

Links between reading and other skills: What does ASER tell us?

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The ASER survey has been measuring the fundamental skills of children across rural India for a decade now. Every year, children in the age group of 5 to 16 years are assessed in basic reading and numeracy. These skills are important precursors to learning in higher grades and hence are assessed in all ASER surveys.

In addition, we have included some 'bonus' tasks each year to assess something more than just the basic skills. In different years these have included as basic comprehension, general knowledge, telling time, money-related tasks and other everyday tasks like reading a calendar, menu card etc.

The main objective of assessing 'beyond basics' was to understand the linkages between basic and higher level skills. The idea was to explore what more the 'story' level readers can do in language and arithmetic. Does reading the ASER 'story' mean only decoding or do children read with understanding? How important is reading with respect to other skills like problem solving and numerical operations?

To accomplish this objective, ASER has assessed various competencies over the years. Table 3 given at the end of this article summarises these additional competencies that have been assessed.

This article explores the linkages between reading levels and basic comprehension,² numerical operations and problem solving³ through the 'bonus' tasks administered in ASER 2006 and ASER 2007. For the sake of brevity, we will limit the discussion to those children who we categorize as readers, i.e. those who can read a Grade 2 level text ('story' level children).

How did we assess comprehension and problem solving?

In 2006, comprehension tasks were introduced for the first time in ASER. More elaborate comprehension tasks were included in ASER 2007. Problem solving tasks were included in ASER 2007. Figures 1, 2 & 3⁴ explain these tasks and the administration procedures for comprehension and problem solving respectively.

Fig. 1 Sample of the comprehension task included in ASER 2006



Meenu is the youngest member of her family. She has an elder brother and an elder sister. Meenu is seven years old and studies in Std 2. They own several buffaloes and goats. Meenu's mother is very busy all day taking care of the household and animals. Meenu's brother and sister help their mother whenever they can. All the children have fun with the animals.

Meenu's father works in the post office of a nearby village. He goes to the post office every morning. There he fills his bag with letters and goes out to deliver them. Sometimes Meenu also go with her father. She sits at the back of the bicycle. Meenu enjoys going with her father to deliver letters to people. Some people ask her to read their letters aloud. Some people even want their letters to be written by Meenu. Meenu thinks she should also work in a post office when she grows up.

Q.1. Who all are in Meenu's family?

Q.2. What does Meenu do with her father?

What does ASER test in basic reading and numeracy?

In reading, children are asked to read letters, simple two-letter words with one or two *matras*, and strings of sentences which are categorized in two levels: a paragraph and a story. The paragraph has 4 sentences and roughly 20 words at Grade 1 level of difficulty. The story has 8 to 10 sentences and approximately 60 words at Grade 2 level of difficulty. The numeracy test includes number recognition (one digit as well as two digit numbers) and basic number operations required in subtraction and division. These operations correspond to Grade 2 and Grade 3/4 level of difficulty respectively.

Administration process of the comprehension task in ASER 2006

Children who successfully read the ASER story were asked to read another story (longer than ASER story) at Grade 3 level.

Children were also asked to read and orally answer two questions based on this story.

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² By basic comprehension, we refer to the ability to answer fact retrieval questions based on a text. ASER cannot test higher level comprehension because the nature of the text does not lend itself to questions assessing higher level comprehension.

³ By basic problem solving we refer to the ability to understand a simple word problem in math and solve it.

⁴ As with basic ASER reading assessment, the 'bonus' tasks are administered in the local language.

Fig. 2 Sample of the comprehension tasks included in ASER 2007



Administration process of the comprehension tasks in ASER 2007

All children in the the age group of 5 to 16 were asked to read a paragraph.

Two fact retrieval questions based on this paragraph were read out to the child. The child was asked to answer the questions orally.

Same procedure was followed for the story.

Paragraph

She likes to read books.
She likes a good story.
She has many books.
She has read all of them.

- Q.1. How many books has Sheela read?
Q.2. What does Sheela like to do?

Story

It was the rainy season. The sky was full of clouds. There was a cool breeze blowing. Aman was eager to play on a swing. His older brother got a thick rope. They tied it on the tree and made a swing. A lot of children joined them and they all started playing. They played till it became dark.

- Q.3. What did Aman's older brother get?
Q.4. How did they make the swing?

Fig. 3 Sample of the problem solving task included in ASER 2007



Administration process of the problem solving tasks in ASER 2007

All children in the age group of 5 to 16 were asked to solve 2 subtraction word problems. These were read out one by one by the surveyor to the child. The child could answer the questions orally or in writing.

Both the subtraction word problems were currency related operations with Rs. 50/- (2-digit with borrowing).

- Q.1. You have Rs.50. From that you buy a pair of shoes for Rs.35. How much money is left with you now?
Q.2. You have Rs.50. From that you buy sweets for Rs.28. How much money is left with you now?

What did we find?

Does a child who can read a story also understand it?

The ASER tool has often been criticized as a tool that only assesses decoding and not reading in its entirety (i.e. reading with comprehension). But is it possible for a child to read the ASER 'story' fluently without understanding it?

Both in ASER 2006 and 2007 we find that if a child is at 'story' level then she is also likely to make some meaning of the story. In ASER 2006, 89% of 'story' level children of Grade 5 could answer both fact retrieval questions based on the Grade 3 level story. (In 2006, comprehension questions on Grade 2 level story were not asked). A similar trend was observed in ASER 2007, where 85% of 'story' level children in Grade 5 could successfully answer both fact retrieval questions based on the story. In addition, 8% children could answer only one question. This implies that more than 90% children in Grade 5 are reading with some basic understanding. This number increases to 97% for Grade 8 children (refer to Chart 1).

This evidence strongly corroborates the conclusion that if children are reading the ASER 'story' fluently then they are not merely decoding; the majority of them read it with understanding.

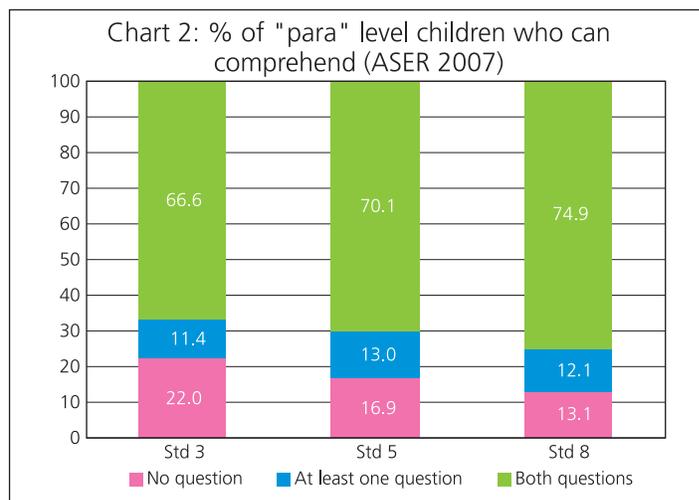
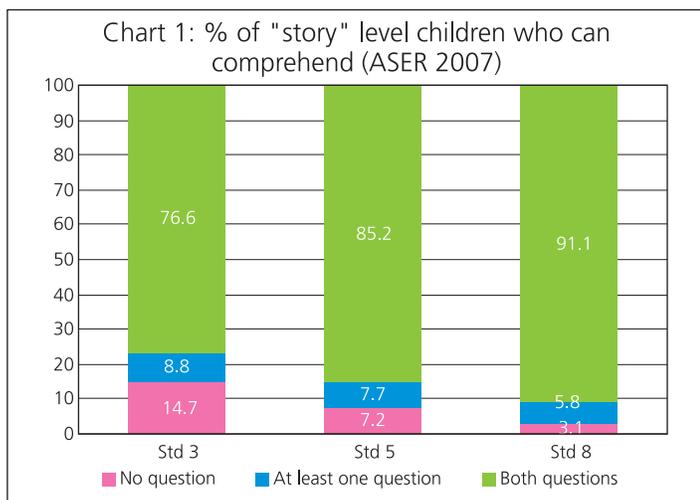
In addition, the 2006 results also demonstrate that children's reading ability is not limited to a 60-word Grade 2 level text, since the majority of 'story' readers could also read a Grade 3 level text and answer two questions based on it. Based on this data, we can conclude that children who are at 'story' level in ASER reading tasks can also read texts at a slightly higher level with understanding.

Does the above finding hold true for children who can read a paragraph?

It is important to see if children who can read shorter text ('paragraph') demonstrate the same results with respect to comprehension. Can we term these paragraph level children as 'readers'? Are they at the same level of comprehension as their story level peers? How different are these two ASER levels with respect to the ability to read with understanding?

From ASER 2007 data, we see a marked difference in the performance of 'paragraph' level children. 85% of 'story' level children in Grade 5 were able to answer both fact retrieval questions correctly. This percentage drops to 70% for 'paragraph' level children of the same grade (refer to Charts 1 & 2). A similar difference can be seen among younger children (Grade 3) and older children (Grade 8). Expectedly, one can also see that as children progress to higher grades, their ability to comprehend increase.

This demonstrates a strong, albeit expected link between children being able to read the ASER story and make meaning of it.



Do story level children also perform better in arithmetic?

Similar to the link between reading and comprehension, a strong relationship can be observed between reading the ASER story and basic skills in arithmetic. The data from ASER 2007 shows that there is a significant increase in the ability to solve numerical division operations among children whose ability to read is higher (story level vs paragraph level vs word level vs letter level children) (refer to Table 1). Children's ability to do numerical division vary enormously by reading level. For instance, 65% 'story' level children in Grade 5 can also divide. This number drops to 16% for para level children.

Table 1: % Children who can do numerical division, according to reading ability - ASER 2007

Grade	'story' level	'paragraph' level	'word' level	'letter' level
3	38.9	7.7	1.8	0.8
5	64.7	15.9	5.0	2.3
8	79.3	28.4	9.3	9.9

Similar trends are visible for the problem solving tasks: 81% of 'story' level readers could do both problem solving questions correctly compared to 49% 'paragraph' level children (refer to Table 2). This finding is particularly interesting because the children were not required to read the word problems to solve them. These word problems were read out by the surveyors.

Table 2: % Children who can do both questions (Q1 & Q2) of the problem solving tasks (word problems) correctly, according to reading ability – ASER 2007

Grade	'story' level	'paragraph' level	'word' level	'letter' level
3	66.0	38.1	13.7	7.3
5	81.3	49.0	24.1	17.8
8	90.3	63.9	39.6	34.9

Conclusion

We know that children who can read the ASER story are not just decoding. They are reading with some basic understanding of the text. This strong correlation, observed in both 2006 and 2007, is the reason that comprehension has not been included in the ASER basic reading tool since 2007.

Expectedly, 'story' level children are also better at arithmetic and basic problem solving. If a child can read, she is more likely to be able to solve numerical operations and also understand a word problem and solve it correctly.

The above findings re-emphasise the fundamental importance of children learning to read. Being able to read at the 'story' level seems to be significantly correlated to the attainment of both comprehension skills and other skills for different subjects. This evidence has directed our approach to developing 'beyond basics' assessments. In the past few years, ASER Centre has developed and implemented a variety of assessments for different subjects and higher grades. We have assessed reading in these assessments and these links have been re-validated.

Given the low and varied learning levels of rural India across grades and the importance of reading, irrespective of the subject or the level, reading tasks should be an integral part of any assessment, whether at primary level or higher.

Table 3: Description of ASER 'Bonus' tasks over the years					
No.	Domain	Description	Details	Target population	Years
1	Reading & Comprehension (Fact Retrieval)	Child was asked to read a Grade 3 level text and was also asked to read and orally answer two questions based on this text.	In all Indian languages & English	Children who could read Grade 2 level text fluently	ASER 2006
2		Child asked to read Grade 1 level text ("paragraph"), then based on this text, 2 fact retrieval questions were read out to the child and the child had to answer orally. Same was done with the Grade 2 level text.		All children: age 5 to 16	ASER 2007
3	Arithmetic	Child asked to read two word problems - one on subtraction (2 digits) and the other on division (3 digits divided by 1 digit). Child could answer orally or in writing.	In all Indian languages & English	Only to those children who could read Grade 2 level text fluently	ASER 2006
4		Child asked to solve word problems with currency operations with (Rs 50) Child was asked orally. Child could answer orally or in writing.		All children: age 5 to 16	ASER 2007
5	Applied arithmetic and everyday tasks	Child asked to tell time with visual images of clocks and to use actual currency notes to solve oral word problems.	In all Indian languages & English	All children: age 5 to 16	ASER 2008
6		Child asked to solve basic questions using visual image of calendar & menu cards (in word problem format). Also do computations for area and estimation tasks (visual images and word problems that are read out to the child).		Children in Grade 5 or above or age 10 or above if out of school	ASER 2010
5	English: Reading & Comprehension	Child asked to recognize English letters, read simple words, basic sentences. Child also asked to say meanings of the words and sentences read.	English as a second language	All children: age 5 to 16	ASER 2007, ASER 2009, ASER 2012, ASER 2014