The International Journal of Indian Psychology
ISSN 2348-5396 (Online) | ISSN: 2349-3429 (Print)
Volume 14, Issue 4, October- December, 2026
DIP: 18.01.047.20261404, DOI: 10.25215/1404.047
https://www.ijip.in

Research Paper

Poverty, Cognitive Processing, and Academic Outcomes among Primary School Children: A PASS Framework Perspective

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ABSTRACT

This study systematically investigates the relationship between cognitive processes, defined by the Planning, Attention, Simultaneous, and Successive (PASS) model, and academic competence in Reading and Mathematics among 150 English Language Learners (ELL) in Grades 4 and 5 from Odisha, India. The sample comprised 80 low socio-economic status slum students and 70 middle socio-economic status students from better-resourced schools. Analysis revealed a significant, deleterious impact of chronic poverty on academic achievement, particularly in reading comprehension and math fluency. Notably, math problem-solving skills demonstrated relative resilience. While slum students scored slightly lower across all PASS measures, the difference remained within half a standard deviation of American CAS norms. This suggests the school environment may serve as a critical protective factor, potentially mitigating the adverse cognitive effects of poverty. The findings align with existing research, emphasizing the protective role of school climate, contextualized within Bronfenbrenner's ecological framework. The study highlights the necessity for focused research on the intersection of ELL status, poverty, and cognitive development in underrepresented global populations.

Keywords: *Comprehension, Math Competence, PASS Processes, Reading, Poverty*

This study explores the relationship between brain-based processes, word reading, reading comprehension and math ability in primary school children within a neurocognitive framework. additionally, this study investigates the impact of poverty on cognitive ability and academic achievements of the children. PASS (Planning, Attention, Simultaneous and Successive) framework is used to measure the cognitive abilities in children.

Reading is a fundamental avenue for gaining knowledge, broadening one's outlook, and enhancing the quality of life that every person aspires to. In today's rapidly evolving and globalized world, where the meaning and value of life are increasingly emphasized, reading serves as a crucial tool for communication and exchange of ideas. The development of reading begins early; right from infancy. Essentially, reading involves decoding written symbols and understanding their meaning. In contemporary society, it forms the foundation

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Received: September 24, 2026; Revision Received: October 29, 2026; Accepted: November 03, 2026

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of education (Pumfrey & Elliot, 1990). It is a multifaceted process made up of several interconnected components (Gough & Tunmer, 1986), with decoding and comprehension being the two most central (Stuart, Stainthorp & Snowling, 2008). Reading ability varies across individuals, and in the early school years, one of the primary tasks for children is learning how to read.

Reading development is influenced not only by a child's individual abilities but also by the dynamic interaction between the learner and their environment. Byrne (1998) explains learning as a "division of labour" between the child and the environmental input, underscoring the importance of understanding each component of the reading process. As Byrne (2005, p.107) notes, "Once we know what the child contributes to acquiring a component of reading and the nature of that contribution, we will know what is left over to teach." A key argument in Byrne's work is that children differ widely in the extent to which they contribute to their own reading development. Individual differences in reading skills become visible early in schooling and often remain stable across time (e.g., Cunningham & Stanovich, 1997; Wagner et al., 1997).

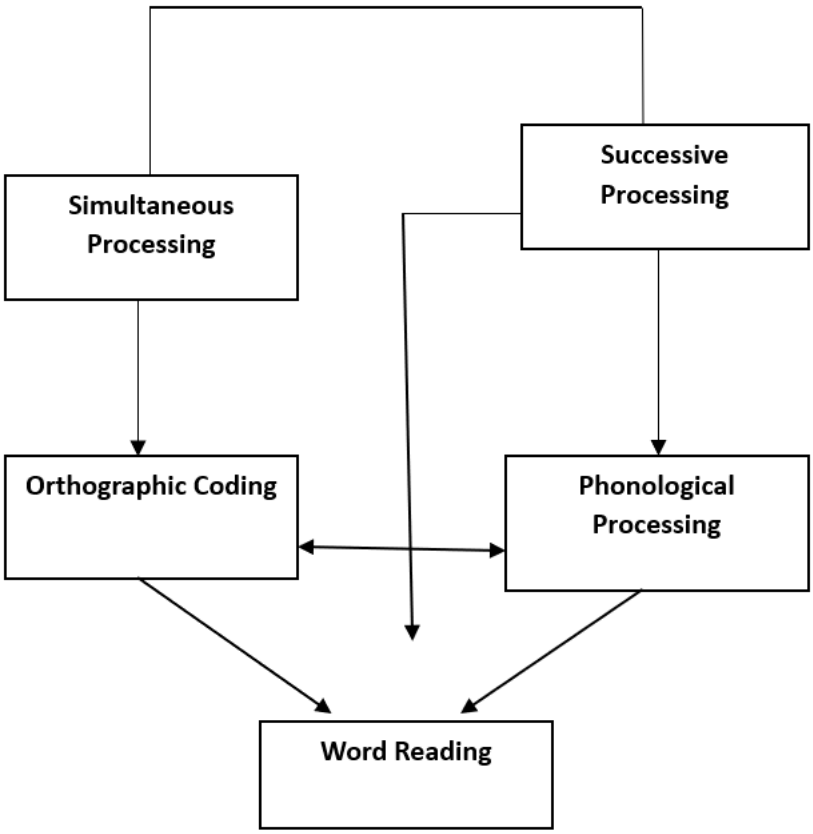
Research consistently shows that environmental factors strongly shape early reading development (e.g., Petrill et al., 2006; Samuelsson et al., 2005). Among these, the literacy-related experiences, activities, and attitudes children encounter at home during the preschool years form a critical dimension of influence. UNESCO's (2014) report, *Teaching and Learning: Achieving Quality for All*, highlights the crucial role of parental education in fostering children's literacy skills. The Home Literacy Environment (HLE) is therefore essential for children's learning and development (Senechal & LeFevre, 2002), offering valuable insights into how family contexts affect literacy growth.

There is also a common assumption that children from low-income backgrounds are inherently less capable, leading to lower academic achievement. However, research demonstrates that poverty can adversely affect children's memory, executive function, language development, reading comprehension, and overall cognitive growth (Lacour & Tissington, 2011; Noble, McCandliss, & Farah, 2007; Sirin, 2005). Conversely, reading development itself follows a structured pathway through which children gradually learn to recognize and understand symbols, letters, phonemes, and other foundational concepts necessary for academic success (Das, 2009; Ehri, 1995; Frith, 1985; Goswami, 2002).

Mathematical ability, or numeracy, is just as vital as reading skills for later academic success. The foundation for comprehending math is established early, with significant growth occurring within the first five years of life. Similar to language acquisition, children naturally develop mathematical reasoning because humans possess an innate, fundamental sense of numbers, spatial awareness, and pattern recognition (Geary, 1994; Clements et al., 2007).

Das, Kirby and Jarman (1979), later expanded by Das, Naglieri and Kirby (1994), outlined distinct connections between the PASS cognitive processes and word reading. They argued that successive processing supports word reading through phonological skills, specifically, the ability to sound out words. While simultaneous processing aids word reading through orthographic skills, or understanding how words look as whole visual patterns (see Figure 1). In the early stages of learning to read, children rely heavily on phonological recoding. This involves identifying individual letters, recalling their associated sounds, holding those

sounds briefly in memory, and blending them in a serial manner to form words, steps that align with successive processing. As reading becomes more fluent, familiar words are often recognized instantly through sight, a process made possible by orthographic knowledge, which relies on simultaneous processing. For instance, distinguishing between visually similar but phonologically alike words requires the ability to compare them at the same time. Studies have shown that children with reading difficulties often exhibit marked weaknesses in both simultaneous and successive processing (Das, Naglieri and Kirby, 1994). In a study of Grade 3 and 4 English-speaking students, Das and colleagues (2007) found that children scoring below 80 on successive processing had a 0.75 probability of being poor readers; a notably high risk. For simultaneous processing, the probability was 0.50, also indicating substantial vulnerability.



Objective of the study:

The primary goals of this investigation are two-fold: first, to investigate the impact of poverty on cognitive ability in children. Second, the study aims to investigate the complex relationship between the four components of the PASS Processes (Planning, Attention, Simultaneous, and Successive processing) and key academic skills, specifically word reading, reading comprehension, and Math Competency in poor children. The impact of poverty was examined by comparing the results with the results of non-poor children.

Background:

Three major theoretical models have been used in this study to understand the trajectory of development in children. PASS theory has been used to measure the cognitive abilities in children and it systematically investigates the differential impact of each individual PASS

cognitive process on academic skills, including word reading, reading comprehension, and mathematical ability.

Vygotsky's Zone of Proximal Development (ZPD) is the "sweet spot" for effective reading instruction. It is the gap between what a child can read independently (their actual developmental level) and what they can read with the guidance and support (scaffolding) of a more knowledgeable person, like a teacher or peer (their potential developmental level).

For poor children, who may enter school with lower levels of language exposure and print awareness due to socioeconomic disadvantage, the ZPD is critical. Teachers must first accurately identify the student's *actual* reading level. Instruction is then targeted just above that level, presenting texts and tasks that are slightly too difficult to do alone (e.g., in a Guided Reading session). Scaffolding, such as pre-teaching vocabulary, modelling decoding strategies, or using graphic organizers, helps the child successfully engage with the text. As the student internalizes these skills, the scaffolding is gradually removed, allowing them to read the challenging material independently. This social and supported learning within the ZPD is essential for accelerating reading development and closing the achievement gap for disadvantaged learners.

Bronfenbrenner's ecological model is a way to understand how everything in a person's life affects their development. It shows that social life and surroundings are very important. The model views development as a holistic process resulting from a constant, reciprocal interaction among an individual's biology, mind, society, and environment. It maps out different, interconnected systems in a person's environment that all work together to shape how they change and behave over time.

METHOD

Two different groups of samples have been taken to understand the developmental trajectory in reading and mathematical performance in children. To examine the impact of Poverty on their cognitive abilities and academic achievements, a comparative analysis was conducted.

Sample

The sample included 4th and 5th-grade students, because it was anticipated that they could clearly understand instructions and comfortably complete the tests by this time. The first sample consisted of 80 children (35 girls, 45 boys) with a mean age of 9.8 years, selected from the largest urban slum in the city of Bhubaneswar, Odisha, an eastern state of India. This specific school was purposefully chosen because English was introduced to students early (around age six) to ensure they could engage with the English-based assessment tools. Additionally, the school was considered to be a model slum school in entire city for having teachers from the same community, who are dedicated and committed for imparting quality education to the children of their own community.

The second sample included 70 children (39 girls, 31 boys) from a general public school in Odisha. These students, who were also English Language Learners (ELLs), had a mean age of 9.11 years and began learning to read in English slightly earlier (around age five). The students were from middle socio-economic status background.

Tools:

The investigation employed a consistent and standardized test battery across both the initial and subsequent participant cohorts. This rigorous application of identical assessment tools ensured comparability of results between the two samples. The study was designed to measure the children's word reading, reading comprehension, mathematical abilities and intellectual ability.

Woodcock Johnson Reading Mastery Test (WJRMT)

The Woodcock Reading Mastery Test (Woodcock, 1979) was used to assess word reading and reading comprehension in English. The word reading section consists of 106 items which increase in complexity, ranging from high-frequency to low-frequency words. Participants are asked to look at each word and say it out loud, with the test discontinuing after four consecutive errors. The total score is the number of correctly read words. The reading comprehension section includes 56 items, also increasing in complexity. Initially, items are paired with pictures and sentences, requiring participants to fill in the blanks based on the pictures. As the test progresses, items become more difficult, eventually presenting only sentences with missing parts. Participants must understand the sentence's meaning and fill in the blanks with appropriate vocabulary. The discontinuation criterion is the same as for the word reading section.

Parallel tests for word reading and reading comprehension in Odia follow the same norms and item difficulty levels. Test administration and instructions were consistent for both the English and Odia tests. The internal consistency reliability coefficients for the WRMT-R range from .91 to .98 (Woodcock, 1987).

Cognitive Assessment System (CAS)

CAS (Naglieri, J. A & Das, J. P 1997) is an individually administered cognitive ability test based on Planning, Attention, Simultaneous, and Successive theory (PASS) theory of cognitive processing. It was developed to integrate theoretical and applied areas of psychological knowledge. There are twelve individual subtests to measure intelligence of children and adolescents aged between 5 to 17 years.

The PASS model is a modern theory as it is based on Luria's analyses of brain structures (1966b; 1973). The model looks at information processing as dynamic instead of static. The participants were administered 2 subtests from each cognitive domain, thus, giving a total of 8 tests for all the 4 domains of cognition. Planning subtests include Matching numbers, Planned codes, and Planned connections. Attention subtests comprise Expressive attention, Number detection, and Receptive attention. Simultaneous subtests include Nonverbal matrices, Verbal – spatial relations and Figure Memory; and successive subtests consist of Word series, Sentence repetition, and Sentence questions. The Basic Battery (8 subtests) takes approximately 40 minutes and the Standard Battery (composed of 12 subtests) takes approximately 60 minutes to administer. Raw scores can be converted to subtest scaled scores, standard scores for each composite score, and Full-Scale score. In addition, percentile ranks and confidence intervals are provided for the scores. The CAS 12-subtest Core Battery Full Scale reliability is .95, with PASS Scale reliabilities ranging from .86 to .93.

Wechsler Individual Achievement Test (WIAT)-III

WIAT (Wechsler, D., 2017) is a standardized test that measures academic achievement in children, adolescents, and adults up to 50 years and 11 months old. It assesses a range of skills, including reading, writing, mathematics, oral language, listening, and speaking. The test is administered individually and can be taken in paper-and-pencil or online formats. Mathematical fluency and Mathematical problem solving are two among them. In the fluency test, the participant needs to do a set of mathematical equation like addition, subtraction, division and multiplication. Each equation set has 16 items. In this study only addition and subtraction were used. The participant was allowed maximum 60 seconds to complete each item. One has to solve as many equations as one can within the time. It measures speed and accuracy. The number of correct responses is the score. On the other hand, problem solving has 70 items. It measures an individual's ability to identify the necessary elements, operations, and strategies required to solve math problems. The test items are combination of matrices, spatial relation tasks and small comprehensive sums. The complexity of items increases as the number progresses. The participant has to understand the question and answer seeing the pictures or reading the question given in the task. The rule to stop the test is four consecutive errors. Total number of correct responses were recorded for further calculation. The administration time varies from approximately 30 to 145 min according to the student's grade level, academic performance, test-taking ability, and behaviour during testing. All subtest reliability coefficients fell between .83 and .97, with the exception of Alphabet Writing Fluency (.69). Fourteen of 16 subtests demonstrated reliability scores between .82 and .94.

Ethical Consideration

Before collecting the data, an ethical approval was obtained from the principal of the school, since the study required the involvement of school children. Initially a request was made to the principal of the school for the study. After getting the permission from the principal, the selection of participants was made after seeking their parental consent. All the pupils were briefed about the method and purpose of the study. They were also told that they were free to withdraw from the study any moment they want.

RESULTS

Poverty has been consistently shown to exert a profound negative influence on children's intellectual development, affecting cognitive processes, academic skills, and brain structure from early childhood onward (Noble et al., 2015; Hair et al., 2015).

In the present study, the intellectual ability of children is assessed in two different socio-economic backgrounds, using Cognitive Assessment System, within the PASS framework. The mean intelligence scores, as assessed by the Cognitive Assessment System (CAS), were compared between poor and non-poor children. The poor children (N = 80) had a mean score of 89.47 (SD = 11.24), whereas the non-poor children (N = 70) had a higher mean score of 96.50 (SD = 9.65). This suggests a noticeable difference in cognitive performance between the two socioeconomic groups.

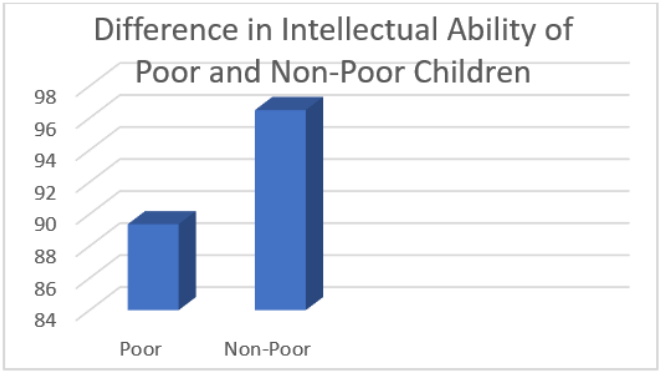
The descriptive statistics reveal that children from non-poor families scored higher on overall intelligence, as measured by the Cognitive Assessment System, compared to children living in poverty. The average difference of around 7 points indicates a moderate cognitive advantage for children from advantaged socio-economic backgrounds. This outcome is consistent with past research showing that socioeconomic status (SES) plays a significant

role in shaping cognitive development. Children from affluent families are more likely to experience enriched environments, greater access to learning materials, better nutrition, and reduced stress, all of which support stronger intellectual abilities (Hackman & Farah, 2009; Bradley & Corwyn, 2002). In contrast, those from low-income households often face challenges that can hinder cognitive development. It is further important to examine the difference found between the groups was statistically significant or not, to contribute meaningfully to the literature. These findings emphasize the importance of implementing educational and policy strategies that enhance cognitive and learning opportunities for children from disadvantaged backgrounds. The results of intellectual ability of children are presented in the Table and figure below.

Mean and Standard Deviation of Intelligence Score of the participants Assessed using Cognitive Assessment System (N= 80 and N= 70 respectively in each group)

Groups	Means	SD
Poor Children	89.47	11.24
Non-Poor Children	96.50	09.65

Comparison of Intellectual Ability in Poor and Non-Poor Children (N= 80, N=70 Respectively)



In order to examine the statistical significance level of the difference in Intellectual ability between poor and non-poor children, an independent sample t-test was conducted (presented in table 2). Results revealed that non-poor children (M = 96.50, SD = 9.65) scored significantly higher than poor children (M = 89.47, SD = 11.24), $t(148) = -4.07$, $p < .001$. The mean difference of -7.12 indicates that non-poor children scored significantly higher than poor children on measures of intellectual ability. This finding highlights the cognitive disparities associated with socioeconomic status.

The findings indicate a statistically significant difference in cognitive performance between poor and non-poor children, with non-poor children scoring higher on the CAS. This outcome reinforces the substantial role that socio-economic status (SES) plays in shaping children's intellectual development. As documented in earlier research, children from higher SES backgrounds often have increased access to stimulating home environments, educational resources, parental support, and quality schooling education, which collectively enhance cognitive outcomes (Bradley & Corwyn, 2002; Hackman & Farah, 2009). On the contrary, poverty is frequently linked to stress, limited cognitive stimulation, and inadequate nutrition, which can negatively impact brain development and executive functioning (Noble et al., 2015).

Summary of t-test results for Intellectual Ability in both the non-poor and poor groups (N= 70 and N=80 respectively)

$Mean_a$—$Mean_b$	***t***	***df***	***p* value**	**Significance Level**
7.12	4.07	148	0.001	.05**

The t (148) = -4.07, p = 0.001. The result is significant at $p < .05$
Note: $Mean_a$ – Mean of Non-Poor Children, **$Mean_b$** - Mean of Poor Children

Moreover, the observed disparities in intellectual ability between poor and non-poor children emphasize the firm impact of poverty on academic achievement but not much on intellectual development because the obtained mean score for comprehensive intellectual ability in poor children is 89.47, whereas the average range of Intelligence scores ranges from "90 to 109". The obtained mean intelligence score is much less than one standard deviation than the average range, although the standard deviation (11.24) reveals moderate level of disparity in ability within the group.

These results not only validate existing theoretical frameworks but also emphasize the need for educational interventions and policy efforts aimed at reducing inequality in learning opportunities. Together, these findings lay a critical foundation for the interpretations and implications discussed in the last part of the paper, and they contribute meaningfully to understanding the multifaceted nature of children's academic development in diverse socio-economic contexts.

Further, the findings indicate that children from poor backgrounds consistently perform less than the non-poor children in both word reading and reading comprehension, with the gap being especially notable in comprehension measures. The higher standard deviations in the non-poor group, particularly for comprehension, may reflect a wider range of reading abilities within that particular group. The results are presented below in the table.

Table showing the difference in word reading and reading comprehension, age and grade equivalent score in Poor and Non-Poor Children (N= 80, N=70 Respectively)

Variables	**Poor**		**Non-Poor**	
	Mean	*SD*	*Mean*	*SD*
WR – AE	07.19	01.66	08.08	01.86
WR – GE	02.18	0.94	02.88	01.80
RC – AE	05.88	01.23	08.53	06.11
RC – GE	01.17	0.63	02.73	03.03

Note: WR -AE: Word Reading Age Equivalent, WR – GE: Word Reading Grade Equivalent, RC – AE: Reading Comprehension Age Equivalent, RC – GE: Reading Comprehension Grade Equivalent

In order to understand the significance of the difference found in word reading and reading comprehension in children from two difference socio-economic backgrounds, independent sample t-test was conducted (presented in table 4). The results of the independent samples t-test for word reading ability, indicate a statistically significant difference in reading ability between poor and non-poor children. The mean reading ability score for the poor group (M = 7.68) was lower than that of the non-poor group (M = 8.53), with a t-value of -2.62 and degrees of freedom (df) = 141, and a p-value of .01. This result is significant at the 0.05 level, suggesting that socioeconomic status has a meaningful effect on children's reading performance. The negative t-value indicates that the direction of the difference favours the non-poor group. These findings support previous studies that highlights the continuing educational gap between socioeconomically advantaged and disadvantaged children, especially in foundational academic skills like reading (Bradley & Corwyn, 2002; Duncan & Murnane, 2011). The mean difference for reading comprehension, an independent samples t-test revealed a highly significant difference between poor and non-poor children, $t(76) = -6.68$, $p < .0001$. The mean difference of -13.30 indicates that non-poor children have performed substantially better than poor children. These results suggest a strong influence of socio-economic status on their performance.

Summary of t-test results for word reading and reading comprehension ability respectively in both the non-poor and poor groups (N= 70 and N=80 respectively)

$Mean_a$—$Mean_b$	***t***	***df***	***p* value**	**Significance Level**
7.68	2.62	141	0.01	.05**
13.30	6.68	76	0.01	.05**

Note: $Mean_a$ – Mean of Non-Poor Children, **$Mean_b$** - Mean of Poor Children

In order to measure the impact of Poverty on academic performance of children, reading and math ability were taken as two foundational skills. There are two constructs of math ability were assessed; math fluency and math problem solving ability from WIAT -III. From the analysis, results show substantial difference in performance between the groups.

In math fluency, poor children (N = 80) had a mean score of 37.63 with a standard deviation of 14.18, indicating lower performance and moderate variability within the group. In contrast, non-poor children (N = 70) had a significantly higher mean score of 88.24 with a standard deviation of 15.45, suggesting stronger performance and slightly more variability.

This finding suggests that socio-economic status may have a considerable influence on math fluency, with non-poor children performing significantly better than poor children.

In case of math problem solving skill, the mean and standard deviation of math problem-solving scores of poor and non-poor children, assessed using the WIAT-III test battery. Interestingly, the poor children (N = 80) had a higher mean score of 39.07 (SD = 5.88), compared to the non-poor children (N = 70), who had a mean score of 32.44 (SD = 3.99).

This result is somewhat unexpected, as non-poor children typically perform better due to favourable learning environments. The higher average score among poor children suggests that in this sample, they may have had specific supports or abilities that contributed to stronger performance in math problem-solving.

Table showing the difference in word reading and reading comprehension, age and grade equivalent score in Poor and Non-Poor Children (N= 80, N=70 Respectively)

Variables	Poor		Non-Poor	
	Mean	*SD*	*Mean*	*SD*
Math - F	37.63	14.18	88.24	15.45
Math - PS	39.07	05.88	32.44	03.99

Note: Math F: Math Fluency, Math PS: Math Problem Solving

An independent samples t-test was conducted to examine differences in math fluency between poor and non-poor children. The results revealed a highly significant difference, $t(148) = -20.91$, $p < .0001$. The mean difference of -50.61 indicates that non-poor children scored substantially higher than poor children on math fluency. These findings emphasize the impact of socio-economic status on fluency in mathematics.

To examine the significance level of difference in math problem solving ability, an independent samples t-test was conducted to compare math problem solving skills between poor children and non-poor children. The results revealed a statistically significant difference, $t(148) = 7.96$, $p < .0001$ (two-tailed). The mean difference of 6.63 indicates that poor children scored higher than non-poor children in math problem solving. This unexpected finding suggests that despite socioeconomic disadvantage, poor children in this sample demonstrated stronger problem-solving abilities in mathematics. This could be assumed that despite, socio-economic status, there are many other factors contributing towards the performance of the children.

We often learn basic concepts of mathematics like addition and subtraction from our family members before we go for formal education in school. The foundation of mathematics begins from home. More we talk about numbers and equation the more we gain the familiarity and practice with them. Only digit knowledge can't contribute significantly for developing knowledge on mathematical equation. In case of poor children, it is already found that the home literacy environment is not very conducive and literacy provoking. These simple mathematical equations and using them in daily life would be rare in poor families, which has reflected in the results.

Similarly, understanding mathematical reasoning and math problem solving tasks needs comprehension skill. Understanding the question and breaking it logically is the key to success in math problem solving. Additionally, knowledge about size, estimation, arithmetic are the fillers to complete any math problem solving tasks. Displaying better score in math problem solving, poor children have raised interest to investigate every potential factor

pulling back these children from acquiring a fair competency in mathematical calculation but pushing them in solving mathematical problems.

Moreover, by taking children living in poverty has squeezed the diversity with regard the socio-economic status is concerned. Non-poor children belong to a group where the socio-economic status is wider and the distribution is spread. Thus, the result we obtained from the non-poor is more reliable than the poor children. To examine the significance of the difference that has been found between the groups, t-test for math fluency and math problem solving were conducted and the results is presented in the below table. The difference between the groups found to be significant at .05 level.

Summary of t-test results for math fluency and math problem solving ability respectively in both the non-poor and poor groups (N= 80 and N=70 respectively)

Mean$_a$—Mean$_b$	***t***	***df***	***p* value**	**Significance Level**
50.61	20.91	148	0.001	.05**
6.63	7.96	148	0.001	.05**

Note: Mean$_a$ – Mean of Non-Poor Children, **Mean$_b$** - Mean of Poor Children

The relationship between PASS Processes and academic skills of children was also investigated in both groups of children. Among poor children, all four PASS processes demonstrated meaningful associations with academic skills. Planning showed significant positive correlations with word reading, reading comprehension, and math fluency, highlighting its role in both literacy and basic numeracy. Attention was moderately associated with word reading and strongly with math fluency, indicating its importance for efficient processing. Simultaneous processing emerged as the strongest predictor, showing significant and substantial correlations across all academic domains, including math problem solving. Successive processing was significantly related to reading outcomes but not to math performance. Overall, cognitive processes, particularly Simultaneous processing play a crucial role in academic achievement among poor children.

Correlation between PASS Measures and Academic Achievements in Poor Children

PASS	**WR**	**RC**	**MF**	**MPS**
Planning	.370**	.278*	.496**	.094
Attention	.243*	.149	.311**	.100
Simultaneous	.512**	.387**	.517**	.358**
Successive	.293**	.369**	.179	.100

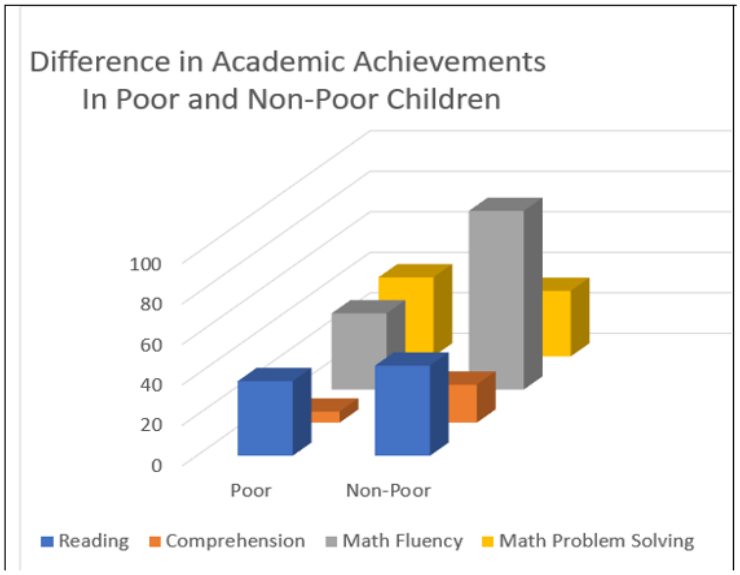
Note: WR – Word Reading, RC – Reading Comprehension, MF – Math Fluency, MPS – Math Problem Solving

In non-poor children, Planning and Attention showed no significant associations with reading outcomes, although both were positively related to math fluency, with Attention demonstrating the strongest effect. Attention also correlated significantly with math problem solving, suggesting its central role in supporting efficient and accurate mathematical performance. Simultaneous processing displayed positive but nonsignificant trends with reading measures, while showing a significant negative association with math problem solving. Successive processing was unrelated to reading but showed a significant positive correlation with math fluency. Overall, the findings indicate that different PASS processes contribute uniquely to mathematical skills in non-poor children.

Correlation between PASS Measures and Academic Achievements in Non-Poor Children

PASS	WR	RC	MF	MPS
Planning	-.152	-.184	.238*	.194
Attention	-.104	-.224	.302*	. 382**
Simultaneous	.148	.194	-.096	-.333**
Successive	.065	.063	.302*	.095

The graph presents the difference of abilities in both groups.



DISCUSSION

The study aimed to investigate the impact of poverty on cognitive ability of poor children and to investigate the complex relationship between the four components of the PASS Processes (Planning, Attention, Simultaneous, and Successive processing) and key academic skills, specifically word reading, reading comprehension, and Math Competency in poor children.

The findings of this study reinforce long-standing evidence that poverty significantly shapes children's cognitive and academic development. Limited financial resources often restrict access to learning materials, enrichment opportunities, and a stimulating home literacy environment, all of which contribute to weaker academic performance among children from low-income households. Echoing the observations of Lacour and Tissington (2011), the present results show that children from economically disadvantaged backgrounds generally scored lower on cognitive and academic measures, highlighting the persistent impact of socioeconomic inequality on educational outcomes.

At the same time, the study highlights the interplay of cognitive, environmental, and socioeconomic factors in influencing children's reading and mathematical performance. Although poverty strongly predicted lower scores on intelligence and academic skills, the data also point to the importance of protective influences within the school environment. Effective instructional practices, supportive teacher–student relationships, and a positive classroom climate emerged as crucial moderators that helped buffer the negative effects of economic disadvantage. This observation resonates with Vygotsky's (1978) Zone of Proximal Development, which emphasizes the role of guided learning in helping children achieve competencies beyond their independent ability. In the participating schools, teachers served as facilitators who motivated students, encouraged persistence, and created opportunities for meaningful learning; thus, narrowing the achievement gap typically linked to poverty.

Bronfenbrenner's (1979) ecological systems theory further contextualizes these findings by highlighting the power of the microsystem, particularly home and school environments, in shaping resilience. In this study, teachers acted as vital support figures, helping children develop both cognitive and emotional resources needed to overcome structural disadvantages. Despite the persistent challenge of poverty in India, the results suggest that strengthening school-based support systems remains a practical and scalable strategy. While enhancing home learning environments is ideal, structural economic barriers often limit such efforts. Equipping teachers with professional development, mentorship skills, and the capacity to address both academic and emotional needs can provide an immediate and effective means of improving learning outcomes.

The study's cognitive findings, based on the PASS framework, provide additional insight into the mechanisms underlying academic performance. Distinct components of Planning, Attention, Simultaneous, and Successive processing showed meaningful associations with reading comprehension and mathematical skills. Planning and Attention were positively related to math fluency and problem-solving, while Simultaneous and Successive processes were more closely connected to reading accuracy and decoding abilities. These results affirm the relevance of the PASS model in understanding how different cognitive processes contribute to literacy and numeracy development, particularly among children facing socioeconomic disadvantage.

Overall, the study emphasizes a complex yet malleable relationship between poverty, cognitive functioning, and academic achievement. Although economic hardship poses formidable barriers, strong school support systems, cognitively informed teaching strategies, and committed teacher mentorship can substantially mitigate these effects. The findings affirm that academic potential is not fixed by socioeconomic status. Rather, with targeted educational interventions, responsive teaching, and supportive school environments,

children from disadvantaged backgrounds can thrive. Strengthening the school microsystem and empowering teachers, especially within the Indian context, emerges as a critical pathway toward reducing educational inequities and fostering long-term resilience and success among all learners.

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Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Samantaray, S. & Das, P.P.P. (2026). Poverty, Cognitive Processing, and Academic Outcomes among Primary School Children: A PASS Framework Perspective. *International Journal of Indian Psychology*, *14*(4)*,* 533-547. DIP:18.01.047.20261404, DOI:10.25215/1404.047