Scalable TRansdiagnostic Early Assessment of Mental health (STREAM)

University of Reading

CENTRE for AUTISM

Nicholas Thompson | Elin Williams | Bhismadev Chakrabarti | The STREAM Consortium*
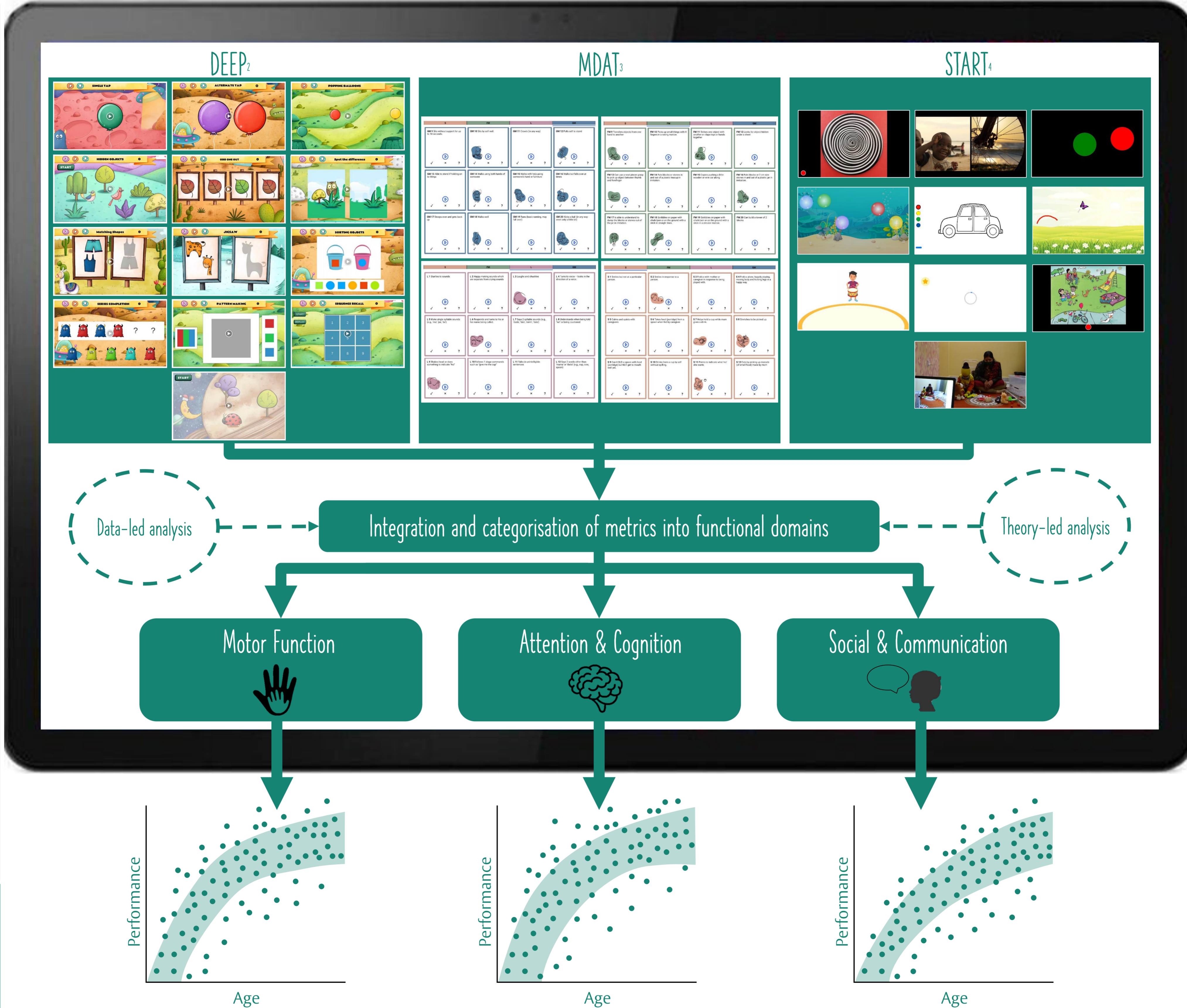
Background & Aims

- It is estimated that 95% (50.2 million) of children with developmental disabilities reside in low/middle-income countries[1]

- Difficulties with early detection may stop these children attaining their true developmental potential. Challenges include:
  - Scarcity of skilled professionals
  - Skewed to urban, often private, clinics
  - Reliance on time-intensive, specialist-dependent, proprietary assessment tools

- It is crucial to develop tools to assess neurodevelopmental status that:
  - Can be administered in the field by non-specialist workers (NSWs)
  - Are applicable across diverse cultural settings

Methods

- STREAM is developing and validating an open-source tablet-based app to assess the neurodevelopmental status of children aged 0-6 years and identify those at-risk of NDDs

- STREAM is an interdisciplinary collaboration between 9 institutions across 4 countries and includes:
  - Psychologists & neuroscientists
  - Paediatricians
  - Computer scientists
  - Statisticians
  - Public health researchers

- Through consensus workshops and iterative pilot testing, STREAM has adapted 3 child development tools into a unified platform

References

1. Olusanya et al. (2018). Developmental disabilities among children younger than 5 years in 195 countries and territories, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Glob Health, 6(10).
2. Mukherjee et al. (2020). Proof of Concept of a Gamified DEvelopmental Assessment on an E-Platform (DEEP) Tool to Measure Cognitive Development in Rural Indian Preschool Children. Frontiers in Psychology, 11: 1202.
3. Gladstone et al. (2010). The Malawi Developmental Assessment Tool (MDAT): The Creation, Validation, and Reliability of a Tool to Assess Child Development in Rural African Settings. Plos Medicine, 7(5).
4. Dubey et al. (2022). Quantifying preference for social stimuli in young children using two tasks on a mobile platform. PLoS ONE, 17(6).

DEEP[2]   MDAT[3]   START[4]

Data-led analysis → Integration and categorisation of metrics into functional domains ← Theory-led analysis

Motor Function | Attention & Cognition | Social & Communication

Performance vs Age (three plots)

Results

- The STREAM frontend app includes:
  - Gamified tasks
  - Observational and parent-report assessments
  - Audio & video recording functionality
  - Flexible survey engine

- STREAM measures 3 domains of functioning:
  - Motor function
  - Attention & cognition
  - Social & communication

- The STREAM backend includes:
  - Secure server for storage/management of data
  - Various levels of access for control over data
  - Intuitive content management system for app

Discussion

- STREAM is being tested on N=4000 children from community and 'at-risk' samples in India and Malawi

- Sample collected to date is > N = 2000, with an overall mean completion rate of 97%

- The working STREAM app has proven to be:
  - Easy to use offline in the field by NSWs
  - Feasible & acceptable
  - Culturally agnostic

- The STREAM app metrics will be:
  - Validated against a gold-standard measure of child development (the GMDS)
  - Assessed in their ability to highlight the role of risk factors known to impact development

Affiliation and contact

Email: n.thompson@reading.ac.uk

Centre for Autism, School of Psychology and Clinical Language Sciences, University of Reading, RG6 6ES

*The STREAM Consortium includes: Melissa Gladstone, Emmie Mbale, Vikram Patel, Gauri Divan, Supriya Bhavnani, Sharat Chandran, Gareth McCray, Debarati Mukherjee, Matthew Belmonte, Sheffali Gulati, Mark Johnson, Emily Jones, Teresa Del Bianco, Maria Crespo-Llado, Diksha Gajria, Vukiwe Ngoma, Chisomo Namathanga, Georgia Lockwood Estrin, Alok Ranjan, Innocent Mpakiza, Richard Nkhata, Anindita Singh, Naina Midha.

University of Reading | Keele University | University of Liverpool | Sangath | Birkbeck University of London | University of Malawi | University of Cambridge | Harvard University | MRC Medical Research Council | GCRF