**Learning in development and education – a mechanistic understanding is needed**

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Childhood and adolescence is a time of learning. Being born with little more than the mere instincts, we rapidly evolve into sophisticated organisms that process information flexibly and highly accurately. Schooling successfully exploits this crucial time to provide a canonical set of skills and knowledge that helps us survive in today's complex society. Having evolved over centuries, today's educational curriculae comprise much wisdom of age-adequate instruction and teaching. However, the neural mechanisms that cause developmental changes in how we learn remain poorly understood.

Over the last years, we have learned a lot about how the brain changes during development [1–3]. We know that brain regions mature at different stages of development [3] and the neurotransmitters, such as dopamine, show characteristic developmental trajectories [4]. However, we are just starting to understand what these neurobiological changes imply for learning and how they can go wrong in developmental disorders.

Learning crucially depends on the neurotransmitter dopamine. Prediction error signals, essential teaching signals indicating the mismatch between expectation and feedback, are encoded by phasic dopamine [5] and impairments thereof lead to impaired learning and decision making [6,7]. It is thus crucial to understand how dopamine affects learning as a function of age. First studies indeed show that prediction error signals change during development and are related to different learning mechanisms [8–10]. The finding of an increased sensitivity to negative feedback in adolescence, as nicely shown by Dion & Restrepro in this issue, can not only help us understand why certain age-groups are particularly sensitive to negative feedback, but it can also help improving our school setting so that we can optimally support our children's learning.

Having a mechanistic understanding of learning also helps understanding disorders such as ADHD [11], which altered prediction error signals, and based thereon develop alternative reinforcement structures to optimally support the special needs of these children during schooling.

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