Project Details	
Project Code	MRC21PHCa Langley
Title	Understanding the health implications of using different definitions of attention deficit hyperactivity disorder (ADHD)
Research Theme	Population Health
Summary	Attention deficit hyperactivity disorder (ADHD) can be defined as a categorical diagnosis or as a continuous trait. Although these definitions are related, we need to better understand how they differ. This PhD will investigate the differences in developmental and clinical outcomes, as well as genetic risk factors in children with ADHD using different definitions.
Description	Attention deficit hyperactivity disorder (ADHD) is one of the most common childhood disorders and is associated with life-long adverse social, educational, and health outcomes, including criminality, unemployment, and premature mortality (e.g. from accidents and suicide) (1). ADHD increases an individual's risk for other neurodevelopmental problems (e.g. autism), co-occurring mental health difficulties such as anxiety and depression, as well as poor educational outcomes (2). Whilst clinically ADHD is defined categorically, evidence suggests that ADHD can also be defined as a continuous trait and that individuals who do not meet diagnostic criteria can still have difficulties due to their ADHD symptoms (3). Understanding how best to define ADHD is very important for supporting children with ADHD and their families. This research project also provides a unique opportunity for a PhD student to develop a highly specialised skillset and to benefit from the expertise of researchers across the fields of psychiatry, psychology, and genetic epidemiology. One essential insight we have for understanding more about ADHD is that it is a heritable brain-based neurodevelopmental disorder, with thousands of genetic risk variants implicated (2). Genetic studies indicate that different definitions of ADHD (i.e. categorical diagnosis or continuous trait) share genetic risk (4,5). However, these definitions are intuitively very different (with categorical diagnoses used for making decisions about treatment and support, while traits are more typically considered for research) and understanding the nature of these differences is important both aetiologically and for clinical practice. ADHD constitutes 18 behavioural symptoms and impairment of functioning, with specific cut-points for diagnosis. There is heterogeneity in the presentation of ADHD, in terms of symptom constellation and level of impairment. However, there is limited research examining how this heterogeneity affects children's long-term mental health, educational outcomes and genetic risk profiles. Understanding these issues better is important for tailoring support, even in the absence of a strict clinical diagnosis. The aims of this proposal are as follows: 1. Examine the impact of different definitions of ADHD (based on symptom constellations and impairment) in children from the general population, on co-occurring developmental difficulties (autistic symptoms, motor difficulties, and learning difficulties) and longer-term outcomes (persistence of ADHD symptoms, later anxiety, depression, substance misuse, and educational success). Sex differences will also be examined. 2. Compare these groups in terms of their genetic risk profiles (for ADHD and other major

	psychiatric disorders) and examine how these genetic risks relate to the measurement of ADHD symptom impairment. 3. Take forward findings from the above studies to further examine how variability in degree of impairment impacts on outcomes and whether genetic risks are associated with degree of impairment in a clinical sample of children with ADHD. Data from the Avon Longitudinal Study of Parents and Children (ALSPAC), a general population sample of children, will be used to address aims 1 & 2 and data from the Study of ADHD, Genes & Environment (SAGE), a genotyped clinical sample of children with ADHD, will be used to address aim 3. Additional data from another UK general population study, the Millennium Cohort Study, and a Swedish population sample, the Child & Adolescent Twin Study in Sweden (CATSS), will be used for replication of aims 1 & 2. References: 1. Polanczyk et al (2014); PMID: 24464188. 2. Thapar et al (2013); PMID: 22963644. 3. Martin et al (2018); PMID: 29198204. 4. Demontis et al (2019); PMID: 30478444. 5. Stergiakouli et al (2015); PMID: 25791149.
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