



## Processing Speed Domain Case Study

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**School is a significant source of stress for Justin.**

**Learning is not easy for him, and he had trouble adjusting to being placed in a full-time, regular education classroom last year. Justin finds his homework difficult and feels that his parents get very frustrated with him when he is not able to finish it.**

**He feels that he is trying his best, but often has to reread information to understand and remember it. He often is not aware of the mistakes that he makes.**



Meet Justin, an active 12-year-old boy who likes camping, fishing and playing soccer. Justin is currently in the 6<sup>th</sup> grade. He says he likes school, but hates reading and writing. He likes making jokes and being the center of attention among his peers. Around adults he is quiet and reserved.

Justin likes to clown around in class and works hard to make other children laugh. He has been diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) and receives outpatient counseling and medications for his behavior problems. Though Justin has attended remedial courses for reading and writing in the past, all other coursework has been completed in a regular education setting.

Over the past two years, Justin has been marginally passing through school. His best grade is a *B* in gym class, and all other grades have been *Ds* or *Fs*. Despite his poor grades, the school no longer provides remedial programming for Justin. His inability to complete homework without constant supervision from his parents is a source of tremendous family stress. Even when Justin is focused, it takes him an extraordinary amount of time to complete his work, which includes subjects that are not particularly difficult for him. The family believes that Justin is not capable of completing all of his work and has asked for tutorial or remedial support from the

school. The family thinks that Justin may have some intellectual deficits that interfere with his ability to learn.

In the 4<sup>th</sup> grade, Justin failed the writing portion of the state achievement examination. According to his teacher, Justin does not work hard in class. He does not finish assignments and turns in half-completed tests. His teacher does not believe that he has a learning disability because the work that he does turn in would earn him a *C* if he were able to complete it. Justin's writing and spelling are quite poor, but his teacher feels that this may be due to a lack of effort rather than an actual learning problem.

Justin was administered the WISC-IV Integrated as part of a comprehensive assessment to understand the problems he is having completing his academic work in school and at home, and to determine what specific cognitive challenges are contributing to his problems with reading and writing.

Justin is currently functioning in the average range of intellectual ability, with a relative weakness in visual processing speed. During

Justin's efforts with these specific elements of the comprehensive psychoeducational assessment earned him the following scores:

**WECHSLER INTELLIGENCE SCALE FOR CHILDREN®—FOURTH EDITION INTEGRATED (WISC—IV INTEGRATED)**

	Composite Score	Percentile Rank
<b>FULL SCALE IQ</b>	101	53

**INDEXES**

Verbal Comprehension	102	55
Perceptual Reasoning	106	66
Working Memory	102	55
Processing Speed	85	16

**VERBAL COMPREHENSION SUBTESTS**

	Composite Score	Percentile Rank
Similarities	12	75
Vocabulary	10	50
Comprehension	10	50

**PERCEPTUAL REASONING SUBTESTS**

Block Design	9	37
Picture Concepts	13	84
Matrix Reasoning	11	63

**WORKING MEMORY SUBTESTS**

Digit Span	11	63
Letter-Number Sequencing	10	50

**PROCESSING SPEED SUBTESTS**

Coding	7	16
Symbol Search	8	25

**PROCESS SUBTESTS**

	Scaled Score	Percentile Rank
Cancellation Random	7	16
Cancellation Structured	3	3
Coding Copy	8	25
Elithorn Mazes (Time Bonus)	4	2
Elithorn Mazes (No Time Bonus)	7	16

**WECHSLER INDIVIDUAL ACHIEVEMENT TEST®—SECOND EDITION (WIAT®—II) SUBTESTS**

	Scaled Score	Percentile Rank
Word Reading	89	23
Pseudoword Decoding	87	19
Reading Comprehension	102	55
Numerical Operations	91	27
Math Reasoning	105	63
Spelling	80	22
Written Expression	90	25

testing, he appeared to struggle with and took a long time to complete tasks involving both visual and motor elements. To determine the impact of slow processing speed on his **Block Design** score, the **Block Design No Time Bonus** scaled score was calculated and found to be 13, which is significantly higher than his **Block Design** scaled score of 9. This discrepancy suggests that slow processing speed may have a negative impact on other cognitive functions as well.

Additional subtests from the WISC—IV Integrated were administered to determine the extent of his processing speed deficits. The incidental learning and cued recall scores from the **Coding** subtest were in the average range, indicating that his low score on the **Coding** subtest was a result of the speed of his work, and not an inability to learn or remember the symbols. Evaluation of **Coding** and **Coding Copy** indicated consistently slow performance on both tasks.

On **Cancellation**, Justin worked very slowly on both the structured and random conditions. He displayed a disorganized approach and appeared to get lost in all the detail in both tasks. The structured condition did not help him to organize his behavior. On both tasks, he covered the same ground repeatedly in order to identify the targets.

Justin's performance on the **Elithorn Mazes** subtest reflects the same pattern of difficulty with speeded tasks that involve visual and motor skills. When calculated without time bonuses, his score was one standard deviation better than when scored with time bonuses, though still in the low average range.

Justin was administered the *Wechsler Individual Achievement Test®—Second Edition* (WIAT®—II) to determine if his inability to process complex visual stimuli and quickly produce motor output is affecting his reading and writing. On the reading tests, Justin consistently mispronounced words when he first read them aloud. After hearing himself say the word incorrectly, he was able to correct himself. This pattern was also observed on **Pseudoword Decoding**, strongly suggesting that Justin is not able to read words by sight. Instead, he relies on sounding out each word as he reads it and correcting himself if it doesn't sound right. This strategy is not efficient in terms of reading speed, but does improve his accuracy considerably.

Justin's spelling also suffers from his inability to automatically recognize and recall words. On the **Spelling** subtest, he frequently attempted to spell words phonetically, but was often incorrect. His writing skills were notable for adequate content, but very poor construction and poor use of punctuation. However, Justin's score was in the average range due to the quality of the content of his writing.

The difference between his FSIQ and reading scores is statistically significant. Academic skills all clustered near the low average to lower end of average range. He exhibits difficulties with writing due to poor attention to details, inability to complete work within set time limits and poor organizational skills. He does have relatively good understanding in reading but his ability to apply what he knows may reflect a weakness in executive functioning or other cognitive domains.

Justin has average intellectual abilities but demonstrates slow processing of complex cognitive information. On simple tasks, his processing speed is aver-

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age but on more complex tasks he experiences a great amount of difficulty and frustration. Justin's single-word reading ability is consistent with dyslexia that is partially compensated for by auditory feedback mechanisms that enable him to correct misread words. This indicates poorly automatized reading ability. His academic and intellectual profile is consistent with phonologically based dyslexia. Justin's writing skills are notable for poor spelling, grammar and syntax but adequate content and production. This pattern is commonly observed in children with learning disabilities.

A school meeting was held to discuss the results of this assessment and determine appropriate accommodations. Justin qualified as a learning-disabled student based on the

words, she devised a game in which Justin earns points for reading a list of words within a specific amount of time without making any errors. He will be allowed to practice the list as many times as possible and tell the teacher when he is ready to play for game points. When he earns a specified number of points, he will be allowed to spend one reading session playing an education computer game. Justin is looking forward to this very much. The Reading Specialist specifically designed the intervention to build slowly and enable Justin to feel successful. The goal of the program will be to keep Justin involved until he achieves reading accuracy at or above grade level.

As part of the sight-word training, Justin will also receive systematic phonics training.

by reducing the number of inappropriate pauses during reading.

Given Justin's difficulty learning novel associations, the Reading Specialist decided to use story writing as a means for improving reading and writing skills. In this intervention, Justin will be given a character and a situation to write about. He will be allowed to write the story without any concern for grammar, punctuation or spelling. After completing the story, he will work with the special education teacher on vocabulary development, spelling and writing mechanics. Because Justin has developed a negative attitude toward reading and writing, which

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state discrepancy criteria and was made eligible for special education services. Based upon his previous functioning over the past two years, it was determined that Justin should receive additional reading and writing services with the school's Reading Specialist. Justin will remain in the regular education setting for all other coursework.

Based in part on results from the assessment that indicate Justin struggles when required to quickly process complex visual information, the reading specialist designed an intervention strategy that focuses on improving Justin's basic phonological skills and sight-reading. To help him improve his reading speed for single

Though this intervention is typically aimed at younger students, it was felt that Justin was behind in his phonics development. This will be a relatively small component of the intervention and serve as an early means for Justin to experience success in his reading as well as firm up some of his basic phonological skills.

Once he has completed this segment to improve reading words in isolation, the Reading Specialist will initiate a program to improve reading fluency through oral reading. For this segment, Justin will earn points toward computer time by reducing his error rate in reading text orally and also

is inhibiting his growth in these areas, all of the interventions are designed to provide him with successful experiences.

In math class, Justin will be provided fewer problems on tests and will be required to review his work before turning in the test. He will also be given fewer homework problems to complete. The goal is for the reduced workload to result in an overall improvement in the quality of the work and an increase in the percentage of tests and classroom assignments that are turned in completed.