Apr 24</p>	<p>Early Experience and Brain Development</p> <p>Dr. John Colombo</p>			<p>Required Reading:</p> <p>Breuer, J. T., & Greenough, W. J. (2001). The subtle science of how experience affects the brain. Bailey, D. B., Breuer, J. T., Symons, F. J., & Lichtman J. W. (2001, Eds.), Critical thinking about critical periods (pp. 209-232). Baltimore: Paul Brookes.</p> <p>Chugani, H. T. (1994). Development of regional brain glucose metabolism in relation to behavior and plasticity. In Dawson, G., & Fischer, K. (1994, Eds.), Human behavior and the developing brain (pp. 314-345). New York: Guilford.</p> <p>Huttenlocher, PR (1990). Morphometric study of human cerebral cortex development. <i>Neuropsychologia</i>, 28, 517-527.</p> <p>Aoki, C., & Siekevitz, P. (1988). Plasticity in brain development. <i>Scientific American</i>, 256, 56-64.</p>
<p>May 01</p>	<p>The Neural Basis of Attention</p> <p>Dr. John Colombo</p>			<p>Required Reading:</p> <p>Webster MJ, Ungerleider LG. (1998). Neuroanatomy of visual attention. In R. Parasuraman (Ed). <i>The Attentive Brain</i> (pp. 19–34). Cambridge, MA: MIT Press.</p> <p>Johnson MH, Vecera SP (1996). Cortical differentiation and neurocognitive development: The parcellation conjecture. <i>Behavioural Processes</i>, 36, 195-212.</p> <p>Niebur, E., Hsiao, S.S., & Johnson, K.O. (2002). Synchrony: A neuronal mechanism for attentional selection? <i>Current Opinion in Neurobiology</i>, 12, 190-194.</p> <p>Munakata, Y. & Pfaffly, J. (2004). Hebbian learning and development. <i>Developmental Science</i>, 7, 141–148</p>
<p>May 08</p>	<p>Attention in Infancy and Toddlerhood</p> <p>Dr. John Colombo</p>			<p>Required Reading:</p> <p>Colombo J. (2001). The development of visual attention in infancy. <i>Annual Review of Psychology</i> 52, 337-367.</p> <p>Colombo J, Cheatham C. (2007). The</p>

				<p>emergence of endogenous attention in infancy and early childhood. In R. Kail (Ed.), <i>Advances in child development and behavior</i> (pp. 283-322). New York: Elsevier.</p> <p>Mundy P, Fox N, Card J (2003). EEG coherence, joint attention and language development. <i>Developmental Science</i>, 6 48–54.</p> <p>Saxon, TF, Colombo J, Robinson EL, Frick JE. (2000). Dyadic interaction profiles in infancy and preschool intelligence. <i>Journal of School Psychology</i>, 38, 9-25.</p>
<p>May 15</p>	<p>FINAL PAPERS DUE</p>	<p>5 PM</p>		<p>FINAL PAPERS: Send electronically to sbarlow@ku.edu; nbradv@ku.edu; & jcolombo@ku.edu</p>