Ensuring Full Literacy
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Impact of interrupted schooling on the development of the brain's capacity for reading: Examining neural systems for reading in Syrian refugee children in Canada

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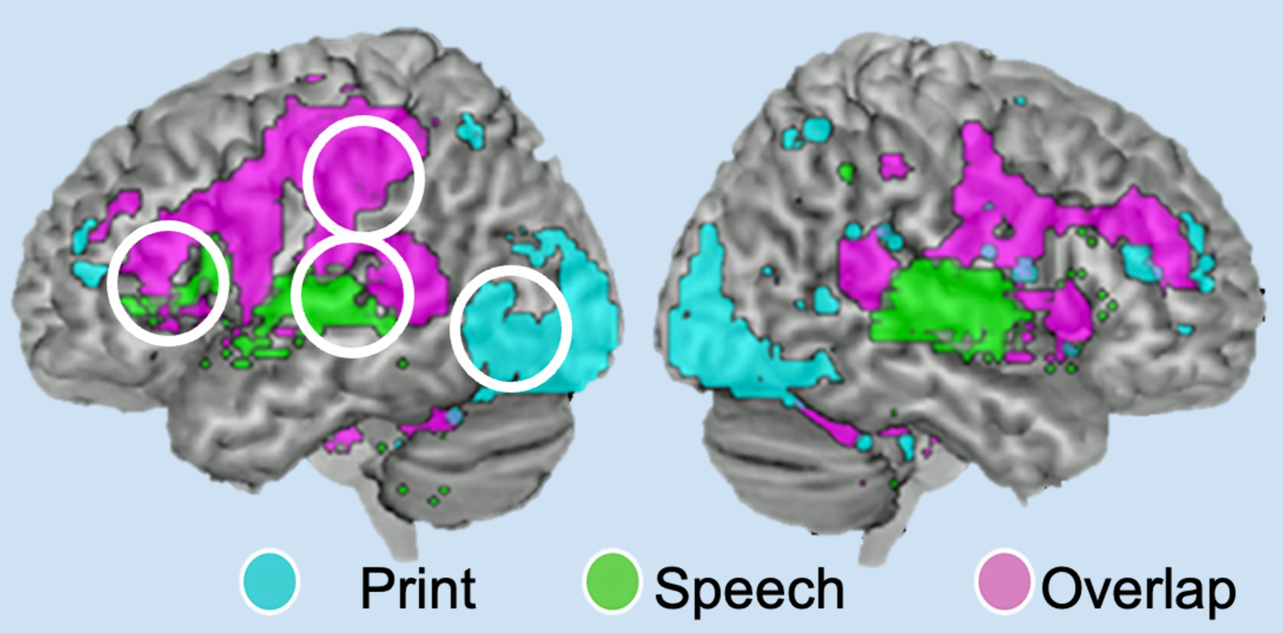
Aim

Aim: For refugee children, displacement and migration often correspond with periods of interrupted schooling and reading instruction. We aim to examine how individual differences in *duration* and *age* when a child experienced interrupted schooling and its impact on underlying neural systems that support language and reading development.

Hypothesis: Younger age of reading exposure and shorter duration of interrupted schooling are associated with the development of canonical neural reading network and reading skills in Syrian refugee children.



Children in Canada experience *continuous* formal literacy instruction at school

Syrian refugee children experience *interrupted* literacy instruction which later resumes in a new language

Research Questions

How does interrupted education (i.e., duration of displacement and the age at which resettlement occurs and education is resumed):

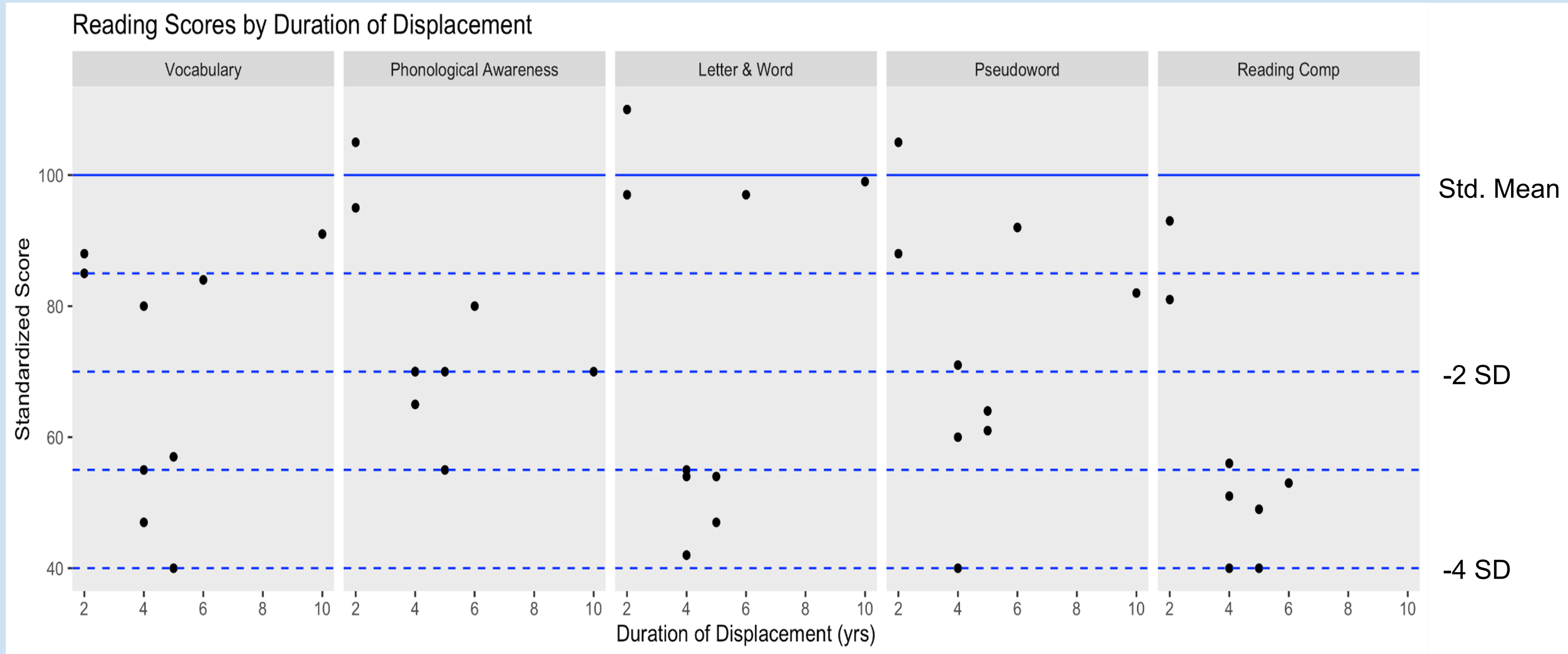
1) Impact reading development?

2) Impact the neural systems that support reading?

Participants (*n*=9) & Descriptive Statistics

Age	Gender	Date of Resettlement in Canada	Age of Resettlement in Canada	Duration of Displacement (yrs)	School During Displacement	Age of Departure from Syria
13	F	2016-02-04	7	2	N	5
11	F	2016-02-04	5	2	N	3
17	M	2019-09-30	14	10	Y	4
9	M	2016-01-01	3	5	N	Born outside Syria
13	M	2016-01-01	7	5	N	2
15	F	2016-07-12	9	4	Y	5
12	F	2016-07-12	6	4	N	2
11	M	2016-07-12	4	4	N	Born outside Syria
10	M	2020-11-11	8	6	Y	2

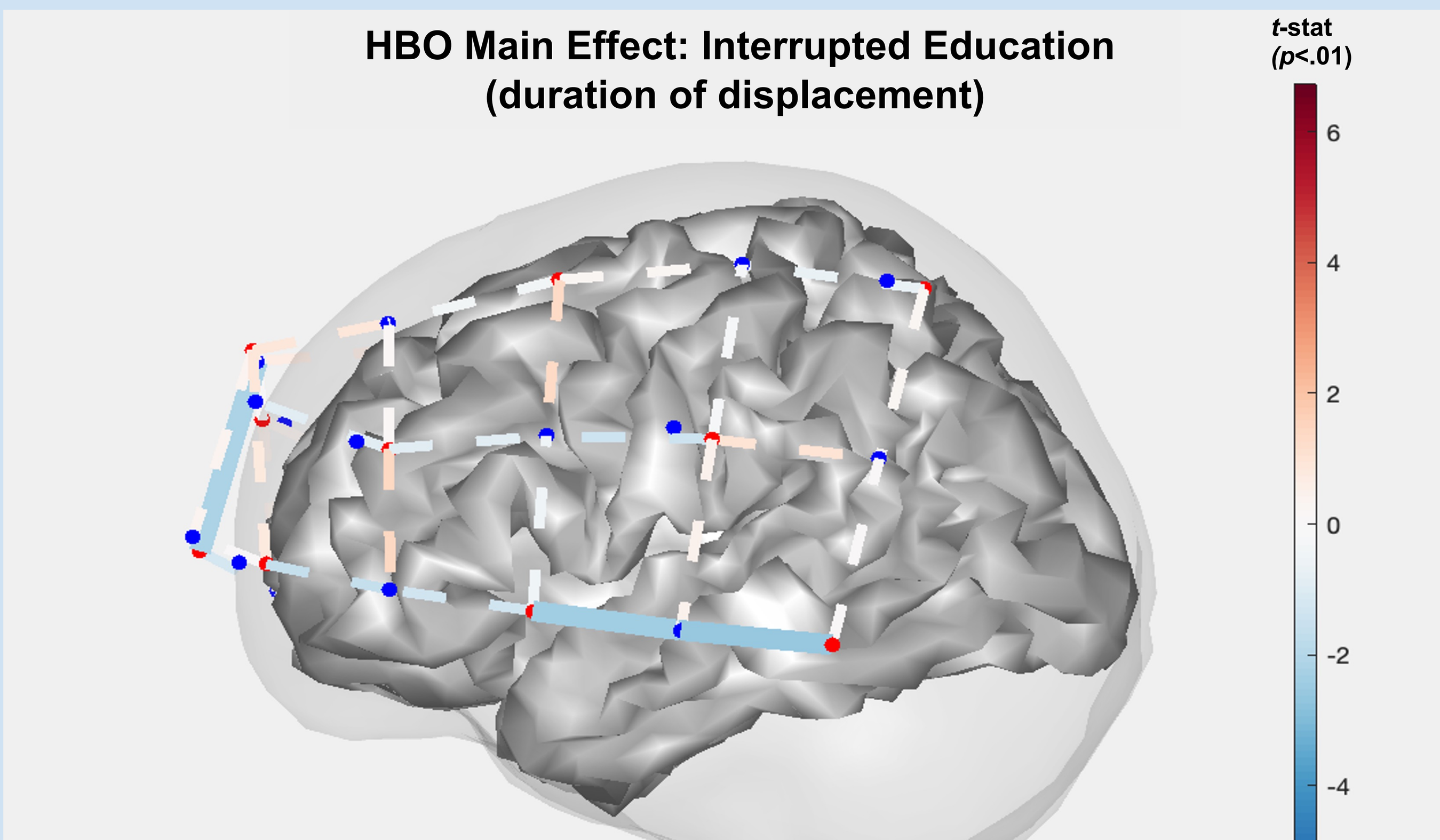
Participants (*n*=9) showed high variability in language & reading performance. Most scores were below the std. mean.



Typical activation for print vs. speech.

HBO Main Effect of Task: (Print - Speech)			
ROI	β	*p*	*q*
L IFG - Pars Triangularis	10.94	.018	.075
R Post-central	-17.36	.008	.046
L Pre-central	24.23	<.001	.001
LSMG	18.38	.007	.046
R temp-pole	-12.72	.013	.061
R STG	-10.65	.009	.046

However, interrupted education is associated with decreased activation in left temporal cortex.



ROI	β	*p*	*q*
LSTG	-1.967	.003	.061

β ~-1 + Condition + Duration of Displacement + Age of Resettlement + (1|Subject)

Discussion

Preliminary behavioural results show a lot of variability in language and reading performance for refugee children, with many performing 2 or more standard deviations below the standardized mean.

Neural results illustrate decreased activation in the left STG for children with longer periods of displacement.

The preliminary neural results suggest interrupted reading instruction contributes to a differential neural activation for language and reading.

Methods

Imaging Tasks

Modality

Print

Speech

Lexicality

Condition	Example
Regular	start / قرأ
Irregular	bouquet / NA
Pseudoword	nobkey / جَرَقْ
False Font / Vocoded Speech	[illegible] / [illegible]

Background Questionnaire

Migration, education, language history (ALEQ-4; Paradis et al., 2020)

Language & Reading Assessments

Phonological Awareness (CTOPP-2; Wagner et al., 2013)

Vocabulary (WIAT; NCS Pearson, 2020)

Decoding (WJ-IV; Schrank & Wendling, 2018)

Reading Comprehension (WJ-IV; Schrank & Wendling, 2018)

Nonverbal IQ (K-BIT; Kaufman & Kaufman, 2004)

Neural Analyses

Data from 47 channels were analyzed using GLM in the Brain AnalyzIR package (NIRs Toolbox; Santosa et al., 2018).

Next Steps

Analyses (contrasts, conjunction, connectivity)

Decoding skills better for children who resettled younger?

Younger resettlement linked with characteristic reading circuit activity?

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