NEUROCOGNITIVE DEVELOPMENT & LEARNING IN ENVIRONMENTS WITH HIGH POVERTY-RELATED RISK OF ILLITERACY

Kaja K. Jasińska, PhD
Applied Psychology and Human Development
University of Toronto
Scientist, Haskins Laboratories

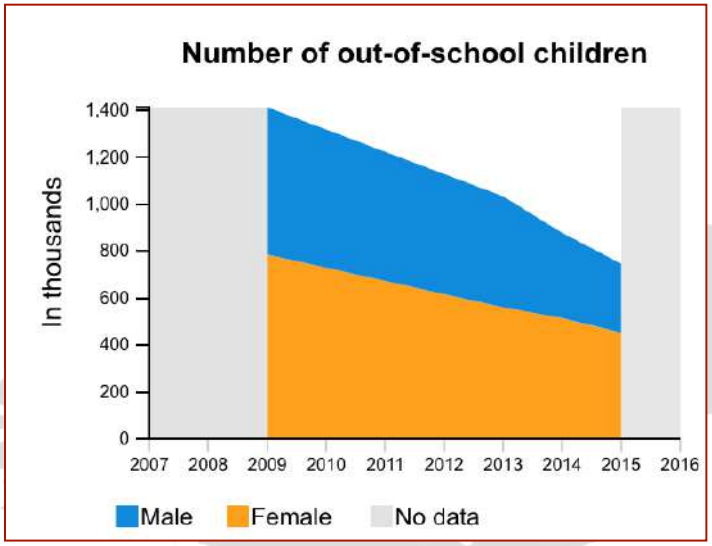
@Kaja_Jasinska
kaja.jasinska@utoronto.ca

a w.e.i.r.d. journey to literacy

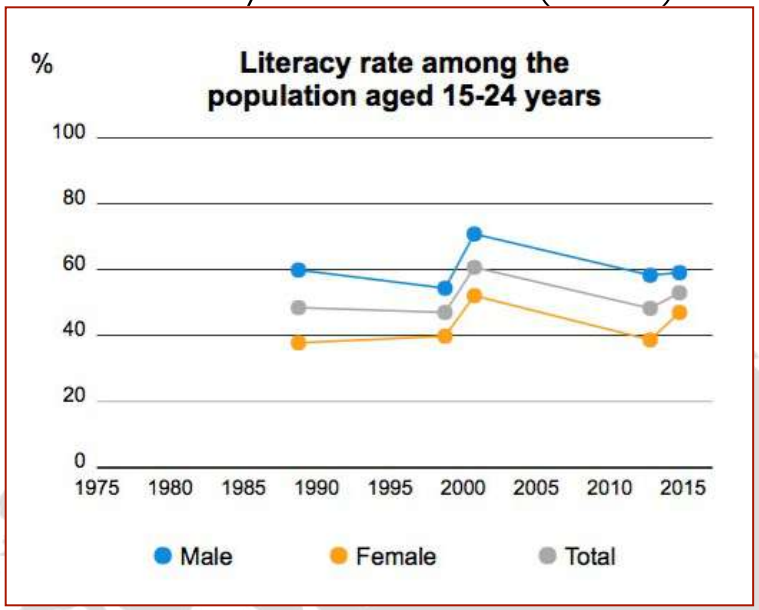

the real journey to literacy
UNICEF/UNI193693/Esiebo
UNICEF/UNI96063/Znidarcic
https://www.washingtonpost.com/news/answer-sheet/wp/2015/11/13/how-classrooms-look-around-the-world-in-15-amazing-photographs/?noredirect=on&utm_term=.fe67c057ad5c

Côte d'Ivoire

800,000 out of school children

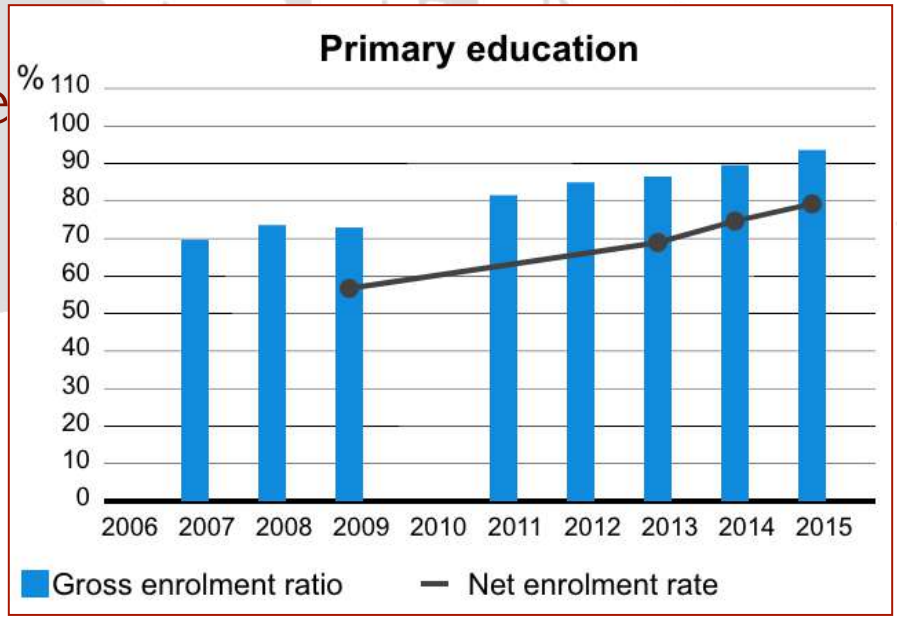


Literacy rate ~56% (2019)



159th out of 191 countries on human development index (HDI)

Increased enrollment, but…



Child labour on Nestlé farms: chocola giant's problems continue

Auditors completing their annual report continue to find evidence of child l on Ivory Coast farms supplying Nestlé

Meet Terry Collingsworth: the lawyer taking on Nestle and ExxonMobil

THE WALL STREET JOURNAL.

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Many States Ease Restrictions on Carrying Concealed Firearms

More American Workers Are Testing Positive for Drugs

Research on Strokes Extends the Window for Clot Removal

FRONTIER MARKETS

Child Labor On The Rise in West Africa

FORTUNE

BBC Sign in News Sport W

NEWS

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World Africa Asia Au

CNN World + Live TV U.S. Edition +

Slave-free chocolate: a not-so-guilty pleasure

By Lidz-Ama Appiah, CNN

Updated 3:57 AM ET, Wed June 7, 2017

ll employing hundreds
e BBC has discovered,
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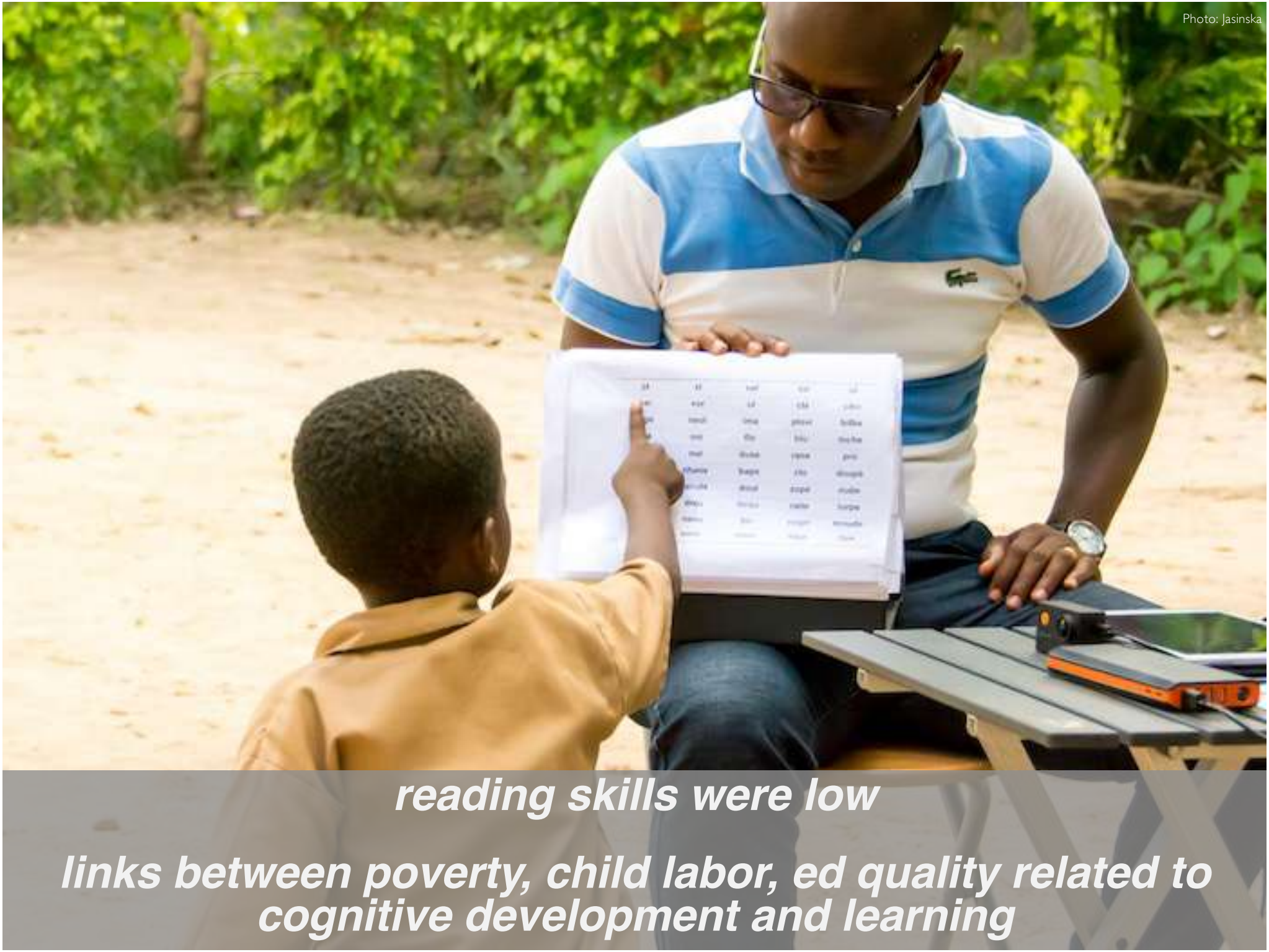
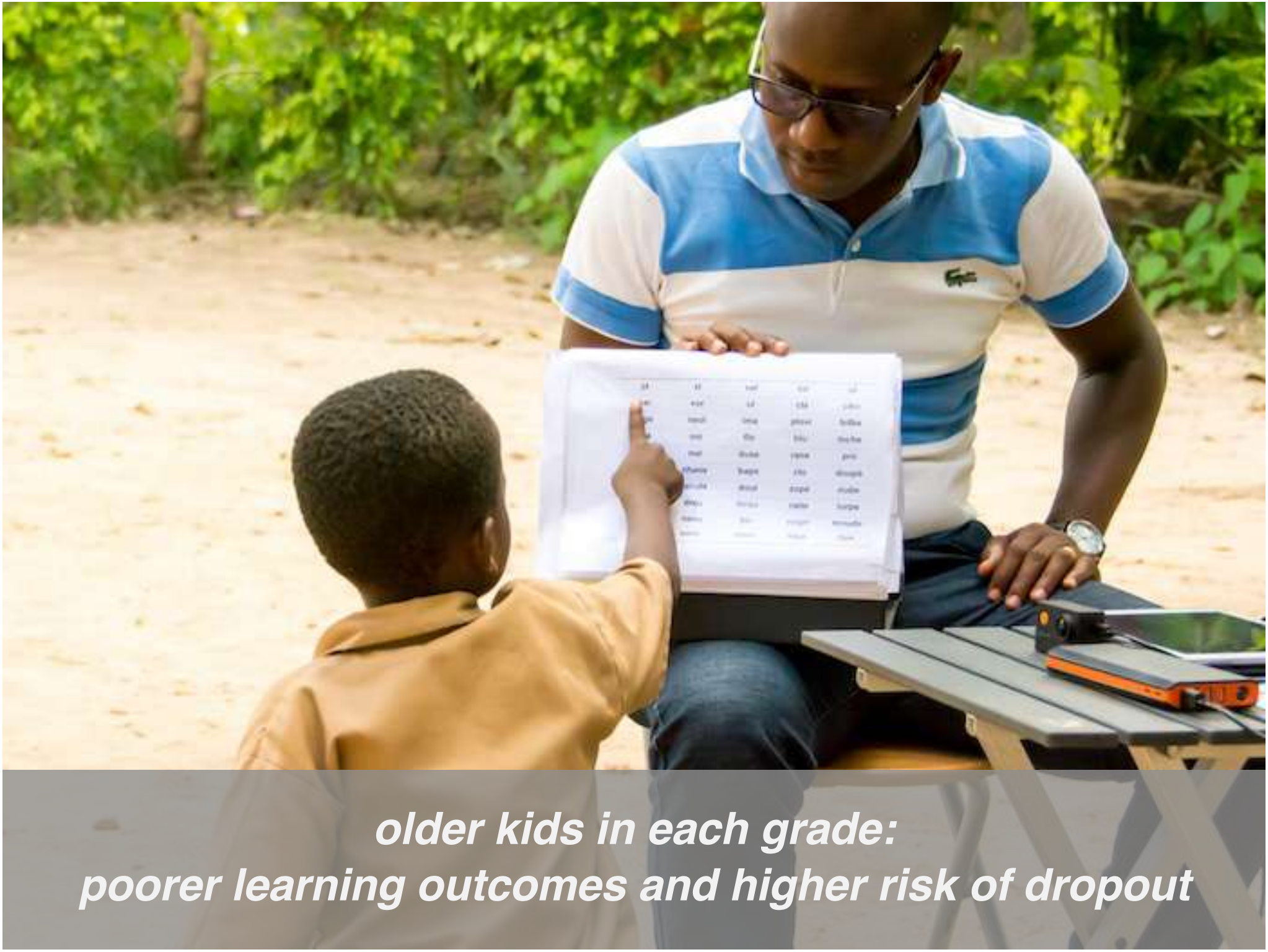
ts from Ivory Coast.



reading skills were low

links between poverty, child labor, ed quality related to cognitive development and learning


older kids in each grade:
poorer learning outcomes and higher risk of dropout

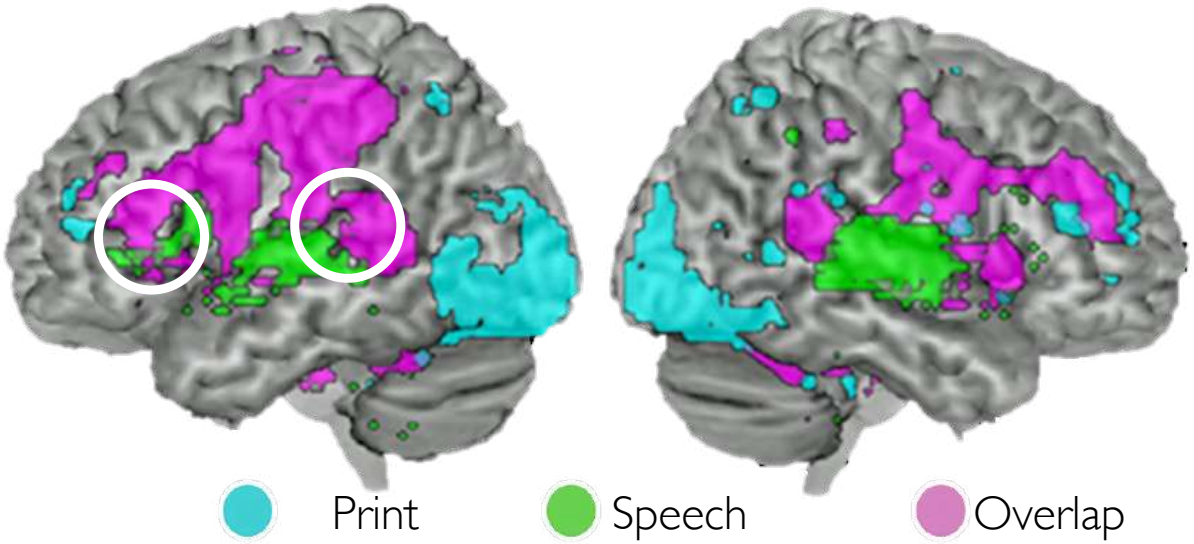
Learning to Read




"Otis"

/dɔg/

dog



Rueckl et al... 2015 PNAS

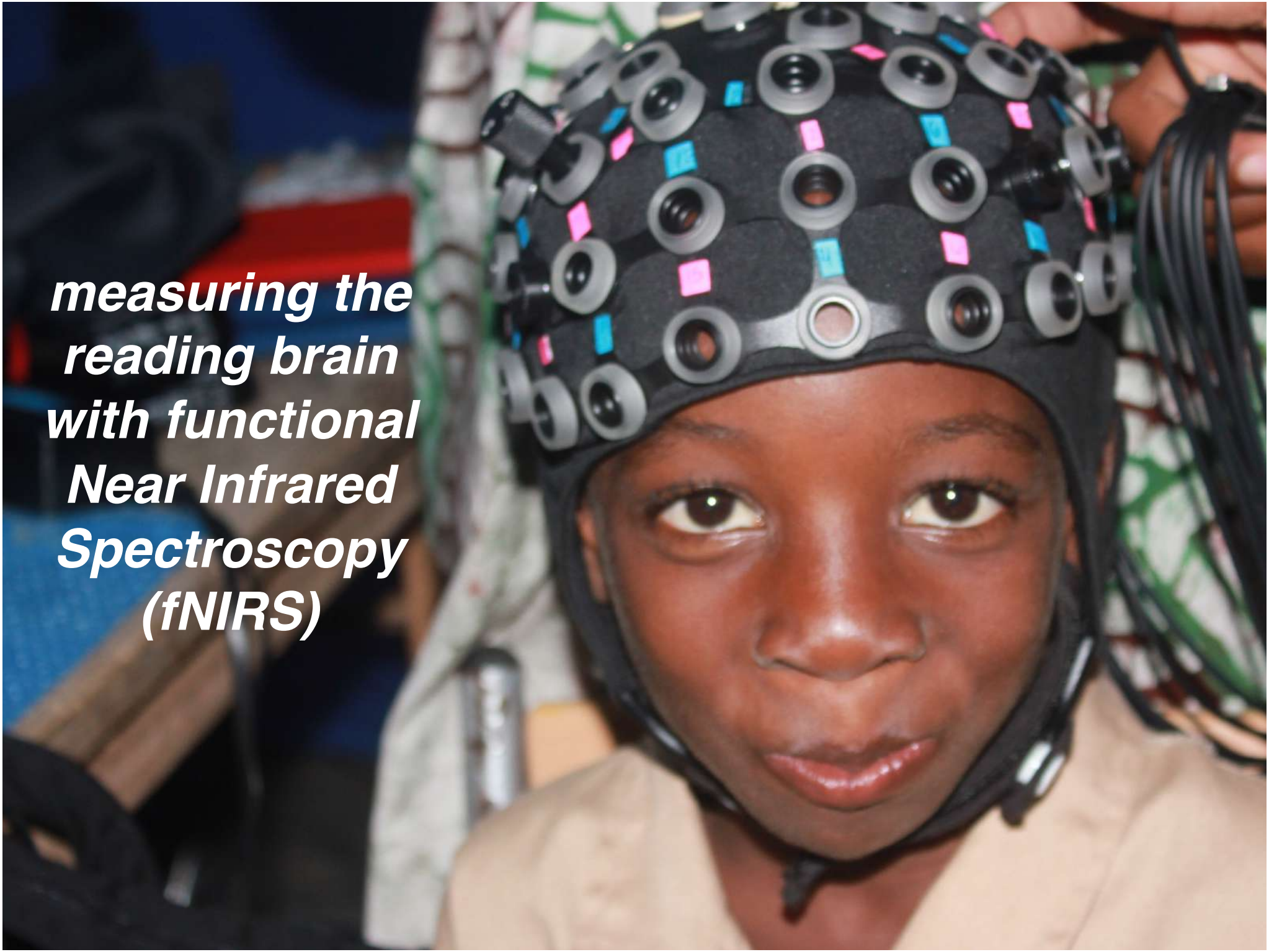
Literacy for Older First-Time Readers

Assumed learning

First formal literacy exposure in HICs

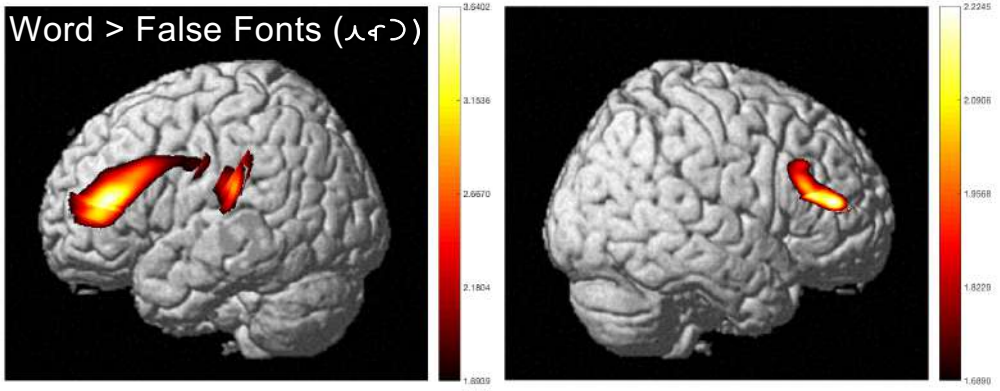
First formal literacy exposure in LMICs

poverty delays and reduces learning


measuring the reading brain with functional Near Infrared Spectroscopy (fNIRS)

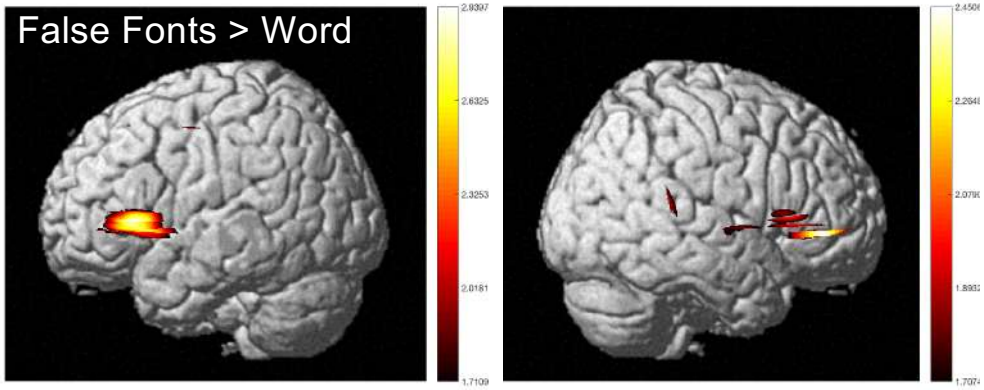
5th grade children (age 8-15 years; M_{age}=10.5)

Stronger Readers



Characteristic Reading Network

Poorer Readers



Lack of sensitivity to orthography, phonology, and lexicality

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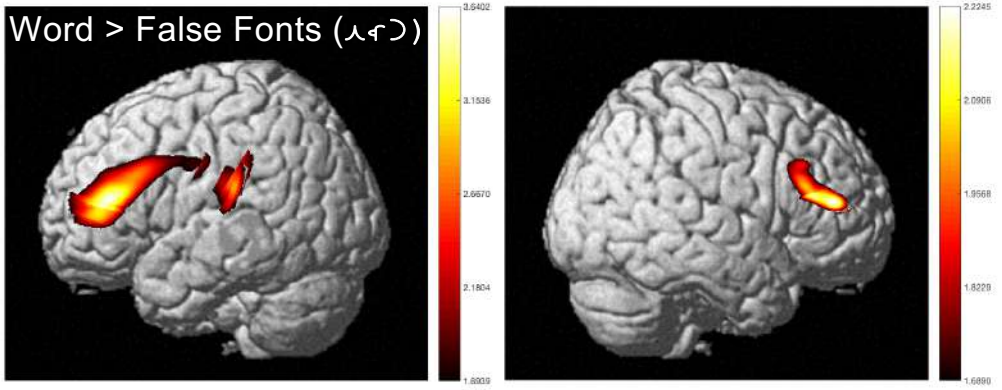
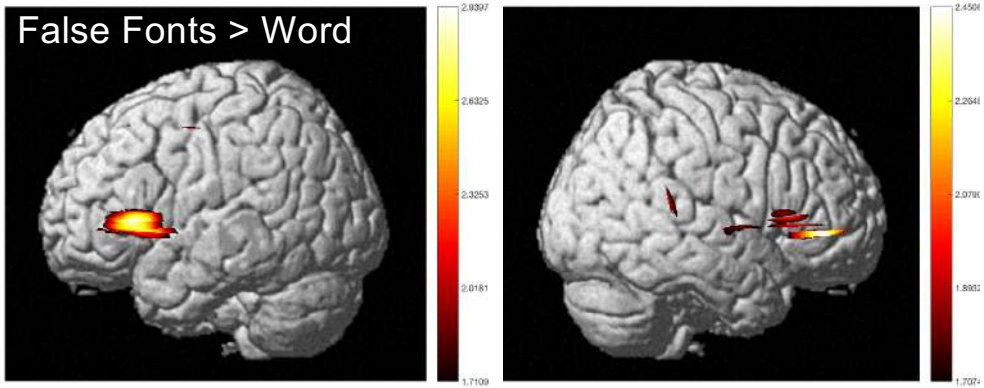
Stronger Readers



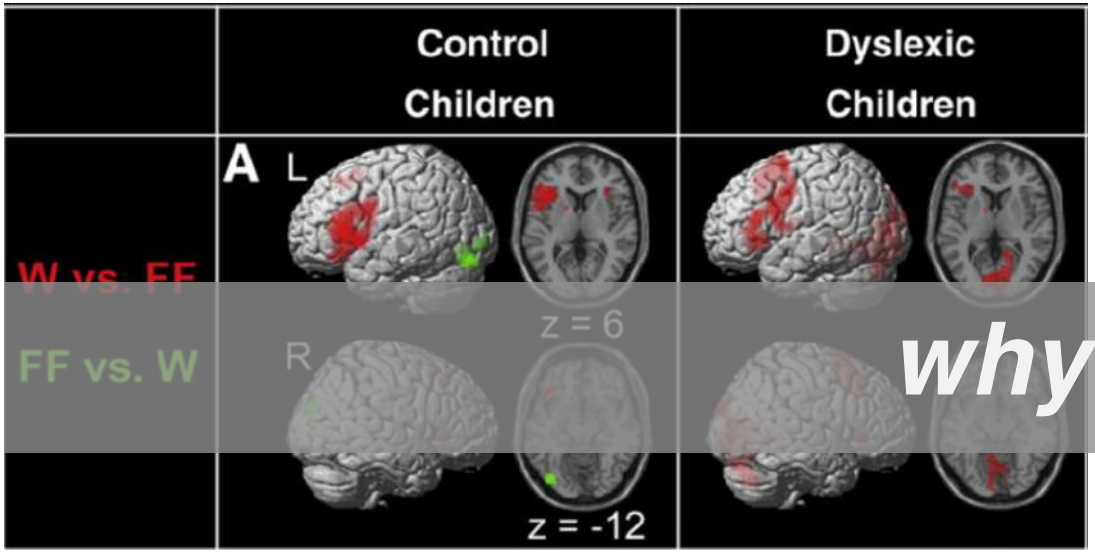
Poorer Readers



Neural activation ≠ Dyslexia

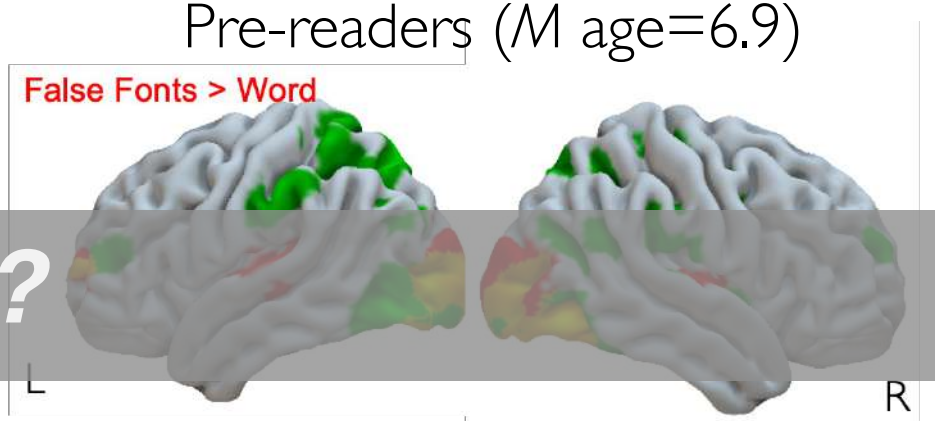
Neural activation ≠ Pre-readers

Dyslexia (*M* age=11.3)



Van der Mark et al, 2009

Pre-readers (*M* age=6.9)

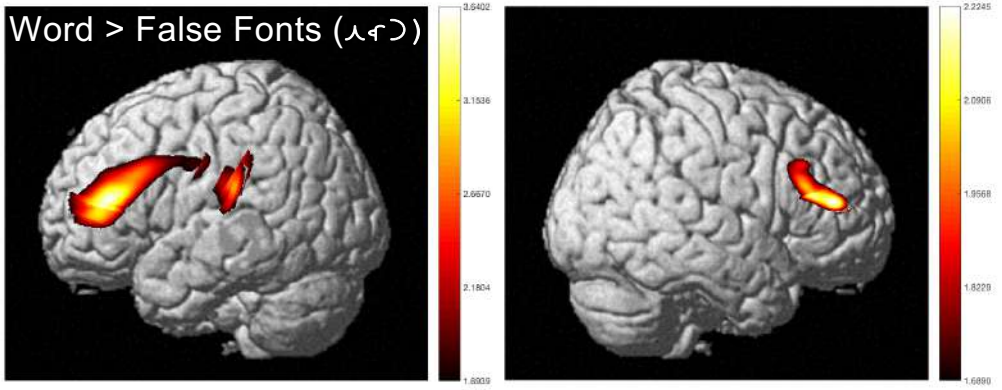


Chyl et al., 2019

why?

5th grade children (age 8-15 years; M_{age}=10.5)

Stronger Readers



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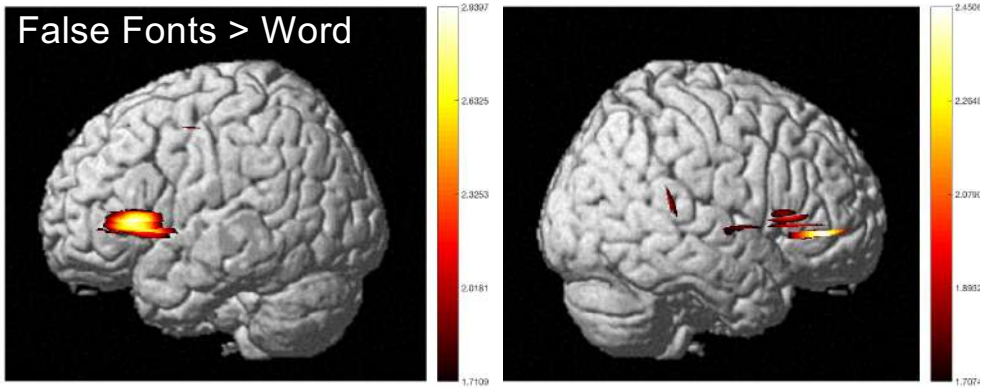

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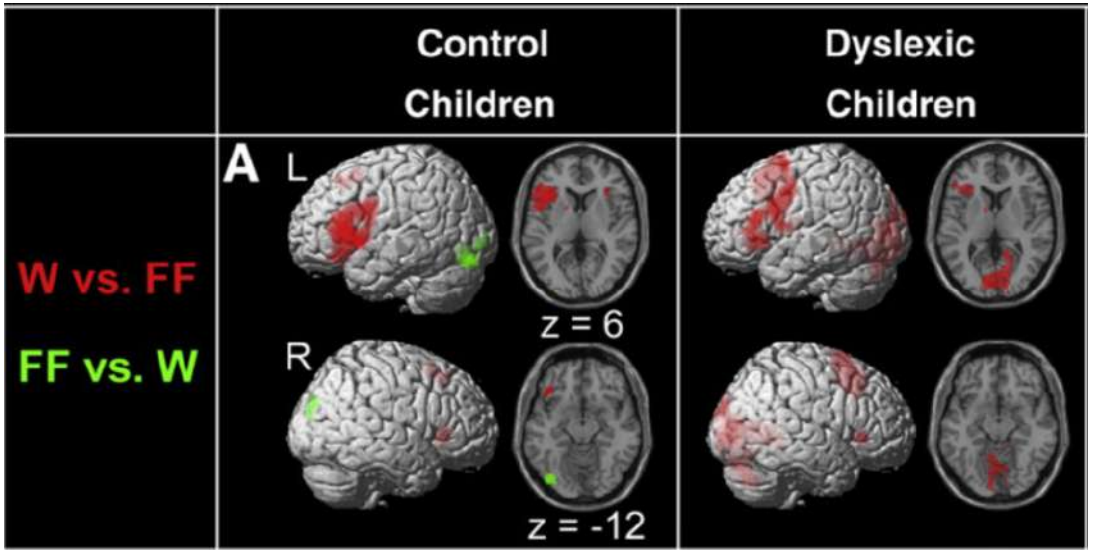

Van der Mark et al, 2009

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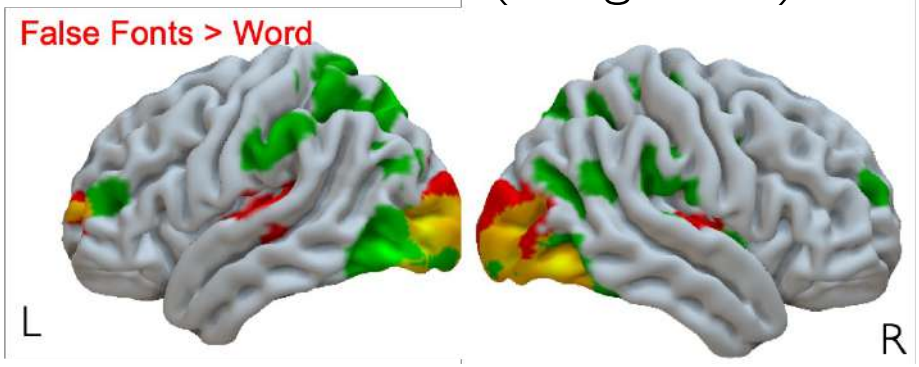
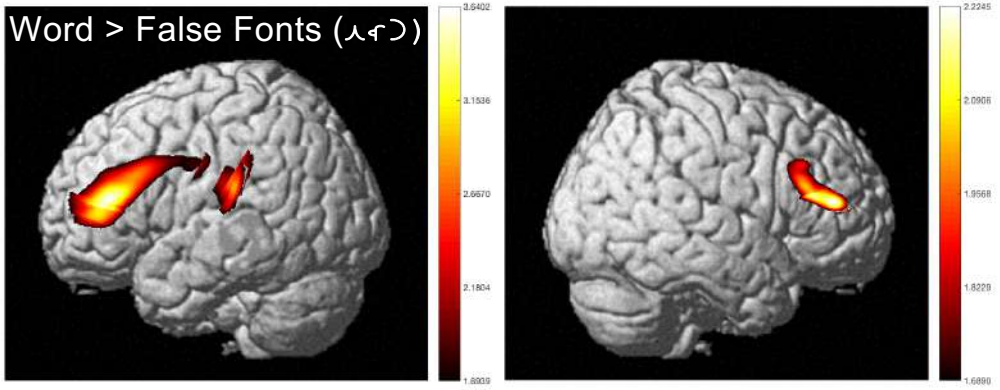


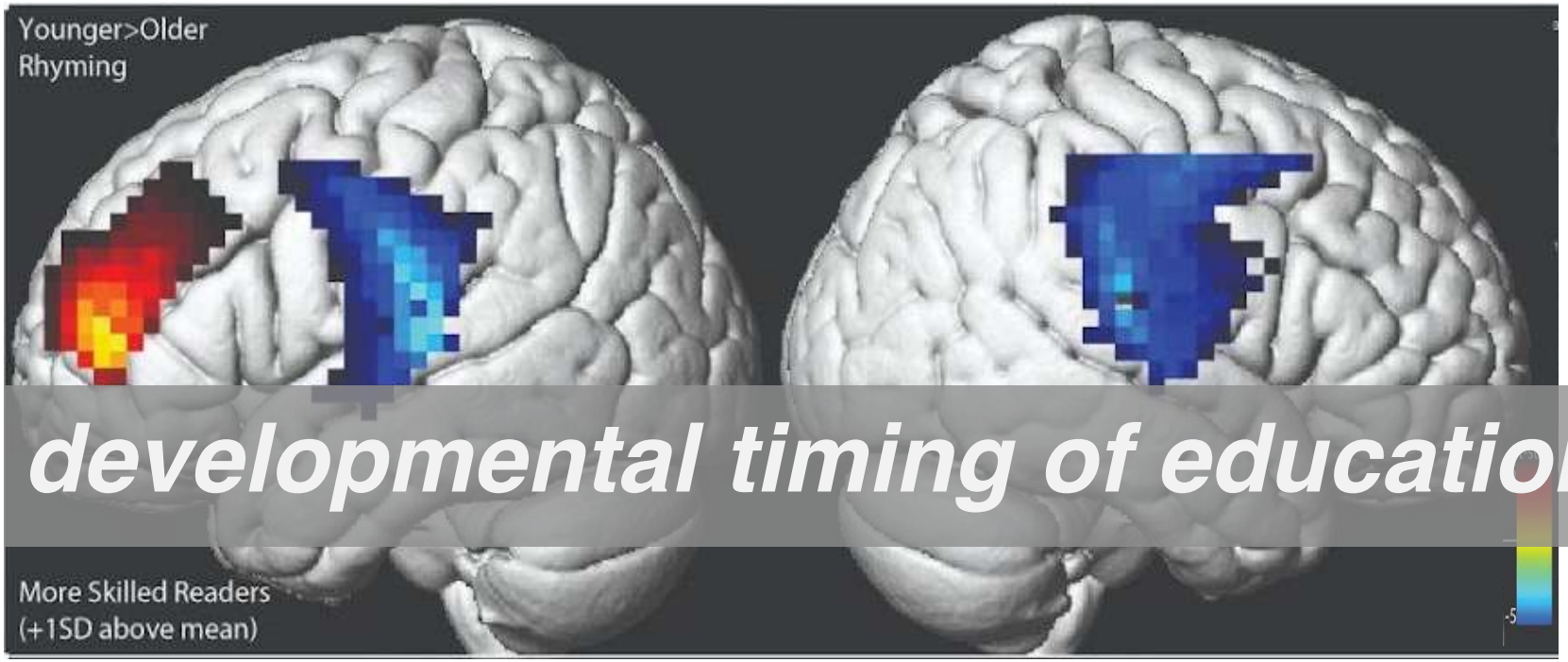
Chyl et al., 2019

5th grade children (age 8-15 years; M_{age}=10.5)

Stronger Readers

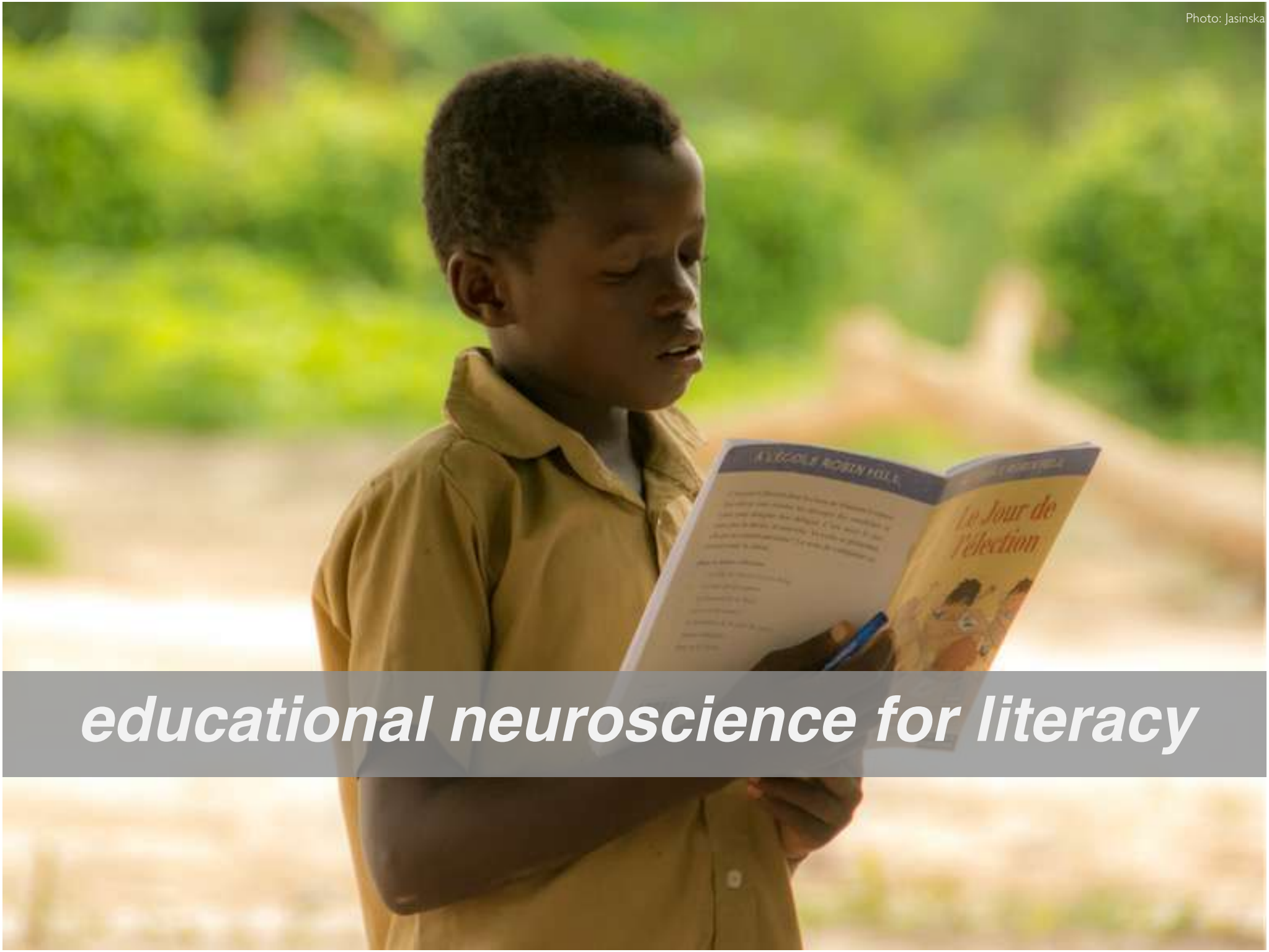


Younger (<9y) and older (>12y) skilled readers show different patterns

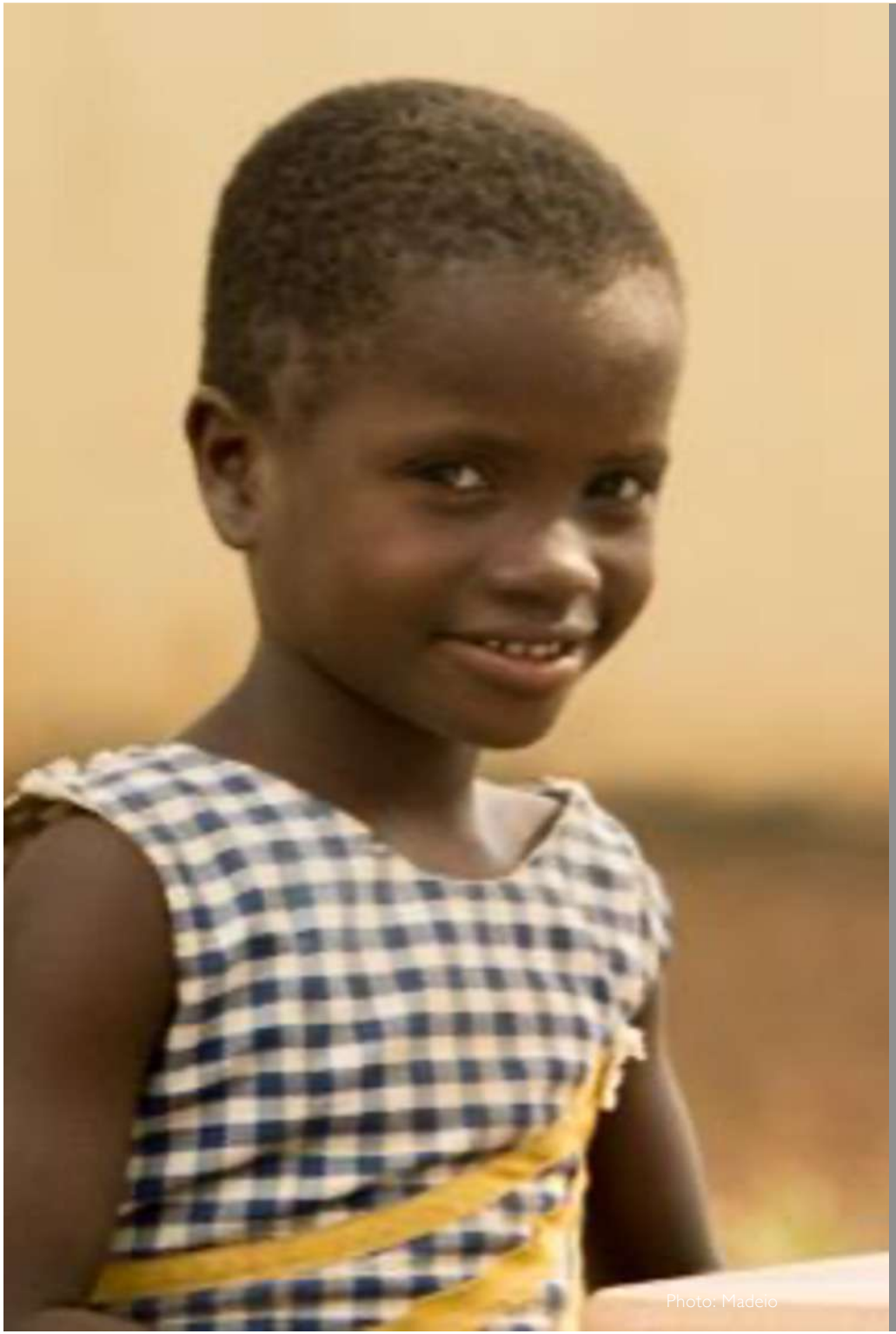


developmental timing of education is key

Jasińska et al., under review



educational neuroscience for literacy



leverage research finding to design, test, and scale solutions

Allô Alphabet

Photo: Madeio

Can we improve decoding skills for these older "illiterate" children? At low-cost?

What are optimal intervention methods that can be scaled?

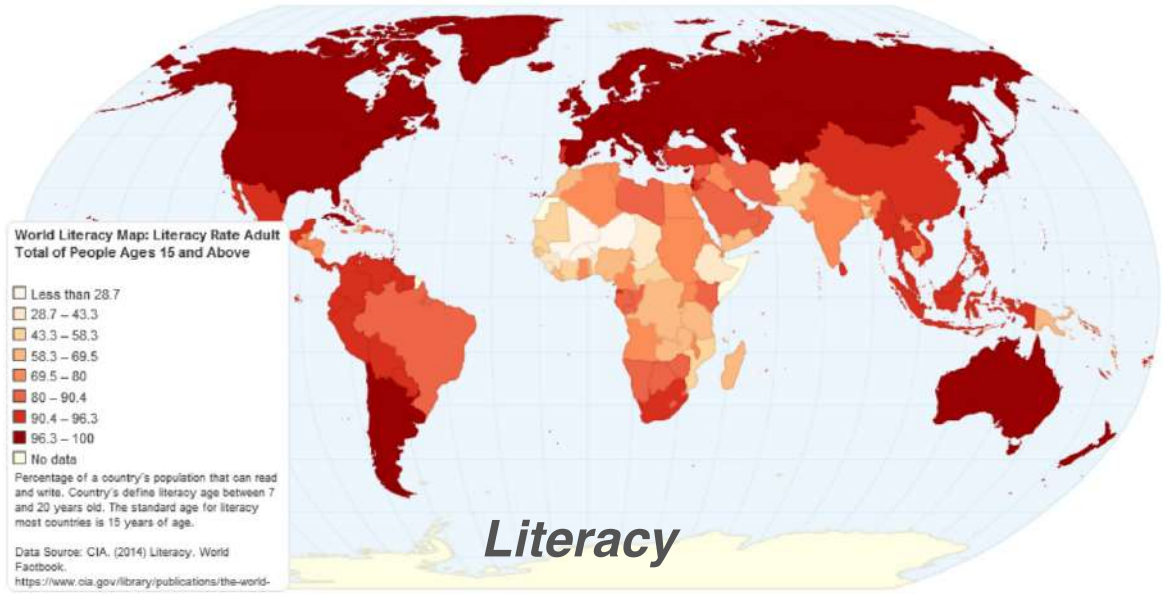
Solution

Home-based phone literacy curriculum

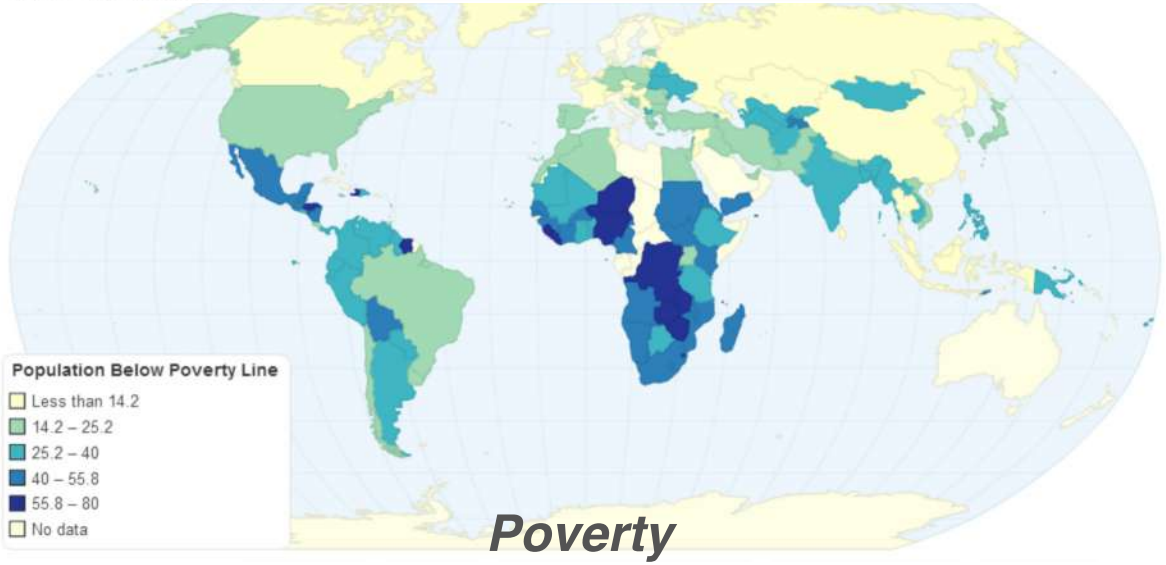
Promising Results

Allô Alphabet use linked to better reading

Kids used Allô Alphabet during school closures (including during COVID19)



Literacy

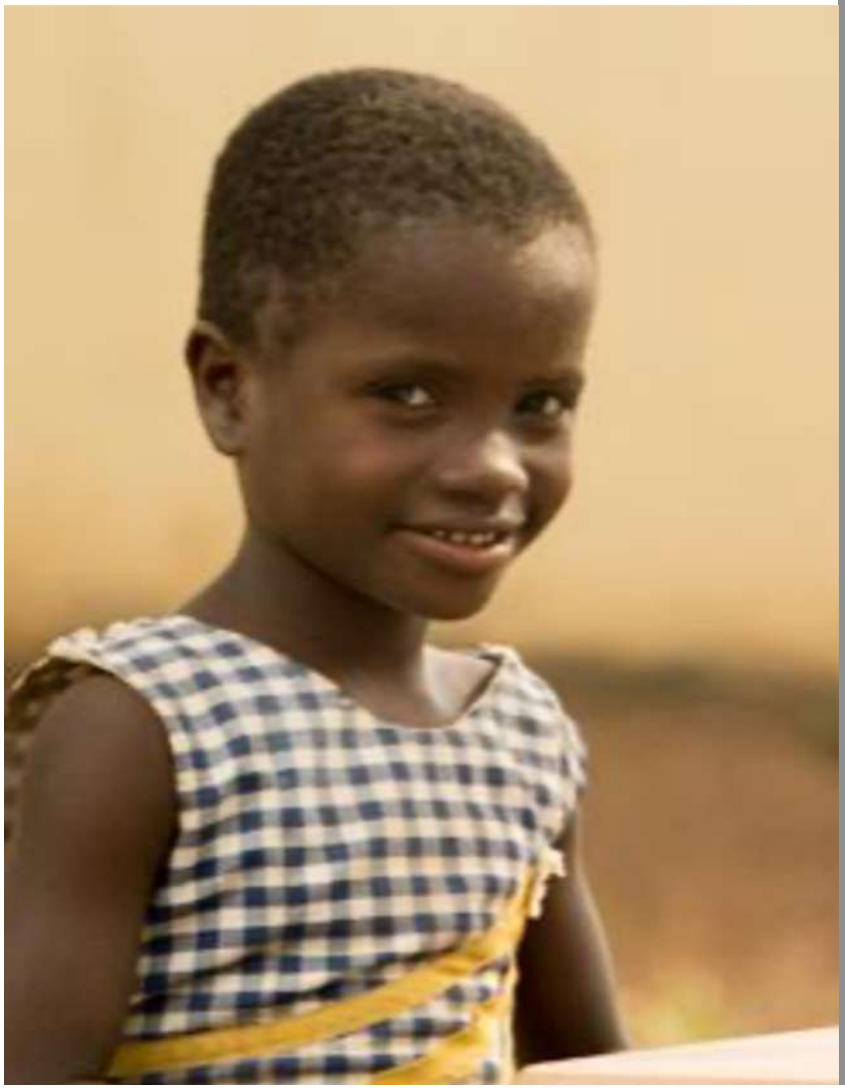


Poverty

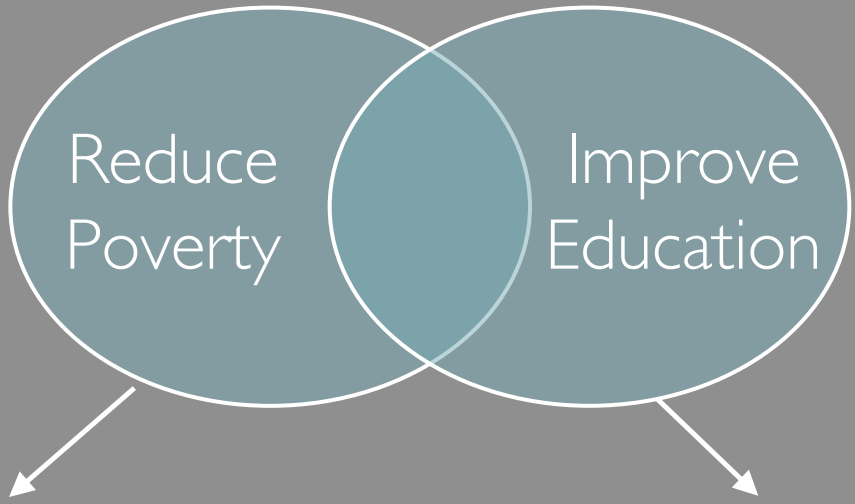
cause and consequence

Soutenir les Enfants à la Maison et à l'École

S E M É



Economic and Educational Intervention



Reduce barriers to school attendance
Reduce need for child labor

Improve learning
Increase value proposition of school for parents

100WEEKS TEMPORARY CASH FOR PERMANENT CHANGE

Unconditional Cash Transfers

TaRL teaching at the right level

Tech-Based Teacher Professional Support

Causal Impacts

Cluster Randomized Control Trial (RCT) design

Control	Quality Education
Cash Transfer	Cash Transfer & Quality Education

N=10,000+ (mother, father, infant, preschooler, school-aged child, adolescent, teacher, school director); 200+ communities

Baseline: Spring 2021
Endline: Summer 2023

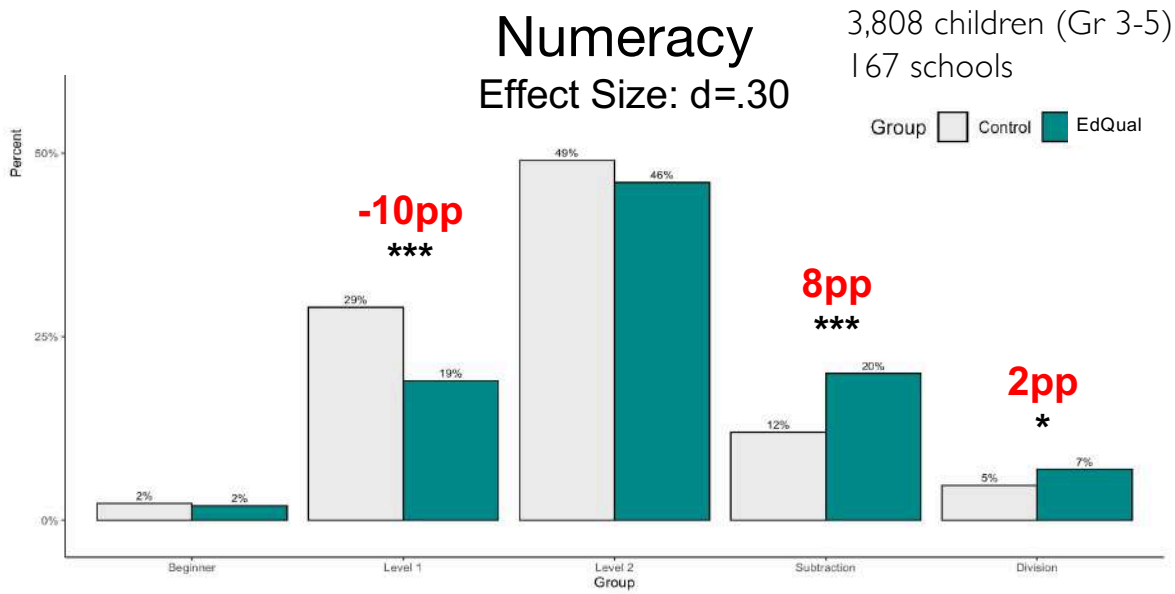
Causal Impacts of Education Quality

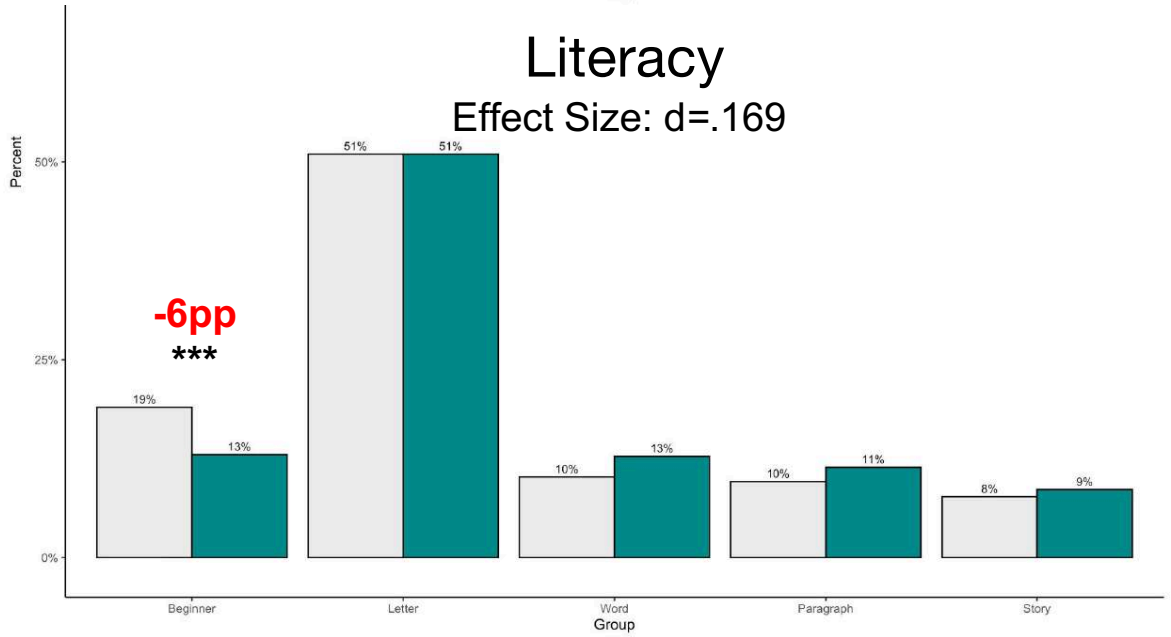
Control	Quality Education

Persistent (puzzling) challenge to improving literacy outcomes

Less puzzling in the context of our neuroimaging findings

3,808 children (Gr 3-5)
167 schools





Causal Impacts of Poverty Reduction

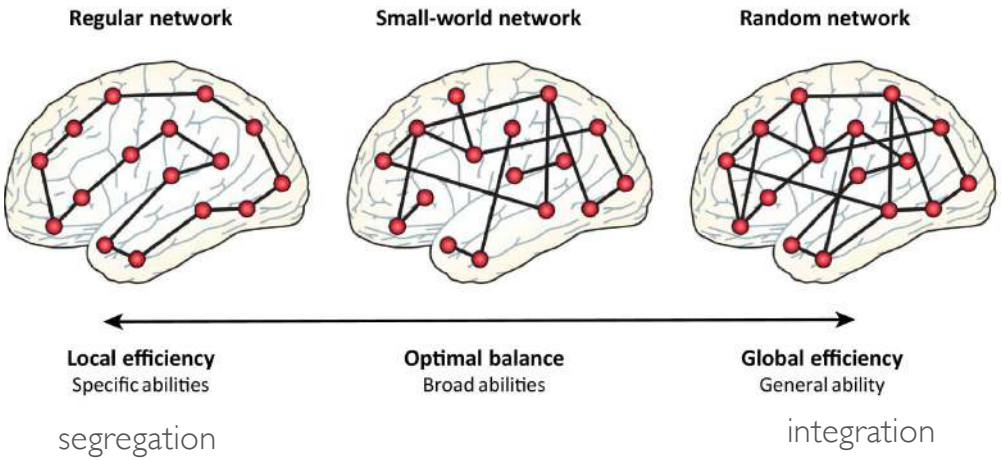
Control

Cash Transfer

developmental timing of poverty reduction on neurocognitive development using neuroimaging (treatment x age)

Poverty and the Infant brain

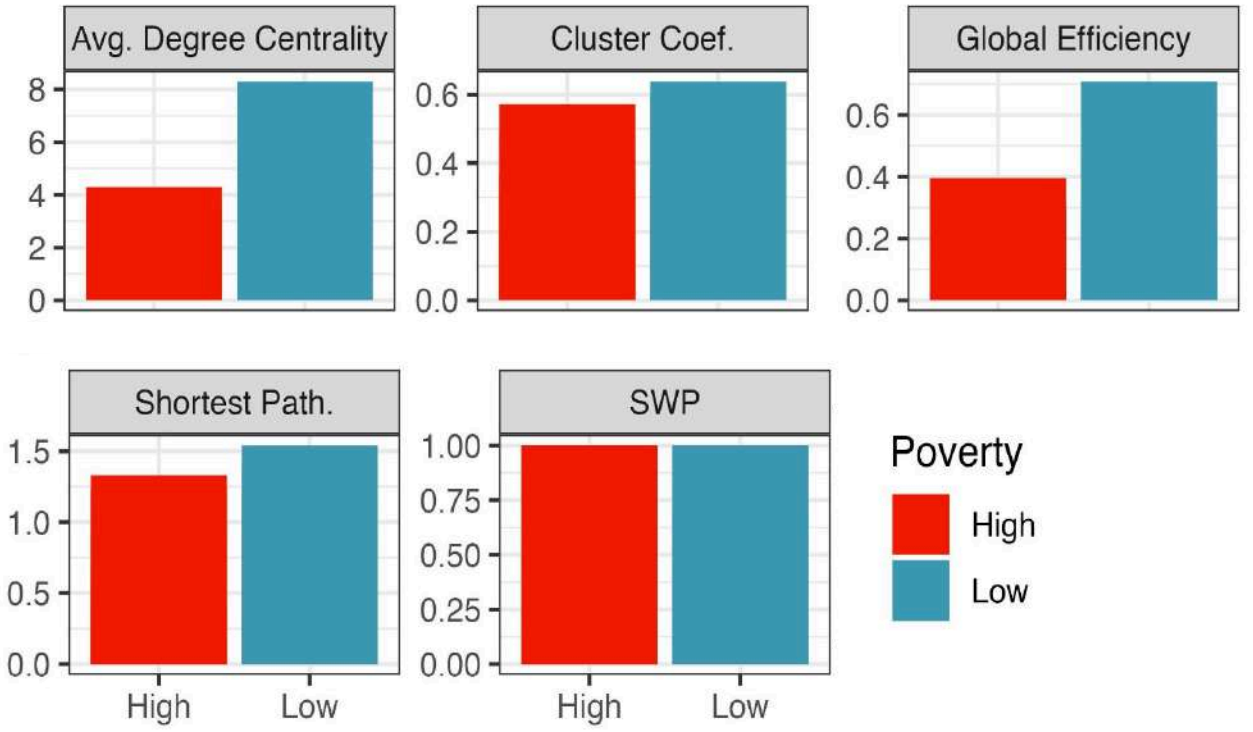
Poverty and its correlates (food insecurity, maternal mental health, and low cognitive stimulation) and emerging neural networks



Poverty and the Infant brain

	Cluster Coefficient	Global Efficiency	Degree Centrality	Shortest Pathlength	Smallworld Propensity
Food Insecurity	-.011	.089	.792	**.546.**	**-.185.**
MPI	**-.062.**	**-.09***	**-6.566***	-.161	.346
R^2	.438	.438	.419	.364	.389

Higher poverty is associated with decreased brain network efficiency– negatively relate to cognitive development and learning

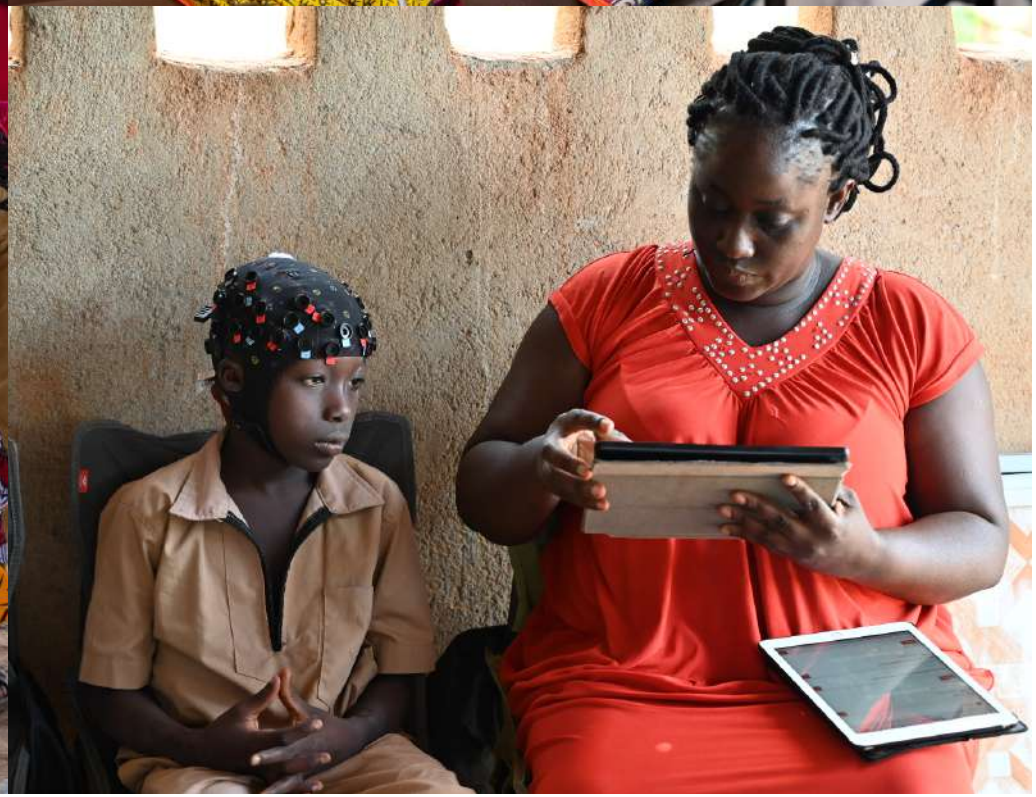


Jasińska et al., in prep

Longitudinal neuroimaging (n=400):
Infants and toddlers (0-2 y)
Preschoolers (4-5 y)
School kids (6-10 y)

Treatment vs Control

Language
Executive Functions
Literacy
Numeracy



poverty and education are potent forces of development and learning

developmental timing of these experiences is critical

policy must address the interdependence between poverty and education

Industry and government partners are eager to hear from neuroscientists

Mercredi 24 janvier 2018 Fraternité Matin Économie 11

Financement de l'éducation en milieu agricole

Cinq multinationales de l'industrie cacaoyère rejoignent le programme Trecc

Cargill, Hershey, Blommer, Cémoi et Cabos ont décidé d'adhérer au programme *Transformer l'éducation dans les communautés de cacao (Trecc).* L'objectif est d'améliorer la qualité de vie des enfants et des jeunes dans les communautés productrices de l'or brun.

Cargill, Hershey, Blommer, Cémoi et Cabos viennent d'adhérer au programme dénommé Transformer l'éducation dans les communautés de cacao (Trecc, Ndlr). Un programme international coordonné en Côte d'Ivoire par la Fondation Jacobs et dont l'objectif est d'améliorer la qualité de vie des enfants et des jeunes, tout en mettant l'accent sur l'apport d'une éducation de qualité particulièrement dans les communautés productrices de cacao.

C'est au cours d'un forum organisé par le Trecc, le 22 janvier, à la salle de conférences de la Communauté de Sant' Egidio sise à Treichville, autour du thème : « *Comment réussir la mise à l'échelle des modèles d'éducation ?* », que ces cinq grosses entreprises de l'industrie du cacao et du chocolat ont formalisé leur adhésion à l'initiative Trecc. Elles se joignent ainsi à trois autres entreprises, à savoir Barry Callebaut, Mars et Mondelez International, déjà membres du programme depuis 2016. Avec lesquelles elles mettront en œuvre, en collaboration avec le gouvernement, plusieurs projets spécifiques visant globalement l'amélioration de la qualité de l'éducation. « *Ces partenariats novateurs qui viennent d'être lancés auront un impact mesurable en augmentant la qualité de l'éducation et en améliorant sa pertinence dans les stratégies de durabilité de l'industrie* », s'est félicité Sabina Vigani, directrice pays de la Fondation Jacobs et coordonnatrice nationale du programme Trecc.

Dans le cadre de ce nouveau partenariat tripartite (gouvernement, Trecc et les entreprises), a-t-elle expliqué, une dizaine de modèles dont l'efficacité a déjà été prouvée sur des sujets liés à l'éducation et au développement de l'enfance en Côte d'Ivoire seront testés. Le programme vise 80 000 enfants et jeunes dans environ 150 communautés, à travers les régions

Les parties prenantes au programme Trecc ont renouvelé leur engagement à soutenir la Côte d'Ivoire. (PHOTOS : DR)

Environ 5 milliards de F Cfa d'engagement

Le montant total de cette initiative s'élève à plus de 8,5 millions de dollars, soit environ 5 milliards de FCfa.

Les interventions s'adresseront aux enfants de tous âges

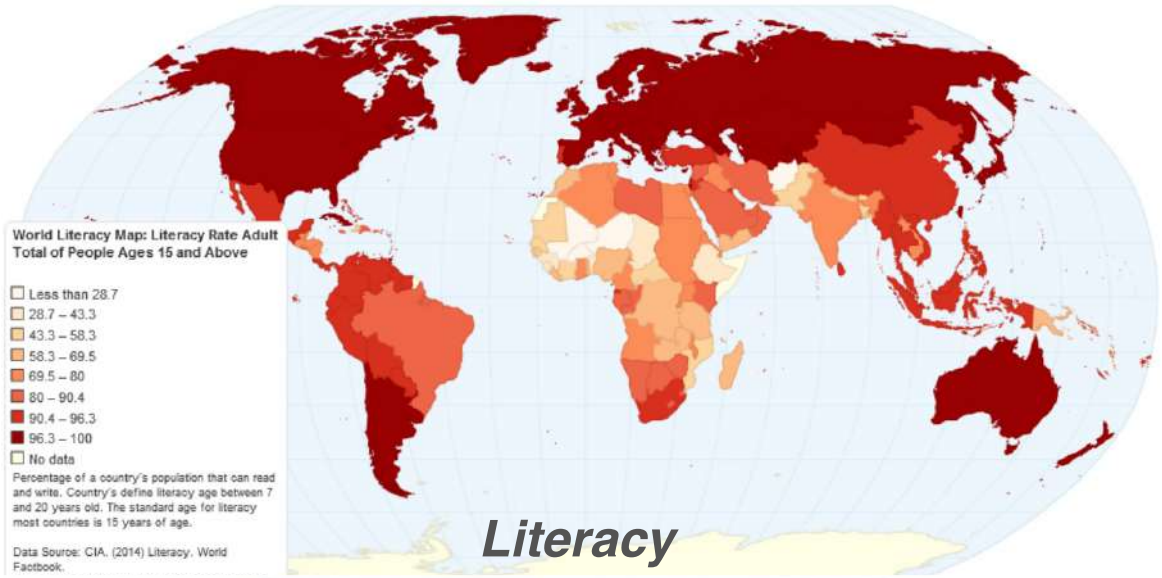
tiatives de dynamisation des écoles primaires et des cours d'économie et d'entrepreneuriat. « *C'est une sélection de modèles basés sur des études solides, approuvés par le gouvernement ivoirien et suivis par Innovations for Poverty Action* », a ajouté Sabina Vigani. Les modèles pourraient être incorporés dans les politiques nationales d'éducation. Trecc et les entreprises partenaires concernées ont également pris l'engagement de répliquer les modèles efficaces à plus grande échelle. Un autre objectif important de ces partenariats est de renforcer le rôle de l'éducation dans les stratégies de l'industrie. Trecc vise à ce que les partenaires du cacao incluent l'éducation de qualité dans leurs stratégies de durabilité et pen-

Foire internationale d'importation

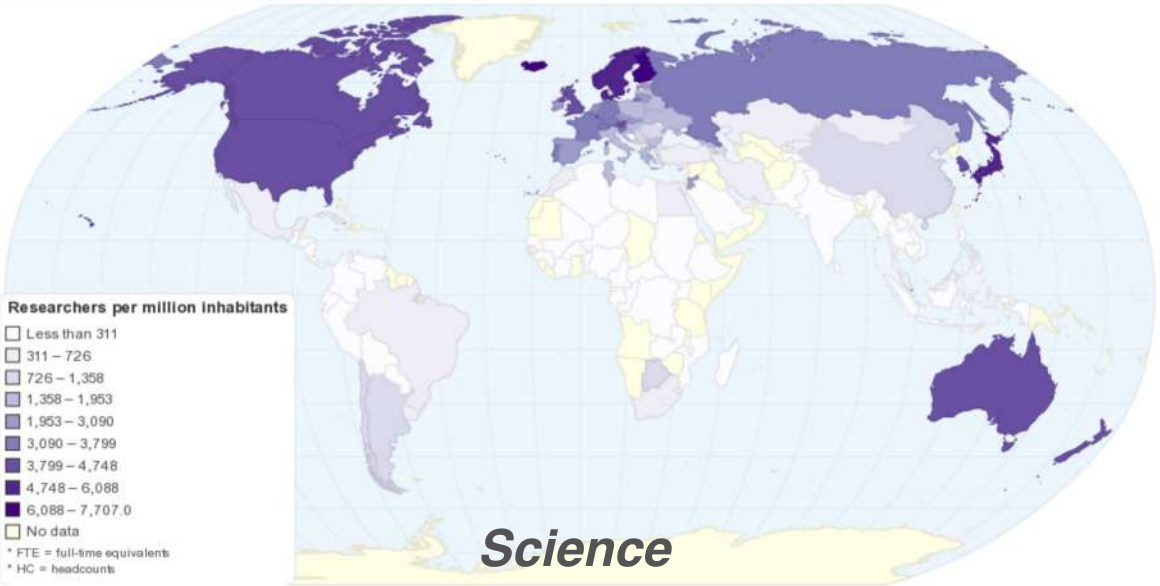
La Chine ouvre son marché aux entreprises ivoiriennes

First politician in fNIRS! (Ministry of Education)

educational neuroscience beyond the laboratory

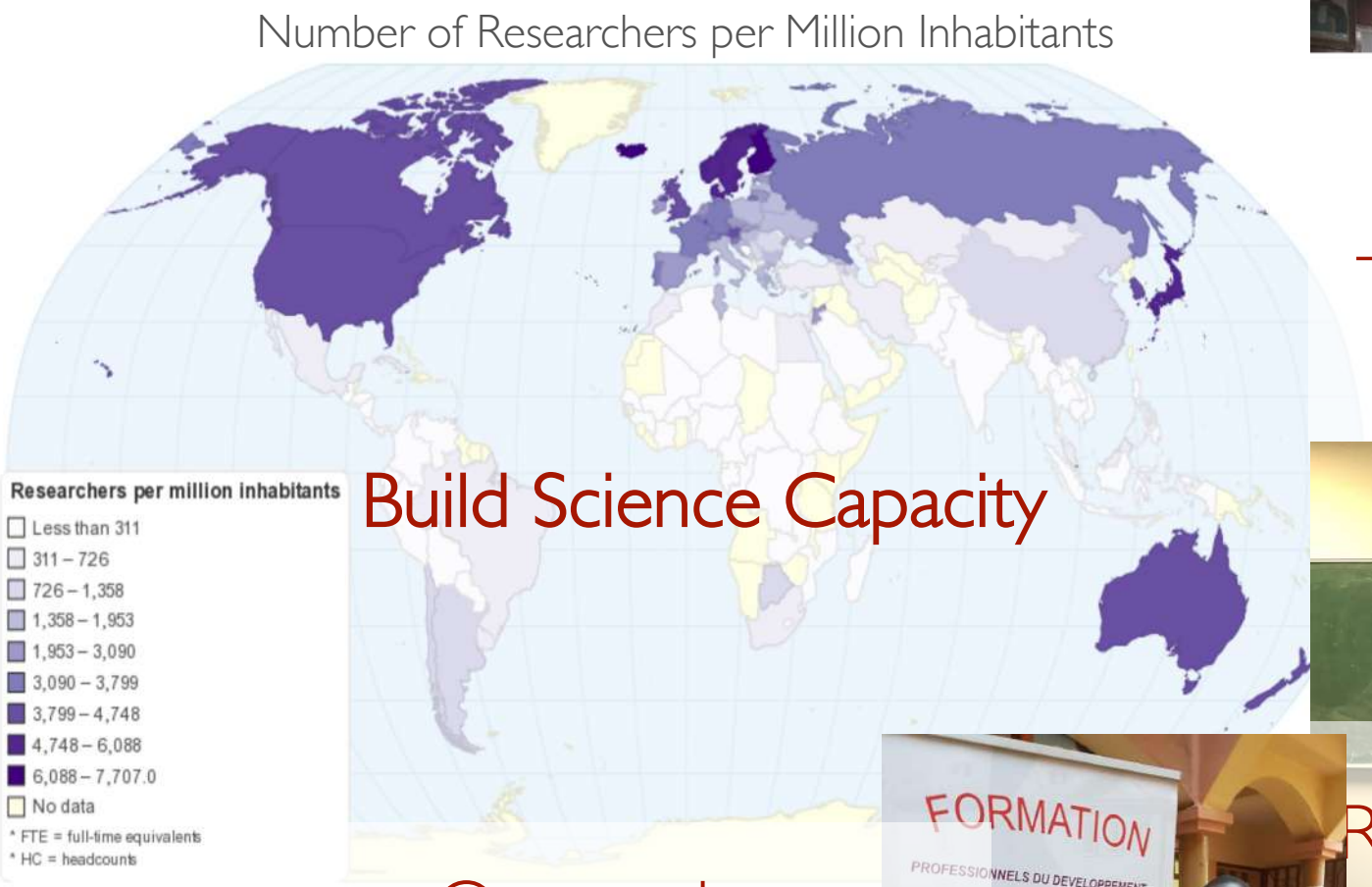


Literacy



Science

mismatch between where science happens and where science is needed most



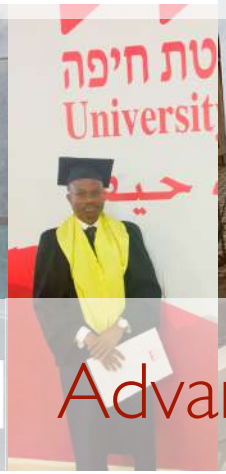
Build Science Capacity

Training for Ivorian Neuroscientists

Research Exchanges

Open science

Leadership Opportunities



Advanced Training

Conference Attendance

Acknowledgments

<u>Côte d'Ivoire Research Funders:</u>
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<u>Partners:</u>

THANK YOU

kaja.jasinska@utoronto.ca