

Term Information

Effective Term Autumn 2018

General Information

Course Bulletin Listing/Subject Area Psychology
Fiscal Unit/Academic Org Psychology - D0766
College/Academic Group Arts and Sciences
Level/Career Graduate, Undergraduate
Course Number/Catalog 5997
Course Title Developmental Cognitive Neuroscience
Transcript Abbreviation Devcogneuro
Course Description How does the brain change over the first few years of life and how do these changes support changes in cognition? What brain architecture is present when you are born, and how does it change with maturation vs. experience? How does early brain structure and function constrain later learning and plasticity? We will have lectures on foundational studies and discussions of current empirical papers.
Semester Credit Hours/Units Fixed: 3

Offering Information

Length Of Course 14 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? No
Grading Basis Letter Grade
Repeatable No
Course Components Lecture
Grade Roster Component Lecture
Credit Available by Exam No
Admission Condition Course No
Off Campus Never
Campus of Offering Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites Psych 3313 or 3513
Exclusions
Electronically Enforced Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 30.1001
Subsidy Level Doctoral Course
Intended Rank Junior, Senior, Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will understand the major questions in the field of developmental cognitive neuroscience.
- Students will obtain an in-depth understanding of the current methodologies used for studying the developing human brain.
- Students will recognize and explain the positive and negative components of impactful empirical papers.
- Students will identify gaps in our knowledge of how the human brain develops and what is required to fill in these gaps.

Content Topic List

- current methodologies
- introduction to developmental neurobiology
- low and high-level sensory perception
- cognition, social and emotional processing
- neurodevelopmental disorders
- early brain injury and plasticity

Sought Concurrence

Yes

Attachments

- Neuroscience Concurrence-Psych 5999.pdf: Neuroscience Concurrence
(Concurrence. Owner: Paulsen, Alisa Marie)
- Psych 5997 syllabus.docx: syllabus
(Syllabus. Owner: Paulsen, Alisa Marie)
- Psychology Major Learning Objectives-November 2017.docx: curriculum map
(Other Supporting Documentation. Owner: Paulsen, Alisa Marie)

Comments

- Number changed to Psych 5997 *(by Paulsen, Alisa Marie on 11/08/2017 05:10 PM)*
- Don;t you need to select another number? x999 is a number set aside by the university for research for thesis. *(by Vankeerbergen, Bernadette Chantal on 11/07/2017 02:44 PM)*

COURSE REQUEST
5997 - Status: PENDING

Last Updated: Haddad,Deborah Moore
11/08/2017

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Paulsen,Alisa Marie	11/02/2017 01:31 PM	Submitted for Approval
Approved	Paulsen,Alisa Marie	11/02/2017 01:31 PM	Unit Approval
Approved	Haddad,Deborah Moore	11/02/2017 04:18 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	11/02/2017 06:26 PM	ASCCAO Approval
Submitted	Paulsen,Alisa Marie	11/02/2017 11:36 PM	Submitted for Approval
Approved	Paulsen,Alisa Marie	11/02/2017 11:37 PM	Unit Approval
Approved	Haddad,Deborah Moore	11/03/2017 11:27 AM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	11/07/2017 02:46 PM	ASCCAO Approval
Submitted	Paulsen,Alisa Marie	11/08/2017 05:10 PM	Submitted for Approval
Approved	Paulsen,Alisa Marie	11/08/2017 05:10 PM	Unit Approval
Approved	Haddad,Deborah Moore	11/08/2017 05:39 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	11/08/2017 05:39 PM	ASCCAO Approval

Developmental Cognitive Neuroscience
Psychology 5997
Fall 2018

Credit:	3 hours
Time:	TuTh 12:45-2:05pm
Place:	?
Text:	Developmental Cognitive Neuroscience, 4 th Edition Mark H. Johnson & Michelle de Haan; other readings will be posted online and are listed below
Prerequisites:	Either Psychology 3313 or 3513
Course webpage:	
Instructor:	Dr. Zeynep Saygin 205 Psychology Building email: saygin.3@osu.edu office hours: by appointment

Course Description & Objectives:

The field of developmental cognitive neuroscience involves trying to understand how the brain supports complex thoughts and behaviors by studying how these processes emerge over development, and how our genes, brains, and experiences interact to make us all unique individuals. Some hot questions include: How does the brain change over the first few years of life and how do these changes support the accompanying changes in perception and cognition? What brain architecture is present when you are born, and how does it change with maturation vs. experience? How does early brain structure and function constrain later learning and plasticity? We will assay foundational studies as well as the latest literature to formulate the field's current answers to these questions.

Specific topics covered will include current methodologies, introduction to developmental neurobiology, low and high-level sensory perception, cognition, social and emotional processing, neurodevelopmental disorders, and early brain injury and plasticity. Although this class is mainly about the human brain, we will discuss some animal literature as it pertains to human evolution and ontogeny.

The objective of the course is for students to grasp the fundamentals of the field, understand the latest literature, and what gaps in our knowledge remain (and how to address these gaps with the latest methods). This course will be a mixture of lecture and discussion, with the instructor lecturing on the background/history of each topic during the first class of each topic, followed by student-led presentations and discussions on the latest empirical papers on the topic. Each student is expected to read the book chapter(s) and papers before each class. Grades will be given based on course participation, weekly response papers, and student presentations.

Resources:

Textbooks: Developmental Cognitive Neuroscience, 4th Edition Mark H. Johnson & Michelle de Haan
Handbook of Developmental Cognitive Neuroscience, edited by Charles A. Nelson & Monica Luciana

Website: The course website is: XXX.osu.edu. This site is where all course materials will be available.

Presentation: All students will be responsible for presenting an empirical paper and leading a discussion on the paper. You will choose the date and paper to present from the available readings below. Depending on class size, some people may do two presentations. The presentation should be a 15-minute powerpoint, keynote, or equivalent presentation of the background, methods, results, and implications of the paper. Presenters for each week should upload their presentations on the course website on Tuesday by 10pm. These slides will only be viewable by the instructor until the presentation takes place. The presenters can edit their slides and re-upload their presentation up until their talk but a draft talk should be there on the Tuesday before the presentation day. This exercise will limit last minute preparation and make the presentations more enjoyable and educational for everyone. The presentation slides will be available for the class to view after the presentation takes place (Thursday). Note that on weeks where the Thursday class is a holiday, we will break up Tuesday's class into lecture and presentations. In that case, the slides will be due Monday before 10pm. Every participant will be expected to present at least once and perhaps more, depending on the total number of class participants. Presenters need to give a brief overview of the questions answered by the paper (talk about some background research as needed), present the methods in a clear manner such that we can all understand it, and discuss the results of the paper. In order to have productive conversations, please discuss one or more things the paper accomplishes well and one or more things that the paper fails to do well. Think about whether the paper answers the question(s) it set out to answer and how you would have set out to answer that question. **Presentations will be worth 50% of the grade.**

Attendance and participation: All students are expected to attend class and participate in the lectures and discussions. Participation is worth **25% of the grade.**

Discussion questions: Students must submit weekly discussion questions/response papers (~1 page, due Wednesday at 10pm). The weekly response can either compare the assigned papers and discuss their merits in answering questions in developmental cognitive neuroscience; OR find an alternative empirical paper that better addresses the current topic and discuss why. **Response papers will be worth 25% of the grade.**

Absences: Illness and personal/professional obligations may be accepted as an excuse for missing class. You will still be responsible for turning in discussion questions for the day that you were absent, with a reasonable (~1 week) delay. If you cannot present on the day that you are scheduled to present, you will need to present on another day on another topic. *If you are sick/contagious but feeling up to it, email me if you want to Skype/video chat in to class.*

Grading: Grades will be based out of 100 points.

Presentation: 50 points

Attendance and participation: 25 points

Response papers: 25 points

The following grading scale will be used to assign final grades:

A	93-100%	C	73-76.99%
A-	90-92.99%	C-	70-72.99%
B+	87-89.99%	D+	67-69.99%
B	83-86.99%	D	63-66.99%
B-	80-82.99%	D-	60-62.99%
C+	77-79.99%	E	0-59.99%

Assistance: I am available to talk to you about any of the course topics. I encourage starting your class preparation earlier so that we can discuss any questions or concerns you have in advance of the class, especially if you are presenting. I am usually available after class and can answer questions by email (saygin.3@osu.edu). Email me to set up an appointment for more lengthy discussions but please no unscheduled drop-ins.

Disabilities Statement: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292- 3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at <http://studentlife.osu.edu/csc/>.

Sexual misconduct/relationship violence: Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu.

Class Schedule (subject to change)

Week 1: Introduction and Methods

Aug 21- Lecture

Introduction & background; why study developmental cognitive neuroscience?
Organization of class, sign up for presentation papers.

Chapter 1: The biology of change

Aug 23 Lecture

Methodological paradigms; event-related potentials; magnetic resonance imaging;
genetic methods; neural networks; application of animal tests of cognition

D.C.N. (Developmental Cognitive Neuroscience) Ch. 2: Methods and Populations

H.D.C.N. (Handbook of Developmental Cognitive Neuroscience) Ch. 8: Inferences about the functional development of neural systems in Children via the Application of Animal Tests of Cognition

Week 2: Building a Brain

Aug 28 - Lecture

Developmental genetics; protomaps/cortex; what is known about gene expression in human development; some work from rodents & macaques as well

D.C.N. Ch. 3: From gene to brain

D.C.N. Ch. 4: Building a brain

H.D.C.N. Ch.3 Synaptogenesis in the Neocortex of the Newborn: The ultimate frontier for individuation?

Aug 30 - Presentations

1. Zembrzycki, A., Stocker, A. M., Leingärtner, A., ... & O'Leary, D. D. (2015). Genetic mechanisms control the linear scaling between related cortical primary and higher order sensory areas. *eLife*, e11416.
2. Chen, C. H., Peng, Q., Schork, A.J., ... & Dale, A. M. (2015). Large-scale genomics unveil polygenic architecture of human cortical surface area. *Nature Communications*, 6 (7549)
3. Farley, B. J., Yu, H., Jin, D. Z., & Sur, M. (2007). Alteration of visual input results in a coordinated reorganization of multiple visual cortex maps. *The Journal of Neuroscience*, 27(38), 10299-10310.
4. Minlebaev, M., Colonnese, M., Tsintsadze, T., Sirota, A., & Khazipov, R. (2011). Early gamma oscillations synchronize developing thalamus and cortex. *Science*, 334(6053), 226-229.
5. Chen, C. H., Gutierrez, E. D., Thompson, W., ... & Lyons, M. J. (2012). Hierarchical genetic organization of human cortical surface area. *Science*, 335(6076), 1634-1636.

Week 3: Vision & endogenous vs. experience-dependent brain development

Sept 4 - Lecture

Sur M., Cortical Development: Transplantation and Rewiring Studies., In: James D. Wright (editor-in-chief), International Encyclopedia of the Social & Behavioral Sciences, Second Edition, VOL 5: Oxford: Elsevier. pp. 30-34.

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Dehaene-Lambertz, G., & Spelke, E. S. (2015). *The Infancy of the Human Brain*. *Neuron*, 88(1), 93-109.

D.C.N. Ch. 5: Vision, orienting, attention

HDCN Ch. 16: Brain- Behavior Relationships in Early Visual Development

Sept 6 – Presentations

1. Arcaro and Livingstone. *eLife* 2017;6:e26196. DOI: 10.7554/eLife.26196

2. Röder, B., Ley, P., Shenoy, B. H., Kekunnaya, R., & Bottari, D. (2013). Sensitive periods for the functional specialization of the neural system for human face processing. *PNAS*, 110(42), 16760-16765.

3. Jandó, G., Mikó-Baráth, E., Markó, K., Hollódy, K., Török, B., & Kovacs, I. (2012). Early-onset binocularity in preterm infants reveals experience-dependent visual development in humans. *PNAS* 109(27), 11049-11052.

4. Benetti S, van Ackeren MJ, Rabini G, ..., Collignon O. *PNAS*. 2017 Aug

1;114(31):E6437-E6446. doi: 10.1073/pnas.1618287114. Epub 2017 Jun 26.

Functional selectivity for face processing in the temporal voice area of early deaf individuals.

5. Language processing in the occipital cortex of congenitally blind adults

Bedny, Pascual-Leone, Dodell-Feder, Fedorenko, Saxe. *PNAS*. 2011.

Week 4 High-level visual perception

Sept 11 – Lecture

D.C.N. Ch. 6: Perceiving and acting in a world of objects

D.C.N. Ch.7: Perceiving and acting in the social world

Sept 13 – Presentations

1. V. Marinovic, S. Hoehl, S. Pauen Neural correlates of human-animal distinction: an ERP-study on early categorical differentiation with 4- and 7-month-old infants and adults *Neuropsychologia*, 60 (2014), pp. 60–76

2. de Heering, A., & Rossion, B. (2015). Rapid categorization of natural face images in the infant right hemisphere. *Elife*, 4, e06564.

3. Srihasam K, Vincent J, Livingstone M. (2014). Novel domain formation reveals proto-architecture in inferotemporal cortex. *Nature neuroscience* 2014. 17(12) pp: 1776-83

4. Pavlova et al. 2017; *Scientific Reports* | 7: 2734 | DOI:10.1038/s41598-017-02790-1

5. Rosenthal et al. 2017 (BioRxiv) Altered topology of neural circuits in congenital prosopagnosia.

<https://www.nature.com/neuro/journal/vaop/ncurrent/pdf/nn.4635.pdf>

6. van den Hurk J., Van Baelen M., Op de Beeck HP. (2017). Development of visual category selectivity in ventral visual cortex does not require visual experience.

PNAS, 114(22):4501-4510.

Week 5 Explicit and Implicit Memory

Sept 18 – Lecture

D.C.N. Ch.8: Learning and Long-term memory

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HDCN. Ch.25: Neural bases of memory development: insights from neuropsychological studies in primates

Sept 20 – Presentations

1. Vargha-Khadem, F., Salmond, C. H., Watkins, K. E., Friston, K. J., Gadian, D. G., & Mishkin, M. (2003). Developmental amnesia: effect of age at injury. *Proceedings of the National Academy of Sciences*, 100(17), 10055-10060.
2. Patai, E. Z., Gadian, D. G., Cooper, J. M., Dzieciol, A. M., Mishkin, M., & Vargha-Khadem, F. (2015). Extent of hippocampal atrophy predicts degree of deficit in recall. *Proceedings of the National Academy of Sciences*, 112(41), 12830-12833.
3. Jabès, A., & Nelson, C. A. (2015). 20 years after “The ontogeny of human memory A cognitive neuroscience perspective,” where are we?. *International Journal of Behavioral Development*, 0165025415575766.
4. *Curr Biol.* 2017 Aug 7;27(15):2374-2380.e3. doi: 10.1016/j.cub.2017.06.070. Epub 2017 Jul 27. *The Sleeping Infant Brain Anticipates Development.* Friedrich M1, Wilhelm I2, Mölle M3, Born J4, Friederici AD5.
5. Finn et al. 2016. Developmental dissociation between the maturation of procedural memory and declarative memory

Week 6 Working Memory & Decision-Making

Sept 25 – Lecture

D.C.N. Ch. 10: prefrontal cortex, object permanence, decision making, working memory
H.D.C.N. Ch.6: The development of prefrontal cortex: the maturation of neurotransmitter systems and their interactions
HDCN. Ch.24: Mechanism & Variation in Development of Attentional Networks
The link between cognitive control and decision-making across child and adolescent development. Steinbeis & Crone (review)

Sept 27 – Presentations

1. *The Role of Fronto-Parietal and Fronto-Striatal Networks in the Development of Working Memory: A Longitudinal Study.* Fahimeh Darki Torkel Klingberg. *Cerebral Cortex*, Volume 25, Issue 6, 1 June 2015, Pages 1587–1595
2. Brod et al. 2017 *Does One Year of Schooling Improve Children’s Cognitive Control and Alter Associated Brain Activation?*
3. Achterberg, M.*, Peper, J. S.*, van Duijvenvoorde, A. C. K., Mandl, R. C. W., & Crone, E. A. (2016). Fronto-striatal white matter integrity predicts development of delay of gratification: A longitudinal study. *Journal of Neuroscience*, 36(6), 1954 –1961.

Week 7 Auditory perception, Speech, Language, Music (p.1)

Oct 2 – Lecture

D.C.N. Ch.9: Language, Ch.11: Cerebral Lateralization
H.D.C.N. Ch. 15: Development, Plasticity, and Learning in the Auditory System

Oct 4 – Presentations

1. Dehaene-Lambertz G, Dehaene S, Hertz-Pannier L. Functional neuroimaging of speech perception in infants. *Science*. 2002 Dec 6;298(5600):2013-5.

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2. Dehaene-Lambertz G, Hertz-Pannier L, Dubois J, Mériaux S, Roche A, Sigman M, Dehaene S. Functional organization of perisylvian activation during presentation of sentences in preverbal infants. *Proc Natl Acad Sci U S A*. 2006 Sep 19;103(38):14240-5.
3. Shultz S, Vouloumanos A, Bennett RH, Pelphrey K. Neural specialization for speech in the first months of life. *Dev Sci*. 2014 Sep;17(5):766-74.
4. Peña M1, Maki A, Kovacic D, Dehaene-Lambertz G, Koizumi H, Bouquet F, Mehler J. *Proc Natl Acad Sci U S A*. 2003 Sep 30;100(20):11702-5. Sounds and silence: an optical topography study of language recognition at birth.

Week 8 Auditory perception, Speech, Language, Music (p.2)

Oct 9 – Presentations

5. Syllabic discrimination in premature human infants prior to complete formation of cortical layers. *Proceedings of the National Academy of Sciences*, 110(12), 4846-4851.
6. Peña, M., Pittaluga, E., & Mehler, J. (2010). Language acquisition in premature and full-term infants. *Proceedings of the National Academy of Sciences*, 107(8), 3823-3828.
7. Gonzalez-Gomez, N., & Nazzi, T. (2012). Phonotactic acquisition in healthy preterm infants. *Developmental science*, 15(6), 885-894.
8. Adult-like processing of naturalistic sounds in auditory cortex by 3- and 9-month old infants. Wild CJ1, Linke AC2, Zubiaurre-Elorza L2, Herzmann C2, Duffy H2, Han VK3, Lee DSC3, Cusack R4. <https://www.ncbi.nlm.nih.gov/pubmed/28648887>

Oct 11 Autumn break, no classes

Week 9 Emotional processing

Oct 16 – Lecture

D.C.N. Ch.7: Perceiving and acting in the social world

HDCN. Ch. 38: Toward a neurobiology of attachment

HDCN. Ch. 40: The biology of temperament: an integrative approach

Oct 18 – Presentations

1. Kroi, Monakhov, ..., Grossmann. Genetic variation in CD38 and breastfeeding experience interact to impact infants' attention to social eye cues. *PNAS* 2015.
2. Rajhans, Jessen, ..., Grossmann. Putting the face in context: Body expressions impact facial emotion processing in human infants. *Developmental Cognitive Neuroscience* 2016.
3. Papageorgiou, K. A. et al. Individual Differences in Newborn Visual Attention Associate with Temperament and Behavioral Difficulties in Later Childhood. *Scientific Reports* 5, 11264; doi: 10.1038/srep11264 (2015).
4. Gee, Gabard-Durnam, ..., Tottenham. Early developmental emergence of human amygdala–prefrontal connectivity after maternal deprivation. *PNAS*. 2013.

Week 10 Literacy and Numeracy

Oct 23 – Lecture

D.C.N. Ch.12: Educational Neuroscience

HDCN. Ch. 21: Experience-Dependent plasticity and the treatment of children with specific language impairment or dyslexia

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HDCN. Ch. 28: Bridging the gap between cognition and developmental neuroscience: the example of number representation

Connectivity precedes function in the development of the visual word form area.

Saygin et al. 2016

Oct 25 – Presentations

1. Peters, S., van der Meulen, M., Zanolie, K., & Crone, E. A. (2017). Predicting reading and mathematics from neural activity for feedback learning. *Developmental Psychology*, 53(1), 149-159.

2. Yeatman, Dougherty, ..., Wandell. Development of white matter and reading skills. *PNAS*. 2012.

3. Edwards, Wagner, ..., Hyde. Functional brain organization for number processing in pre-verbal infants. *Developmental Science*. 2015.

4. Wang, ..., Dehaene. Representation of Numerical and Sequential Patterns in Macaque and Human Brains. *Current Biology* 2015.

Week 11 Social Cognition

Oct 30 – Lecture

DCN. Ch. 7: Perceiving and acting in the social world

Nov 1 – Presentations

1. White matter maturation is associated with the emergence of Theory of Mind in early childhood. *Wiesmann et al. 2017. Nature communications*

2. Braams, B. R. and Crone, E. A. (2016). Longitudinal changes in social brain development: Processing outcomes for friend and self. *Child Development*. doi:10.1111/cdev.12665

3. Davis, E.P., Stout, S.A., ... Baram, T.Z. Exposure to unpredictable maternal sensory signals influences cognitive development across species. *PNAS*. 2017 Sep 11. pii: 201703444. doi: 10.1073/pnas.1703444114.

4. Bedny, Pascual-Leone, Saxe. Growing up blind does not change the neural bases of Theory of Mind. *PNAS*. 2009.

Week 12 Clinical and neurodevelopmental disorders

Nov 6 – Lecture

HDCN. Ch. 34. Advances in the cognitive neuroscience of autism

HDCN. Ch. 35. Tics: when habit-forming neural systems form habits of their own

HDCN. Ch. 36. Developmental disorders of attention

HDCN. Ch. 37. Neuropsychology of schizophrenia and its relationship to the neurodevelopmental model

Nov 8 – Presentations

1. Whyte et al. 2016; Animal, but not human, faces engage the distributed face network in adolescents with autism. *Developmental Science* 19:2 (2016), pp 306–317

Week 13 Connectivity driving development

Nov 13 – Lecture

HDCN. Ch.3 Myelination in developing human brain

Lebel 2011; Lebel & Beulieu 2012

Nov 15 – Presentations

1. Gao, W., Alcauter, S., Elton, A., Hernandez-Castillo, C. R., Smith, J. K., Ramirez, J., & Lin, W. (2014). Functional network development during the first year: relative sequence and socioeconomic correlations. *Cerebral cortex*, *bhu088*.
2. Pruett, J. R., Kandala, S., Hoertel, S., Snyder, A. Z., Elison, J. T., Nishino, T., ... & Adeyemo, B. (2015). Accurate age classification of 6 and 12 month-old infants based on resting-state functional connectivity magnetic resonance imaging data. *Developmental cognitive neuroscience*, *12*, 123-133.
3. Alcauter, S., Lin, W., Smith, J. K., Goldman, B. D., Reznick, J. S., Gilmore, J. H., & Gao, W. (2015). Frequency of spontaneous BOLD signal shifts during infancy and correlates with cognitive performance. *Developmental cognitive neuroscience*, *12*, 40-50.
4. O'Muircheartaigh, J., Dean, D. C., Ginestet, C. E., Walker, L., Waskiewicz, N., Lehman, K., ... & Deoni, S. C. (2014). White matter development and early cognition in babies and toddlers. *Human brain mapping*, *35*(9), 4475-4487.

Week 14 Early brain injury, intervention, and plasticity

Nov 20 – Presentations

1. Beharelle, A. R., Dick, A. S., Josse, G., Solodkin, A., Huttenlocher, P. R., Levine, S. C., & Small, S. L. (2010). Left hemisphere regions are critical for language in the face of early left focal brain injury. *Brain*, *133*(6), 1707-1716.
2. Dick, A. S., Beharelle, A. R., Solodkin, A., & Small, S. L. (2013). Interhemispheric functional connectivity following prenatal or perinatal brain injury predicts receptive language outcome. *The journal of Neuroscience*, *33*(13), 5612-5625.
3. Lidzba, K., Konietzko, A., Schwilling, E., Krägeloh-Mann, I., & Winkler, S. (2013). Processing of non-canonical word-order: A case-series on lesion-induced reorganized language and age-effects in typical development. *Brain and language*, *127*(3), 377-387.
4. Adhikari, M. H., Beharelle, A. R., Griffa, A., Hagmann, P., Solodkin, A., McIntosh, A. R., ... & Deco, G. (2015). Computational Modeling of Resting-State Activity Demonstrates Markers of Normalcy in Children with Prenatal or Perinatal Stroke. *The Journal of Neuroscience*, *35*(23), 8914-8924.
5. Paul, B., Appelbaum, M., Carapetian, S., Hesselink, J., Nass, R., Trauner, D., & Stiles, J. (2014). Face and location processing in children with early unilateral brain injury. *Brain and cognition*, *88*, 6-13.

Nov 22 (thanksgiving break)

Week 15 Interactive specialization, maturation, experience

Nov 27 – Lecture

DCN. Ch.13 Interactive Specialization

DCN. Ch. 14 Toward an integrated developmental cognitive neuroscience

Interactive specialization: a domain-general framework for human functional brain development? Johnson, M. Developmental Cognitive Neuroscience 2011.

Nov 29 – Presentations

1. Mahmoudzadeh, M., Dehaene-Lambertz, G., Fournier, M., Kongolo, G., Goudjil, S., Dubois, J., ... & Wallois, F. (2013). Syllabic discrimination in premature human infants

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prior to complete formation of cortical layers. *Proceedings of the National Academy of Sciences*, 110(12), 4846-4851.

2. Jandó, G., Mikó-Baráth, E., Markó, K., Hollódy, K., Török, B., & Kovacs, I. (2012). Early-onset binocularity in preterm infants reveals experience-dependent visual development in humans. *Proceedings of the National Academy of Sciences*, 109(27), 11049-11052.

3. Peña, M., Pittaluga, E., & Mehler, J. (2010). Language acquisition in premature and full-term infants. *Proceedings of the National Academy of Sciences*, 107(8), 3823-3828.

4. Gonzalez-Gomez, N., & Nazzi, T. (2012). Phonotactic acquisition in healthy preterm infants. *Developmental science*, 15(6), 885-894.

5. Watanabe, H., Homae, F., & Taga, G. (2010). General to specific development of functional activation in the cerebral cortexes of 2-to 3-month-old infants. *Neuroimage*, 50(4), 1536-1544.

6. Riggins..Redcay 2016. Hippocampal functional connectivity and episodic memory in early childhood. *Developmental Cognitive Neuroscience*.

Week 16 last class

Dec 4

Concluding remarks, putting it all together, last presentations, surveys

**The Ohio State University
College of the Arts and Sciences Concurrence Form**

The purpose of this form is to provide a simple system of obtaining departmental reactions to course requests. **An e-mail may be substituted for this form.**

An academic unit initiating a request should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Units should be allowed two weeks to respond to requests for concurrence.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before this form and all other accompanying documentation may be forwarded to the Office of Academic Affairs.

A. Proposal to review

Psychology 5999 Developmental Cognitive Neuroscience


Initiating Academic Unit	Course Number	Course Title	
New			11/2/2017
Type of Proposal (New, Change, Withdrawal, or other)			Date request sent
Neuroscience			11/16/2017
Academic Unit Asked to Review			Date response needed

B. Response from the Academic Unit reviewing

Response: include a reaction to the proposal, including a statement of support or non-support (continued on the back of this form or a separate sheet, if necessary).

The Department of Neuroscience supports this new course.

Signatures

	Professor and Chair	Neuroscience	11/2/2017
1. Name	Position	Unit	Date
2. Name	Position	Unit	Date
3. Name	Position	Unit	Date

Psychology Major Learning Objectives

Program Objectives

Knowledge Base in Psychology

- K1. Describe key concepts, principles, & overarching themes in psychology
- K2. Develop working knowledge of psychology's content domains
- K3. Describe applications of psychology

Scientific Inquiry & Critical Thinking

- S1. Use scientific reasoning to interpret psychological phenomena
- S2. Demonstrate psychology information literacy
- S3. Engage in innovative & integrative thinking & problem solving
- S4. Interpret, design, & conduct basic psychological research
- S5. Incorporate sociocultural factors in scientific inquiry

Ethical & Social Responsibility in a Diverse World

- E1. Apply ethical standards to evaluate psychological science & practice
- E2. Build & enhance personal relationships
- E3. Adopt values that build community at local, national, & global levels

Communication

- C1. Demonstrate effective writing for different purposes
- C2. Exhibit effective presentation skills for different purposes
- C3. Interact effectively with others

Professional Development

- P1. Apply psychological content & skills to career goals
- P2. Exhibit self-efficacy & self-regulation
- P3. Refine project-management skills
- P4. Enhance teamwork capacity
- P5. Develop meaningful professional direction for life after graduation

Learning Goal Levels

- F – Foundational
- A- Advanced

I. Data Analysis and Research Requirement																				
Course	Area	K1	K2	K3	S1	S2	S3	S4	S5	E1	E2	E3	C1	C2	C3	P1	P2	P3	P4	P5
2220(H) Data Analysis		F			F	F	F	F					F			F	F	F		
2300 Research Methods		F	F	F	F	F	F	F	F	F	F		F		F	F	F	F		

II. Core Requirements (1 from each area)																				
A. Brain and Behavior																				
Course	Area	K1	K2	K3	S1	S2	S3	S4	S5	E1	E2	E3	C1	C2	C3	P1	P2	P3	P4	P5
3313 Intro to Behavioral Neuroscience	BN	F	F		F	F				F										
3313H Intro to Behavioral Neuroscience	BN	F	F		F	F	F	F		F	F		F	F	F				F	
3513 Intro to Cognitive Neuroscience	CO	F			F	A		F		F			F							
B. Cognitive Psychology																				
3302 Perception & Language	CO	A	A	A	A	A	F		F											
3310 Sensation & Perception	CO	A	A	F	A	F	F									F				F
3312 Memory & Cognition	CO	A	A	F	A	A	F	F	F	F			F	F	F					F
C. Clinical and Developmental Psychology																				
2367.02 Abnormal Psychology Analysis	CL	F	F	F	F		F						F		F				F	
3331 Abnormal Psychology	CL	F	F	A	A			A	A											
3335 Psychology of Adjustment	CL	F																		
3340 Lifespan Development	D	F	F	F	F	F						F	F							
3530 Theories of Personality	CL	A	A	A	A	F	F	F	A	F	A		F				F			
3550 Psychology of Childhood	D	F	F	F	F	F						F	F							
3551 Psychology of Adolescence	D	F		F	F	F		F						F						F

D. Social Psychology																			
2367.01 Social Psychology	S	F	F,A	F,A	F	F,A	F,A	F		F		F	F,A	F	F	F	F,A	F	F
3325 Intro to Social Psychology	S	F	F,A	F,A	F	F,A	F	F		F		F			F				
3375 Stereotyping and Prejudice	S	F	F	F,A	F	F	F	F	F	F	F	F,A			F	F,A			

III. Advanced Requirements																				
Course	Area	K1	K2	K3	S1	S2	S3	S4	S5	E1	E2	E3	C1	C2	C3	P1	P2	P3	P4	P5
Sequenced Advanced Courses																				
4305 Intro to Psychopharmacology	BN	A	A	A	A	A	A	A	A											
4475 The Self	S	A	A	A	A		A		A		A	A			A	A				A
4501 Advanced Behavioral Neuroscience	BN	A	A	A	A	A	A	A												
4510 Cognitive Psychology Laboratory	CO	A	A	A	A	A	A	A		A			A	A	F	F				
4518 Attitudes	S	F,A	F,A	F	F,A	F,A	F	F	F		F	F				F	F	F		
4520 Social Psychology Laboratory	S	A		F,A	F,A	F,A	A	F,A	F,A	F,A		A	A	A		F,A	F,A	A	A	A
4532 Clinical Psychology Science	CL	A	A	A	A		A	A		F,A						A				A
4540 Counseling Psychology	CL	F,A	F,A	F	F	F	F		F	F	F,A	F			F	F				
4630 Attitudes and Persuasion	S	F,A	F,A	F,A	F,A	F	F	F,A	F			F	F,A		F	F	F	F		
4644 Hormones and Behavior	BN	A	A	A	A	A	A	A												
5250 Mood Disorders	CL	A	A	A	A	F	A	A	F					F	F					
5600 Psychobio. of Learning and Memory	BN	A	A	A	A	A			A	A	A									
5602 Behavioral Genetics	BN	A	A	A	A	F	F	A	A											
5606 High Level Vision	CO	A	A	F	A	F	A	A					A	A	F					
5614 Cognitive Neuroscience	CO	A	F	F	A	A	F	A	F	F			F	A	A			A	A	

5610 Emotion Regulation	CL	A	A	A	A	A	A	F	F	F			A		A	A				
5613H Biological Psychiatry	BN	A	A	A	A	A	A													
5615 Psychology of Language	CO				F	F	F	F	F	F			F							
5618 Computational Cog. Neuroscience	CO	A	A	A	F	F	F						F	A	F	F				
5621 Intro to Event-Related Potentials	CO	A	A	A	A	F	A	A		F	F	F	F	A	F	F			A	
5832 Lifespan Sociomoral Development	D	A	F		F	A							A							
5898 Seminar in Behavioral Neuroscience	BN	A	A	A	A	A	A	A	A					A	A					

IV. Elective Courses

Course	Area	K1	K2	K3	S1	S2	S3	S4	S5	E1	E2	E3	C1	C2	C3	P1	P2	P3	P4	P5
2301 Psychology of Extraordinary Beliefs	Q	F			A				F	F										
2303 Positive Psychology	CL	F		F	F	F	F	F		F	A	A	F		F	F	F			
2311 Psychology of Motivation	CO	A	A	F	F	F	F								F	F	F			
2333 Psychology of Human Sexuality	CL	A	F	F	F	F			F	F	A	A			F	F	F			
2350 Contemp. Developmental Psychology	D	F		F	F		F					F								
2376 Interpersonal Relationships	S	F,A		F,A	F	F		F	F		F				F	F		F	F	
2420 Psychology Applied to Sport		F		F,A	F,A	F			F	F	F				F	F			F	
2462 Psychology of Creativity							F,A				F	F		F	F	F,A				
3321(H) Quant. and Statistical Methods		F			A	F	F	F	F											
3371 Language and the Mind	CO	A	F		A	F		F	F		F		F	A	A	A	F	F	F	
3624 Primate Cognition		F	F		F	F				F										
4320 Psychological Science of Addiction		F	F	F			F													
4525 Psychology of Personal Security	S	A		F,A	F,A	F	F,A		F	F,A	F	F,A	F,A		F	F	F	F		
5425 Introduction to fMRI	CO	A		F,A	F,A	F	F,A			F,A	F	F,A	F,A		F	F	F	F		
5603 Stem Cells and the Brain	BN	A	A	A	A	A	A	A	A											
5612 Introduction to Cognitive Science	CO	A	A		F	F	F						F							
5620 Technology, Efficiency, and Happiness	CO	A	F	A	F	F	F	F				F	F	A		F				
5870 Neuroeconomics and Decision Neuroscience	D	F	F	A	A		F	F	F											
5891 Proseminar in Cognitive Science	CO	A	A	A	A	A	A	A		A			A	A	F					

5997 Developmental Cognitive Neuroscience	CO	A	A	A	A	A	A	A	A	A		A	A	A	A					
Experiential Elective Courses																				
3191 Internship in Psychology		F		F		F					A	F, A	F		A	F, A	F, A		A	F, A
3193.01 Individual Studies in Psychology		A				A														
3193.02 Individual Studies: Teaching		A	F,A	F,A	F,A	A	A	F	F	F	A	F, A	A	A	A	F, A	F	F, A	A	A
4998 Undergraduate Research		A			F,A	A	F, A	F,A		F,A					A					
4999.01(H) Thesis Research I			A		A	A	A	A		A	A		A	A		A	A	A		A
4999.02(H) Thesis Research II			A		A	A	A	A		A	A		A	A		A	A	A		A
5700 Science Education Outreach	D		A	A	A	A		A	A			A		A	A	A	A		A	