

How ready are Indian children for English medium instruction? An analysis of the productive vocabulary of low SES children in state schools in Hyderabad

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- Vocabulary and reading
  - Importance of vocabulary for school success

Overview

- Reading skills of primary school children in India
- The current study
  - Lexical quality of oral English narratives among children in years 4 and 5 children in EMI in Hyderabad
  - Lexical coverage needed to read Indian textbooks
  - Correlations between lexical quality of oral narratives and reading
  - Correlations between lexical quality and input in English

# Why study vocabulary?



- Vocabulary is a key determinant of reading skills, and these are, in turn, of vital importance for academic success, both in children (Bleses, Makransky, Dale and Højen, 2016) and adults (Trenkic & Warmington, 2019).
- Vocabulary size and depth (Cain & Oakhill, 2014; Ouellette, 2006; Perfetti & Hart,2002; Tannenbaum, Torgesen, & Wagner, 2006).
  - Depth -> comprehension
  - Size -> decoding
- Receptive vocabulary measured in kindergarten explains unique variance in reading comprehension in later school years (Sénéchal et. al. 2006).





#### Vocabulary needed for reading (lexical coverage)

- No absolute lexical threshold for reading.
- 98-99% of words need to be known if a text is to be understood to 70% (Schmitt, Jiang & Grabe, 2011).
- Knowing all words does not mean a reader understands the text.
- At 95% coverage good comprehension not possible.
- ... But how many words are needed for EMI in primary schools...?

# Measuring lexical quality



- Vocabulary tests
  - Often meaning recognition (give L2 prompt and choose from either L1 translation equivalents or pictures)
  - No context
  - Suitability for low SES children learning L2 questionable
- Measuring vocabulary through story tellings
  - Expressive vocabulary
  - Inobtrusive testing suitable for low SES (Gort 2019)
  - Fun activity
  - Measures of lexical diversity widely used as proxy for language proficiency





# Lexical diversity

- The range of vocabulary used in writing/speaking
- Type token ratio: types/tokens
  - The cat sat on the mat (5 types, 6 tokens): TTR = 0.83
  - The cat sat on the mat by the door (7 types, 9 tokens): TTR =
    0.777
- Index of Guiraud (Guiraud, 1954): types / V tokens
  - Corrects (though not perfectly) for text length
  - Often used as proxy for language proficiency (see Treffers-Daller et al. 2018)

#### Moving Average TTR (Covington & McFall, 2010)

- Computes TTR through a moving window with a fixed text length
- Choose a window length (say 500 words) and then compute the TTR for words 1–500, then for words 2–501, then 3–502, and so on to the end of the text.
- The mean of all these TTRs is a measure of the lexical diversity of the entire text and is not affected by text length.
- Is this an improvement by comparison with traditional measures?





# Indian context

- Annual State of Education Reports (Pratham) consistently reveal low levels of learning outcomes in reading and maths and even report a downward trend between 2010 and 2014 (Banerji & Chavan, 2016; Pratham, 2017).
- Year III: The percentage of all children in Std III who can read at Std II level has increased from 21.6% in 2013 to 23.6% in 2014 to 25.1% in 2016, and finally to 27.2% in 2018.
- Year V: Slightly more than half of all children enrolled in Std V can read at least a Std II level text. This figure has inched up from 47.9% in 2016 to 50.3% in 2018.

# English medium instruction (EMI)



- EMI on the rise across the world (Dearden, 2014)
- India: Demand for EMI is on the increase, particularly at the school level, in order to access opportunities in the tertiary level and for employment. EMI is equated with good education and learning outcome, but studies don't support this parental assumption
- Elite urban schools have access to teachers with C1 to C2 levels of English for reasons of class and economic background. Low SES children lose out.
- Low SES is one of the key factors that negatively affect learning outcomes (Alcott & Rose, 2017).





# THE CURRENT STUDY





- What is the lexical quality of English stories told by low SES children in years 4 and 5 in Indian primary schools?
- 2. Which levels of coverage are needed to read *My English World* (Telangana textbook)?
- 3. To what extent does lexical quality as measured with lexical diversity measures correlate with reading as measured with the ASER tool?

- Is Moving Average TTR better predictor than Guiraud?

4. To what extent does amount of English input correlate with lexical quality of narrative retelling?



# Methods - Participants

	Slum	Non- slum	total
female	38	15	53
male	23	14	37
total	61	29	90



Year 4: 67 and Year 5: 23 Ages: M = 9.92 (range 7-12) Only children who opted to tell story in English (20%) from participants in EMI in Hyderabad

# Frequency of Home Languages Spoken





- Story retelling task
- Multilingual Assessment Instrument for Narratives (MAIN, Gagarina et al. 2012)





# ASER tool: letter and word reading



Used in annual household surveys conducted by Pratham, a non-governmental organization, among 600,000 participants in every district in India.







Story

Para In front of my house is a hill. It has a forest. We play on the hill. We hide behind the trees.

A big tree stood in a garden. It was alone and lonely. One day a bird came and sat on it. The bird held a seed in its beak. It dropped the seed near the tree. A small plant grew there. Soon there was another tree. The big tree was happy.





# **Textbook** analysis



# Telangana (Dept of Education)

- 5 texts from year 4
- 5 texts from year 5
- Vocabprofile analysis
  (Vocab frequency layers)
- Lexical diversity





#### Data treatment

- Narratives were transcribed and analysed with CLAN (McWhinney, 2000)
- Types were counted on the morphosyntactic tier
- Lemmatized transcripts
  - All inflected forms of a word are counted as tokens of one type
    - *run, runs, running, ran*: tokens of one type
    - *runner*: separate type (derived forms)
  - Lemma is unit of counting

# Computation of MATTR:



		_
2 a	3 in	30 Total number
1 also	1 it	of different item
1 and	4 jump	types used
6 ball	1 one	types used
21 be	1 sad	139 Total number
8 boy	7 see	of items (tokens)
8 butter+fly	3 take	
11 cat	35 the	
2 come	1 there	0.216 Type/Token
1 day	1 this	ratio
3 eat	1 tree	Ο 520 ΝΛΛΤΤΡ
5 fish	1 water	0.525 WATT
1 garden	1 where	
1 give	1 who	
6 go		

1 have





# **1. DESCRIPTIVE RESULTS:** NARRATIVES AND ASER





# Example of a learner's cat story

 One day, cat is seeing a yellow butterfly and cat is catch a butterfly. Butterfly is flying. Butterfly is, then one boy is coming on a fish, a ball and a fish bucket. Boy ball, boy ball is from there water. Cat is chase the butterfly and uh down a tree. Ball is, uh boy is crying. Cat is seeing a fish bucket. Boy is crying and his fish uh fish, fish, umm, and taking a ball. And ball is coming and boy is taking and happy. Cat is seeing a fish and please please the cat is eating a fish and boy happy.





# Lexical Diversity: Index of Guiraud

	Mean	Min	Max	StD
Retelling	3.34	1.56	5.38	0.77
MAIN stimulus	6.67			
My English World	8.96	6.83	11.44	1.36
(textbook)				

Differences between retelling Years 4 (3.4) and 5 (3.17) n.s.

*My English World*: Significant difference in LD between texts from Year 4 (8.01) and Year 5 (9.75) (t -= 2.674, df = 9, p = -.025)





## Differences in ASER scores across years?



## ASER results

	min	max	mean	SD
Letters correct	0.00	10.00	9.78	1.10
Words correct	0.00	10.00	7.64	2.76
Sentences (Correct lines)	0.00	4.00	3.06	1.40
Paragraphs (correct lines)	0.00	8.00	5.57	2.97
Sentences_Total(12)	0.00	12.00	8.62	4.26
Total score (max 34)	0.00	34.00	26.69	7.69





#### **ASER total**



Mean = 7.64, SD 2.7

Mean = 26.69, SD 7.67





#### Moving Average TTR (Covington & McFall, 2010)

	mean	min	max	SD
MATTR	0.72	0.49	0.89	0.09

Retellings Window size set at 16 in current study (excluded 3 learners)

With window sizes of 100 and 500 words, typical MATTRs are 0.8 and 0.6 respectively.





- Good ASER reading average scores, but long tail of low performers
- Mismatch between lexical quality of oral narratives and textbooks
- No differences between lexical quality of narratives over two years





# 2. LEXICAL COVERAGE NEEDED TO READ TEXTBOOKS/UNDERSTAND STORY

# Lexical profiles K1-K11









## Lexical profiles K2-K11







## My English world: lexical coverage



# Mid/low frequency vocabulary in *My English World* (Telanga, Dept of School Education)

K5	K6	K7		K8		К9
bold	creaked	archer	-	mango		fodder
blossomed	heartily	hoarse	9	pounces		nutrition
merciless	gulped	nipped	b	sizzled		peacock
stumbled	lobster	peepe	d			
K10	K11		K12		K1	.3
ladle	forefathers				_	
			cake ("cak earth	d ed n″)	pir	ncer
pester	fro ("to and	d fro")	cake ("cak earth crock	d ed n") kery	pir	ncer





#### Lexical coverage of MAIN stories







- Oral narratives: generally words only from two highest frequency layers (1K – 2K)
- Discrepancy with textbooks: words up to 13K
- Lexical coverage of 98% for textbooks: reached at 8K
- Many children likely to not have the required vocabulary knowledge to read the textbooks





# **3.** CORRELATIONS BETWEEN LD AND READING (ASER)

# Spearman correlations LD and ASER



	MATTR	Letters	Words	senten ces	paragra phs	Comp qstn	ASER Total
Guiraud	.871**	.162	.261*	.317**	314**	.363**	.404**
MATTR	1.000	.228*	.187	.185	.182	.213*	.264*
Letters		1.000	.430**	.448**	.453**	.168	.457**
Words			1.000	.810**	.790**	.412**	.884**
Sentences				1.000	.826**	.404**	.825**
Paragraphs					1.000	.500**	.909**
Comprehen sion						1.000	.696**





# Text length of the oral stories correlated even more strongly with ASER total score: .460\*\*







# **Partial correlations**

• Controlling for text length

	ASER comprehension	ASER total
Types	.333**	.250*
(lemmatized)	( <i>p</i> =.001)	( <i>p</i> = 0.018)







# Reading is grafted onto oral skills (Gough & Tunmer, 1986)





- Oral vocabulary correlates with reading skills (ASER)
- Guiraud correlates more strongly than MATTR
- Guiraud correlates best with reading comprehension
- Text length of oral stories: strongest correlation with ASER





# **4. LEXICAL DIVERSITY SCORES AND INPUT**

#### **Overall Teacher language use (English medium)**



## Spearman correlations

LD measure/ASER	Percentage English
	input in classroom
MATTR	0.417*
Guiraud	0.451*
ASER English	0.189*

Around 20% of the variance in LD is explained by percentage English input in the classroom.

#### Scatterplot Guiraud lemma/percent English input





#### Conclusions



- Children with low English vocabulary levels struggle to tell the story, despite having attended EMI for several years
- Vocabulary levels: 2k at most?
- No difference between years 4 and 5 in ASER and LD scores
- Mismatch between English in textbooks and children's vocabulary knowledge
- LD correlates with reading measures (ASER)
  - Guiraud better than MATTR
  - Guiraud correlates most strongly with reading comprehension
  - Or is a simple measure of text length enough to measure "lexical quality"?
- 20% of LD explained by percentage of English input





# Conclusion: are the children ready for EMI?

- Children with good oral vocabulary skills are better readers
- But: children with low oral vocabulary are not ready for EMI
- Language proficiency (including vocabulary) needs to be developed further
- Key question: how much English vocabulary is needed for EMI?

# Limitations and ways forward



- Limitations
  - MATTR had to be set at a very low level, due to short texts
  - No separate vocabulary test included in test battery
- Next steps
  - How does quality of narrative structure and grammatical complexity relate to reading skills?
  - How do pedagogical approaches affect oral and reading skills?
- Pedagogical implications
  - Different approach to reading necessary?
  - Textbooks need to be adjusted to learners' levels
  - Implications for teacher training?











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