

AEDC Fact Sheet

About the validity and reliability of the Australian version of the Early Development Instrument (AvEDI)



Background

The Australian version of the Early Development Instrument (AvEDI) is the teacher completed instrument that is used within the AEDC program to collect information on the holistic development of children. The AvEDI was adapted from the Early Development Instrument (EDI), a Canadian instrument that was created in the 1990s by Dr Dan Offord and Dr Magdalena Janus [1]. There is a large body of evidence that shows that the EDI and the AvEDI are psychometrically valid and reliable indicators of child development. Indeed, the EDI has been the subject of more validity and reliability studies than almost any other holistic measure of children, and it is currently being used in a range of countries within North and South America, Asia, Europe, and Africa. This fact sheet aims to provide an overview of the reliability and validity studies that have been conducted into the EDI and the AvEDI over the past 20 years.

The Australian version of the Early Development Instrument (AvEDI)

The AvEDI contains a set of 96 items that are combined together to create five domain scores that measure different aspects of child development. These developmental domains are:

- Physical Health and Wellbeing (12-items)
- Social Competence (24-items)
- Emotional Maturity (26-items)
- Language and Cognitive Skills (26-items)
- Communication skills and general knowledge (8-items).

These 96-items are sometimes referred to as the “domain” items and they are used to create both a child’s domain score (0-10) as well as the domain indicator category that denotes whether the child is developmentally vulnerable, at risk or on track on each domain (see [AEDC domains factsheet](#) for more information). There are also a range of “non-domain” items that collect background information on the child such as their early education and care experience prior to school, and how well they are transitioning to school. A full list of the domain items and the non-domain items can be found in the [AEDC Data Dictionary](#). This research snapshot focuses exclusively on the validity and reliability of the 96 “domain” items, and the five domain scale scores that they are used to create, as well as the domain indicator category that denotes whether children are developmentally vulnerable, at risk or on track on each domain, and the vulnerability summary

indicators (developmentally vulnerable on one or more or two or more domains). Given the small differences between the AvEDI and the EDI, this snapshot summarises the validity and reliability studies on the AvEDI where available, and supplements this with information on the EDI.

Differences between the EDI and the AvEDI

There are some small differences between the EDI and the AvEDI. During the initial trial of the EDI in Australian there were changes made to the language for some of the items (e.g. washroom to bathroom). Following the Indigenous Adaptation Study [2], a single item was added to the physical health and wellbeing domain. Following the Rasch modelling completed by Andrich and Styles in 2004 [3], nine domain items were removed from the AvEDI (but not the EDI), and the categorical response scales were reduced from 5-point to 3-point scales for some items in both the AvEDI and the EDI. As such, the EDI and AvEDI measure the same five developmental domains but the AvEDI has slightly fewer items than the EDI (96-items vs. 104 items). Given the small differences between the two instruments, we present the findings from validity and reliability studies on both instruments but indicate which one was used in the study. Table 1 provides a summary of research that has been carried out on the EDI and the AvEDI regarding the validity and reliability of the two versions of the instrument.

Table 1: Summary of research on validity and reliability carried out on the EDI and AvEDI

Validity research	Concurrent validity	Predictive Validity	Internal reliability	Test retest reliability	Inter-rater reliability
EDI	✓	✓	✓	✓	✓
AvEDI	✓	✓	✓	x	✓

Key findings/messages

- The AvEDI and EDI are reliable and valid measures of child development.
- Policy makers can be confident in not only using the AEDC data as a valid, population-level indicator of Australian children’s developmental status but also as a lead indicator of academic success and social and emotional wellbeing in school.
- Governments and policy makers need to consider how best to support the physical, social and emotional skills of children, as well as their literacy and numeracy skills, during the early years if they want to improve academic achievement and wellbeing in primary school.
- The AEDC provides an extraordinary data resource for researchers from a range of disciplines including public health, public policy, developmental psychology, and economics who are interested in exploring children’s development across Australia.

Validity and reliability research

Concurrent validity

An instrument has good **concurrent validity** when scores on that instrument are strongly related to scores on established measures of the same construct. For example, scores on the AvEDI language and cognitive skills domain should correlate with scores from validated tests of language skills.

The AvEDI has good concurrent validity with research using a sample of children from the Longitudinal Study of Australian Children (LSAC) showing moderate to large correlations¹ between the scores on each domain and other theoretically related measures of learning and development [4]. Specifically, the *social competence domain* correlated strongly with the LSAC Prosocial scale and the Relationship Quality Scale (0.69 and 0.62). The *emotional maturity domain* correlated highly with the Prosocial and Hyperactivity scales from the Strengths and Difficulties Questionnaire (0.75 and -0.63). The *language and cognitive skills domain* correlated highly with teacher-rated measures of reading, writing and numeracy (0.62, 0.69 and 0.70, respectively). The *physical health and wellbeing domain* correlated moderately with teacher rated measure of fine and gross motor skills (0.37 to 0.45) but had a weak correlation with score on the Parent’s Evaluation of Developmental Status (PEDS) Physical Health Summary suggesting the two scales measure different aspects of physical health. The *communication and general knowledge domain* scored moderately with the LSAC teacher rated Open Communication scale (0.47).

¹ Based on Cohen’s effect sizes, a correlation of 0.10 is considered small, 0.30 is medium/moderate, and 0.50 is large/strong.

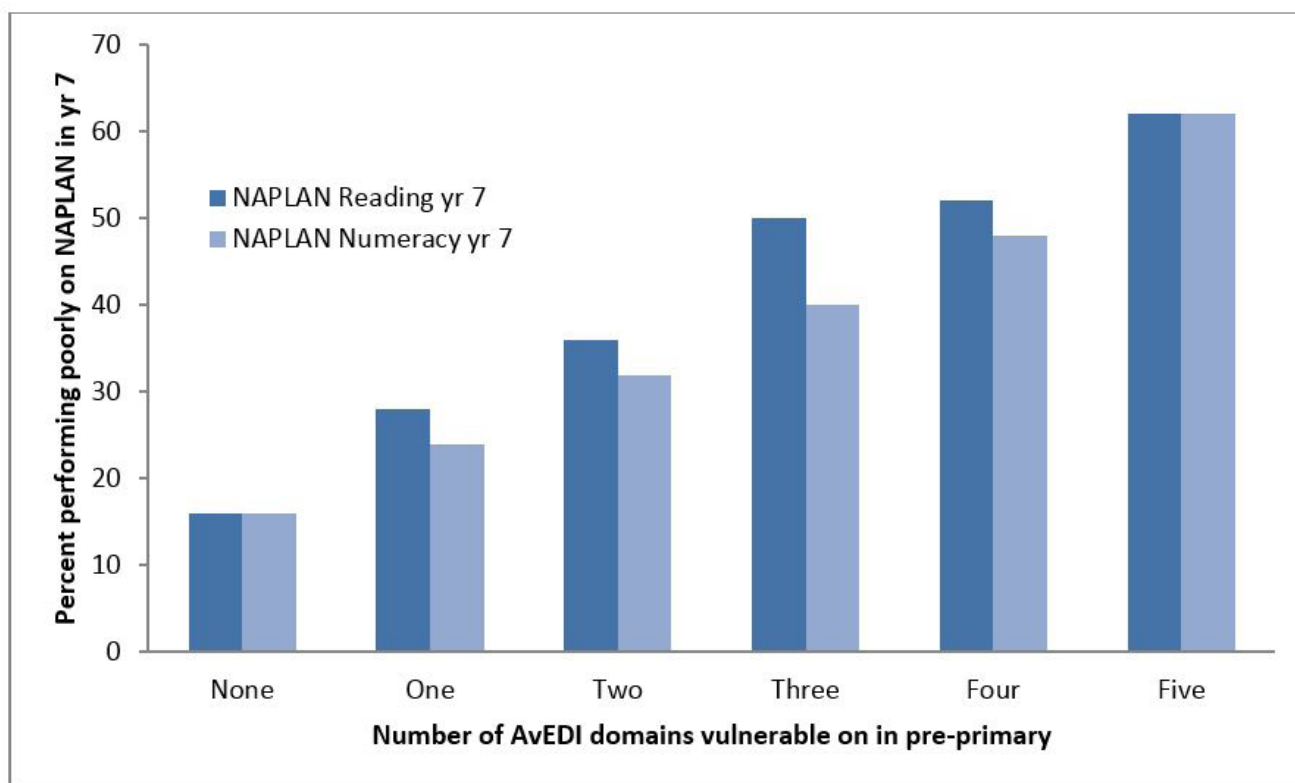
Predictive validity

An instrument has good **predictive validity** when scores on that instrument predict important outcomes measured at a later time. For example, scores on the AvEDI language and cognitive skills domain at school entry should be related to literacy and reading assessments in later primary school.

There are a range of studies in Canada that have established that the EDI is predictive of academic achievement and social and emotional wellbeing during middle childhood [5-7]. The predictive validity of the AvEDI has been established in three key studies. The first study was an extension of the LSAC study described above, which explored the ability of the AvEDI to predict children's academic and behavioural skills at age 8 [8]. Children with lower scores on the *language and cognitive skills domain* at age 4 were more likely to be doing poorly on the Literacy and Mathematics sub-scales of the Academic Rating Scale, and have more behavioural problems on the Strengths and Difficulties Questionnaire at age 8. Lower scores on the *social competence domain* at school entry were predictive of having poorer literacy and more behavioural problems at age 8.

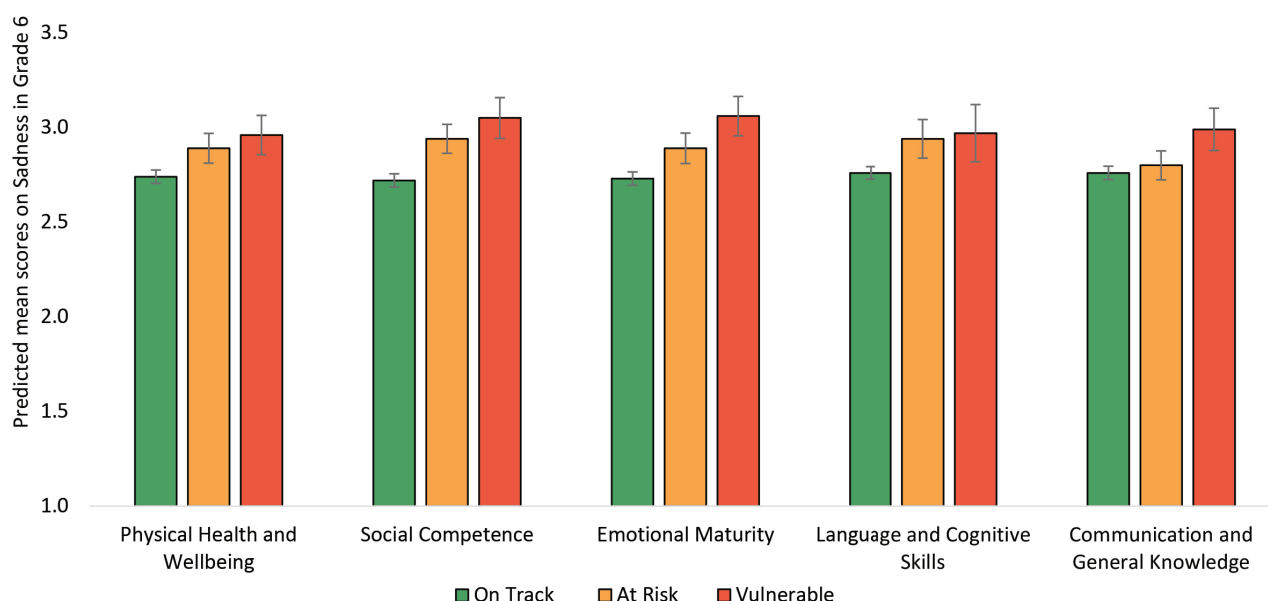
A second study linked children's scores on the AvEDI at school entry to their results on the National Assessment Program – Literacy and Numeracy (NAPLAN) in Grades 3, 5 and 7 [9]. Higher scores on all five domains of the AvEDI were associated with higher NAPLAN reading and numeracy scores in Grades 3, 5 and 7. Of the five domains, the *language and cognitive skills domain* and the *communication skills and general knowledge domain* were the best predictors of scores on the NAPLAN assessments. The research showed that children who were developmentally vulnerable on one or more domains of the AvEDI were more than twice as likely to score in the bottom 20% of scores in their NAPLAN assessment in Year 7 as children who were not developmentally vulnerable on any domains. For each additional domain that a child was vulnerable on at school entry, there was an incremental increase in the probability that they would have poor reading and numeracy scores in Year 7 (see Figure 1).

Figure 1. Association between vulnerability on the AvEDI and Year 7 NAPLAN performance



A third study linked children's scores on the AvEDI at school entry to measures of their social and emotional wellbeing in Year 6 [10]. Children's physical, social and emotional development at school entry were associated with their level of life satisfaction, optimism, sadness and worries in Year 6. Children who faced challenges in their language and cognitive skills or communication and general knowledge skills had higher levels of sadness and worries in Year 6, but there were no differences in their level of life satisfaction or optimism. This study shows that all five aspects of development measured in the AvEDI have predictive validity for student wellbeing in Year 6, but the specific patterns vary across the AvEDI domains and wellbeing outcomes. Figure 2 shows the difference in student wellbeing for one outcome (sadness) for children who were *vulnerable*, *at risk* or *on track* in their development at school entry.

Figure 2. Association between each AvEDI domain and Year 6 sadness



Internal reliability

An instrument has good **internal reliability** (internal consistency) if the items within each scale are strongly related to one another. For example, the 26-items from the AvEDI social competence domain should all be correlated with one another if they are measuring the same construct.

The internal reliability of the EDI and AvEDI was established in a 2011 study using samples of children from Canada, Jamaica, the USA and Australia [11]. In the Australian sample, the internal reliability was acceptable for all five of the AvEDI scales, with values² ranging from 0.80 for the *physical health and wellbeing domain* to 0.95 for the *social competence domain*. Results were similar across the samples with the internal reliability generally lowest for the *physical health and wellbeing domain* scale. This domain measures a range of aspects of physical health including independence in toileting, coming to school hungry and tired, and fine and gross motor skills, that do not correlate as strongly together as the aspects of social, emotional, language and communication skills do.

Test-retest reliability

An instrument has good **test-retest reliability** if it is completed on two occasions within a short time period, and the two scores are highly related. For example, a teachers rating of a child's level of emotional maturity in week three of the school term should be strongly related to their rating in week five.

A Canadian study has established that all five of the EDI domains have high test-retest reliability³ ranging from 0.82 for the *physical health and wellbeing domain* and the *language and cognitive skills domain*, to 0.94 for the *communication and general knowledge domain* [12]. This indicates that teachers make clear and consistent judgements of children using the AvEDI items, and the resulting domain scores are highly consistent over time, providing strong evidence of the reliability of teachers to assess the development of children in their class. While there is no published Australian evidence about the test-retest reliability of the AvEDI, the EDI and AvEDI are so similar that the Canadian results are highly likely to translate to high test retest reliability in the Australian context.

² Internal reliability was tested using the Cronbach's alpha statistic, and values of 0.70 and above are considered acceptable

³ Generally, correlations of 0.70 and above are considered acceptable, so the test-retest reliability of the EDI scales is high

Inter-rater reliability

An instrument has good **inter-rater reliability** if when two people complete the instrument independently, based on their knowledge and observations about the child, these two sets of scores are highly related to one another.

A Canadian study explored the inter-rater reliability of the EDI between the child's school teacher and their day care teacher [12]. Inter-rater reliability for the two teachers was very good⁴ for *language and cognitive skills domain* (0.72), *emotional maturity* (0.77) and *social competence* (0.80), and intermediate/good for the *physical health and wellbeing domain* (0.69) and the *communication and general knowledge domain* (0.53). This indicates that different teachers tend to rate children similarly on the AvEDI and provides evidence that teachers are well placed to report on children's development, and do so in a high consistent manner.

An Australia study explored the inter-rater reliability of the AvEDI using a convenience sample of children who moved school during the AEDC collection period. These children were thus captured twice with two different teachers in different schools completing the AvEDI on the same child ($n = 654$ students "duplicates" found in either the 2015 or 2018 AEDC) [13]. The inter-rater reliability was a little lower in the Australian sample than the Canadian sample but was good to very good for all domains. As in Canada, the highest inter-rater reliability was observed for the *language and cognitive skills* (0.72), *emotional maturity* (0.58) and *social competence domains* (0.64), and this was slightly lower for the *physical health and wellbeing domain* (0.47) and the *communication and general knowledge domain* (0.55). The lower inter-rater reliability statistics in the Australian sample are likely to reflect that fact that children who have recently moved school may be exhibiting different behaviours to what they did at their previous school, and the teacher is likely to have had fewer opportunities to observe the child's behaviours and get to know them. Nonetheless all teachers in this sample responded that they knew the child well enough to make an assessment of their development.

Conclusions

- The AvEDI and EDI are reliable and valid measures of child development.
- The AvEDI and EDI are designed to be completed by teachers based on their observations of children in their classroom. Teachers are well placed to report on the development of children, and do not require input from parents about children's behaviour at home or to conduct direct assessments of children's skills and capacities.
- The **test-retest reliability** and **inter-rater reliability** studies have established that teachers are able to make clear and consistent judgements of children using the AvEDI items and that different teachers tend to rate children similarly. This demonstrates that teachers are well placed to report on the developmental status of the children they know.
- The AvEDI has high **predictive validity** compared to other measures collected from teacher ratings, parent ratings and direct assessments of children, and is a strong predictor of student's academic achievement and social and emotional wellbeing during primary school. Policy makers can be confident in not only using the AEDC data as a valid, population-level indicator of Australian children's developmental status but also as a lead indicator of academic success and social and emotional wellbeing in school.
- The **predictive validity** findings also provide strong evidence that children's skills in all five developmental domains of the AvEDI at school entry are predictive of their academic and behavioural skills in later primary school, as well as their social and emotional wellbeing. As such, governments and policy makers need to consider how best to support the physical, social and emotional skills of children, as well as their literacy and numeracy skills, during the early years if they want to improve academic achievement and wellbeing in primary school.
- The AEDC provides an extraordinary data resource for researchers from a range of disciplines including public health, public policy, developmental psychology, and economics who are interested in exploring children's development across Australia.

⁴ While there are different benchmarks depending on which inter-rater reliability coefficient is used, scores less than 0.40 generally indicate poor inter-rater reliability, 0.40-0.70 indicates intermediate/good inter-rater reliability, and score above 0.70 indicate very good/excellent inter-rater reliability.

Suggested citation for this fact sheet

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About the organisation

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. Our vision is simple – happy healthy kids. We bring together community, researchers, practitioners, policy makers 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.

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The Australian Government is working with State and Territory Governments to implement the Australian Early Development Census (AEDC). Since 2002, the Australian Government has worked in partnership with eminent child health research institutes: the Centre for Community Child Health; Royal Children's Hospital, Melbourne; and the Telethon Kids Institute, Perth, to deliver the AEDC to communities nationwide.