Australian Early Development Census
An Australian Government Initiative

Our Children
Our Communities
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ISSUE 6

AEDC DATA STORY

School-based language and cognitive skills

Nationally, between 2018 and 2021, there was an increase in the proportion of children developmentally vulnerable on three domains of the AEDC: physical health and wellbeing; communication skills and general knowledge; and language and cognitive skills (school-based). Refer to Data Story Issue 1.

Of the three domains that showed an increase, the greatest increase was in the language and cognitive skills (school-based) domain. This is the first time since 2012 that there has been a marked change in the proportion of children developmentally vulnerable on this domain, with developmental vulnerability increasing from 6.6 per cent to 7.3 per cent. While all domains contribute in important ways to children's wellbeing and learning, this AEDC Data Story focuses on changes in the language and cognitive skills (school-based) domain to consider potential drivers and impacts of this change on developmental trends.

Key messages

- Language provides a critical foundation for communication, expression and lifelong learning.
- Rich home learning environments, and quality early childhood education and care, support children's early literacy.
- The language and cognitive skills (school-based) domain experienced the most significant shift of all AEDC domains in 2021, with developmental vulnerability increasing from 6.6 in 2018 to 7.3 per cent.
- Since 2012, developmental vulnerability in basic literacy has increased from 6.5 to 7.9 per cent.
- In 2021, developmental vulnerability in advanced literacy increased from 5.8 to 7.7 per cent.
- The COVID-19 pandemic may have contributed to increases in developmental vulnerability.
- The greatest increases in developmental vulnerability occurred in the most disadvantaged communities.
- Home reading has been decreasing since 2009.

The AEDC language and cognitive skills (school-based) domain appears to be the domain most affected by the COVID-19 pandemic. This Data Story explores how this domain has changed including changes in interest in literacy and numeracy, basic literacy and numeracy, and advanced literacy.

Greater developmental vulnerability on this domain may be related to the challenges faced by children and their families during the COVID-19 pandemic including school and preschool closures, reduced family income or increased household stress. Refer to Data Story Issue 1.

Regardless of the causes, the changes are concerning given the critical importance of children's language and cognitive skills. Oral language, numeracy and literacy competence significantly affect children's development, social participation and learning, which have an enduring impact on future educational and employment opportunities.

What we know

Early experiences and environments have a powerful and lasting influence on children's language and cognitive skills. Language development begins at birth and rich language environments during the early years help children develop the oral language and early literacy skills that support school and educational success.

The home environment has an especially powerful impact on children's language and cognitive development.[1] Parents' beliefs about the impact they can have on their children's development influences their behaviour, which subsequently influences child outcomes, including their language and numeracy skills.[2]

Quality early childhood education and care (ECEC) also provides children with valuable developmental opportunities. High quality preschool programs help children to develop learning-related skills, such as the ability to concentrate and express their thoughts.[3]

These rich early learning environments help to foster children's interest in literacy and numeracy.[4] Children build language and cognitive skills through play[5] and routine interactions, such as talking about the things that interest them, as well as more intentional activities, such as shared reading.[6]

Sharing songs, stories and books with children from birth supports language development. Reading that involves family members reading to (or with) 3–5-year-old children has been shown to have a positive impact on children's language development.[7,8] Experience with numerical concepts helps pave the way for engagement with mathematical concepts, and an interest in books can encourage a love of reading.[9]

These early experiences of listening, speaking, engaging and interacting, provide the foundation for literacy and numeracy development. Cognitive skills such as memory, problem solving and creative thinking support children's learning.[10]

The Early Years Learning Framework outlines the importance of communication for children's belonging, being and becoming.[11] It highlights the importance of literacy and numeracy skills for communication and success at school. If a child achieves well in these areas during the early years of school, they typically continue to perform well in those areas throughout their school-life.

Factors that pose a risk to children's early literacy and numeracy skills are more commonly experienced by children whose families are experiencing financial disadvantage.[12] Barriers such as cost and access can make it more difficult for some families to enrol their children in ECEC and regularly attend.[13] Psychosocial stressors such as financial difficulties and psychological stress can make it difficult for parents to set aside time to read to their children.[14]

School closures during the COVID-19 pandemic and other lockdown restrictions, such as the closure of public libraries, may have had a negative impact on young children's literacy skills. Research undertaken in the United States indicates that regular shared reading at home lessened those effects.[15]

Understanding the sub-domains

The AEDC measures the language and cognitive skills that children demonstrate in the school environment, i.e. 'language and cognitive skills (school-based)'.

The language and cognitive skills (school-based) domain includes four components, or sub-domains that support their learning and development: basic literacy, advanced literacy, interest in literacy/numeracy and memory, and basic numeracy. Each is measured in a different way (see Table 1).

Table 1: Language and cognitive skills (school-based) sub-domains

Sub-domain	What is measured?
Basic literacy	Skills such as identifying letters of the alphabet, attaching sounds to letters and being able to write one's name
Advanced literacy	The ability to read and write simple words, complex words and simple sentences
Interest in literacy, numeracy and memory	Interest in books, reading and games involving numbers, and ability to remember things easily
Basic numeracy	Skills such as being able to sort and classify objects, count to 20, and recognise numbers and shapes

The AEDC also measures other aspects of language and literacy in the communication skills and general knowledge domain including the symbolic use of language and storytelling.

What have we learned?

National findings: language and cognitive skills (school-based) domain

For the past decade, the percentage of Australian children who were developmentally on track on the language and cognitive skills (school-based) domain has consistently been above 80 per cent. In 2021, 82.6 per cent of children were developmentally on track on this domain, which is a slight decrease from 84.4 per cent of children in 2018.

Between 2012 and 2018, the proportion of children who were developmentally vulnerable on the language and cognitive skills (school-based) remained relatively steady, but increased by 9 per cent between 2018 and 2021.[16]

National findings: sub-domains

Consideration of the sub-domains may provide greater depth of understanding and insights into potential action for making a difference. Since 2009, the sub-domain with the greatest percentage of developmentally vulnerable children has been basic numeracy (see Figure 1).

While the proportion of children in this sub-domain remained steady between 2018 and 2021, there was a noticeable change in the proportion of children who were developmentally vulnerable on the literacy sub-domains during this period. The proportion of children who were developmentally vulnerable on:

- basic literacy increased from 7.1 per cent in 2018 to 7.9 per cent in 2021
- advanced literacy increased from 5.8 per cent in 2018 to 7.7 per cent in 2021 – an increase of approximately 9 per cent and the greatest increase in developmental vulnerability of all four sub-domains.

Prior to 2021, the proportion of children who were developmentally vulnerable on the sub-domain of advanced literacy had been decreasing over time. Between 2009 and 2012, the proportion of children who were developmentally vulnerable on this sub-domain decreased from 10.1 per cent in 2009 to 5.8 per cent in 2018 (see Figure 1).

Since 2012, the proportion of children who lacked interest in literacy and numeracy has gradually increased. Between 2018 and 2021, it increased slightly again from 8 to 8.2 per cent (see Figure 1).

More children are starting school developmentally vulnerable in literacy. There has been a small, steady increase in developmental vulnerability on the basic literacy sub-domain since 2012. Of concern is the sharp increase in the advanced literacy sub-domain. For the first time in the history of the AEDC data collections this sub-domain increased by 1.9 percentage points between 2018-2021. The increase is a key contributor to the overall domain level increase in 2021.[i]

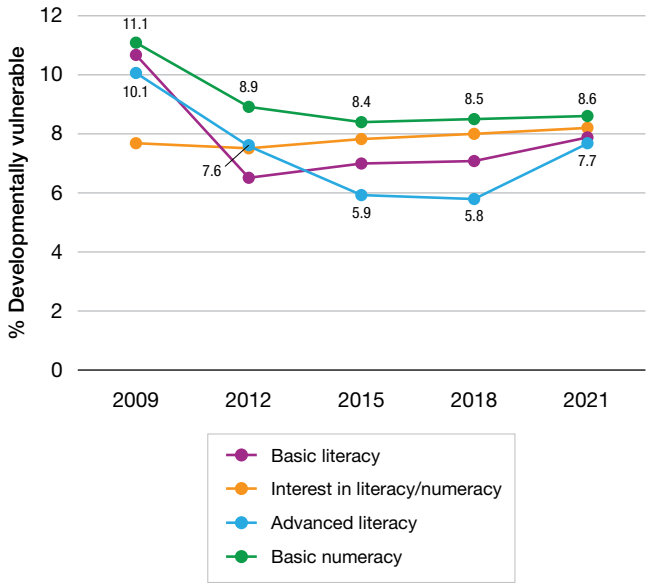

Figure 1: Percentage of children developmentally vulnerable on language and cognitive skills (school-based) sub-domains

REFLECTION

What role can early childhood educators and schools play in building on family and community strengths to support children's language and literacy skills?

State and territory findings

Data from individual states and territories provides further insight into the language and cognitive skills (school-based) domain over time. Variations provide an opportunity to consider factors that could be contributing to the changes, what is making a difference for children, and where further attention may be required.

Language and cognitive skills (school-based)

Between 2012 and 2018, most states and territories experienced gradual increases in the proportion of children developmentally on track on the language and cognitive skills (school-based) domain. However, between 2018 and 2021 the percentage of children developmentally on track on this domain decreased in every state and territory.

The state/territory with the highest proportion of children on track on this domain in 2021 was NSW (84.9 per cent), followed by the ACT (83.4 per cent) and Victoria (82.6 per cent).

i Each sub-domain is calculated separately so changes are best observed by considering how a sub-domain has changed over time rather than comparing sub-domains at a time point.

Since 2012, most states and territories have experienced gradual increases in the percentages of children developmentally vulnerable on the language and cognitive skills (school-based) domain (NSW, Victoria, South Australia, Tasmania, ACT). In the other states and territories, the percentages of children who were developmentally vulnerable on this domain have fluctuated.

In 2021, the state/territory with the highest proportion of children developmentally vulnerable on the domain of language and cognitive skills (school-based) was the Northern Territory (21.2 per cent), followed by Tasmania (9.2 per cent) and Queensland (8.4 per cent).

State and territory findings: sub-domains

Basic numeracy

In the past decade, the number of children who were developmentally vulnerable on the sub-domain of basic numeracy has fluctuated in different ways in the states and territories – with each state and territory recording slight increases and slight decreases at different points in time (see Figure 2).

Interest in literacy and numeracy

Since 2012, most states and territories reported increases or no change in the percentages of children who lacked interest in literacy and numeracy (see Figure 2).

Basic literacy

Over the past decade, most states and territories reported increases or no change in the percentages of children who were developmentally vulnerable on the sub-domain of basic literacy.

Between 2018 and 2021, all states and territories, except for the ACT, reported an increase in the proportion of children who were developmentally vulnerable on this sub-domain, with the greatest increase (from 7.9 to 9.7 per cent) in Tasmania.

Advanced literacy

Since 2012, growing numbers of states and territories have reported increases in the proportion of children who were developmentally vulnerable on the sub-domain of advanced literacy (see Figure 3).

Between 2018 and 2021, all states and territories reported an increased percentage of children who were developmentally vulnerable on this sub-domain. The state/territory which experienced the greatest increases in this sub-domain was the Northern Territory, followed by NSW and Victoria (see Figure 3). This equates to an increase in developmental vulnerability of 50.5 per cent in NSW and a 26.7 per cent in Victoria - potentially a result of greater COVID restrictions and lockdowns in these states.

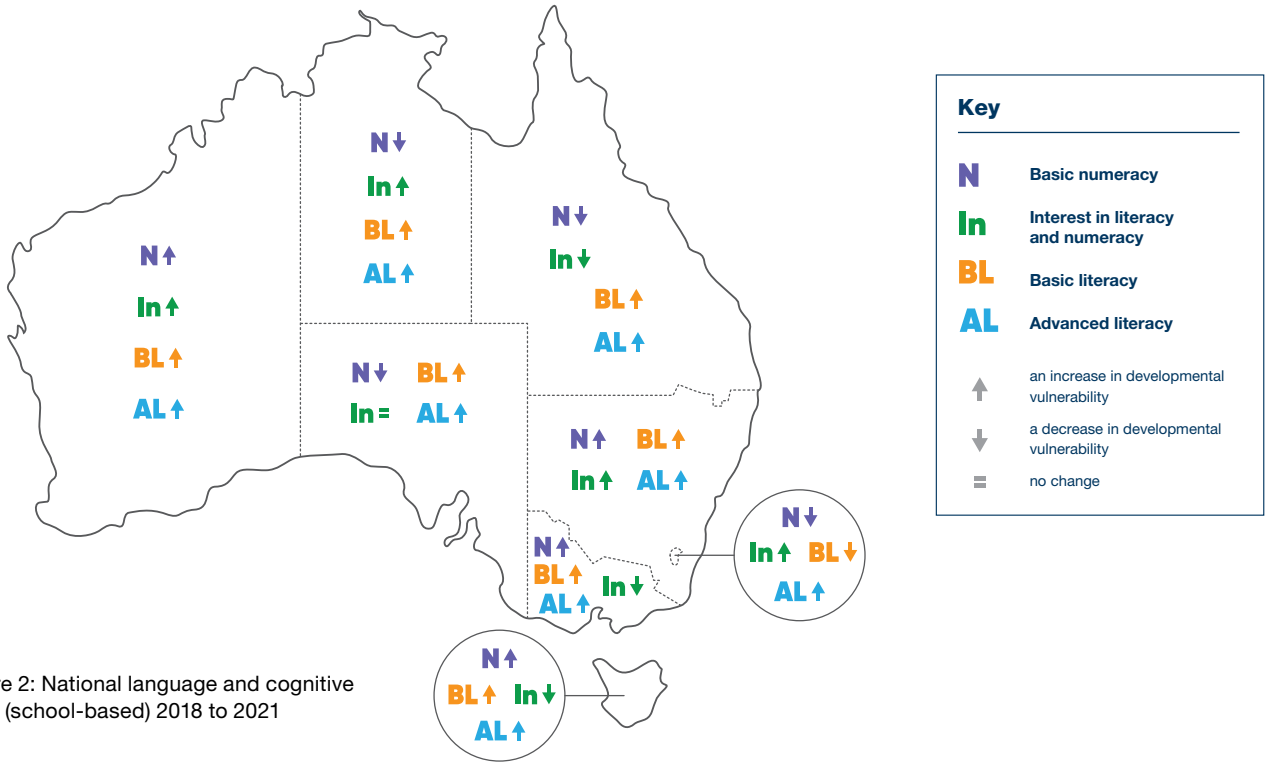

Figure 2: National language and cognitive skills (school-based) 2018 to 2021

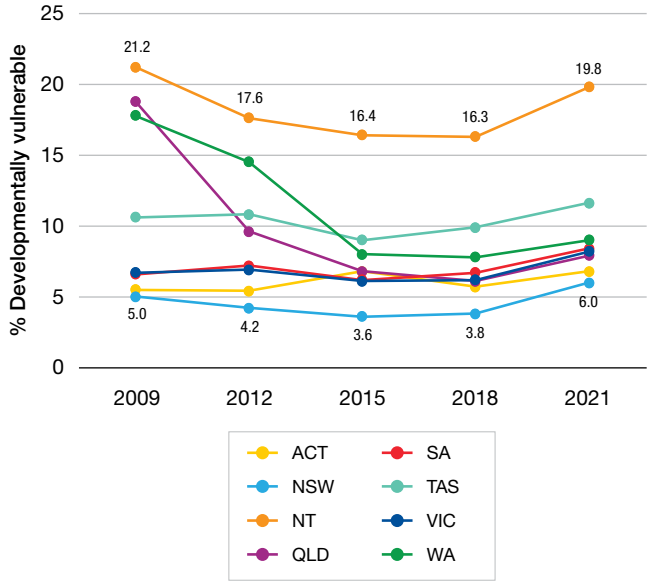

Figure 3: Percentage of children developmentally vulnerable on the sub-domain of advanced literacy by state/territory

REFLECTION

What support can be provided to children in the early years to ensure their learning – especially in language and literacy – is not adversely affected in the long term by their early childhood experiences during the pandemic?

Regional differences

Regional differences: language and cognitive skills (school-based)

Over the past decade, metropolitan regions have consistently had a higher percentage of children developmentally on track on the language and cognitive skills (school-based) domain than regional areas, and regional areas have consistently had a higher percentage of children developmentally on track than remote/very remote areas.

This trend continued in 2021. Among children living in major cities, 84.1 per cent were developmentally on track on the domain of language and cognitive skills (school-based), compared to 79.6 per cent in Inner Regional/Outer Regional areas and 65.7 per cent in Remote/Very Remote areas.

Over the past decade, metropolitan areas have also consistently had a lower proportion of children who were developmentally vulnerable on the language and cognitive skills (school-based) domain than regional areas, and regional areas consistently had a lower proportion of children who were developmentally vulnerable than remote/very remote areas.

This trend also continued into 2021. Among children living in remote/very remote areas, 20 per cent were developmentally vulnerable on the language and cognitive skills (school-based) domain, compared to 9 per cent in regional areas and 6.4 per cent in major cities.

Regional differences: sub-domains

Over the past decade, the proportions of children who were developmentally vulnerable on the sub-domain of basic literacy have been increasing in major cities, regional and remote/very remote areas. This trend continued in 2021: all geographical areas experienced increases in the proportion of children who were developmentally vulnerable on this sub-domain between 2018 and 2021.

Prior to 2021, the proportion of children who were developmentally vulnerable on the sub-domain of advanced literacy decreased in most areas, with some slight increases between 2015 and 2018 in regional and remote/very remote areas.

In 2021, all geographical areas experienced increases in the proportion of children who were developmentally vulnerable on the sub-domain of advanced literacy – with the highest proportion in remote/very remote areas, followed by regional and major cities (see Figure 4).

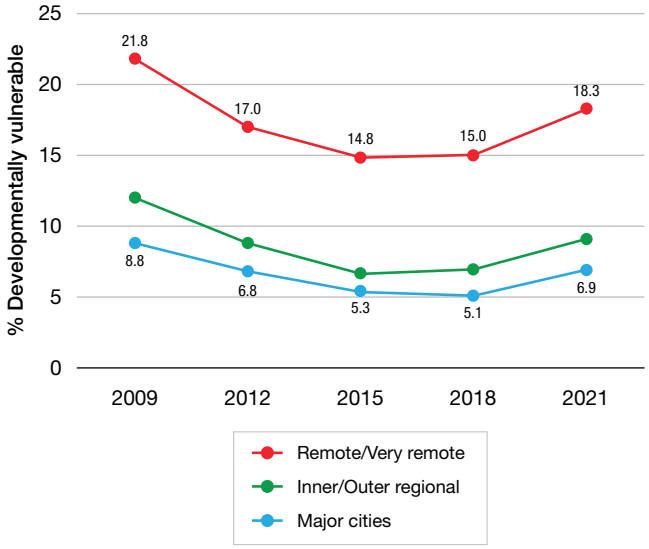

Figure 4: Percentage of children developmentally vulnerable on the sub-domain of advanced literacy by geographical remoteness

The proportion of children lacking interest in literacy and numeracy has mostly increased over the past decade in all geographical areas. Between 2018 and 2021, levels of interest in literacy and numeracy did not change among children living in major cities, but increased in regional and remote areas.

Prior to 2021, the proportion of children who were developmentally vulnerable on the basic numeracy sub-domain had been gradually decreasing in regional areas

and fluctuating slightly in remote/very remote areas. Between 2018 and 2021, there was a very slight increase (from 10.5 per cent to 10.8 per cent) in the proportion of children who were developmentally vulnerable on this sub-domain in regional areas, and a slight increase in remote/very remote areas (from 21 per cent to 22.1 per cent).

Over the past decade, the proportion of children who were developmentally vulnerable on the basic numeracy sub-domain has been relatively stable in the major cities, and did not change from 2018 to 2021.

Language background

Language background: language and cognitive skills (school-based)

Since 2012, children from Language Backgrounds Other than English (LBOTE)[ii] have consistently been less likely to be developmentally on track on the language and cognitive skills (school-based) domain when compared to children who only speak English.

This trend continued in 2021. Among LBOTE children, 80.6 per cent were developmentally on track on the domain of language and cognitive skills (school-based), compared to 83.3 per cent among children who only speak English.

Unsurprisingly, over the past decade LBOTE children who are proficient in English have been more likely to be developmentally on track on this domain than LBOTE children who are not proficient in English. This trend also continued into 2021; 85.5 per cent of LBOTE children proficient in English were developmentally on track compared 35.3 per cent of LBOTE children not proficient in English. English proficient LBOTE children have also been more likely to be developmentally on track on the language and cognitive skills (school-based) domain over the past decade. This result reflects the developmental advantages of being bilingual.[17]

In 2021, this trend continued; 85.5 per cent of English proficient LBOTE children were developmentally on track on this domain compared to 83.3 per cent of children who only speak English.

Language background: sub-domains

Among children who only speak English, there has been a gradual increase in developmental vulnerability on the basic literacy sub-domain over the past decade. This trend continued into 2021; between 2018 and 2021, there was a 0.9 percentage point increase in the proportion of children from this cohort who were developmentally vulnerable on this sub-domain.

The proportion of LBOTE children who were developmentally vulnerable on the basic literacy sub-domain decreased between 2012 and 2018 but increased very slightly by 0.2 percentage points between 2018 and 2021.

A similar pattern is evident in advanced literacy – an increased proportion of LBOTE children and children who only speak English were developmentally vulnerable on this sub-domain in 2021. Prior to 2021, developmental vulnerability in advanced literacy had been decreasing for both LBOTE and English-only speaking children.

Developmental vulnerability in the literacy sub-domains has therefore increased more markedly among children who only speak English. This pattern is unexpected and difficult to explain.

Developmental vulnerability in basic and advanced literacy for both English-only speaking and LBOTE children has INCREASED between 2018-2021.

Over the past decade, there has been slight increases in the proportion of English only speaking children who lack interest in literacy and numeracy. Among LBOTE children, the proportions of children who lack interest in literacy and numeracy have fluctuated.

The proportion of LBOTE children developmentally vulnerable on the basic numeracy sub-domain has been gradually decreasing since 2009 (from 15.6 per cent in 2009 to 10.2 per cent in 2021). The proportion of children from English-speaking backgrounds developmentally vulnerable on this sub-domain decreased between 2009 and 2015 (from 10.1 per cent to 7.6 per cent), remained steady in 2018 and slightly increased in 2021 (8 per cent).

Developmental vulnerability in basic numeracy has DECREASED for LBOTE children and remained STEADY for English-only speaking children between 2018-2021.

ii For the purposes of the AEDC, children who come from a Language Background Other Than English (LBOTE) are children who speak a language other than English at home or speak English at home but are still considered to have English as a Second Language (ESL) status. Children have ESL status if English is not their first language and they need additional instruction in English; or English is not their first language and they have conversational English but are not yet proficient in English.

Equity

Language and cognitive skills (school-based)

Over the past decade, the highest proportion of children developmentally on track on the language and cognitive skills (school-based) domain has been in the least disadvantaged Australian communities. The proportion of children in this domain decreases as the level of socio-economic status decreases, with the lowest proportion of children in the most disadvantaged group.

This trend continued in 2021. In the least disadvantaged communities 90.3 per cent were developmentally on track on the language and cognitive skills (school-based) domain, compared to 71.3 per cent in the most disadvantaged communities (see Figure 5).

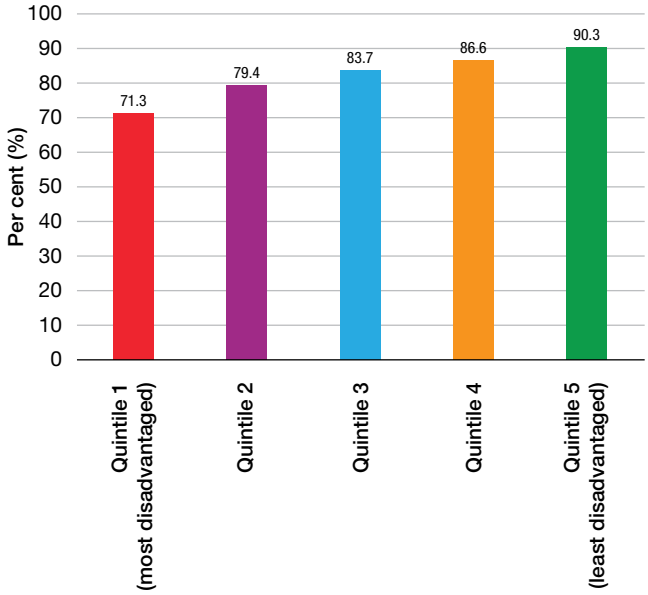

Figure 5: Percentage of children developmentally on track on the language and cognitive skills (school-based) domain by socio-economic status of communities in 2021

Sub-domains

Over the past decade, children living in the most disadvantaged communities have been more vulnerable on all four sub-domains that comprise the language and cognitive skills (school-based) domain. Furthermore, the less disadvantaged the community, the lower the proportion of developmental vulnerability on these sub-domains. This pattern has endured over time and continued in 2021 (see Figure 6).

Increases in the proportion of children who were developmentally vulnerable on the sub-domain of advanced literacy occurred in all communities – from the most to the least disadvantaged. However, the most disadvantaged communities experienced the highest increase (2.8 percentage points). See Figure 6.

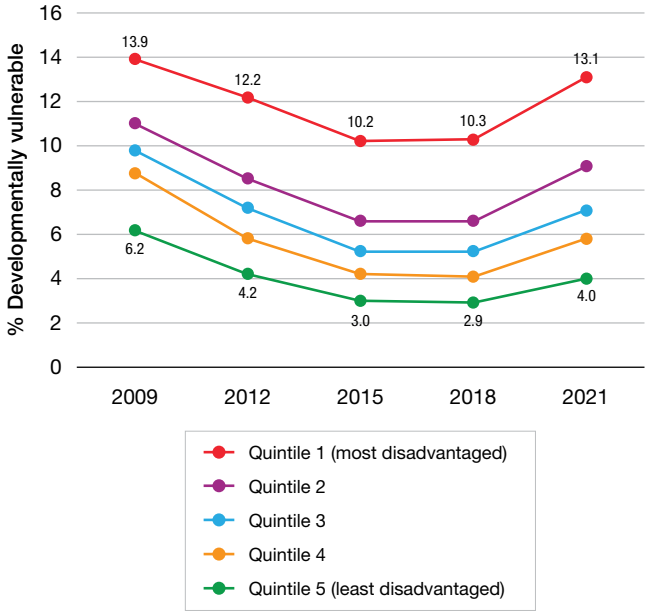

Figure 6: Percentage of children developmentally vulnerable on the sub-domain of advanced literacy by socioeconomic status

REFLECTION

What universal interventions (i.e., available to all) could support children's language and literacy skills? What targeted interventions (i.e., for those experiencing the greatest disadvantage) from universal platforms might be required?

Home reading and preschool

The proportion of parents regularly reading to their child at home has been gradually decreasing since 2009. This trend continued in 2021.[iii] In 2018, 74.6 per cent of children were regularly read to by parents, compared to 73.5 per cent in 2021.

Between 2018 and 2021, all communities experienced a decrease in the proportion of children being regularly read to by parents, regardless of their level of socio-economic disadvantage. However, the relationship between home reading and community-level disadvantage remains consistent – the greater the disadvantage, the less likely it is for children to be read to by their parents (see Figure 7).

Since 2009, the proportion of children attending preschool has been gradually increasing. The proportion of children attending preschool decreased in 2021, however only by only 0.1 percentage point when compared to 2018.

iii For the purposes of the AEDC, teachers report upon how regularly parents read to their children.

Other than a slight decrease in 2015, the proportion of children attending day care has also been increasing since 2009. This trend continued in 2021. The proportion of children attending day care increased from 51.8 per cent in 2018 to 55.1 per cent in 2021. This is the highest it has ever been since the first AEDC collection in 2009.

State and territory reforms to increase access to preschools for children are likely to have supported this trend. The COVID pandemic may have reduced the growth rate in 2021.

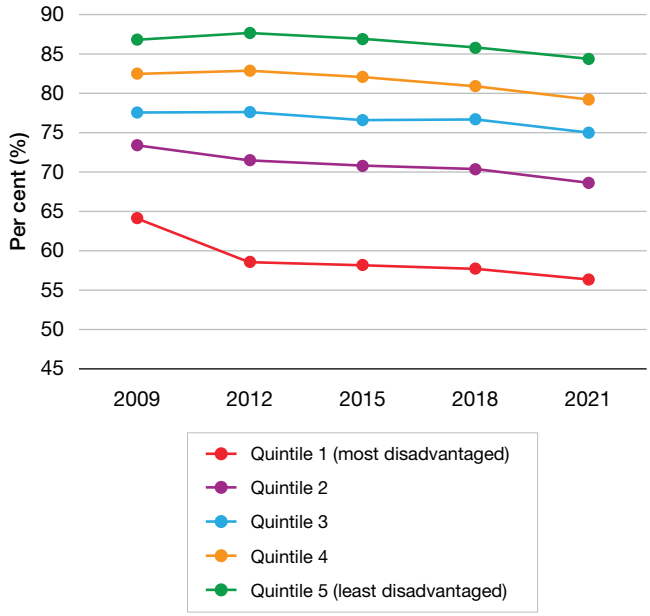

Figure 7: National trends on child's home reading by community socio-economic status

REFLECTION

What are potential obstacles to regular home reading for parents? What strategies or supports can help parents to engage in reading with their child from birth and continue reading to them throughout their childhood?

Implications

The greatest increase in developmental vulnerability on AEDC domains between 2018-2021 was in the language and cognitive skills (school-based) domain. More children started school with developmental vulnerability that could have an enduring effect on their learning and success in school. A holistic approach that considers policy, practice and research is required to mitigate the effects of early developmental vulnerability, respond to the needs of children, parents and educators, and better understand the factors contributing to unprecedented changes in the advanced literacy sub-domain.

Policy and practice

There is an opportunity to consider how existing universal platforms (i.e., available to all) and targeted services (i.e., for those experiencing the greatest disadvantage) can be mobilised to support early literacy and numeracy. This could include strategies to:

- increase access to, and participation in, quality early childhood education and care
- identify barriers to home reading, raise awareness its importance and support parents to regularly read to their children
- increase the availability of sustained nurse home visiting programs which have demonstrated beneficial child development and parenting practice outcomes for families experiencing vulnerability[18]
- identify evidence-based approaches that can be used in schools (at a classroom, group or individual level) to address the growing number of children experiencing developmental vulnerability. Noting that while the most significant recent increases in developmental vulnerability have been on literacy sub-domains, the sub-domain of numeracy has the highest proportion of children experiencing developmental vulnerability.

There is also considerable variation in AEDC results between states and territories on the language and cognitive skills (school-based) domain. This offers an opportunity to consider what might be learned from different regions that could help accelerate efforts to ensure that children can get the best start.

Research

- Although AEDC data cannot be used to demonstrate causality, the indirect impacts of the pandemic (Refer to Data Story Issue 1) may have contributed to the unprecedented increase in the proportion of children who are developmentally vulnerable on the advanced literacy sub-domain in 2021. Examining which pandemic factors specifically affected the development of advanced literacy skills during 2018-2021 – whether it was factors within the home environment, ECEC, school and/or other factors – may provide valuable insights into more targeted and efficient policies.
- Shared reading during the preschool years plays a key role in the development of children's literacy skills. A better understanding of the barriers to shared reading experienced by parents – which may include their own beliefs about its benefits – could help governments and service providers develop effective targeted strategies.
- There is an opportunity to establish and monitor a series of early language and literacy interventions from infancy through to the early years of school that could optimise children's language and cognitive skills.[19]

For further information

About AEDC Data Stories

What can the AEDC tell us about children's health and development, and how can we use this information to improve their wellbeing? The AEDC Data Story series explores the 2021 AEDC data to reveal how children are faring at school entry and where efforts could be focused to help ensure all children thrive. Each Data Story considers trends and how AEDC data can inform priorities, policies and practice to improve outcomes for children. *Publication disclaimer - This report uses data from the Australian Early Development Census (AEDC). The AEDC is funded by the Australian Government Department of Education. The findings and views reported here are those of the authors and should not be attributed to the Department or the Australian Government.*

The AEDC

In 2021, the fifth Australian Early Development Census (AEDC) was undertaken with 305,015 children in their first year of full-time school. The Australian Early Development Census (AEDC) is a nationwide measure of early childhood development that shines a light on what is working well and where we have more work to do to ensure all children are afforded the benefits of a strong start in life. For further information consult the AEDC website: www.aedc.gov.au

The Centre for Community Child Health

The Centre for Community Child Health is a department of The Royal Children's Hospital Melbourne, and a research group of the Murdoch Children's Research Institute. We strive to improve the lives of children and families. www.rch.org.au/ccch

The Telethon Kids Institute

The Telethon Kids Institute is one of the largest, and most successful medical research institutes in Australia, comprising a dedicated and diverse team of more than 1000 staff and students. Its vision is simple – happy healthy kids. We bring together community, researchers, practitioners, policymakers and funders, who share our mission to improve the health, development and lives of children and young people through excellence in research. Importantly, we want knowledge applied so it makes a difference. Our goal is to build on our success and create a research institute that makes a real difference in our community, which will benefit children and families everywhere. www.telethonkids.org.au

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16. There was an increased critical difference in the proportion of children who were developmentally vulnerable in these domains between 2018 and 2021. 'Critical difference' is a term used by the AEDC to refer to "the minimum percentage point change required between two collection cycles for the results to represent a 'significant change' in children's development." For more information see https://www.aedc.gov.au/resources/detail/aedc-fact-sheet-critical-difference
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18. Molloy, C., Beatson, R., Harrop, C., Perini, N., & Goldfeld, S. (2020). Systematic review: Effects of sustained nurse home visiting programs for disadvantaged mothers and children. Journal of Advanced Nursing, 77(1), 147-161.
19. GenV is a research program involving Victorian families that is designed to enhance understanding of the things that affect parent and child health. https://www.genv.org.au/