

Remediating Reading Difficulty: A Cognitive Processing Approach

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ABSTRACT

Reading difficulty is a major drawback for school going children as reading is a very important aspect of academics. The present study is an attempt to understand the efficacy of PASS (Planning, Attention, Simultaneous and Successive) Model based remedial intervention, which is purely a cognitive processing approach in reading difficulty. The review of literature suggest while the simultaneous and successive processing measures could differentiate the good readers from the poor ones, the former group showed their superiority in terms of attention and planning when the task features was complex. It was also found that there was a huge improvement in word decoding, phonological awareness, rapid naming, reading, and cognitive ability, where cognitive enhancement programmes was used. As per the PASS model of intelligence, reading was found to be a strong determinant of successive processing, particularly at earlier grades, while reading comprehension depends primarily on simultaneous processing. Attention and Planning are found to be necessary for all levels of reading. The PASS Reading Enhancement Programme (PREP) is one of the interventions which has emerged from PASS theory of intelligence, helps remediate the word decoding and reading comprehension skills of children by improving the underlying cognitive processes. The efficacy of PREP has been proved not only in case of children who are the native speakers of English language, but also in those for whom English is the Second Language (ESL children).

Keywords: *Simultaneous Processing, Successive Processing, Planning, Attention & Reading Disability.*

Reading is a very important aspect of literate life. It is also considered to be crucial as it is such a process through which knowledge is acquired by vast population of children as students. Good reading is implicated for clear understanding, even though understanding or comprehension is affected by many more factors.

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Reading as a process can be divided into two components: word recognition and comprehension (Aaron, 1997; Gough & Tunmer, 1986; Hoover & Gough, 1990). Word recognition refers to the transformation of written words into their corresponding sounds (phonetics). Second component, comprehension is the process of understanding on a higher cognitive level where the reader makes use of personal experience, interpretations are made, and conclusions are drawn. This mental activity is similar to the mental activity engaged in listening to a text read by someone else (Aaron, 1997).

Reading Disability

There are many children, who cannot read and comprehend properly; their problem is called as reading difficulty, reading disability etc. Reading disability is a cognitive processing failure. Cognitive Processing could best be explained through the PASS Model of intelligence.

The leading cognitive processing theory, which is known as PASS (Planning, Attention, Simultaneous and Successive Processing) Model of processing was first proposed in 1975 by Das, Kirby, and Jarman (and later elaborated by Das, Naglieri & Kirby, 1994 and Das, Kar & Parrila, 1996) . The below given are the various components of PASS Model.

1. *Planning*: This is the ability to make decisions about how to solve problems and perform actions. It involves setting goals, anticipating consequences and using feedback. Planning also includes attention, simultaneous and successive processing functions described below, and is associated with the frontal lobes of the brain.
2. *Attention-Arousal*: This involves the ability to selectively attend to stimuli while ignoring other distractions. Children with Attention Deficit Disorder (ADD) have impairments in this area. The arousal functions are generally associated with the brain stem and thalamus, whereas the higher attentional processes are thought to be related to the planning functions of the frontal lobe.
3. *Simultaneous Processing*: This involves the ability to integrate separate stimuli into a cohesive, interrelated whole. Simultaneous processing is necessary for language comprehension. (Horton, & Wedding, 2006).
4. *Successive Processing*: This involves the ability to integrate stimuli into a sequential order. An example of this process is the sequencing of letters and words in reading and writing.

The PASS Model of intelligence states that , information first stimulates the sense organs from external and internal sources, at that point the four cognitive processes activate to analyze its meaning which falls in the individual's knowledge base (e.g. semantic and episodic knowledge, implicit and procedural memories, and so on). Thus, the same information can be processed multiple ways (Das, 2002).

Based on this PASS Model, J.P Das further made two remediating programmes, basically for the enhancement of reading difficulties, they are PREP(The Pass Reading Enhancement Program) and COGENT (Cognitive Intervention Programme).

PREP (Pass Reading Enhancement Programme): The program consists of four successive processing modules and four simultaneous processing modules, each involving a global and curriculum-related bridging component. The components falling under global part consists of non-reading tasks requiring application of successive or simultaneous strategies while the bridging component involves the same processing and strategy use in activities linked to

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reading and spelling. The four successive modules were completed first followed by the simultaneous modules.

COGENT (Cognitive Enhancement Programme): It consists of five distinct modules, each designed to activate different aspects of cognition, language and literacy.

The method used in COGENT are based on vital cognitive aspects during the developmental period and at the same time using basic cognitive processes such as successive, simultaneous processing and attention and planning..

REVIEW OF LITERATURE

Plenty of techniques have been developed to enhance reading skills in children with reading difficulty. Numerous researchers have used various types of interventions in this field. Pass Reading Enhancement Programme (PREP) and Cognitive Enhancement Programme (COGENT) are the two intervention programme which was found to be very effective in the improvement of Cognitive Skills.

In order to examine the effectiveness of PASS Model based intervention, Das and Das in 2011 took twenty good and twenty poor readers each from Grade 3 and Grade 5 and examined the cognitive processing strategies of good and poor readers to make an information processing analysis of reading. The performance of twenty good and twenty poor readers each from Grade 3 and Grade 5 was compared on tasks of attention, simultaneous and successive processing as well as planning. Analysis of variance revealed a significant effect of grade suggesting that the processes were developmentally sensitive. The simultaneous and successive processing measures were not only able to distinguish the good readers and poor readers, the former group showed their superiority in terms of attention and planning when the task was difficult.

In another study Jeom-Jo, Kwang-Eung, Jakyoun and Youngho in 2012 worked on 3 students with reading disabilities of 8 -9 yrs age. The students with reading disabilities attended a special school in Korea. The first student was 96 months, the second student was 98 months & the third student was 108 months. It was found that students with reading disability could improve simultaneous-processing & successive-processing function by using the PREP.

In 2011 Keat and Ismail conducted an intervention taking 50 normal readers and 50 children with reading disability of primary standard. Cognitive Assessment System (CAS) was used to measure the PASS cognitive functions. CAS was administered individually to 50 normal readers and 50 children with reading disability of primary standard in Malaysia. There was significant differences for both PASS cognitive processing and reading processes between the normal readers and children with reading disability. It was found that the poor readers were significantly low for Simultaneous processing. While the normal readers didn't show any significant weakness or strength in their overall cognitive processing as measured by CAS. Thus both the simultaneous and successive processing skills are important factors in determining the good and poor readers and again the interventions which are based on these two processes are found to be effective in enhancing reading skills in children.

Same year, in 2011 Iseman, Jack and Naglieri took students with attention deficit hyperactivity disorders (ADHD), and attempted to examine the effectiveness of PASS based cognitive intervention on them. The authors examined the effectiveness of cognitive strategy

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instruction based on PASS given by special education teachers to students with ADHD randomly assigned by classroom. Students in the experimental group were given a brief cognitive based instruction for 10 days, which was aimed at encouraging effective planning for mathematical computation, whereas the control group received only standard math instruction. Thereafter effectiveness of the training was evaluated. After 1 year follow-up the experimental group continued to do better than the control group.

Das, Mishra and Pool in 1995 did a study on 51 children with decoding difficulties in Grade 4 where they applied PREP, where they have applied six successive and four simultaneous processes. They have divided 51 children with decoding difficulties in Grade 4 into two groups: PREP and the other one is no treatment group. In the second part of the study, children from the no-treatment group received few parts of PREP. The relative efficacy of training was tested by pre-, and post tests of performance on a standard word-decoding test (the WRMT-R), as well as on some cognitive tests (e.g., the CAS). It was found that there was a huge improvement in word decoding, where PREP was used along with all of its components in the treatment, where as the other group, where PREP was only partially used was found to be not so effective in reading improvement

In the year 2010 Mahapatra, Das, Cutlet and Pariila took 14 English-as-a-second-language (ESL) poor readers in Grade 4 who had significant difficulty in comprehension and 14 normal ESL readers in Grade 4 who received no remediation. Both groups were selected from two english-medium schools in India. They applied PASS based intervention strategy on those children. They examined pretest-to-posttest changes in word reading, comprehension, and planning–attention–simultaneous–successive cognitive processes. Result showed marked improvement in comprehension and some improvement in simultaneous processing for the treated group. The results indicated that the cognitive-based remediation program has potential for substantially improving comprehension and its underlying cognitive process among ESL children.

In another study Das, Mishra & Pool, in 1995, applied 10 structured tasks that are aimed at developing internalized strategies for mainly successive and simultaneous process with a assumption that deficits in either of the two may lead to poor decoding. They have divided 51 children with decoding difficulties in Grade 4 into two groups: PREP (both global and bridging), where the bridging component involves the same simultaneous & cognitive demands as their global counterparts, which have been closely linked to reading and spelling (Das, Naglieri, & Kirby, 1994), and the other one is no treatment group. In the second part of the study, children from the no-treatment group received either the global or the bridging part of PREP. The relative efficacy of training was tested by pre-, and post tests of performance on a standard word-decoding test (the WRMT-R), as well as on some cognitive tests (e.g., the CAS). There was a huge improvement in word decoding, where PREP was used along with global and bridging treatment, where as the bridging task alone was found to be not so effective in reading improvement although it is directly focused in reading.

In a study Hayward, Das & Janzen, in 2007, have taken, 45 Grade III students from a reservation school in Western Canada and were divided into two remedial groups and a no-risk control group. One remedial group was given a classroom-administered cognitive enhancement program (COGENT) throughout the school year. The second group received COGENT for the first half of the year followed by a pull-out cognitive-based reading enhancement program (PREP). Children were assessed across phonological awareness, rapid naming, reading, and cognitive ability at the beginning of the year, midterm, and at the end of

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the school year. MANOVA results showed a significant interaction for reading measures, with students receiving classroom intervention over the school year making the greatest gains. Results are discussed in terms of group, remediation program, and individual participant improvements.

DISCUSSION AND CONCLUSION

Researchers conducted within the framework of PASS model have proved that planning, attention, simultaneous and successive processes are necessarily involved in reading. Attention being the primary prerequisite of all cognitive tasks helps the reader to attend to the relevant information, thereby, enhancing the coding of information that may be either simultaneous or successive or both. Rather a cyclical hierarchy of involvement of both the processes is seen in the entire process of reading. But as the phonological processing is necessarily involved in word decoding, successive processing plays an important role in reading, particularly in the initial stage of reading. Simultaneous processing which improves in deeper level of semantic analysis of the information, examining the interrelationship among separate components of information and synthesizing them into larger units of information, on the other hand, plays a very vital role in comprehension at any stage of reading. Mastery over the two skills of reading, ultimately improves the reading skills significantly. Studies further reveal that a weakness in simultaneous processing in children is linked with comprehension difficulties, whereas, word decoding difficulties are associated with a successive processing weakness in beginning readers. Planning and attention, on the other hand are necessary at all levels of reading and their importance increases as a function of complexity of the reading tasks (Das, Naglieri, & Kirby, 1994 ; Das, Parrila and Papadopoulos, 2000; Mahapatra, 1989, 1990, 2015a, 2015b ; Mahapatra & Dash 1999). Thus planning, attention, simultaneous processing and successive processing was considered to be effective dimensions of Cognitive functions and the intervention based on these processes are found to be very effective.

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Conflict of Interest

The author declared no conflict of interests.

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