INTERNSHIP PROPOSAL MASTER 2, année 2025–2026

Supervisor Name (s): Dr Xavier BENAROUS

Institution / Organization: INSERM U1136, Institut Pierre Louis d'Épidémiologie et de Santé Publique, Équipe Épidémiologie Sociale, Santé Mentale et Addictions (ESSMA)

Professional address: 27 rue Chaligny, 75571 Paris Cedex 12

Phone number: 01 85 56 02 42

E-mail address: xavier.benarous@aphp.fr

Duration: 6-9 mois

The internship will be located in (city, country):: Equipe ESSMA, 27 rue Chaligny, 75571 Paris Cedex 12

Description of the internship topic

Internalising symptoms in youths with traits of neurodevelopmental difficulties using the ELFE cohort data : risk factors and gender-effect

Background:

Neurodevelopmental difficulties include difficulties in the emergence of at least one of the dimensions of development, namely cognitive, motor, communication skills, social interactions and academic learning. Alongside categorical approaches (such as in the DSM-5 or ICD-11) which distinguish different clinical entities according to the domain of development impacted, neurodevelopmental difficulties can be conceptualized in the form of a dimension with a gradient ranging from normal functioning to severe difficulties associated with a marked impact (Thapar 2017). Such dimensional approach also makes it possible to better understand the association between difficulties in several developmental domains (Astle 2022).

Young people with neurodevelopmental difficulties are at risk of exhibiting anxiety or depressive symptoms (Riglin 2021, Hollo 2014), which can be grouped into the category of internalising symptoms. The occurrence of internalising symptoms contributes to the functional impact of these young people, with in particular a higher risk of exhibiting behavioral problems (e.g., aggressive behavior, rage crisis, regressive behavior) which can increase isolation and rejection (Benarous 2023). Despite the existence of appropriate treatments for internalising symptoms in young people with neurodevelopmental difficulties (Morin 2010, Menezes 2020), these disorders remain poorly identified (Benarous 2024, Young 2025).

To date, few studies have examined the influence of neurodevelopmental difficulties on the risk of developing internalising symptoms using a dimensional perspective (i.e., by jointly examining different developmental domains). In an analysis of the National Child Development Study cohort, Addicoat et al. (2020) showed that a latent variable "ND" factor demonstrated associations with mood problems at each adult follow-up (23, 33, 42, and 50 years), but the assessment of mood problems lacked specificity and corresponded to a positive response to a self-report item relating to psychological distress. Farhat et al. (2023) showed, through the analysis of two English birth cohorts, that the association between neurodevelopmental traits and depressive symptoms in adolescents was partly mediated by environmental stressors (peer relation problem, academic failure). The existence of detailed measures on child' development, emotional problems, and comprehensive family and social features in the ELFE cohort represents an opportunity to address these research questions.

Objectives : The objective of this epidemiological study is
(1) to confirm the importance of non-specific risk factors for internalizing symptoms (such as peer relation problems), but also of risk factors more specific to neurodevelopmental difficulties, such as the presence of associated somatic illness or physical pain (Maiano 2018, Whitney 2019).
(2) to identify the nature of neurodevelopmental difficulties most strongly associated with a risk of developing internalizing symptoms: taking into account (i) the overall severity of neurodevelopmental difficulties, (ii) the neurodevelopmental domains involved, and (iii) their multidimensional nature.
(3) to identify the moderating effect of gender on these relationships.

Methods: In this study, we use the ELFE birth cohort to examine internalising symptoms developed by children with neurodevelopmental difficulties. Neurodevelopmental difficulties are measured using the Child

Development Inventories (CDI) at 1 year of age, which includes 8 dimensions: social, autonomy, gross motor skills, fine motor skills, expressive language, comprehensive language, and general development score. The main outcome is the "internalized symptoms" score of the Strengths & Difficulties Questionnaire (SDQ) at 5.5 years, which includes the score on the "emotional difficulties" and "relationship problems" subscales.

Activities to be conducted:
- Bibliographic research in international bibliographic databases and development of a conceptual framework to organize reflection, analysis and writing.
- Writing a data analysis plan
- Management and analysis of the ELFE data (including variable construction, identification of relevant covariates, handling of missing data)
- Implementation of univariate / multivariate analyzes and mediation analyses necessary to achieve the above objectives
- Writing of the dissertation according to the modalities defined by the university

A scientific publication of the results is possible.

Requested Competences/qualities:
- Capacity to work independently, sense of organization
- Familiarity with statistical analysis in R (or equivalent statistical software)
- Knowledge of basis statistical modelling, and affinity with/interest in applying more complex methods
- Good knowledge of English

Selected literature
- Benarous X, Walesa S, Guilé JM, Cravero C, Consoli A, Cohen D, Young H, Labelle R, Lahaye H. A systematic review of the psychometric properties of tools for measuring depression in youths with intellectual disability. Eur Child Adolesc Psychiatry. 2024 Dec;33(12):4061-4082. doi: 10.1007/s00787-024-02405-x. Epub 2024 Mar 20. PMID: 38509427.
- Young H, Lahaye H, Guilé JM, Cravero C, Consoli A, Cohen D, Labelle R, Benarous X. Psychometric Properties of Measuring Tools for Depression in Autistic Youths: A Systematic Review. J Autism Dev Disord. 2025 Aug 20. doi: 10.1007/s10803-025-07008-2. Epub ahead of print. PMID: 40833659.
- Morin D, Cobigo V, Rivard M, Lépine M (2010) Intellectual Disabilities and Depression: How to Adapt Psychological Assessment and Intervention. Canadian Psychology 51:185-193
- Menezes, M., C. Harkins, M.F. Robinson, M.O. Mazurek (2020). Treatment of Depression in Individuals with Autism Spectrum Disorder: A Systematic Review. Research in Autism Spectrum Disorders 78, 101639 doi:https://doi.org/10.1016/j.rasd.2020.101639
- Riglin L, Leppert B, Dardani C, Thapar AK, Rice F, O'Donovan MC et al (2021) ADHD and depression: investigating a causal explanation. Psychol Med 51(11):1890–1897
- Hollo A, Wehby JH, Oliver RM (2014) Unidentified Language deficits in children with emotional and behavioral disorders: a Meta-analysis. Except Child 80(2):169–186
- Benarous X, Guilé JM, Consoli A (2023) Letter to the editors: an interactive model to understand the vulnerability to emotional disorders in youths with neurodevelopmental disorders-a triple jeopardy? Eur Child Adolesc Psychiatry
- Maïano C, Coutu S, Tracey D, Bouchard S, Lepage G, Morin AJS, Moullec G. Prevalence of anxiety and depressive disorders among youth with intellectual disabilities: A systematic review and meta-analysis. J Affect Disord. 2018 Aug 15;236:230-242. doi: 10.1016/j.jad.2018.04.029. Epub 2018 Apr 6. PMID: 29751238.
- Whitney et al. Factors associated with depression and anxiety in children with intellectual disabilities. J Intellect Disabil Res. 2019 May ; 63(5): 408–417. doi:10.1111/jir.12583.
- Addicoat A, Thapar AK, Riglin L, Thapar A, Collishaw S (2020) Adult mood problems in children with neurodevelopmental problems: evidence from a prospective birth cohort followed to age 50. Soc Psychiatry Psychiatr Epidemiol 55(3):351–358
- Farhat LC, Blakey R, Davey Smith G, Fujita A, Shephard E, Stergiakouli E et al (2023) Networks of neurodevelopmental traits, Socioenvironmental Factors, emotional dysregulation in Childhood, and Depressive Symptoms across Development in Two U.K. cohorts. Am J Psychiatry 180(10):755–765