

# Dietsje Jolles, PhD

## Address of correspondence

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## Summary

I am an Assistant Professor at the Institute of Education and Child Studies, Universiteit Leiden and a 2019-2021 Jacobs Foundation Research Fellow. I am also a board member of the Leiden Institute for Brain and Cognition (LIBC) and a principal investigator in the sellSTEM Marie Skłodowska-Curie Innovative Training Network (2020-2024). In my work, I employ an interdisciplinary approach to study the complex interplay between learning and (neuro)cognitive development, integrating insights from developmental cognitive neuroscience, psychology, and the educational sciences. I also teach several (BA and MSc) courses in this domain, including 'Learning and Cognition' and 'Learning, Cognition, and the Brain'. I received my PhD from Leiden University in 2011 (advisors: Prof. Serge Rombouts, Prof. Eveline Crone, and Prof. Mark van Buchem), after which I spent 2,5 years at Stanford University with a Rubicon fellowship. From summer 2017 to spring 2019 I was a visiting research associate at the University of California in Los Angeles (UCLA).

## Employment

- 2014 (May) – present     **Assistant Professor**, Institute of Education and Child Studies, Leiden University (Netherlands) & Leiden Institute for Brain and Cognition
- 2017 (Aug) – 2019 (Mar)     **Research Associate**, Department of Psychology, UCLA (collaboration with Dr. Katherine Karlsgodt and Dr. Carrie Bearden)
- 2011 (Oct) – 2014 (Mar)     **Postdoctoral Fellow**, Department of Psychiatry and Behavioral Sciences, Stanford University Medical Centre (collaboration with Dr. Vinod Menon)
- 2011 (March – Sept)     **Lecturer**, Department of Developmental Psychology, Leiden University

## Education and Research Experience

- 2007 – 2011     **PhD, Developmental Cognitive Neuroscience**  
Graduation: 27 September 2011, Leiden University (Netherlands)  
Advisors: Prof. Serge Rombouts, Prof. Eveline Crone, and Prof. Mark van Buchem  
Dissertation: The Changing Brain: Neurocognitive Development and Training of Working Memory
- 2001 – 2006     **MSc, Psychology (Cum Laude)**  
University of Groningen (Netherlands)  
Major: Experimental Psychology, Minor: Neuro/ Biopsychology
- 2006     Research Internship; University of Cambridge (UK)
- 2005     Research Internship; BCN NeuroImaging Center, Groningen (Netherlands)

## Awards and Scholarships

- Pilot fund Science communication by scientists: Appreciated! (with members of the Brain & Education lab and Change Leiden, 2021)  
Amount: €10.000
- Local grant from the Institute of Education and Child Studies concerning our research related to the school closure during the COVID-19 pandemic (with Hinke Endedijk and Kim Stroet, 2020)  
Amount: €13.000
- Consortium member: Horizon 2020 Marie Skłodowska Curie Innovative Training Network, coordinated by Dr. Gavin Duffy from TU Dublin.  
Title: Enhancing spatial ability to help close the gender gap in STEM  
Amount: €265.619
- Jacobs Foundation Research Fellowship (2019-2021).  
Title: Teaching the young-adolescent brain: One size does not fit all  
Amount: CHF:150.000
- Netherlands Organization for Scientific Research (NWO), Rubicon Fellowship (2012-2014).  
Title: Examining brain network changes associated with cognitive training in children with and without learning disability  
Amount: €128.000
- Travel awards: Organization for Human Brain Mapping (2010), Travel grants for research internship at the University of Cambridge (2006): Marco Polo fonds; Nederlandse Vereniging voor Neuropsychologie; Groninger Universiteitsfonds.

## PhD Student (Co)Supervision

- Katinka Beker, Graduation: March 2, 2017  
Dissertation: Learning from Texts: Extending and Revising Knowledge.
- Amy de Bruïne, Anticipated graduation: 2022  
Dissertation topic: Passive and Strategic Processes during Reading Comprehension
- Chloe Oi Ying Leung, Anticipated graduation: 2025  
Dissertation topic: Training of Spatial Cognition and STEM Performance

## Teaching

- Learning and Cognition (second year BA), 2014 – 2021.
- The Learning Brain (third year BA), 2014 and 2016.
- Learning, Cognition, and the Brain (MSc), 2015 – 2021.
- Learning and Instruction (MSc), 2015 and 2016.
- Educational Innovations (MSc), 2018 – 2021.
- Developmental Cognitive Neuroscience (MSc), 2011.

In addition, I have supervised numerous Master's and Bachelor's students, majoring in Educational Sciences, Developmental Psychology, and Academic Teacher Training (Academische PABO).

## Conference Organization

September 2018, Berlin. Science of Learning: Convergence of educational and developmental cognitive neuroscience perspectives. Expert meeting (with Wouter van den Bos, Ben Eppinger, and Julia Rodriguez).

June 2009, Amsterdam. Challenges and Methods in Developmental Neuroimaging. International scientific symposium (with Eveline Crone, Sarah Durston, and Janna van Belle).

## Scientific Outreach

I am actively engaged in communicating science to the general public. A selection of projects is presented below:

- Online article for educators about translating neuroscientific findings to the classroom (2021): <https://didactiefonline.nl/blog/blonz/tweeluik-over-het-nut-van-kennis-over-hersenen-en-cognitie>
- Development of videoclip about 'braintraining' for BOLD blog (2020): <https://bold.expert/brain-training-an-attractive-idea-but-not-as-easy-as-it-seems> (collaboration with Jacobs Foundation, science communicators from Catta, and animators from Kurzgesagt)
- Article for Frontiers for Young Minds special issue: Want to Train Your Brain? Read This Article! <https://kids.frontiersin.org/articles/10.3389/frym.2020.00071> (with Linda van Leijenhorst, 2020)
- Lectures at schools and symposia for the general public (2008 – 2016)
- Development of material to encourage critical thinking and imagination abilities in elementary school children (2014 – 2015, with Jelle Jolles and Marleen van Tetering)
- Volunteer Innovation Lab, Children's Creativity Museum, San Francisco, CA (Sept 2013 – Mar 2014)
- Volunteer Science is Elementary, Mountain View, CA (Sept 2012 – June 2013)
- Development of high school science lessons about the adolescent brain (2011, with Eveline Crone and YoungWorks)
- Contributed to (first version of) website informing youth on brain development ([www.kijkinjebrein.nl](http://www.kijkinjebrein.nl); with Eveline Crone, Linda van Leijenhorst, and YoungWorks)
- Finalist of *The Battle of The Universities*, 2008 (representing Leiden University; with Eveline Crone and the Brain & Development lab)

## Board membership

- Board member, Leiden Institute for Brain and Cognition (2019 – present)
- Member of the admission committee for Leiden University's master's programs Educational Sciences and Applied Neuroscience in Human Development (2018 – present)
- Member of the education committee, evaluating the bachelor and master's programs at the Institute of Education and Child Studies at Leiden University (2014 – 2017)

## Reviewer for Scientific Journals

I frequently act as referee for scientific journals, notably: Brain Imaging and Behavior, Developmental Cognitive Neuroscience, Developmental Science, Cerebral Cortex, Cognitive and Behavioral Neuroscience, Frontiers in Human Neuroscience, Human Brain Mapping, Journal of Experimental Child Psychology, Journal of Neuroscience, Learning and Individual Differences, Molecular Psychiatry, NeuroImage, Social Cognitive and Affective Neuroscience

## Publications

My publications center around a number of key topics: Neurocognitive Development, Learning and Skill Acquisition, Individual Differences, Cognitive Training, Math Cognition, Reading Comprehension, Functional and Structural Brain Connectivity

### Journal articles

- De Bruïne, **Jolles, D.D.**, Van den Broek, P. (2021) Minding the Load or Loading the Mind: Manipulating Working Memory in Coherence Monitoring. *Journal of Memory and Language*, 118, 104212.
- Jolles, D.D.**, Mennigen, E., Gupta, M. W., Hegarty, C. E., Bearden, C. E., & Karlsgodt, K. H. (2020). Relationships between intrinsic functional connectivity, cognitive control, and reading achievement across development. *NeuroImage*, 221, 117202.
- van Moort, M. L., **Jolles, D.D.**, Koornneef, A., & van den Broek, P. (2020). What you read versus what you know: Neural correlates of accessing context information and background knowledge in constructing a mental representation during reading. *Journal of Experimental Psychology: General*, 149(11), 2084–2101.
- Mennigen, E., **Jolles, D. D.**, Hegarty, C. E., Gupta, M., Jalbrzikowski, M., Olde Loohuis, L. M., ... & Bearden, C. E. (2020). State-dependent functional dysconnectivity in youth with psychosis spectrum symptoms. *Schizophrenia Bulletin*, 46(2), 408-421.
- Hegarty, C. E., **Jolles, D.D.**, Mennigen, E., Jalbrzikowski, M., Bearden, C.E., & Karlsgodt, K.H. (2019). Disruptions in White Matter Maturation and Mediation of Cognitive Development in Youth on the Psychosis Spectrum. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* , 4(5), 423-433.
- Karlsson, J., **Jolles, D.**, Koornneef, A., van den Broek, P., & Van Leijenhorst, L. (2019). Individual differences in children's comprehension of temporal relations: Dissociable contributions of working memory capacity and working memory updating. *Journal of experimental child psychology*, 185, 1-18.
- Beker, K., van den Broek, P., & **Jolles, D.** (2019). Children's integration of information across texts: reading processes and knowledge representations. *Reading and Writing*, 32(3), 663-687.
- Rosenberg-Lee, M., Iuculano, T., Bae, S.R., Richardson, J., Qin, S., **Jolles, D.D.**, Menon, V. (2018) Short-term cognitive training recapitulates hippocampal functional changes associated with one year of longitudinal skill development. *Trends in Neuroscience and Education*, 10, 19-29.
- Jolles, D.**, Supekar, K., Richardson, J., Tenison, C., Ashkenazi, S., Rosenberg-Lee, M., ... & Menon, V. (2016). Reconfiguration of parietal circuits with cognitive tutoring in elementary school children. *Cortex*, 83, 231-245.
- Beker, K., **Jolles, D.D.**, Lorch Jr, R. F., & Van den Broek, P. (2016) Learning from texts: activation of information from previous texts during reading. *Reading and Writing*, 29(6), 1161-1178.

- Jolles, D.D.**, Ashkenazi, S., Kochalka, J., Evans, T., Richardson, J., Rosenberg-Lee, M., ... & Menon, V. (2016). Parietal hyper-connectivity, aberrant brain organization, and circuit-based biomarkers in children with mathematical disabilities. *Developmental science*, 19(4), 613-631.
- Jolles, D.D.**, Wassermann, D., Chokhani, R., Richardson, J., Tenison, C., Bammer, R., ... & Menon, V. (2015). Plasticity of left perisylvian white-matter tracts is associated with individual differences in math learning. *Brain Structure and Function*, 221(3), 1337-1351.
- Peters, S., **Jolles, D.D.**, Van Duijvenvoorde, A.C., Crone, E.A., & Peper, J.S. (2015). The link between testosterone and amygdala-orbitofrontal cortex connectivity in adolescent alcohol use. *Psychoneuroendocrinology*, 53, 117-126.
- Pannekoek, J.N., Werff, S.J.A., Meens, P.H., Bulk, B.G., **Jolles, D.D.**, Veer, I.M., ... & Vermeiren, R.R. (2014). Aberrant resting-state functional connectivity in limbic and salience networks in treatment-naive clinically depressed adolescents. *Journal of Child Psychology and Psychiatry*, 55(12), 1317-1327.
- Kleibeuker, S.W., Koolschijn, P.C.M.P., **Jolles, D.D.**, De Dreu, C.K.W., Crone, E.A. (2013). The neural coding of creative idea generation across adolescence and early adulthood. *Frontiers in Human Neuroscience*, 7.
- Supekar, K., Swigart, A., Tenison, C., **Jolles, D.D.**, Rosenberg-Lee, M., Fuchs, L., & Menon, V. (2013). Neural predictors of individual differences in response to math tutoring in primary-grade school children. *Proceedings of the National Academy of Sciences*, 110(20), 8230-8235. F1000 Evaluation
- Kleibeuker, S.W., Koolschijn, P.C.M.P., **Jolles, D.D.**, Schel, M.A., De Dreu, C.K.W., Crone, E.A. (2013). Prefrontal cortex involvement in creative problem solving in middle adolescence and adulthood. *Developmental Cognitive Neuroscience*, 5, 197-206.
- Jolles D.D.**, Van Buchem M.A., Crone, E.A., Rombouts, S.A.R.B. (2013). Functional brain connectivity at rest changes after working memory training. A study in adults and children. *Human Brain Mapping*, 34(2), 396-406.
- Jolles D.D.** & Crone, E.A. (2012). Training the developing brain: a neurocognitive perspective. *Frontiers in Human Neuroscience*, 6.
- Jolles D.D.**, Van Buchem M.A., Rombouts, S.A.R.B. & Crone, E.A. (2012). Practice effects in the developing brain: A pilot study. *Developmental Cognitive Neuroscience*, 2, S180-S191.
- Jolles D.D.**, Kleibeuker S.W., Rombouts S.A.R.B., Crone E.A. (2011). Developmental differences in prefrontal activation during working memory maintenance and manipulation for different memory loads. *Developmental Science*, 14(4), 713-724.
- Jolles D.D.**, van Buchem M.A., Crone E.A., Rombouts S.A.R.B. (2011). A comprehensive study of whole brain functional connectivity in children and young adults. *Cerebral Cortex*, 21(2), 385-391.
- Jolles D.D.**, Grol M.J., van Buchem M.A., Rombouts S.A.R.B., Crone E.A. (2010). Practice effects in the brain: changes in cerebral activation after working memory practice depend on task demands. *Neuroimage*, 52(2), 658-668.
- Owen A.M., Coleman M.R., Boly M., Davis M.H., Laureys S., **Jolles D.D.**, Pickard J.D. (2007). Response to comments on "Detecting awareness in the vegetative state". *Science*, 315(5816), 1221c-1221c.

### *Bookchapters*

- Beker, K., **Jolles, D.D.**, & Van den Broek, P. Meaningful learning from texts: The construction of knowledge representations. In J.A. León & I. Escudero (Eds). *Current Trends in Reading Research*. Amsterdam, Netherlands: John Benjamins.
- Van Leijenhorst, L., **Jolles, D.D.**, & Van den Broek, P. Onderwijspedagogiek in neurocognitief perspectief: De rol van de neurowetenschappen in onderwijzen en leren. In M.H. van IJzendoorn & H. de Frankrijker (Eds.), *Pedagogiek in beeld. Inleiding in de pedagogische studie van opvoeding, onderwijs en hulpverlening*. Bohn Stafleu Van Loghum. (Translation: "Educational Pedagogy in a Neurocognitive Perspective: The Role of Neuroscience in Teaching and Learning")

### *Articles under review*

- Jolles, J. & **Jolles, D.D.**, On neuroeducation: why and how to improve neuroscientific literacy in educational professionals
- Stroet, K., Endedijk, H., Van der Liende, M., Eijsink, T., Gijlers, H., & **Jolles, D.D.** Schoolsucces als de scholen dicht zijn? Een onderzoek naar de rol van ondersteuning door leerkrachten en ouders tijdens de coronacrisis (Translation: "School success when schools are closed? An investigation into the role of support by teachers and parents during the corona crisis")
- Van Tetering, M., Jolles, J. & **Jolles, D.D.**, Academic performance in early adolescence is associated with students' self-perceived executive functions
- Abreu-Mendoza, R.A., Pincus, M., Chamorro, Y., **Jolles, D.D.**, Matute, E., & Rosenberg-Lee, M. Parietal and hippocampal hyper-connectivity is associated with low math achievement in adolescence
- De Bruïne, **Jolles, D.D.**, Van den Broek, P. Modifying mental representations with causal explanations: Is updating an effortful endeavor or an automatic affair?

### *Invited presentations and conference talks (selection)*

- Can immaturity be adaptive? Developmental changes in the interaction between top-down control and experiential learning in a predictable task environment. Flash talk at the Virtual Flux Congress, 2021.
- The Changing Brain: Implications for Education?, Research Institute LEARN! Vrije Universiteit Amsterdam, 2020.
- Reconfiguration of large-scale brain circuits with math tutoring in elementary school children, Paepsy conference, Leipzig, Germany, 2019.
- Reconfiguration of brain circuits associated with cognitive and academic skill acquisition across development, Department of Psychiatry and Biobehavioral Sciences (laboratory of Prof. Carrie Bearden), University of California in Los Angeles, 2017
- Guest Lecture: The learning brain, De Nederlandse School, Doorn, Netherlands, 2016
- Guest Lecture: Working memory training: implications for education? Stanford University, 2015.
- Guest Lecture: Challenges and opportunities of the immature brain, Department of

Psychology, Leiden University, 2015.

- Guest Lecture: Reconfiguration of brain circuits associated with cognitive and academic skill acquisition in children, Max Planck Institute for Human Development, Berlin, 2014.
- Guest Lecture: Training the Mathematical Brain, Stanford University, 2013.
- Training-related changes in attention and memory circuits supporting the development of mathematical skills in children; European Association for Developmental Psychology, Lausanne, Switzerland, 2013.
- Math training strengthens intrinsic connectivity of parietal cortex in children; Society for Neuroscience, New Orleans, LA, USA, 2012.
- Math training changes intrinsic brain connectivity of the intraparietal sulcus; Department of Experimental Psychology, Oxford, UK, 2012.
- Math training changes intrinsic brain connectivity of the intraparietal sulcus; Special Interest Group 'Neuroscience and Education' of the European Association for Research on Learning and Instruction, London, UK, 2012.
- The Changing Brain: Neurocognitive development and training of working memory; NYU Child Study Center (laboratory of Prof. Xavier Castellanos), New York, USA, 2011.
- The Changing Brain: Neurocognitive development and training of working memory; Weill Medical College of Cornell University (laboratory of Prof. BJ Casey), New York, USA, 2011.
- Developmental differences in brain activation can be reduced after practice; Organization for Human Brain Mapping (OHBM), Barcelona, Spain, 2010.
- Guest Lecture: Cognitive Development and the Brain, University of Amsterdam, 2010.
- Plasticity of resting-state connectivity: Effects of age and practice; Endo-Neuro-Psycho Meeting, Doorwerth, Netherlands, 2009.
- Practice effects in the brain: Working memory training in adults and children; Workshop Challenges and Methods in Developmental Neuroimaging, Amsterdam, Netherlands, 2009.
- Guest Lecture: Working Memory: Development, Practice and Expertise, Experimental Psychological Research School, 2008.