Promoting Literacy Development in Children in Rural Cocoa Producing Communities

Kaja K. Jasińska[12], Clarisse Hager[3], Ariane Amon[4], Sosthene Guei[5], Christelle Kakou[5], Salomon Koffi[4], Axel Seri[5]

University of Delaware, Newark, DE, [2]Haskins Laboratories, New Haven, CT [3]Nutrition and Education for Children, Jacqueville, Côte d'Ivoire [4]Université Félix Houphouët-Boigny, Abidjan, Côte d'Ivoire, [5]Centre d'Action et de Recherche pour la Paix, Abidjan, Côte d'Ivoire

INTRODUCTION

Children living in poverty grow up facing numerous obstacles to literacy, including limited time and/or resources dedicated to learning, impoverished learning environments, and inadequate education resources.

Child Labor in Cote d'Ivoire: Estimated 1.3 million children between the ages of 5-17 are working in cocoa production, 14.8% of children working in cocoa production are not attending school (Tulane University, 2015)

Specific Aim: To examine the impact of poor educational access, cocoa labor, and impoverished environments on:
- bilingual language development in French and Attié
- cognition (working memory, attention), and in turn,
- reading ability

Hypotheses: Children's French and Attié abilities and cognitive abilities may be differentially sensitive to impoverished learning environments over critical ages for literacy acquisition (ages 6-12).

METHODS

Participants. 228 children ages 6-12 in grades 1,3,5 (French: CP1, CE1, CM1)

Language Assessment and Literacy Assessment (Yopp et all, 1995; Woodcock et al., 2001)

Task	Description	French	Attié
Phonological Awareness	Identification, elision, segmentation	✔	✔
Tonemic Awareness*	Identify words that "share tone" to target	n/a	✔
Vocabulary	Synonym and antonym generation	✔	✔
Rapid Automatized Naming	Timed digit naming	n/a	✔
Oral Comprehension	Listen to story + comprehension questions	✔	✔
Letter Decoding	Letter identification	✔	n/a
Reading	Word and pseudowords reading	✔	n/a
Passage Comprehension	Read passage + comprehension questions	✔	n/a

Tonemic Awareness Task

(Shu et al., 2008)

Target
fè [bone]
Low tone

ʃẽ [gazelle]
Very high tone

ʃè [yam]
Low tone

Cognitive Assessment (NIH Cognitive Assessment Toolbox)

Task	Description
Working Memory: List Sorting Task	Sequence items in a 2-7 item list (animals) according to size.
Attention: Flanker Task	Indicate the arrow direction in congruent and incongruent trials

Survey of Home/School Environment and Child Labor
Based on USAID Early Grade Reading Assessment and Tulane University Survey of Child Labor in West African Cocoa Growing Areas (2015)
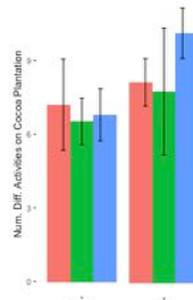
Measures school attendance and school habits, access to literacy materials, language background, family structure, socioeconomic status, child involvement in cocoa agriculture and other domestic and economic activities

RESULTS

Cocoa Labor

|	Cocoa Plantation	Other Plantation (Manioc, banana)	Never
	127 (60 hazardous work)	55	14

>50% of children reported working on a cocoa plantation

SES and additional workload (domestic, other out-of-home economic activities) predict number of activities on cocoa planation

Only boys exposed to hazardous working conditions (spraying pesticide, cutting trees, burning trees, and/or carrying heavy loads)

Predictor	Std. Beta	p-value
Family SES	-0.238	<.001
Other Economic Activities	0.183	0.04
Domestic Work	0.369	<.0001
Gender	0.257	<.001

Language, Cognitive, and Literacy Assessment
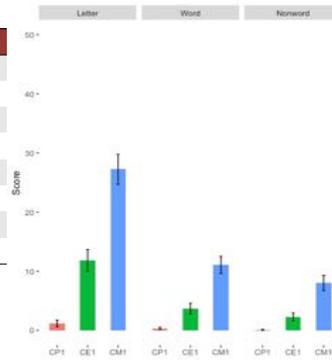
Letter-Sound Knowledge

Predictor	Std. Beta	p-value
Book at home	4.852	<.05
Work in Cocoa	-4.077	.06
Work (Other Economic)	1.963	<.05
Age	-1.873	<.05
PA (Attié)	0.527	<.01
PA (French)	0.639	<.001
Vocabulary (French)	0.828	<.01

Word Reading

Predictor	Std. Beta	p-value
Book at home	2.739	<.05
Family SES	-0.055	<.05
Age	-2.349	<.001
Age at School Start	4.824	.054
PA (Attié)	0.248	<.05
PA (French)	0.426	<.001
Vocabulary (French)	0.405	<.05

Nonword Reading

Predictor	Std. Beta	p-value
Age	-2.062	<.001
PA (Attié)	0.204	<.05
PA (French)	0.363	<.001
Vocabulary (French)	0.321	<.05
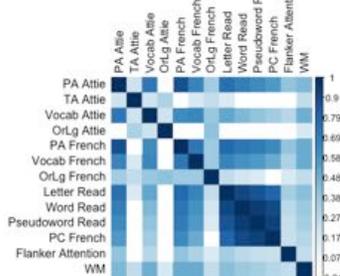
DISCUSSION

Cocoa Labor
50% of children are working on cocoa plantations, 25% of children are engaged in hazardous labor on cocoa plantations – this has negative associations with literacy

Literacy
Children engaged in agricultural labor on cocoa plantations show poorer reading outcomes compared to their peers

Literacy outcomes are overall extremely poor. 5th graders' (CM1) average scores indicate little to no reading competency.

Bilingualism
French and Attié phonological awareness independently predict literacy outcomes – local (first) language matters!

Understanding the complex relationships between impoverished environment, delayed and/or inconsistent access to education, children's linguistics and cognitive development, and reading outcomes yields new information about reading development in environments with a high risk of illiteracy.

SCIENTIFIC CAPACITY BUIDING

Robust collaboration with local researchers and long-term mentorship for Ivorian students to provide opportunities to conduct child development research and advance skills in transition to independent global scientists.

NEXS STEPS AND FUTURE DIRECTIONS

Wave 2 data collection currently underway in Sikensi. Evaluation of bilingual (PEI program) and monolingual education program in Côte d'Ivoire.
Portable fNIRS brain imaging scheduled for June, 2017.

Our findings will reveal how the typical developmental trajectory for literacy responds to periods of interrupted reading instruction. Crucially, this approach will inform when in development reading is most susceptible to the negative effects of missed schooling and can be used to identify target areas for instruction and intervention.

CONTACT