

as executive function. For example, **Blair** provides an overview of a growing body of evidence indicating the importance of executive function abilities and related contributors to school readiness and early school success, which are in turn highly relevant to early educational programs for children, especially those in impoverished environments. **Shanmugan and Satterthwaite** extend the significance of executive function and facilitation of these skills into childhood and young adulthood, and how atypical development helps us understand typical developmental processes. **Ofen, Yu and Cheng** review literature on the development of working memory, another aspect of domain general functions, how this process is constrained by brain maturation, and how our understanding of its interaction with prior knowledge, strategies used and metacognitive abilities may inform educational practices. **Klingberg** takes a step further and discusses training of working memory in the context of brain development. He poses the hypothesis that training and development involve similar neuronal processes. Such commonality would have implications for both the interpretation of research results and practical implementation of training programmes. **Steinbeis and Crone** direct attention to the importance of understanding the development of various cognitive control processes throughout childhood and adolescence in determining individual differences in future-oriented and social decision making. Adequate training of appropriate cognitive control components is likely to have lifelong influence on both individual well-being and academic achievement.

Turning to motivational, affective and social processes important for educational practice, several papers address these issues in addition to the aforementioned papers by Chang and Beilock on math anxiety and Haft, Myers and Hoeft on socio-emotional resilience in dyslexia. **Howard-Jones and Jay** focus on understanding game based learning with efficient and child-friendly game-like classroom interventions based on recent insights regarding midbrain responses to reward. They discuss the relationship of reward and attention processes, clarify important differences in terminology and questions between traditional neuroscience and education approaches, and emphasize the importance of increasing the evidence base of current educational approaches. **Van Hoorn, Fuligni, Crone and Galvin** point to how peer influence plays a key role in health-compromising risky behaviors as well as positive psychosocial outcomes such as enhancement of learning and prosocial behavior in adolescence. The review highlights the significance of motivational and social circuitries in these processes, and how taking advantage of knowledge gained, in particular about prosocial behavior, may be a promising avenue to promote school-based instructions/interventions. **McRae** describes various types of emotion regulation and suggests that cognitive reappraisal may be the most useful type in practical settings such as in schools. **Martin and Oschner** provide a framework for the development of emotion regulation as a critical skill that can facilitate learning and improve educational outcome. They point to differential neurocognitive developmental trajectories associated with regulation of positive and negative emotions, and the importance of the role of social contexts. Further, they discuss how we may capitalize on understanding of regulation strategies to enhance positive emotions and help educators better scaffold and manage their classrooms for enhanced learning and successful student outcomes. **Sheridan and McLaughlin** propose a novel model that links exposure to adverse experiences to education success, and specify particular dimensions of experience such as decreased social stimulation or presence of threat, rather than the type of exposure such as poverty, in impacting neurodevelopmental processes. They suggest that such models are useful in generating testable hypotheses and pathways for specific intervention strategies, and may be particularly useful in considering educational achievement for disadvantaged children.

Finally, several papers cover a broad topic of fundamental principles underlying neurodevelopmental processes that may guide educational instruction and interventions. **Haartsen, Jones and Johnson** discuss difference in the time-course of the emergence of functional specialization that is regionally specific, and how complex bidirectional relationships between structure and function including neural oscillation may contribute to the substantial resilience and adaptation shown by the developing brain, which may in turn be helpful in understanding optimal interventions. **Goswami** points to the importance of understanding how relatively low level neural information coding and transmission processes originating in sensory systems may inform our understanding of higher level cognitive processes relevant for education. She suggests that a better understanding of neural oscillatory mechanisms can inform our knowledge about language development and developmental dyslexia, and that we need to address causal developmental mechanisms going beyond structure/function correlations. **Dumontheil** reviews major changes in brain structure and function during adolescence and how these may relate to behavior characteristic of adolescence. She suggests that specific aspects of adolescent brain development such as Adolescent-specific sub-cortical reactivity to emotions and rewards contrasted with their developing self-control skills, have important implications for training programmes targeting adolescent populations. **Cooper and Mackey** take a unique approach by comparing the role of brain plasticity on visual and cognitive interventions. They take advantage of decades of basic research on the development and treatment of developmental visual disorders, which they argue may help to inform how cognitive training approaches can be tailored for students who experience environmental disadvantages.

Together, recent transdisciplinary research in the areas we cover in this special issue will provide us with a fine-grained and at the same time, a macroscopic view of cognitive, affective and social constructs important for educational practice. Our hope is that such research, discussions and new integrative models will further our understanding of learning and teaching, and ultimately lead to enhanced educational practices.

BIOGRAPHY: 70-100 words

Fumiko Hoeft MD PhD.

Fumiko Hoeft is Director of brainLENS and Associate Professor of Psychiatry, Weill Institute for Neurosciences, and Dyslexia Center at UCSF. Hoeft's research program focuses on brain mechanisms underlying skill acquisition such as reading and how it intersects with domain general cognitive processes and motivation. She received her research training at Harvard, Caltech and Stanford in neurophysiology, and systems and developmental cognitive neurosciences. Recent honors include the IDA's 2014 Norman Geschwind Memorial Lectureship, and Learning and the Brain's 2015 Transforming Education through Neuroscience Award. Hoeft has published over 115 articles in journals such as the PNAS and the Journal of Neuroscience. Her work has been covered in media such as The New York Times, NPR, CNN, the New Yorker and Scientific American.