PREreview Journal Club (UCL Great Ormond Street Institute of Child Health)

Laura Kischkel[1], Sophie Adler-Wagstyl[1], and Maria Eriksson[1]

[1]University College London

January 18, 2019

[Child Growth Predicts Brain Functional Connectivity and Future Cognitive Outcomes in Urban Bangladeshi Children Exposed to Early Adversities]

PREreview Guidelines

Overview and take-home messages:

The authors propose a potential mediating effect of neural connectivity on the link between growth stunting and cognitive outcome in two Bangladeshi cohorts assessed during infancy and toddlerhood, respectively. Neuroimaging evidence from low- and middle-income countries is extremely scarce and so this data set holds great value to better understand the important issue of suboptimal developmental outcomes of children in low- and middle-income countries.

Positive feedback:

Neuroimaging evidence from low- and middle-income countries is extremely scarce and so this data set holds great value to better understand the important issue of suboptimal developmental outcomes of children in low- and middle-income countries. The data are of particular value as they were collected in very young age groups, which are of great relevance in the field in context of early identification and intervention.

Major concerns:

In reviewing the manuscript, we had some questions to the authors and some concerns that in our opinion need to be addressed prior to publication of this work.

1. The authors examine the link between growth and cognitive outcome, however growth is defined cross-sectionally as growth status at Time 1 only. Could growth be assessed more longitudinally, within each the infant and the toddler cohort, say by looking at a percentile change from Time 1 to Time 2? Many factors in participants' environments could have led them to either show a 'catch -up' effect or contrarily exhibit stunting or wasting between the time of the anthropometric measures and the age at which cognitive outcome is assessed.

2. Can the authors comment on the fact that although participants in both the infant and the toddler cohort were tested twice, EEG connectivity and growth were only measured at T1 and cognitive outcome at T2? A change in connectivity corresponding to a change in say z score of both growth and cognitive score would be more compelling?

3. Could the authors expand on their motivation for the chosen growth indicators in context of undernutrition, and not others commonly used such as mid-upper arm circumference? In relation to this, could the authors have taken into account other factors impacting growth (in particular parental height)?

4. Methodological concerns with cognitive outcome measures: did authors encounter any difficulties employing these in this Bangladeshi cohort and were any adaptations made to make them appropriate for use in this context?

5. In the methods section - could the authors expand on the explanation of mediation analyses and how they were conducted, i.e. how multiple comparisons were corrected for? It is currently difficult to critically appraise this models without more details.

Minor concerns:

1. Could the authors expand on the their interpretation of the differential activity within certain frequency bands and what this could mean for cognitive functioning in specific domains? It might also be useful to the reader to mention how the frequency bands change across development (as they define the Hz range of the bands differently according to age group). Finally, and this might be not be the main goal of the presented analysis, but do the authors have any thoughts on whether differential associations between the examined frequency bands could be pulled out if they were to examine subscales of Mullen/WPPSI as opposed to a composite score/full scale IQ.

2. Information on data processing and source analysis methods is missing from pre-print, so cannot be commented on. We trust that additional information is provided there regarding:

- Participant characteristics and demographics, including recruitment procedures
- Data quality in terms of retained/assessed for both cognitive and EEG assessment

p3 'children's brain and development cognitive functions' 'developing/development of cognitive functions'

p3 'behaivoral' 'behavioral'

p3 'refect' 'reflect'

p5 'Scalre' 'Scale'

p7 acronyms CFI, SRMR and RMSEA are not previously defined in the manuscript

p9 'Servey' 'Survey'