Project Details	
Project Code	MRCNMH26Ca Gruber
Title	How ADHD affects curiosity and curiosity-based learning
Research Theme	NMH
Project Type	The project will combine behavioural and neuroimaging studies (in particular, functional Magnetic Resonance Imaging, fMRI) in human participants.
Summary	This PhD project explores how curiosity shapes learning in ADHD. While ADHD is linked to attention and learning challenges, it also involves curiosity-related strengths like novelty seeking and creativity. The student will examine how different types of curiosity relate to ADHD behaviours and learning, using behavioural and fMRI experiments at Cardiff University's imaging centre CUBRIC. Supervision will be provided by experts in curiosity neuroscience (Gruber, Cardiff), novelty seeking (Gocłowska, Bath), and ADHD (Langley, Cardiff), offering a unique interdisciplinary opportunity across two GW4 universities.
Description	This PhD project will investigate the role of curiosity in Attention Deficit Hyperactivity Disorder (ADHD). Over the last decade, the nascent interdisciplinary research field of curiosity has shown that curiosity enhances attention, learning and memory. Curiosity has also been characterised as the third pillar of academic performance (Von Stumm et al., 2011), suggesting that cultivating curiosity can support learning in the face of challenges in other areas (e.g., information processing, motivation). This has important ramifications for individuals with ADHD. On the one hand, ADHD is accompanied by attention and learning challenges; on the other hand, ADHD is linked to novelty seeking (Gocłowska et al., 2019) and creativity (Taylor et al., 2025), strengths that are likely to be linked with curiosity. However, despite these positive associations, without direct evidence of how curiosity is associated with and works in individuals with ADHD, the benefits of curiosity are difficult to harness. To understand this, the proposed PhD project will examine whether curiosity is a correlate of ADHD, and whether it can enhance learning and memory in individuals with ADHD. In the first step, the proposed PhD project will offer the opportunity to characterise the relationship between ADHD behaviours, and different types of trait curiosity (e.g., diversive joyous exploration curiosity vs. specific deprivation-based curiosity), and whether any types of curiosity are potentially related to already well-characterised symptoms of ADHD (e.g., inattention, hyperfocus, impulsivity). For example, it has been proposed that curiosity and impulsivity (a key dimension of ADHD) overlap strongly in terms of shared cognitive and neural mechanisms, suggesting that attempting to dissociate curiosity and impulsivity in ADHD might be a fruitful research direction (Marvin et al., 2020). In addition, preliminary findings from our group have shown that novelty seeking (which is associated with ADHD) overlaps with curiosity. These initial ideas and findings provide a promising starting point for the student to develop studies for a more thorough characterisation of curiosity in ADHD, and importantly, how trait and state curiosity affect learning and memory in people with ADHD.

	In particular, the PhD project offers the opportunity to investigate how states of curiosity (i.e., momentary fluctuations in curiosity) impact learning and memory in individuals with ADHD compared to controls. The role of curiosity-based learning in ADHD could be investigated via established experimental paradigms such as trivia paradigms (Gruber et al., 2014), curiosity-exploration paradigms (Cen et al., 2024), novelty seeking manipulations (Gocłowska et al., 2019), or interest in different types of imagery (Gocłowska et al., 2017). Additionally, to specifically target the potentially unique processes associated with curiosity in ADHD, the PhD candidate will have the opportunity to modify existing experimental paradigms or to develop a new experimental paradigm. During their PhD, the candidate will have the opportunity to investigate the neural mechanisms underlying curiosity in ADHD via functional Magnetic Resonance Imaging (fMRI) at the Cardiff University Brain Research Imaging Centre (CUBRIC). This could be achieved via currently collected fMRI data on curiosity-based learning in healthy children and adolescents, in whom ADHD behaviours will also be assessed. In addition, CUBRIC offers 50 hours of MRI scanning to PhD candidates that could be used for collecting a new dataset investigating the neural mechanisms of curiosity in people with ADHD. The student will have independence, supported by the supervisors, to make these decisions. In conclusion, this PhD project provides the opportunity to investigate a previously unexplored area of research with potential long-term applications. The prospective candidate will be supervised by experts in the neuroscience of curiosity (Gruber, Cardiff University), novelty seeking (Gocłowska, University of Bath) and ADHD (Langley, Cardiff University). This supervisory team includes a unique combination of expertise and research interests to optimally support this PhD project across two GW4 universities. Candidate Requirements: The ideal PhD candidate would have an interest in learning and memory, especially how that is relevant to groups such as those with ADHD. They would also have extensive knowledge and practical experience with advanced statistical packages such as R or similar, and should display an enthusiasm for working with complex technologies such as fMRI and other brain imaging modalities. Experience in collecting and analysing fMRI data, or neuroimaging data more generally, is desirable. Informal inquiries can be made via email to the lead supervisor, Dr Matthias Gruber (GruberM@cardiff.ac.uk) and co-supervisors Dr Gosia Goclowska (mag86@bath.ac.uk), Dr Kate Langley (LangleyK@cardiff.ac.uk).

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