



Reading instruction for young school-age children with autism: From research to practice

Marleen Westerveld, PhD



Rationale for our program of research

- Autism Spectrum Disorder (ASD) is a **neurodevelopmental disorder** - it impacts on the way the brain develops - affects ability to learn, socialise, self-control, interpret information, memory etc.
- ASD affects **~ 1 in 200** school-age children in Australia
- It is a spectrum disorder with **levels of severity** – not high/low functioning
- 95% of these children experience challenges in education due to social, communication and learning difficulties.



Rationale cont..

- Although not considered a core-impairment, a high proportion of children with ASD demonstrate **reading difficulties**.
- An improved understanding of the development of early reading skills in children with ASD **will help guide intervention practices**, both prior to school-entry and during the school years.



Overview of the presentation

A: Autism – definition + cognitive explanations

B: Typical reading development:

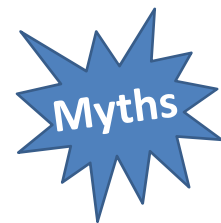
- The Simple View of Reading – and why it matters
- Emergent literacy development

C: Our program of research:

- emergent literacy development in children with autism
- Early reading development of children with autism

D: Implications for reading instruction:

- Reading accuracy / decoding
- Reading comprehension



What is ASD



The slides in this section are taken/adapted from Dr Kate Simpson.

ASD

Social
communication



Restricted and
repetitive
behaviours and
interests



Co-occurring conditions

- Intellectual and/or language impairment
- Another neurological, mental or behavioural disorder
- Known medical, genetic condition or environmental factor

Levels of severity

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



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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
- Able to respond to the intent of the message

RRB

At least 2 of the following:

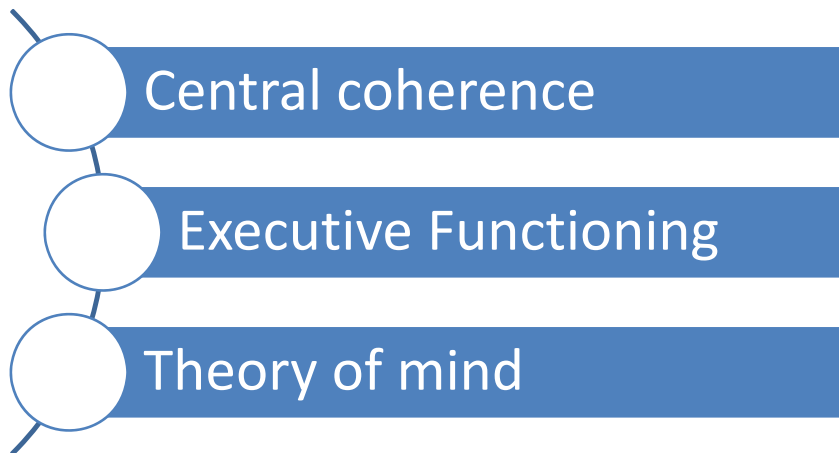
1. Stereotyped or repetitive movements
2. Insistence on sameness
3. Circumscribed interests
4. Sensory responsivity



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Some cognitive explanations:



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Executive functioning



- Planning
- Mental flexibility
- Response inhibition
- Generativity



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Central coherence/detailed focus



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Theory of Mind

- Representing and reasoning about other's minds
- Using this understanding to predict and understand other people's behaviours
- Addresses social/communication impairments

This is an amazing astrological event. This is the first time in recorded history that a heart has been visible on the moon

This is a special night

I am so excited he is going to propose



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Reading Development



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Theoretical links between oral and written language

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

$$\text{Reading comprehension (RC)} = \text{word recognition (WR)} \times \text{language comprehension (LC)}$$

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

But when do children develop their precursor literacy skills? AKA: emergent literacy skills?



Emergent literacy skills development...

- 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 – implications for assessment / early identification of difficulties



Source: Justice, 2006

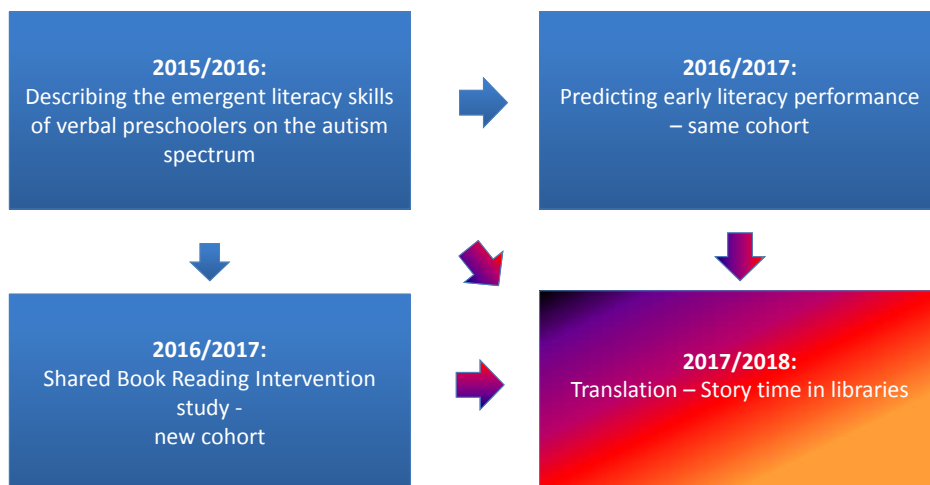
Emergent Literacy Skills

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
Phonological awareness	Vocabulary knowledge
Letter knowledge	Grammatical ability
Print concepts	story telling and comprehension
Name writing	



Overview of our Autism CRC program of research



CRC-supported project no 1.

J Autism Dev Disord
DOI 10.1007/s10803-016-2964-5



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}



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	

Adapted the tasks:

- duration
- language complexity



57 preschoolers met criteria for ASD



Home book reading observation

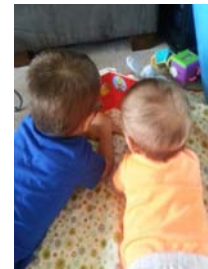
Speak in short sentences
Can participate in preschool type activities
Prior to school-entry

Home literacy questionnaire



Research Questions

1. How do pre-schoolers on the autism spectrum perform on print-related and meaning-related **emergent literacy skills**?
2. Are oral language skills, IQ, and autism severity associated with emergent literacy skills in preschool-age children on the spectrum?



Group performance

Our participants (ages 4.0 to 5, years, 10 months) showed a wide range of skills:

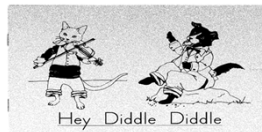
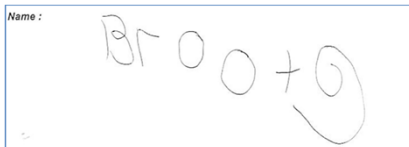
- Some children showed intellectual disability, whereas others showed superior cognitive skills
- Some children had significant language disorders, whereas others performed within the normal range.
- Children demonstrated a range of autism characteristics

So how did the children perform on letter knowledge, print concepts, phonological awareness, and story comprehension?



Print-related skills

- **Letter knowledge:** 63% of the children scored within the expected range (range 0 – 26)
- **Phonological awareness:** 75% of children scored within the expected range (beginning sound awareness; [0 – 10])
- **Print and word awareness:** 40% scored within the expected range (0 – 10)
- **Name writing:** 58% scored within the expected range.



Meaning - related skills

- **Vocabulary:** 54% of the children scored within the expected range for their age (PPVT).
- **Story retelling:** 14% score within expected range for 4-year-old children (> 25th percentile).
- **Story comprehension:** 16% score within expected range for 4-year-old children (>25th %)



Analysing the results

- There was **no** direct link between autism traits (SCQ) and emergent literacy performance (but LNK approached significance).
- Children who showed cognitive impairment ($SS < 70$) performed significantly worse on **all** measures, **except** letter name knowledge and phonological awareness.
- **Receptive vocabulary** was a significant predictor of children's print-related skills



Conclusions: print-related skills

- As a group the children showed relative **strengths** in print-related skills of PA and Letter knowledge.
- **Letter name knowledge** may be related to children's focus on detail – and may not reflect literacy learning more broadly.
- **AND** – a sizeable proportion of children did not meet expectations on print-related emergent literacy skills.



Conclusions: meaning-related skills

- Significant difficulties were found in **story retelling**:
 - Limited inclusion of critical events
 - Descriptive or action sequence, indicating a lack of understanding of goal-directed behaviour.
- Significant difficulties in **story comprehension**:
 - **particularly answering inferential questions** (Why did Ana get bored / scared?) – possible link to challenges with Theory of Mind tasks.



(Westerveld & Roberts, 2017)

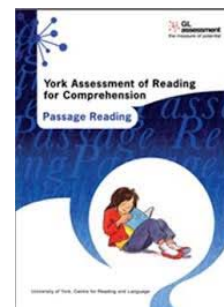
CRC-Supported project no 2. – Predictors of literacy success

- 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.



What did we find?

- Approx. **half** of the children were able to read a short passage (a skill most 5 ½ year olds master).
- 44% of children performed within normal limits - **56%** of the children showed significant reading accuracy difficulties
- **Just over 80%** of the children showed early reading comprehension deficits



Are preschool emergent literacy skills linked to / predictive of reading outcomes in Prep (as we would expect for typically developing children)?



Predictors of word reading / reading accuracy

- **IQ** and **Letter Sound Knowledge** at age 4 predicted 53.4% of the variability in word reading in Prep.
- Autism severity was **not** significantly linked to reading outcomes.
- **Receptive vocabulary** and **IQ** were significant predictors of reading comprehension in Prep.



Links with early reading comprehension

After controlling for IQ:

- Reading comprehension ability in Prep shows significant links with **prep story comprehension** ($r = .744$) and **standardised language test scores** ($r = .564$)
 - as we would expect from typically developing children (Simple View).



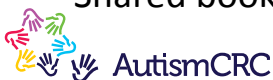
What does this all mean? Preschool period

ONE

Children with autism show strengths in decoding.



- **Assess – don't assume.** We can assess the emergent literacy skills of preschoolers with ASD
- Importance of encouraging emergent literacy skills during the preschool years, including vocabulary, story comprehension, letter sound knowledge, (PA).
- Shared book reading is an amazing context for promoting these skills.



CRC-supported project no 3. Shared book reading

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>



Take home messages from our SBR study

- **social validity** – what did the parents tell us about it? Parents felt that it was a positive way of engaging their children
- **effectiveness** - we saw significant improvements in children's use of language in shared book reading, they were engaged for longer, and showed a greater interest in a variety of book styles.
- But – establishing a book reading routine took time for some families (consider RRB).



Reading instruction – Early Years



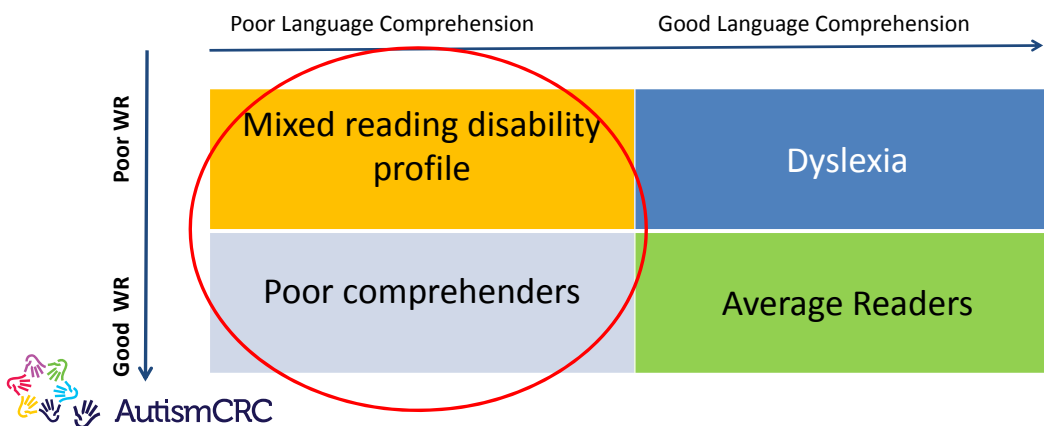
READING



The simple view of reading

Reading comprehension (RC) =

word recognition (WR) x language comprehension (LC)



Assessment to Intervention Framework:

Assess, don't assume

Use an interdisciplinary approach –SLPs, educators, literacy education specialists (e.g. educational psych).

3-step process:

- 1) Use an assessment task that will assess both reading comprehension and reading accuracy.
- 2) Conduct follow-up testing in **word recognition** and/or **oral language comprehension** (Simple View of Reading).
- 3) Identify areas for instruction.



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Paynter, Westerveld, & Trembath, 2016

Word recognition Intervention

The skills needed to recognise words (regular/irregular/nonwords)

- Phonological awareness
- Orthographic knowledge – mapping sounds to letters
- Semantics – word meanings

②

Learning styles and children with autism are *Visual Learners* – children with autism



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What's the evidence?

- Little research addressing PA intervention for young children with ASD – but promising findings¹
- Reasonable evidence for effectiveness of explicit teaching of alphabet knowledge, letter sound knowledge, and early word recognition – including minimally verbal children with ASD.

3

Children with autism who have cognitive impairments and/or severe communication impairments cannot learn to read.



¹Hudson et al., 2017

What's the evidence?

- Better evidence for effectiveness of comprehensive reading interventions – e.g., ABRACADABRA*.
- ABRA targets alphabet knowledge, phonics, word identification; fluency and comprehension; adult-led extension activities (e.g. shared reading, word games)
- Importance of guided instruction to encourage participation in the learning activities.



*Bailey et al., 2017

Reading Comprehension

Good readers:

- Set a purpose for reading
- Apply knowledge of grammar
- Make inferences – connecting ideas/events to prior knowledge
- Apply vocabulary knowledge
- Apply text structure knowledge
- Monitor their understanding at word, sentence, text levels.



Whalon, 2018

Instruction - What's the evidence?

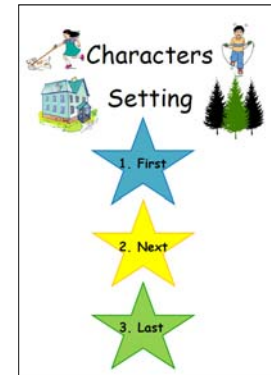
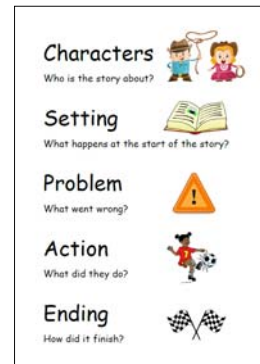
- A. Teach text structure
- B. Build vocabulary and content knowledge
- C. Teach comprehension strategies

Just like we would for students with language impairment or reading difficulties (in the absence of ASD)



A. Text structures

- Narrative structure, using graphic organisers.
- Introduce these early – prior to school entry.
- Also consider expository planners/ persuasive



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Petersen et al., 2014

B. Vocabulary and Content knowledge

- Dialogic Reading promotes word learning – include visual supports and strategies to encourage joint attention
- Our own SBR study with very young children with ASD resulted in an improvement in expressive vocabulary during shared book reading.
- Create/activate background knowledge – may be based on students' preferences.



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C. Comprehension Strategies

- To teach applying the strategies that good readers use.
- Involves targeting cognitive processes: predicting, summarizing, generating questions



Summary:

Evidence-based reading instruction should:

- Be assessment-based
- Be systematic and explicit
- Include visual supports / graphic organisers
- Include scaffolding (prompting and corrective feedback).



Final words, for now

- Most, if not all, children with ASD will demonstrate reading difficulties.
- Assess, don't Assume
- Early intervention is critical
- Intervention may need to be intensive and be conducted individually or in small groups.
- Although the research evidence is scarce – we can base our interventions on current evidence with children with language impairment / reading disorders – and adapt to suit students with ASD.



Project Team

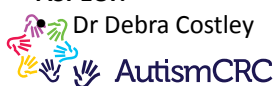
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- Visit ResearchGate and request full copy:
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Thank you 😊



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- Westerveld, M. F., Paynter, J., & Trembath, D. (2016). Reading instruction for children with ASD: Getting the story straight. *Journal of Clinical Practice in Speech-Language Pathology*, 18, 80-83.
- Whalon, K. (2018). Enhancing the Reading Development of Learners with Autism Spectrum Disorder. *Seminars in Speech and Language*, 39(02), 144-157.



Links

- **ABRACADABRA:**
 - <http://www.concordia.ca/research/learning-performance/tools/learning-toolkit/abracadabra.html>
- **Literacy Profiles and Literacy Predictors for Early Learners on the autism spectrum - webinar**
 - <https://www.autismcrc.com.au/news/webinars/early-years-14-september-2017>
- **Early Literacy Predictors for Young Children on the Autism Spectrum**
 - <https://www.youtube.com/watch?v=4qcDksXtfVE&t=90s>
- **Shared book reading intervention for preschoolers on the autism spectrum**
 - <https://www.youtube.com/watch?v=Z-Zuh0y8f98&t=9s>

