Predicting Literacy in the Brain in Emergent Readers in Rural Côte d'Ivoire
A Longitudinal Study

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INTRODUCTION

Over 90% of developmental neuroscience is carried out in WEIRD Minority World contexts[1], with little understanding of developmental trajectories in Majority World contexts.

In rural communities in Côte d'Ivoire, adult literacy rates are below 50%[2], and the poverty rate is over 60%[3]. Ivorian children typically speak one of 60+ Ivorian languages as their mother tongue, but literacy is acquired in L2 French.

RQ1: How does the neurological footprint of print processing predict literacy two years later?

Children in Côte d'Ivoire begin school at a broad range of ages, and so are exposed to literacy for the first time at a broad range of ages, which impacts the way writing is processed[4,5].

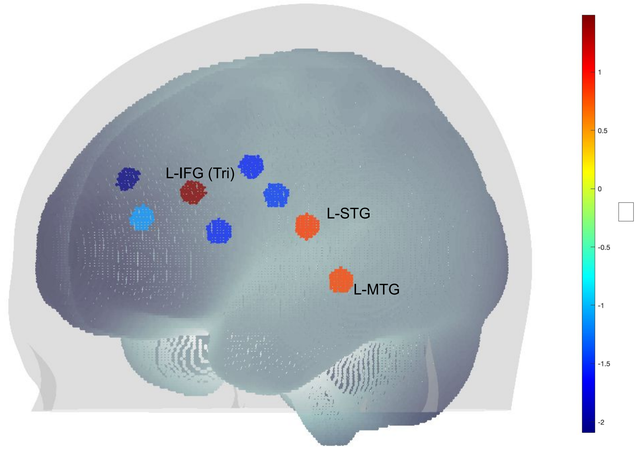
RQ2: How does the age of first exposure to literacy impact print processing in the brain?

METHODS

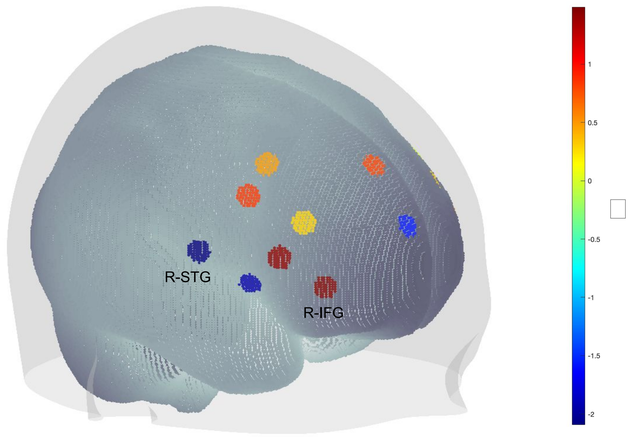
N = 132; 5th grade; Ages 8-15; M_{age}=10;7
Shimadzu LightNIRS, 47 channels, 7.4Hz
AnalyzIR Toolbox, NIRS_KIT
fNIRS passive task, Print & speech:
Word, Pseudoword, Vocoded/False font
French literacy tasks: Grapheme, Word, Pseudoword naming

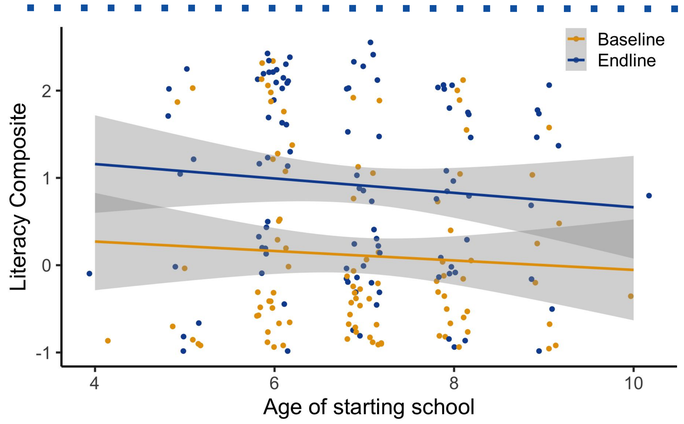
RESULTS

Left hemisphere activation for printed words predicts literacy two years later



Age of exposure to literacy is associated with right hemisphere activation for printed words





DISCUSSION

Activation at baseline for written words in typical left hemisphere reading network predicts individual differences in literacy skills two years later:

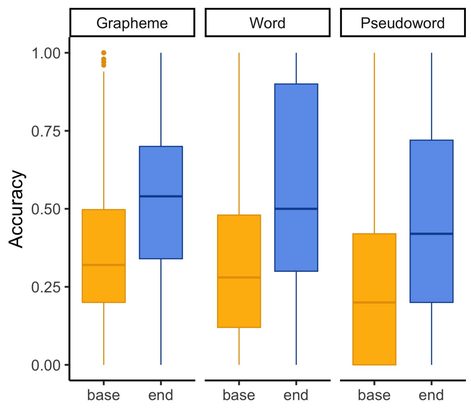
- Higher activation in L-IFG and temporal regions
- Less activation in frontal and pre-central regions

Age of exposure to literacy substantially impacts the organisation of the reading network.

Children who started school at a later age show greater recruitment of right hemisphere for print processing.

- Lateralisation may not be a hallmark of fluent readers in children whose first exposure to literacy is at an older age

LITERACY PERFORMANCE



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