



Predicting Optimal Literacy Outcomes in Children on the Autism Spectrum in their First Year of Schooling

Executive summary

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The Cooperative Research Centre for Living with Autism (Autism CRC)

The Cooperative Research Centre for Living with Autism (Autism CRC) is the world's first national, cooperative research effort focused on autism. Taking a whole of life approach to autism focusing on diagnosis, education and adult life, Autism CRC researchers are working with end-users to provide evidence-based outcomes which can be translated into practical solutions for governments, service providers, education and health professionals, families and people on the autism spectrum.

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Purpose of this study

Learning to read and write is a pivotal skill in an increasingly literate world for *all* children, including children on the autism spectrum. Although reading is not considered a core area of impairment associated with autism spectrum disorders, previous research into reading performance of children on the spectrum has shown significant difficulties in reading that cannot be explained by a diagnosis of autism, low intelligence, or spoken language weaknesses alone (Brown, Oram-Cardy, & Johnson, 2013). However, surprisingly little research has been conducted into how young children on the spectrum develop their emergent literacy skills across meaning-related and print-related skills (Westerveld, Trembath, Shellshear, & Paynter, 2016). To better understand the early literacy pathways of children on the spectrum, we initially recruited a cohort of 57 verbal preschool-age children on the spectrum, who had not yet started school (Westerveld et al., 2016; Westerveld et al., 2017). Our results indicated early strengths in print-related skills, such as letter knowledge and phonological awareness and weaknesses in meaning-related skills, particularly in story comprehension (Westerveld et al., 2017; Westerveld & Roberts, 2017). The current study followed these children as they transitioned into their first year of formal schooling to identify which, if any, emergent literacy skills would predict their reading accuracy and comprehension performance approximately one year later. This longitudinal study is the first of its kind to investigate factors that may predict and maintain reading advantage and disadvantage in young children on the spectrum.

Study description

This research employed a prospective cohort design to investigate how children on the spectrum perform on reading-related measures in their first year of formal schooling. We also wanted to know whether there were correlations between children's oral language performance and their reading performance in year one of schooling and what pre-school emergent literacy skills predicted reading performance following the child's transition to school. The children were seen at two time points, prior to and following their transition into formal schooling. This report describes data obtained at the second time point, which took place when the children had completed between 6 – 12 months (2 – 4 school terms) of their foundation year of schooling (Prep year in Queensland), with one child seen after only 4 months due to scheduling issues.

Of the original cohort of 57 children, a total of 41 children and their families were available and agreed to participate in the follow-up study. Children were seen for a one-off assessment session by one of four research assistants who were qualified speech-language pathologists and a psychology PhD candidate. Assessment sessions lasted approximately two hours and took place at AEIOU centres (service provider that supported the research), the Griffith University Campus clinic,

or in the children's homes, depending on parent preference. The sessions comprised a set number of tasks assessing oral language and early literacy skills, with the order of the tasks varied to suit individual children's behavior and attention, in an attempt to obtain the most valid estimate of their abilities.

Data analysis

Data were analysed to investigate correlations between cognitive ability, pre-school emergent literacy skills, pre-school oral language ability, and children's performance on tasks of reading accuracy and reading comprehension in their first year of formal schooling. Regression analyses were performed to further investigate the predictors of reading performance in the first year of school.

Summary of findings

Overall, 43.9% of children scored within typical range on reading accuracy (i.e., the ability to read short passages); 19.5% of the children scored within the typical range on reading comprehension (i.e., the ability to answer questions after reading short passages). When asked to read single words, just over 50% of the children demonstrated age-appropriate skills decoding regular words (such as *pet* and *hot*).

Next, we investigated the relationship between children's oral language skills and their reading ability. As expected, children's performance on a standardised test of oral language was significantly related to their reading accuracy and comprehension skills, indicating the important links between spoken and written language.

When investigating children's pre-school performance on emergent literacy skills and their reading accuracy performance approximately one year later, significant correlations were found between pre-school performance on letter sound knowledge, phonological awareness, and print awareness and single word reading when children were in their first year of schooling. Similarly, significant correlations were found between pre-school performance in receptive vocabulary and story comprehension and reading comprehension approximately one year later.

Finally, we investigated preschool predictors of year-one reading accuracy and reading comprehension performance. After accounting for vocabulary and nonverbal intelligence, pre-school skills of letter sound knowledge, phonological awareness and print and word awareness accounted for a significant amount of the variance in year-one single word reading. For year-one

reading comprehension, preschool vocabulary knowledge, story comprehension, and print and word awareness were significant predictors.

Implications/recommendations

We most importantly need to raise awareness of the significant difficulties in reading many children on the spectrum are likely to experience. We are currently pursuing several avenues for disseminating our findings. We have created a video clip for educators illustrating our findings and providing suggestions for assessment and intervention of emergent and early literacy skills (<https://www.youtube.com/watch?v=4qcDksXtfVE&t=90s>) and are running workshops and webinars on request. Second, with support from the Autism CRC, we are conducting a study in collaboration with the First Five Forever team (Brisbane City Council Libraries) aimed at upskilling librarians to provide accessible, affordable (free) autism-friendly story time sessions in the community.

Having established the literacy needs of children on the spectrum, and potential pathways for supporting their development, a key focus of future research should be on developing and evaluating interventions. Although recent research suggests preschoolers on the spectrum show improvements in emergent literacy in response to intervention (Hudson et al., 2017), the effect sizes are small and it is not clear if these interventions result in better reading outcomes once children start school. We recommend future research to investigate the effectiveness of individualised intervention strategies targeting print-related and/or meaning related emergent literacy skills based on individual children's early reading profiles. Further, we recommend children in these future studies are followed up longitudinally to confirm the causal connections between emergent literacy skills and future reading accuracy and reading comprehension for children on the spectrum.

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