Developmental Cognitive Neuroscience 2023/2024

Instructors:

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Course	Developmental Cognitive Neuroscience
Department:	Faculty of Psychology
Language	English
Type of class:	classroom, 30 hours
Prerequisites	Basic knowledge of neuroanatomy and cognitive neuroscience. Passed classes: Introduction to cognitive neuroscience & Methods in neuroscience
Brief course description	 Infancy and early childhood is a period of most dramatic changes in brain organization. The majority of perceptual, motor and cognitive skills emerge during this period. A large proportion of our knowledge about the world is based on developmental achievements from this time. Throughout the course we will look at basic concepts and key studies in the area of Developmental Cognitive Neuroscience. That is, the study of associations between cognitive and brain development, with particular emphasis on changes in functional brain organization. The course introduces key concepts and ideas, as well as the most important research evidence in developmental cognitive neuroscience. Throughout the course we will try to answer the most important question in this area of research: 1. How does the brain specialise to perform specific functions? 2. What is the relationship between changes in brain activity and changes in the child's knowledge and skills? We will approach these questions by reviewing the principles of brain development, known theories and newest research findings.
Literature	Obligatory textbook in full: Johnson M. & de Haan M. (2015). Developmental Cognitive Neuroscience, 4th Ed. Oxford: Wiley. (available online for UW students at Dawsonera) + additional literature set for each class are listed in the full description box.

	TThe course introduces key concepts and ideas, as well as the most important research evidence in developmental cognitive neuroscience. Throughout the course we will try to answer the most important question in this area of research: 1. How does the brain specialise to perform specific functions?
	2. What is the relationship between changes in brain activity and changes in the child's knowledge and skills?We will approach these questions by reviewing the principles of brain development, known theories and newest research findings. We will then look at several domains of cognition and the development of their brain correlates. We will review few cases, where atypical biological constrains or atypical, adverse environment lead to atypical neurocognitive development of the child. Finally, we
	will create (in small groups) the research projects based on collected knowledge.
	Full list of topics with literature:
	1. Introduction, study designs in developmental cognitive neuroscience (M. Szmytke)
	2. Developmental change (M. Szmytke)
	Textbook, Chapter 1
Full description:	3. Research methods in developmental cognitive neuroscience (Z. Laudańska)
	Textbook, chapter 2
	4. Movement (Z. Laudańska)
	Adolph, K. E., & Hoch, J. E. (2019). Motor Development: Embodied, Embedded, Enculturated, and Enabling. <i>Annual Review of Psychology</i> , 70(1), 141–164. https://doi.org/10.1146/annurev-psych-010418-102836
	5. Object perception (M. Szmytke)
	Stahl & Feigenson, Observing the unexpected enhances infants' learning and exploration. <i>Science</i> 348 ,91-94(2015). DOI:10.1126/science.aaa3799
	6. Vison & Face processing (M. Szmytke)
	Johnson, M. H., Senju, A., & Tomalski, P. (2015). The two-process theory of face processing: Modifications based on two decades of data from infants and adults. Neuroscience & Biobehavioral Reviews, 50, 169–179. http://doi.org/10.1016/j.neubiorev.2014.10.009
	7. Early language (Z. Laudańska)

Oller, D. K., Ramsay, G., Bene, E., Long, H. L., & Griebel, U. (2021). Protophones, the precursors to speech, dominate the human infant vocal landscape. <i>Philosophical transactions of the Royal Society of London. Series B,</i> <i>Biological sciences</i> , 376(1836), 20200255. https://doi.org/10.1098/rstb.2020.0255
8. Early communication (Z. Laudańska)
Long, H. L., Ramsay, G., Griebel, U., Bene, E. R., Bowman, D. D., Burkhardt-Reed, M. M., & Oller, D. K. (2022). Perspectives on the origin of language: Infants vocalize most during independent vocal play but produce their most speech-like vocalizations during turn taking. <i>PloS one</i> , 17(12), e0279395. https://doi.org/10.1371/journal.pone.0279395
9 Research nlanning & analysis (M Szmytke)
Striano (2016) Doing developmental Research
A practical guide (The Guilford Press) Chapters 8-9
replaced galde (The Guillord Press), Chapters 6 9
10. Multisensory processing (M. Szmytke)
Lewkowicz, D. J. (2014). Early experience and multisensory perceptual narrowing. <i>Developmental psychobiology</i> , <i>56</i> (2), 292-315. https://doi.org/10.1002/dev.21197
11. Social brain (M. Szmytke) Blakemore, SJ., & Mills, K. L. (2014). Is adolescence a sensitive period for sociocultural processing? Annual Review of Psychology, 65, 187–207. http://doi.org/10.1146/annurev-psych-010213-115202
12. Atypical development (Z. Laudańska)
D'Souza, H., & Karmiloff-Smith, A. (2017). Neurodevelopmental disorders. <i>Wiley</i> <i>Interdisciplinary Reviews: Cognitive Science</i> , 8(1–2), 1–10. https://doi.org/10.1002/wcs.1398
13. Pregistration consultations (M. Szmytke & Z. Laudańska)
14. Early adverse environment (Z. Laudańska) & Preregistration submission deadline
Tomalski, P., & Johnson, M. H. (2010). The effects of early adversity on the adult and developing brain. <i>Current Opinion in Psychiatry</i> , 23(3), 233–8. http://doi.org/10.1097/YCO.0b013e3283387a8c

	Farah M.J. (2018). Socio-economic status and the brain: prospects for neuroscience-informed policy. <i>Nature Reviews Neuroscience</i> , 19(7), 428-438. Doi: 10.1038/s41583-018-0023-2.
	15. Student presentations (M. Szmytke & Z. Laudańska)
Teaching methods:	Short presentations by the lecturer; Group discussions; Small group activities. Independent study and questioning research methods and results; small group preregistration projects.
Learning outcomes	 After the course student will: know fundamental processes of structural and functional brain development know the complex relationships between biologically-driven mechanisms and experience-dependent processes know basic concepts related to neurocognitive development (experimental paradigms, research methods) be able to explain, using examples, the relationships between selected domains of cognitive development and changes in functional brain networks by using examples be able to explain atypical and abnormal development in terms of developmental trajectories of neural systems be able to communicate acquired knowledge of functional brain development in English be able to independently collate and critically evaluate original research papers in English from the area of developmental cognitive neuroscience
Assessment methods and assessment criteria:	Assessment criteria and attendance rules will be discussed in details on the first classes. Pre-registration written project (70%) Presentation of the pre-registration project (30%)
Notes:	Attendance: 2 unexcused absences are allowed. Students may submit short written work to make up for one additional missed classes. Students must respect the principles of academic integrity. Cheating and plagiarism (including copying work from other students, internet or other sources) are serious violations that are punishable and instructors are required to report all cases to the administration.