

## Concept Paper Amendment

**Paper Title:** Unravelling the contribution of complex trauma to psychopathology and cognitive deficits: a cohort study\*

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\*Note that the provisional paper title in the original concept paper was "Psychopathology in young people exposed to complex trauma"

### Changes to Study:

1. In addition to studying links between complex trauma and psychopathology as outlined in the original concept paper, we also investigated the links between complex trauma and cognitive deficits at age 18. We opted to include cognition in this study for three reasons. First, impaired cognition is an important aspect of clinical presentations, which is reflected in the poor functional outcomes of people with cognitive deficits.<sup>1,2</sup> Second, preliminary evidence suggests that complex trauma may be associated with cognitive deficits, though this requires further investigation. Only one study has directly tested this association, and this study found that young people exposed to complex trauma had poorer executive function (the only cognitive domain assessed) compared to those exposed to non-complex trauma and no trauma.<sup>3</sup> Additionally, studies of exposures that resemble complex trauma (e.g. child/adolescent victimization or adverse childhood experiences) have consistently found that these exposures are associated with broad cognitive deficits.<sup>4</sup> However, because these exposure constructs only partially overlap with complex trauma, it cannot be assumed that these findings necessarily apply to complex trauma. Therefore, further investigation of complex trauma and cognitive deficits is needed to better understand this topic. Third, considering both psychopathology and cognitive deficits in the same study enables us to capture broad clinical presentations linked with complex trauma, and allows us to compare these different aspects of presentations.
2. In addition to studying the origins of psychopathology linked with complex trauma as outlined in the original concept paper, we also investigated the origins of cognitive deficits linked with complex trauma. To do this we tested whether early childhood vulnerabilities (including cognitive deficits) accounted for the associations between later complex trauma exposure and cognitive deficits at age 18, by including these vulnerabilities as covariates in regression models and comparing the results with those from unadjusted models. We also studied this topic using twin-difference analyses. Although previous studies of victimization have considered the origins of associated cognitive deficits,<sup>5</sup> no previous studies of complex trauma have investigated the origins related cognitive deficits.
3. We chose not to use structural equation modelling to test differences in the structure of psychopathology between groups exposed to complex trauma, non-complex trauma, and no trauma, due to concerns that we may not have adequate power to undertake these analyses. Instead we used confirmatory factor analysis to derive dimensional measures of psychopathology based on data from the total sample,<sup>6</sup> and tested for group differences in these dimensional scores. These findings are also likely to be easier for our readers to interpret and consider with regard to implications for clinical practice.

## References:

- 1 Deary IJ, Whiteman MC, Starr JM, Whalley LJ, Fox HC. The impact of childhood intelligence on later life: following up the Scottish Mental Surveys of 1932 and 1947. *J Pers Soc Psychol* 2004; **86**: 130–47.
- 2 Schmidt FL, Hunter J. General mental ability in the world of work: occupational attainment and job performance. *J Pers Soc Psychol* 2004; **86**: 162–73.
- 3 op den Kelder R, Ensink JBM, Overbeek G, Maric M, Lindauer RJL. Executive function as a mediator in the link between single or complex trauma and posttraumatic stress in children and adolescents. *Qual Life Res* 2017; **26**: 1687–96.
- 4 Pechtel P, Pizzagalli DA. Effects of early life stress on cognitive and affective function: an integrated review of human literature. *Psychopharmacology (Berl)* 2011; **214**: 55–70.
- 5 Danese A, Moffitt TE, Arseneault L, *et al.* The origins of cognitive deficits in victimized children: implications for neuroscientists and clinicians. *Am J Psychiatry* 2017; **174**: 349–61.
- 6 Schaefer JD, Moffitt TE, Arseneault L, *et al.* Adolescent victimization and early-adult psychopathology: approaching causal inference using a longitudinal twin study to rule out noncausal explanations. *Clin Psychol Sci* 2018; **6**: 352–71.