Literacy Profiles and Literacy Predictors for Early Learners on the autism spectrum

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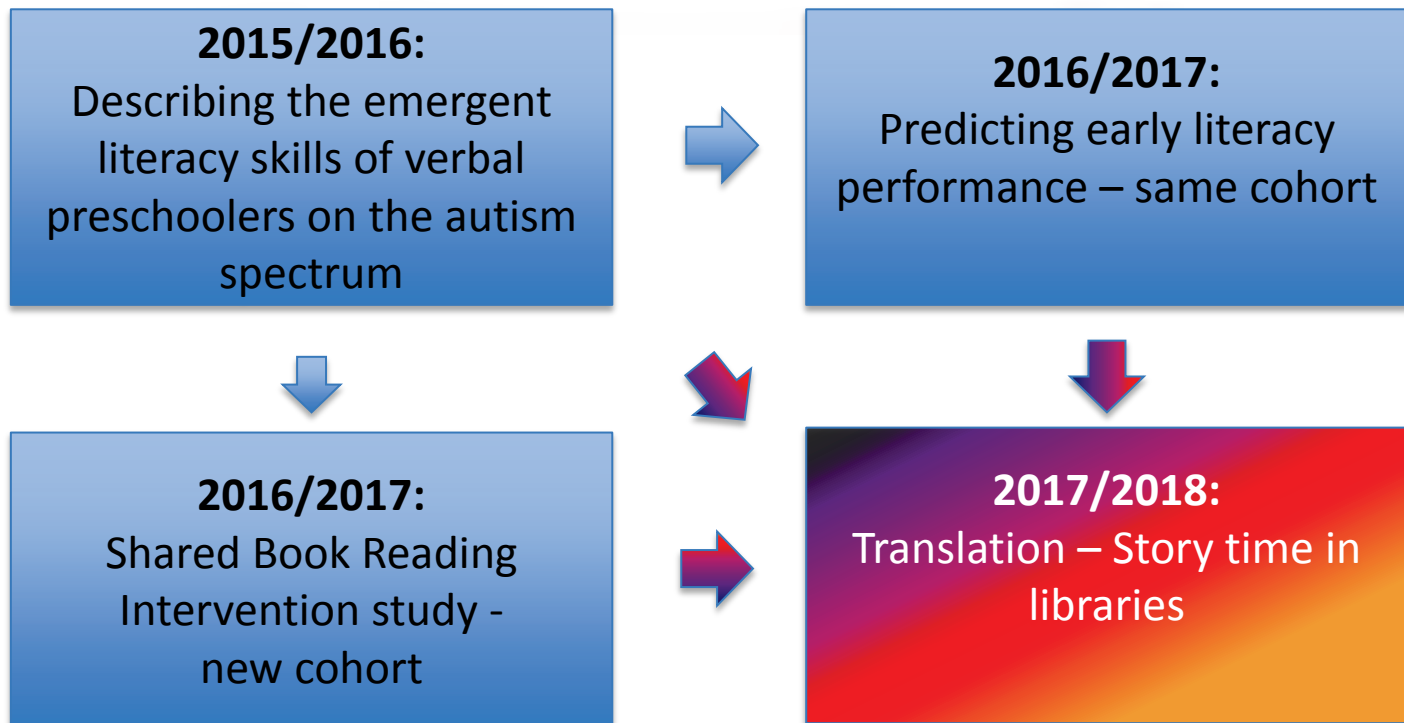
CRC volunteer:
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Rationale for our program of research

- Autism Spectrum Disorder (ASD) affects ~ 1 in 200 school-age children in Australia

- 95% of these children experience challenges in education due to social, communication and learning difficulties.

- About 50% of children with autism struggle to read.

- Some children with autism do not learn to read at all.

- A majority of children with autism show difficulties in reading comprehension

- Improved knowledge of the development of early literacy skills in children with autism will help guide intervention practices and inform future research.

(Arciuli et al., 2013; Nation et al., 2006; Ricketts et al., 2013)

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Overview of our Autism CRC program of research

2015/2016:
Describing the emergent literacy skills of verbal preschoolers on the autism spectrum

2016/2017:
Predicting early literacy performance – same cohort

2016/2017:
Shared Book Reading Intervention study - new cohort

2017/2018:
Translation – Story time in libraries

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Overview of the Presentation

- Emergent literacy – an overview

- Unpacking the constructs - with examples of tasks

- (emergent) literacy development in children with ASD – what do we know and what did we find?

- Future studies

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Emergent literacy skills

Children are typically in the emergent literacy stage from birth to about 5 years.

During this period, most children will:

- Show a keen interest in print
- Pretend to read books
- Play with writing utensils, write 'stories'
- Enjoy sharing books
- Participate in sound games, rhyming words, alliteration
- Use literacy themes in their play

Source: Justice, 2006

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Emergent literacy theory

- Literacy development begins at birth, and many milestones are achieved before children start school
- There is a bidirectional relationship between literacy- and language development
- Children are active participants in the literacy development process
- Children acquire much of their literacy knowledge incidentally
- Children's literacy development is guided by adults
- Early literacy achievements tend to follow a developmental sequence

Source: Justice, 2006

The simple view of reading (Gough & Tunmer, 1986)

Reading comprehension (RC) =
word recognition (WR) x language comprehension (LC)

- For Reading Comprehension to occur none can be equal to zero
- Unique contributions of WR and LC to RC
- Changing contributions over time

Emergent literacy skills can thus be regarded as:
Code- or print-related skills and   meaning-related skills

Emergent Literacy Skills

1. We need **print-related skills** to <u>decode</u> the written word
2. We need **strong oral language skills** to <u>understand</u> the written word.

Print-related skills	Oral language related skills
Phonological awareness	Vocabulary knowledge
Letter knowledge	Grammatical ability
Print concepts	Discourse skills / story telling and comprehension

The home literacy environment

- The importance of a 'rich' home literacy environment:
- Frequency of shared book reading is positively related to expressive vocabulary in 4-year-old children with typical development
- Frequency of book reading is also associated with higher levels of print knowledge
- Relationship for children with language impairment less clear
- Quality of shared book reading is also important

Boudreau, 2005; , Lanter et al., 2012; Petrill et al., 2014; Reese & Cox, 1999; Senechal, 2006

CRC-funded project no 1.

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ORIGINAL PAPER

The Emergent Literacy Skills of Preschool Children with Autism Spectrum Disorder

M. F. Westerveld[1,2,5] · J. Paynter[2,3,5,8] · D. Trembath[2,5] · A. A. Webster[1,5,6,7] ·
A. M. Hodge[4,5] · J. Roberts[1,5,6]

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Methods

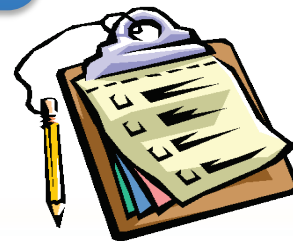| Print related skills	Meaning related skills
Phonological awareness	Vocabulary knowledge
Letter name and sound knowledge	Grammatical ability
Print concepts	story telling and comprehension
Early writing	

Home book reading observation

Adapted the tasks:
- duration
- language complexity

57 preschoolers met criteria for ASD

Speak in short sentences
Can participate in preschool type activities
Prior to school-entry

Home literacy questionnaire

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Research Questions

1. How do pre-schoolers with autism perform on print-related and meaning-related emergent literacy skills?

2. Are oral language skills, nonverbal cognition, and autism severity associated with print-related and/or meaning-related emergent literacy skills in preschool-age children with autism?


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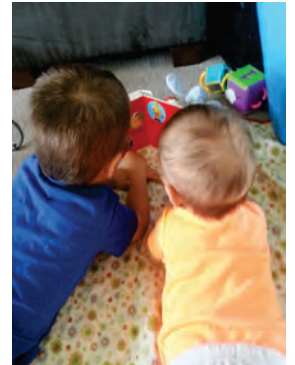
Group performance

Table 1 Group performance on measures of autism severity, nonverbal cognition, and oral language

$n = 57$	Mean	SD	Range
Age (in months)	57.6	6.11	48–70
SCQ	15.790	5.753	5–32
Nonverbal cognition	79.11	19.53	44–119
VABS-II: communication SS[a]	83.929	11.659	57–110
VABS-II: spoken communication AE[a]	35.902	9.893	17–69
VABS-II: written communication AE[a,b]	54.036	10.839	29–73
PPVT-4—SS	90.0	16.3	64–127

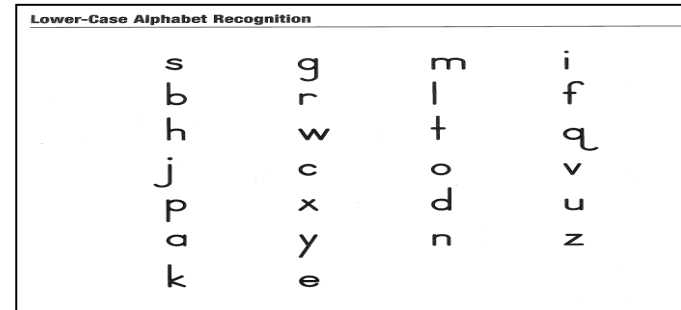# Unpacking the constructs – Letter Knowledge

- Recognise or name the letters

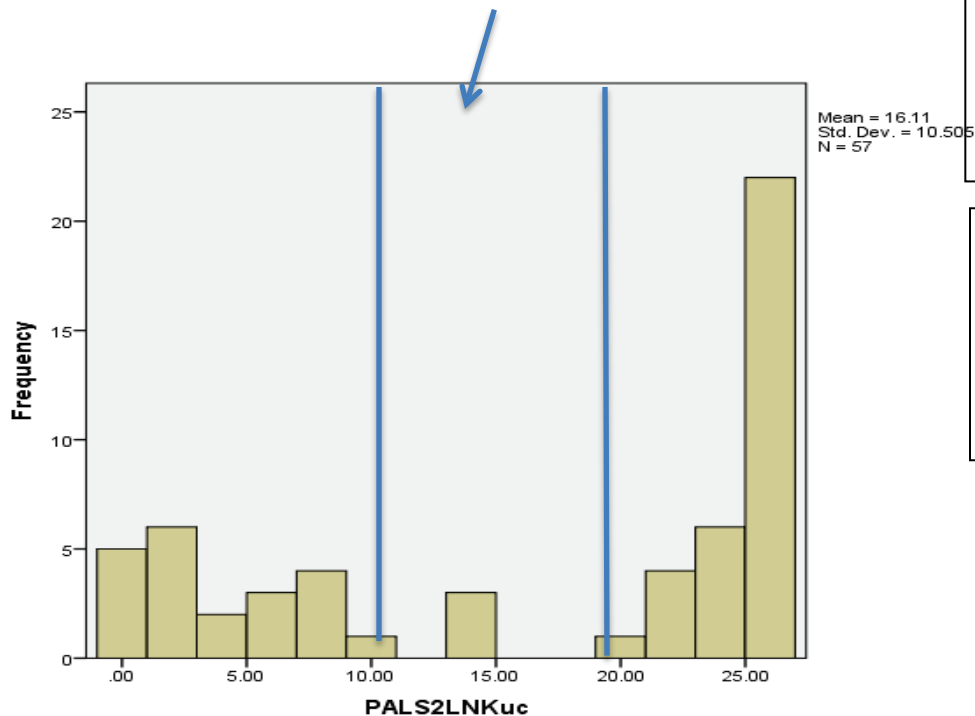- Knowing the sound/s the letter/s make

Byron LNK.mp4

https://www.youtube.com/watch?v=C2SRf2JFUdI

Lower-Case Alphabet Recognition
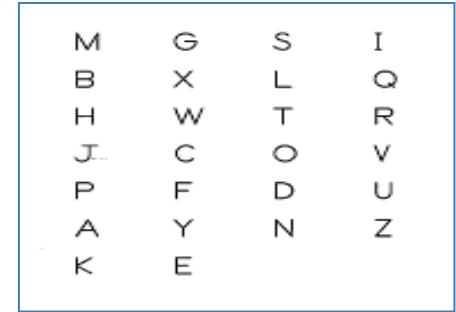
Letter name and letter sound knowledge

PALS Pre-K

Mean = 16.11
Std. Dev. = 10.505
N = 57

Scores: 0 – 26
Mean: 16
63% score within or above the expected range for pre-K children

Scores: 0 – 25
Mean: 9
53% score within or above the expected range for pre-K children

Lower-Case Alphabet Recognition

s	g	m	i
b	r	l	f
h	w	t	q
j	c	o	v
p	x	d	u
a	y	n	z
k	e		

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Phonological Awareness (PA)

"The conscious awareness of sounds in spoken words"

- Typically develops from larger to smaller linguistic units (syllables, onset-rime, phonemes).

- PA can be seen in children as young as three years of age.

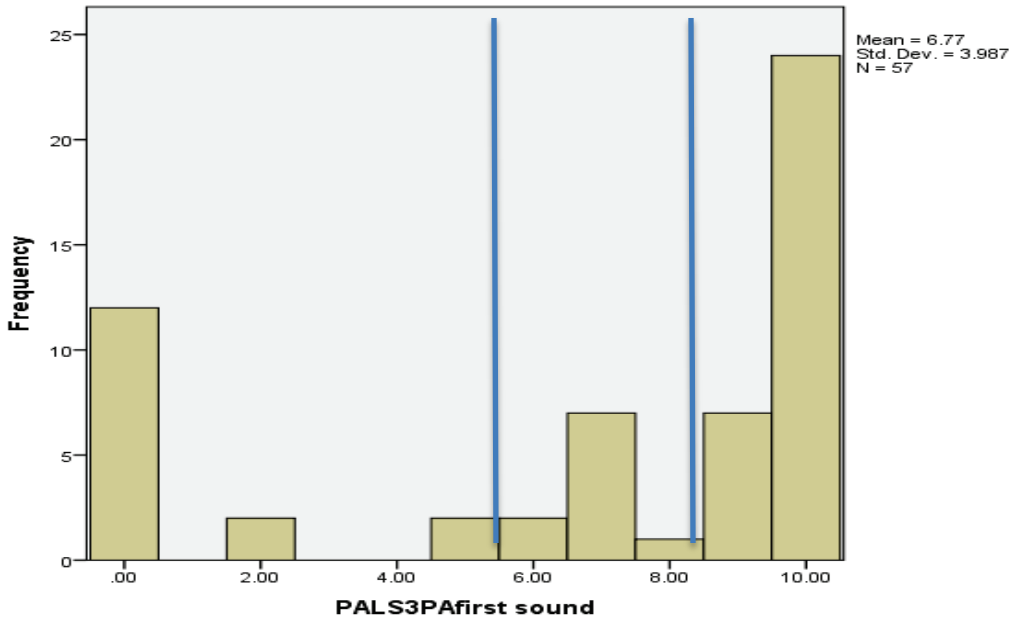- How do we assess phonological awareness in young children?

https://www.youtube.com/watch?v=Ep0bySNVyRw

demo

Phonological Awareness

PALS Pre-K

Scores: 0 – 10
Mean: 6.8
75% score within or above the expected range for pre-K children
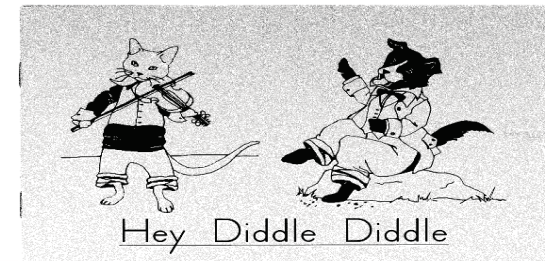

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Print Concepts - (print & word awareness)
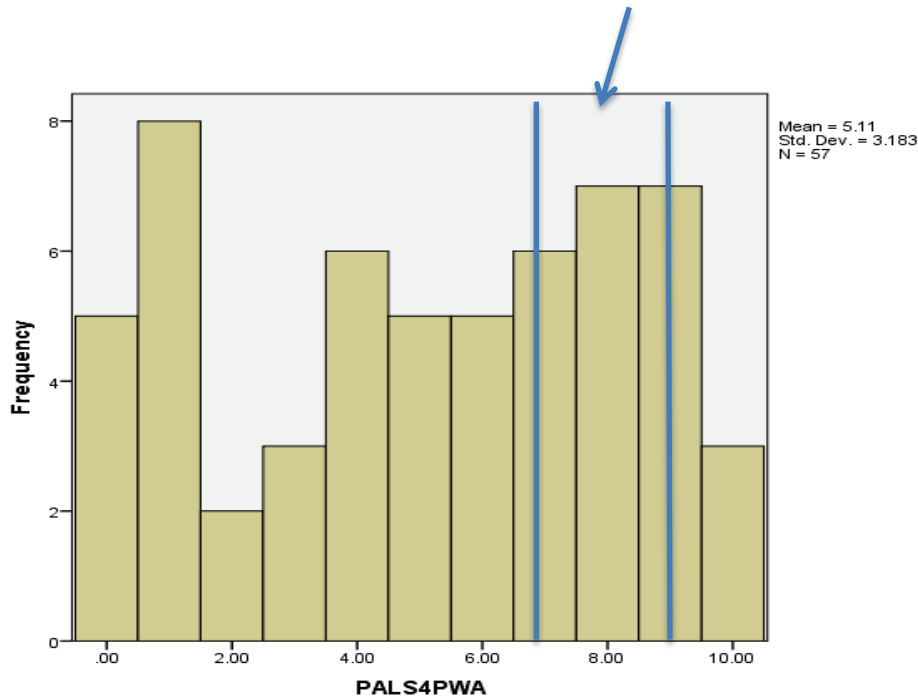
Scores: 0 – 10
Mean: 5.1
40% score within or above the expected range for pre-K children

Story comprehension

Mean = 1.40
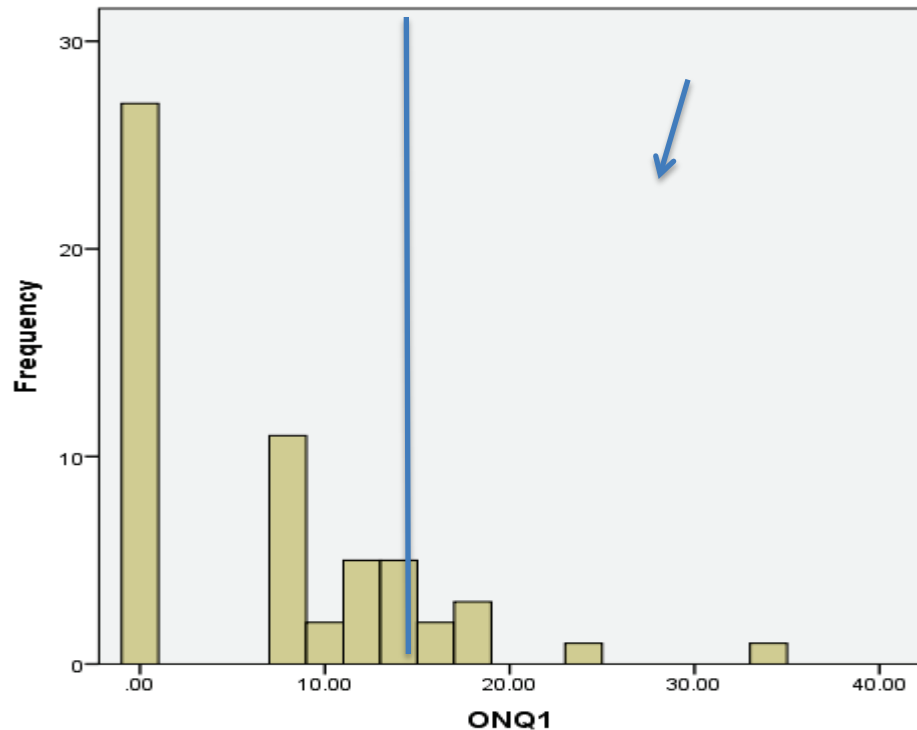Std. Dev. = 1.761
N = 57
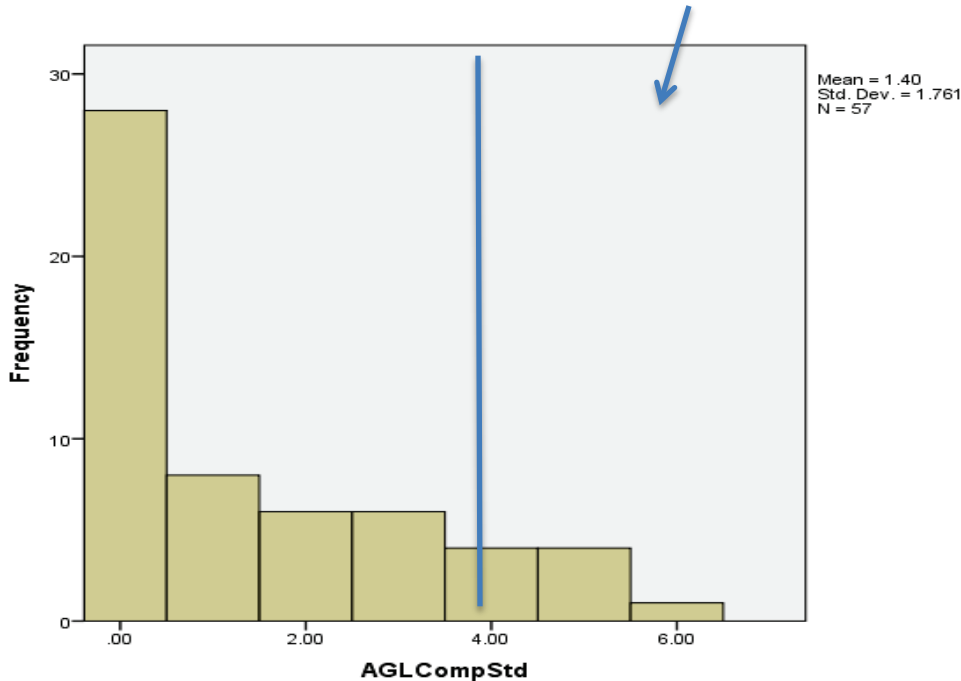
Scores: 0 – 8
Mean: 1.4
16% score within expected range for 4-year-old children (>25th %)

Note: 54% scored WNL on the PPVT-4

Story retelling

Scores: 0 – 34
Mean: 6.7
14% score within expected range for 4-year-old children ($> 25^{th}$ percentile)

Correlations

Multiple regressions showed:

- 34.3% of the variance in print-related ability scores was predicted by Autism severity, nonverbal cognition, Spoken Communication (VABS scores), and Receptive vocabulary (PPVT). Only vocabulary was a significant individual predictor.

- 40.7% of the variance in meaning-related ability was predicted by Autism severity, nonverbal cognition, and VABS spoken communication. All three were significant individual predictors.

Nonverbal cognition

When dividing our group into low NVIQ (<70, n = 21) and higher NVIQ (≥ 70, n = 36), we found:

- No differences on LNK or PA.

- Small to medium effect sizes were found for group differences on all other measures ($p < .05$)

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Conclusions

Measures:

- The tasks seem suitable and doable for verbal preschoolers with autism

- As a group the children showed relative strengths in print-related skills of PA, Letter name and letter sound knowledge.

- Significant difficulties were found in story retelling and comprehension.

- Vocabulary knowledge shows significant correlations with both print- and meaning-related emergent literacy skills.

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CRC-funded project no 2. – Predictors

- 41 families were seen for follow-up
- Children had attended prep 6 – 12 months
- Children were assessed on measures:
  - reading accuracy (single words and passages),
  - reading comprehension,
  - and phonological awareness.

CC2

The Castles and Coltheart 2 (CC2) tests different processes in single-word reading.

Sutherland Phonological
Awareness Test – Revised

SPAT-R Manual

York Assessment of Reading for Comprehension
Passage Reading
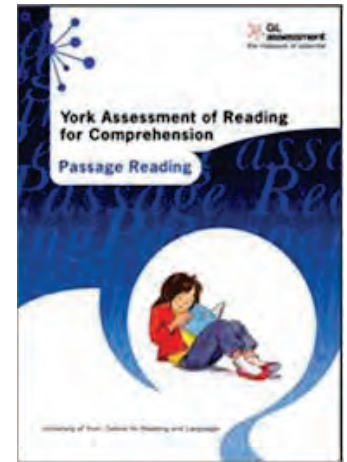
Participant details

	n	Mean	Range	SD
Gender (M/F)	35/6			
Age (months)	41	73.4	66-81	4.5
Months of schooling	41	9.2	4-12	2.0
CELF Core Lang*	38	75.6	45-122	20.5
DEAP PPC	38	92.1	59-100	8.9

- Scores between 85 – 115 are considered within typical limits.
- PPC = percent consonants correct

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Preliminary results

	n	Mean	Range	SD	WNL#
Regular words* (z-score)	39	- 0.45	-1.58 – 2.05	1.1	56%
Irregular words*	39	- 0.28	- 1.58 – 2.53	1.4	51%
PA (SPAT-R) - PR	39	44.4	2 - 99	39	61%
Letter sounds PR	41	48.2	2 - 98	36	71%
Reading accuracy PR	21	54.7	4 - 98	34	43.9%
Reading comp PR	21	32.1	2 - 94	38	19.5%

- * Z Scores between -1 and +1 are considered within typical limits.
- PR = Percentile rank – scores between 16 and 84 are within normal limits
  # calculated on the total cohort of 41

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Preliminary results

- Approx. half of the children were able to participate in the passage reading task (from 5;06).

- 44% of children performed WNL - 56% of the children showed significant reading accuracy difficulties

- Just over 80% of the children showed early reading comprehension deficits

1. Which preschool emergent literacy skills are predictive of early reading accuracy and/or comprehension skills?
2. Which Prep skills correlate with reading accuracy/comprehension skills?
3. Can we predict prep group membership (good vs poor decoders) based on pre-school skills?

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We used the Ability score / first passage of YARC as outcome variables:

- Accuracy(n = 39)
- Comprehension(n = 36)

Best predictors are:

- Reading accuracy in Prep – oral language and IQ important, but **Letter Sound Knowledge** at 4 only individual significant predictor
- Reading Comprehension in Prep: **Receptive vocabulary** and **IQ** at age 4

Question 2: Concurrent correlations

After controlling for IQ:

- Reading comprehension ability in Prep shows significant correlations with story comprehension (r = .744) and standardised language test scores (r = .564)

- Reading accuracy ability in Prep shows significant correlations with single word reading, letter sound knowledge, and phonological awareness

As you would expect from typically developing students.

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Can preschool oral language and emergent literacy performance predict whether students will be average or below average readers in their first year of formal schooling?

Yes: Main contributors are Oral language, name writing, and Rapid Automatic Naming with very high sensitivity and specificity.

Now let's have a look at our final project
– Shared Book Reading

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Shared book reading intervention for preschoolers on the autism spectrum, specifically targeting meaning-related emergent literacy skills in a context that is part of most families' routine.

https://www.youtube.com/watch?v=Z-Zuh0y8f98

Future directions

- **Story time project**, involving the First Five Forever team, Brisbany City Council Libraries

- **Creating a video** outlining our results and containing a **checklist** for teachers on how to check early literacy progress in students on the autism spectrum.

- Investigating ways to provide **targeted intervention** for pre-school and young school-age children on the autism spectrum who show early signs of reading difficulties.

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Final words – for now ☺

- **Fostering emergent literacy development** during the preschool years is important to aim for reading success for children at risk of persistent literacy difficulties, including children on the autism spectrum.

- **Assessment of emergent literacy skills** during the preschool years is doable and predictive of early reading skills once children start school.

- **Monitoring early literacy** development is vital, considering the high levels of literacy failure in this population.

- **Providing early targeted intervention** is essential.

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Thank You !

"The more you **read** the more **things** you know. The more that you **learn** the more **places** you'll go."

-Dr. Seuss

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