



## Emergent literacy development in young children on the autism spectrum

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**CHLD Network**  
Child Health, Learning, and Disability


### Introduction

Literacy helps us connect with the world around us.

Literacy is a cornerstone of academic success.

Literacy proficiency is linked to better academic achievement, socio-emotional wellbeing, academic outcomes, and vocational attainment

**Literacy is a basic human right.**



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

Dr Seuss

### Autism Spectrum Disorder (ASD) & Education

92% of children with ASD experience challenges in education due to social, communication, and learning difficulties.

Majority of teachers can expect to have 1+ students with autism in their class each year

Highly heterogeneous group, there's no "one size fits all" for inclusion

### Did you know?


About 50% of children on the spectrum struggle to read.

Some of these children do not learn to read at all.

A majority of children on the spectrum show difficulties in reading comprehension

Knowing how these children develop early literacy skills will help guide (early) supports

Let's look at some theory

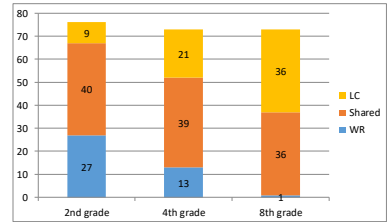


### Some theory

#### The Simple View of Reading:

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

### Unique and shared contributions to reading comprehension across grades



Grade	WR (%)	Shared (%)	LC (%)
2nd grade	27	40	9
4th grade	13	39	21
8th grade	1	36	36

From learning to read to learning through reading Catts, Hogan, and Adlof (2005)

## Emergent literacy period

Literacy learning happens long before children start their formal schooling – some children stay in this period during the first few years of school

- ❑ Shared book reading
- ❑ Playing with writing utensils
- ❑ Pretending to read books
- ❑ Participating in sound games
- ❑ Engaging in literacy-related themes
- ❑ Environmental print
- ❑ .....



## Key emergent literacy skills

**Reading comprehension (RC) =**

**word recognition (WR) x language comprehension (LC)**

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

Print-related skills	Oral language related skills
Alphabet Knowledge	Vocabulary knowledge
Phonological Awareness	Grammatical ability
Print concepts	story re/telling and comprehension
Emergent name writing	

## Alphabet knowledge

Recognise or name the letters

Knowing the sound/s the letter/s make

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		



## Phonological awareness (PA)

- ❑ 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.
- ❑ We are particularly interested in phoneme-level awareness, for example, *'what is the first sound in 'dog'?*

dog / house  
d / og  
d / o / g



## Print concepts



### 1. Book conventions – how books 'work'

How to hold the book; There is a beginning and an ending; There are pages etc.

### 2. Print conventions

Read from front to back, page by page, top to bottom etc.

### 3. Print form

words are separated by spaces, difference between words, letters, numbers, point to individual words, words are made up of letters etc.

## emergent name writing



What does that say?

## Oral language skills

Includes vocabulary, grammar, and story retell/comprehension skills.  
 Vocabulary is a powerful predictor, but good vocabulary alone is not enough!  
 Story retelling skills in particular have been shown to be predictive of future academic performance.

## Vocabulary

- How many words does the child know?
- How many different words does the child use?
- What types of words does the child know and/or use?



## Oral narrative (fictional stories)

Story retelling skills AND story comprehension skills.  
 To find out:

- the child's ability to answer questions (factual / inferential)
- the quality of the retell (is it a good story – story structure),
- and the child's ability to use correct grammar and appropriate vocabulary.



Crucial predictor of future reading comprehension skills

## 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 in typically developing children
- Quality** of shared book reading is even more important



## Some of our findings

Journal of Autism and Developmental Disorders  
<https://doi.org/10.1007/s10803-020-4480-5>

**BRIEF REPORT**

**No Differences in Code-Related Emergent Literacy Skills in Well-Matched 4-Year-Old Children With and Without ASD**  
 Marleen F. Westerveld<sup>1</sup> · Jessica Paynter<sup>2,3</sup> · Amanda Brignell<sup>4,5</sup> · Sheena Reilly<sup>6,7,8,9</sup>

**ORIGINAL PAPER**

**The Emergent Literacy Skills of Preschool Children with Autism Spectrum Disorder**  
 M. F. Westerveld<sup>1,2</sup> · J. Paynter<sup>3,4,5,6,7,8</sup> · A. A. Roberts<sup>9,10,11</sup> · A. M. Brady<sup>12</sup> · J. Bealby<sup>13</sup>

**RESEARCH ARTICLE**

**Parent perceptions of literacy learning of their young children on the autism spectrum in their first year of schooling**  
 Katherine A. O'Leary  
 Bev Flückiger  
 Jessica Paynter  
 Marleen F. Westerveld

**RESEARCH ARTICLE**

**The Oral Narrative Comprehension and Production Abilities of Verbal Preschoolers on the Autism Spectrum**  
 Marleen F. Westerveld<sup>1</sup> and Jacqueline M. A. Roberts<sup>2</sup>

**RESEARCH ARTICLE**

**Preschool Predictors of Reading Ability in the First Year of Schooling in Children With ASD**  
 Marleen F. Westerveld · Jessica Paynter · Kathryn O'Leary, and David Trembath

## Who participated

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	

**We adapted the tasks:**

- duration
- language complexity

57 preschoolers on the spectrum

Home book reading observation

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

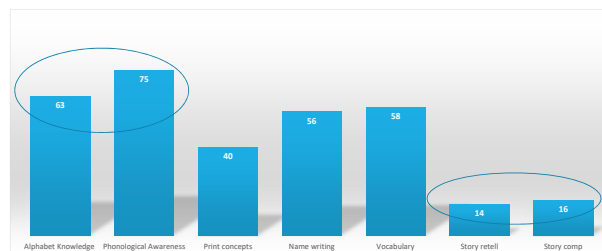
Home literacy questionnaire

### Our questions:

1. How do pre-schoolers on the spectrum perform on print-related and meaning-related emergent literacy skills?
2. Is their performance prior to school predictive of their performance one year later?
3. What may explain some of the difficulties these preschoolers have in literacy related skills?



### What we found: relative strengths and challenges % children performing within expected range



### One year later

At the end of their first year of schooling:

Approx. **half** of the children were able to read a short passage (a skill most 5½ year olds master).

- **44%** of children performed within grade expectations - 56% of the children showed significant **reading accuracy** difficulties
- **Just over 80%** of the children showed early **reading comprehension** deficits



### A common myth

**ONE** Children with autism show strengths in ~~reading~~ coding.



### Why at risk?

- Autism core features
  - Restricted interests and repetitive behaviours
  - Social communication difficulties ~ difficulties with inferencing
- Associated cognitive features
  - Theory of Mind
  - Local processing bias (formerly Weak Central Coherence)
  - Executive functioning (e.g., working memory, mental flexibility)
- Co-occurring conditions
  - Language
  - Behaviour and mental health
  - intellectual impairment



### Autism Spectrum Disorder (ASD, 2013)



#### Social Communication

- Impairments in:
  - Social/emotional reciprocity
  - Non-verbal communication
  - AND
  - Relationships



#### RRB

At least 2 of the following:

1. Stereotyped or repetitive movements
2. Insistence on sameness
3. Circumscribed interests
4. Sensory responsivity

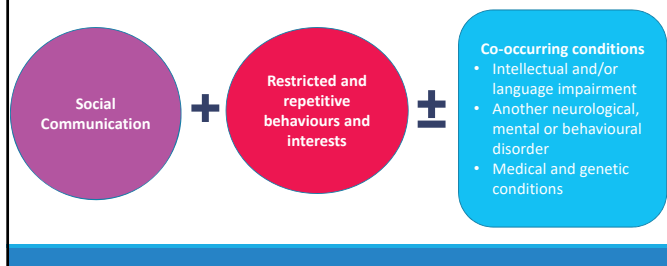
#### Levels of Support

- 1: Requiring support
- 2: Requiring substantial support
- 3: Requiring very substantial support

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## Autism Spectrum Disorder (ASD)

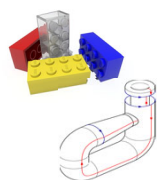


## Social communication

- Desire to communicate
- Something to communicate about
- A method to communicate
- Able to detect the response
- Able to interpret the intent of the message (written or spoken)
- Able to respond to the intent of the message
- Consider how this may affect engaging in reading activities



## Restricted interests



- Intensity
- Type
- Focus
- Detail



- 
- Not interested in stories that are not special interest
  - Special interest focus more detailed than typical

## Repetitive behaviours

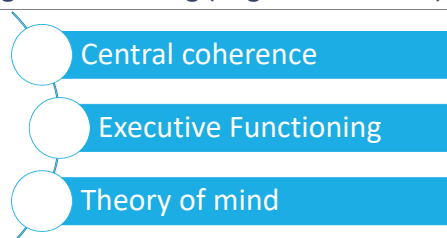
- Repetitive motor, verbal behaviours
- Insistence on sameness
- Generalising learning from one context to another

### Function of Repetitive behaviours

- Self regulation
- Sensory

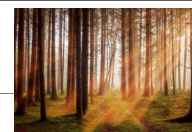


## Thinking and Reasoning (Cognitive features)



## Central Coherence

- Previously called "Weak central coherence"
  - "Can't see the forest for all the trees"
- Bias towards focus on details rather than big picture
- Explains strengths
  - Fine details, e.g., embedded figures test
- Explains cognitive challenges
  - Perceptual: preference to process information locally vs globally
  - Conceptual: failure to process contextual meaning or use prior knowledge



Examples: unable to use context to make sense of a situation; difficulty generalising from one setting to another

## Executive functioning



The brain's ability to take in information, interpret this information, and make decisions based on this information

- Planning
- Organising
- Shifting attention
- Multitasking
- Response inhibition
- Working memory

## Theory of Mind

- Representing and reasoning about others' minds
- Using this understanding to predict and understand own and other people's behaviours
- Links to the social/communication impairments
- Required to understand and predict story character's feelings, belief, knowledge, and actions

Her: he's probably thinking about other girls...

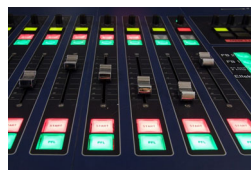
Him: buzz lightyear was in denial of being a toy but still froze when humans were around??



## Co-occurring conditions

**Rule rather than exception, most commonly:**

- Language difficulties
  - Approx. 40%
- Attention Deficit Hyperactivity Disorder
  - 40-70%
- Mood disorders and/or anxiety disorders
  - Up to 70%
- Intellectual impairment
  - Approx. 30%



## Language difficulties

*Simple View of Reading*

Approx. 40% of children diagnosed with ASD have language difficulties

Language competency is needed for reading success – Listening comprehension component of simple view of reading

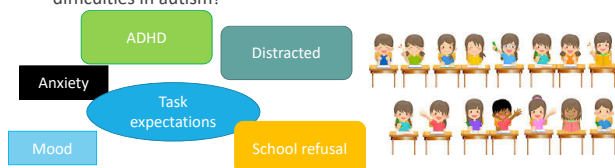
**Language competency:**

- Need to understand the person's language and communication
  - Receptive and expressive modalities
  - At word (vocabulary), sentence (syntax, grammar), and text level (narratives, explanations etc)
  - Inferencing skills are important: ability to connect ideas within and between sentences

## Behaviour & Mental Health

What have you observed in your classroom / at home?

Any other potential explanations for the high incidence of literacy difficulties in autism?



## Intellectual functioning

- Approximately 30% of individuals also show an intellectual impairment
  - Functional impact on learning = slower to learn than peers, needs additional supports to acquire same skills
- Uneven cognitive profiles
  - E.g., Strength in verbal abilities can lead to expectations that don't match working memory or processing speed abilities
- Diagnostic overshadowing
  - Best practice to assess cognitive ability as part of diagnostic assessment but rare in practice (\$)
  - Intellectual impairment may be missed or diagnosed later

## Back to our findings – from preschool:

### Preschool:

#### Print related:

- Many children showed strengths in alphabet knowledge
- Up to 40% of preschool-age children did not meet expectations on print related skills.

#### Oral-language related:

- Most preschoolers struggled retelling a story
- Story comprehension was a challenge.



## From preschool to prep to year 2

### Predicting successful reading in Prep/year 1:

Children who show strong word reading skills in their first year of schooling, performed better on all emergent literacy tasks in preschool: vocabulary, letter sound knowledge, phonological awareness, name writing ..

#### And:

Story comprehension in preschool was linked to reading comprehension two years later (year 2).

Just like we would expect in typical development.....

## In summary: early identification of literacy-related strengths and challenges is crucial

### Teacher Checklist at school entry

#### Check performance on key emergent literacy skills:

- Phonological awareness, alphabet knowledge, name writing
- Vocabulary
- Attention and comprehension
- Story telling



## For further information

We have created a demonstration video for educators:

[https://youtu.be/fdnW\\_4aB7so](https://youtu.be/fdnW_4aB7so)

Find the links on my website.



## Our checklist




Task	Developmental expectations at school entry	Child's Score	Interpretation (e.g. age-appropriate, below expectations)
<b>Print-related skills</b>			
Letter-sound awareness	At least 7 letter sounds correct.		
First sound awareness	At least 6 first sounds correct.		
Name writing	Attempts to write his/her name with some distinguishable letters.		
<b>Vocabulary</b>			
Uses frequently encountered words	Uses a variety of: <ul style="list-style-type: none"> <li>nouns (e.g. common objects, names of familiar people)</li> <li>pronouns (she, they)</li> <li>verbs (go, run, jump, eat)</li> <li>adjectives (big, small, fast, slow, common colours)</li> <li>prepositions (in, on, under)</li> <li>question words (who, where, what)</li> <li>connecting words (e.g. and, because, but, if)</li> </ul>		
Understands frequently encountered words	able to point to most frequently encountered words, when requested, in a shared book reading session		
Uses infrequently encountered words (Tier 2)	Starting to use more sophisticated verbs, and adjectives (e.g. purchased, exhausted, stretched, vanished).		
Understands infrequently encountered words (Tier 2)	Developing ability to follow directions which incorporate Tier 2 vocabulary (e.g. point to the items he purchased).		
<b>Attention and Comprehension</b>			
Attending	able to sit and attend to a book for at least 5 minutes.		




<b>Understanding story elements</b>	Able to answer at least 3 questions related to: <ul style="list-style-type: none"> <li>Who the story is about</li> <li>What happened in the beginning of the story</li> <li>What the problem was</li> <li>How the problem was fixed</li> <li>How the story ended</li> </ul>
<b>Making predictions</b>	Provides a plausible prediction of events of at least 1 sentence (does not need to be correct) in an unfamiliar story.
<b>Story telling</b>	
<b>Story retell</b>	Emerging ability to retell a simple story which includes at least 6 of the following: <ul style="list-style-type: none"> <li>Simple introduction</li> <li>Mentions the main theme in the retell or title</li> <li>Labels the main character's name or title (e.g. brother)</li> <li>Mentions at least some of the supporting characters by name or title (e.g. brother)</li> <li>Starting to provide a rationale for the characters behaviour e.g. goes out because she is bored</li> <li>Events are organised logically, 1-2 events may be missing</li> <li>At least 1 mention of a resolution for the story's problem.</li> <li>Some mention of the way the story ends e.g. they were all happy.</li> </ul>
<b>Recommendations:</b>	

**Byron**

Time 1: Age 4;7



**Lachie**



Emergent Literacy Skills	Performance	Interpretation
<b>Print-related skills</b>		
Letter sound awareness	0	
Phonological awareness	0	
Name writing	2	
<b>Vocabulary</b>		
Peabody Picture Vocabulary Test	Standard Score 77	Time 1: Age 5;4
<b>Attention and Comprehension</b>		
Attending	adequate	
Story comprehension	0	
Making predictions		
<b>Story telling</b>		
Story elements	0	
Sequencing	n/a	

Emergent Literacy Skills	Performance	Interpretation
<b>Print-related skills</b>		
Letter sound awareness	25	
Phonological awareness	10	
Name writing	2	
<b>Vocabulary</b>		
Peabody Picture Vocabulary Test	Standard Score 78	
<b>Attention and Comprehension</b>		
Attending	Appropriate	
Story comprehension	1	
Making predictions		
<b>Story telling</b>		
Story elements	Character, resolution	
Sequencing	n/a	

## Take home messages

1. Assess don't assume: we need to **understand each student's literacy profile**
2. Take each child's individual strengths and challenges into account: restricted interests, detail-focused cognitive style of processing, ToM difficulties, executive functioning, behaviour
3. Use a **team approach** – work with the SLP / Autism coach / Psychologist / Parents

## What's next?

- Literacy Assessment Clinic [free of charge]
- Research project: story comprehension skills of children on the spectrum

Parents/speech pathologists/teachers:

Contact Marleen or Jess if you live in the Gold Coast or Brisbane area and are interested in participating

## Useful resources

Paynter, J., Westerveld, M. F., & Trembath, D. (2016). [Reading assessment in children with autism spectrum disorder](#). *Journal of Psychologists and Counsellors in Schools*, 26(2), 205-217. doi:10.1017/jgc.2016.15

Clendon, S., Paynter, J., Walker, S., Bowen, R., & Westerveld, M. F. (2021). Emergent literacy assessment in children with autism spectrum disorder who have limited verbal communication skills: A tutorial. *Language, Speech, and Hearing Services in Schools*, 52(1), 165-180. doi:10.1044/2020\_LSHSS-20-00030



## Useful resources - continued



Westerveld, M. F., Armstrong, R., & Barton, G. (2020). *Reading Success in the Primary Years: An Evidence-Based Interdisciplinary Approach to Guide Assessment and Intervention* Singapore: Springer Open.

For **links** to our work, YouTube videos, and other websites, visit

[www.marleenwesterveld.com](http://www.marleenwesterveld.com)

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