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Project: Working memory development and risk for psychopathology

Abstract: Working memory (WM) is a cognitive skill that allows people to store information over a brief period of time. Deficits in WM capacity are common in psychiatric disorders, such as attention deficit / hyperactivity disorder (ADHD) and schizophrenia. Furthermore, low WM capacity in children is a risk factor for psychopathology later in life, such as psychosis, depression and suicidal ideation. As such, increasing knowledge of brain mechanisms underlying typical WM development can shed additional light on atypical development and guide initiatives to predict and remediate problem behavior.

The goal of my project is to examine the effects of genes previously associated with psychiatric disorders on brain measures and how these relate to WM capacity and behavioral symptoms. In particular, I will be focusing on effects of polymorphisms in genes related to the dopamine system. Dopamine is a neurotransmitter in the brain that is crucially important for optimal WM capacity and dysregulation of the dopamine system commonly leads to psychopathological symptoms.

Follow-up data (genetic, cognitive, magnetic resonance imaging and behavioral) of a healthy population sample (6-25 years) will be analyzed using standardized WM protocols and state-of-the-art methods for imaging and genotyping. In addition, I will investigate whether evidence-based WM training can help reduce (sub-) clinical psychopathological symptoms in individuals with observed attention deficits.

Career Plan: As a postdoctoral researcher my main aim is to become an independent researcher within the field of developmental cognitive neuroscience. The focus of my work will be on underlying neurobiological and cognitive mechanisms of vulnerability for psychopathology in children and adolescents. Ultimately, this type of work can lead to improved prediction and intervention procedures to prevent development of psychopathology. To achieve this, I will use the Marie Curie COFAS fellowship to improve my research skills and further my knowledge in the fields of molecular genetics, neuroimaging, biostatistics and cognitive training interventions.

During the fellowship my goal is to diversify and enhance my skills in image processing. Through attending relevant courses and workshops I will learn more about different methodologies in genetics, statistics and their optimal use for interpreting neuroimaging data. I also plan to gain experience in facets of international research collaborations, such as data-sharing, international research guidelines and networking. Together these training goals will add to my existing research skills and enhance my academic competence. It is expected that our efforts will lead to multiple high-profile publications in peer-reviewed journals.