WISC®-IV Integrated

insight.

Processing Speed Domain Case Study

"Justin's parents and teachers believe that he has the necessary skills to do grade-level work and that his failing grades are due more to lack of effort than lack of ability."

ALWAYS LEARNING

PEARSON

intervene.

School is a significant source of stress for Justin.

Learning is not easy for him. He finds homework difficult to complete and feels that his parents get frustrated with him when he is not able to finish it. When he takes his incomplete homework to school, he gets into trouble.

He believes that he is trying his best but this year he has been unable to keep up. His teachers are concerned that he will not be ready to go to middle school next year.

Case Study No. 4

Meet Justin... a 12-year-old sixth grader who claims to like school but hates reading and writing. He likes to clown around and works hard to make other children laugh even when it is at his own expense. Around adults, he is quieter and more reserved. He enjoys family activities, plays soccer, and has friends at school and in the neighborhood.

Over the past two years, Justin has been marginally passing his classes. His best grades are in gym class (B's) and all other grades have been D's or F's. At the beginning of fifth grade, he was diagnosed with Attention-Deficit/Hyperactivity Disorder (AD/HD) by his pediatrician, who recommended a medication trial, but his parents did not wish to pursue medication at the time. He has participated weekly for the past year in a social skills development group at a local clinic as recommended by his doctor. According to his parents, the group work has been somewhat helpful, but he continues to have major difficulties in school.

In the fourth grade, Justin failed the writing portion of the state achievement test, which resulted in placement in a remedial writing class that met weekly for an hour for 6 weeks. According to his teacher, the intervention was ineffective. In fifth grade, he attended after-school tutoring twice weekly for 30 minutes with his teacher to develop reading comprehension strategies. After a semester of tutoring, his teacher reported little improvement.

At the end of the first reporting period of sixth grade, Justin is failing every class but gym. In the classroom, he is observed to frequently be off task, playing with his materials, talking when he should be listening or working, and failing to follow verbal directions. His inability to complete homework assignments without constant supervision is a source of tremendous family stress. Justin's parents and teachers believe that he has the necessary skills to do grade-level work and that his failing grades are due more to lack of effort than lack of ability.

Early in November, Justin was referred for an individual, comprehensive assessment to determine if his problematic behaviors and failing grades are primarily the result of his AD/HD, if he might have additional deficits that impair classroom performance, and how best to increase his motivation to do well in school.

Justin's overall cognitive ability falls within the average range but there are significant discrepancies among the subtests that contribute to the composite scores. Investigating his pattern of performance will be helpful in understanding some of the difficulties he experiences in school. On the core WISC®-IV (Wechsler Intelligence Scale for Children®, Fourth Edition) subtests, Justin demonstrates cognitive abilities commensurate with his age on tasks requiring verbal concept formation, verbal reasoning, and knowledge acquired from his environment, as well as on working memory tasks that require him to temporarily retain verbal information in memory, perform some operation or manipulation with it, and produce a result. His cognitive strengths are in the areas of nonverbal perceptual and fluid reasoning as well as visual-spatial processing, when tasks are untimed. His performance declines, however, when speed is required.

As a part of his evaluation Justin was administered the WISC-IV Integrated and the WIAT-III.

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

	Composite Score	Percentile Rank
FULL SCALE IQ	100	50
INDEXES		
Verbal Comprehension	102	55
Perceptual Reasoning	104	61
Working Memory	102	55
Processing Speed	85	16
VERBAL COMPREHENSION SUBTESTS		
	Scaled Score	**Percentile Rank**
Similarities	12	75
Vocabulary	10	50
Comprehension	10	50
PERCEPTUAL REASONING SUBTESTS		
Block Design	8	25
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**
Block Design Multiple Choice	12	75
Block Design No Time Bonus	9	37
Cancellation Random	7	16
Cancellation Structured	3	3
Coding Copy	8	25
Elithorn Mazes Time Bonus	4	2

WIAT®-III (WECHSLER INDIVIDUAL ACHIEVEMENT TEST®-THIRD EDITION) SUBTESTS

	Scaled Score	Percentile Rank
Word Reading	95	37
Pseudoword Decoding	90	25
Oral Reading Fluency	85	16
Reading Comprehension	95	37
Basic Reading Comprehension	92	30
Reading Comprehension and Fluency Composite	86	18
Total Reading Composite	87	19
Math Problem Solving	105	63
Numerical Reasoning	91	27
Math Fluency Addition	88	21
Math Fluency Subtraction	85	16
Math Fluency Multiplication	78	7
Mathematics Composite	97	42
Math Fluency Composite	82	12
Spelling	88	21
Sentence Composition	92	30
Essay Composition	85	16
Written Expression	85	16
Composite		

For example, one of the PRI subtests—Block Design—is timed and requires quick problem solving and Justin's score, although still within the average range, was among his lowest. He earned only a single time bonus on the task and he failed to earn points because of an error with a single block on the two more difficult items. He approached the task by looking at the whole design for a few seconds and duplicating it two blocks at a time but did not always pay attention to the visual details of each block.

To better determine the effect of slower performance, Justin's Block Design score was compared to the Block Design No Time Bonus (BDN) score but there was no difference between the two. The next step was to separate out the effect of visual-perceptual and perceptual-organizational skills from motor planning and execution, so he was given the timed Block Design Multiple Choice subtest, on which his score improved significantly to a 12 (or from the 25th to the 75th percentile rank) when a quick motor response was no longer required.

Justin also was administered the Elithorn Mazes subtest, a measure requiring visual scanning ability, visual and motor sequential processing, planning, organization, motor execution, and the ability to inhibit impulsive responses. The test requires both accuracy and speed of performance. Justin earned a below average score of 4. He tended to be impulsive and quickly made errors and there was little evidence of motor planning. He talked his way through all of the mazes, frequently reminding himself of the rule, "Don't pick up your pencil."

On two of the more difficult mazes, Justin required a second trial but appeared to learn from his mistakes. At most, he was able to connect five dots after two trials. The high number of Motor Imprecision errors is unusual for a child his age and indicates poor graphomotor control. Typically, students with executive functioning deficits perform poorly on this subtest although a low score by itself is not indicative of global impairment in executive abilities. Overall, it appears that even Justin's cognitive strengths are affected to some degree by his deficits in graphomotor control, poor motor planning, slower response time, and impulsivity.

Justin's cognitive weakness is in the area of processing speed and his lower performance on the Coding and Symbol Search subtests were the result of his difficulty in quickly scanning visual information, discriminating visual similarities and differences, and providing a motor response. On Coding, where he had to learn quickly the pairing of an abstract symbol and a numeral and then reproduce the symbol beneath the corresponding numeral in another location, Justin worked slowly in drawing the symbol even though he appeared to memorize the pairs. Frequently, his drawing was too large for the assigned box. The longer he worked on the task, the slower he became.

Initially, Justin was impulsive and made errors but he took the time to correct them—an indication that he was self-monitoring. He complained at one point that his hand hurt; he needed redirection to complete the task. His performance on Coding Recall supports the observation that poor incidental learning was not the cause of the lower score. The Coding Copy subtest was administered because it provides a purer measure of graphomotor speed since paired associative learning is not required. Justin's score of 8 indicates that he may have underdeveloped visual-motor integration abilities that affect his graphomotor speed. Variability in his performance across the time intervals indicates problems with maintaining attention and sustained effort over time and a fatigue effect.

Justin also was administered the Cancellation subtests under both the Random and Structured conditions, resulting in his lowest ability scores. When he was asked to visually scan a large amount of randomly displayed information and mark only specific target pictures as quickly as possible, his performance was low average. Occasionally, he mismarked a target (commission error) and he frequently he missed a target (omission error). His approach to the random task was revealing in that it was disorganized and inefficient. He worked all over the page and he covered the same ground repeatedly in order to identify the targets. When administered the

structured task in which pictures appear in rows rather than scattered across the page, he employed the same disorganized, ineffective strategy.

It is unusual to see a much lower Structured score than Random score but that may be attributed to Justin's comment that "I already did this" when shown the second task. He appeared to be more motivated when the task was novel and he viewed the second administration as more of a punitive exercise designed to "fix" his mistakes. He did not comment otherwise on the differences between the two tasks.

Justin's performance on the WISC-IV Integrated subtests identify persistent difficulties with executive functioning related to graphomotor planning and execution, inhibition, sustained attention and effort over time, and organization of visual information. Further, he demonstrates poor visual-motor integration and the inefficient use of strategies for problem solving. His executive functioning difficulties related to his AD/HD, when paired with his slower processing speed especially on tasks requiring graphomotor output, contribute significantly to his academic struggles in all content areas. To better understand the effect of these deficits on learning, he was administered the WIAT®-III (Wechsler Individual Achievement Test®-Third Edition).

Justin scored in the average range on all of the reading subtests of the WIAT-III, although his Oral Reading Fluency score is at the bottom of the average range. On Word Reading, for which he was asked to read aloud words of increasing difficulty, he recognized some words immediately but spent up to 10 seconds trying to decode unknown words. He decoded unfamiliar words with some success but also guessed at irregular words based on initial letter.

His overall Word Reading Speed score placed him at the 25th percentile ranking, indicating a lack of automaticity when reading whole words. He frequently recognized errors when they occurred and self-corrected but this also contributed to his slower speed. His performance was weaker on Pseudoword Decoding, for which he was required to read nonsense words. Once more, his reading speed was slower than about 75% of children his age and he self-corrected frequently.

Oral Reading Fluency, for which Justin was asked to read grade-level passages aloud, yielded his lowest reading score and placed him at the 16th percentile ranking. His score reflects not only a slow oral reading rate but a greater-than-expected number of errors and poor prosody. He occasionally skipped words, self-corrected, then re-read the sentence again. When he read grade-level passages silently then answered questions about what he had read, his Reading Comprehension score was average and he was able to answer questions based on both inferred and stated information in the passage. Even though Justin reads more slowly, he demonstrates appropriate understanding of grade-level material when he has adequate time to read it silently.

Justin was administered the WIAT-III Numerical Operations, Math Problem Solving and Math Fluency subtests. His Math Problem Solving score was his highest achievement score and places him at the 63rd percentile ranking. His math calculation skills as reflected in the Numerical Operations score of 91 was somewhat weaker (at the 27th percentile). His lack of self-monitoring contributed to the lower score since he made careless errors on some of the easier items. He also had trouble on problems related to long division (a process that requires considerable cognitive flexibility, which is often problematic for children with executive functioning deficits), multi-digit multiplication, and solving simple equations.

His greatest difficulty was on the three Math Fluency subtests that required him to retrieve addition, subtraction, and multiplication facts quickly. He was able to eventually retrieve the correct answer but it took him considerably longer to do so. He had particular difficulty retrieving multiplication facts—a skill that is required almost daily in his math class. In fact, 93% of students his age perform better on this subtest. It was noted that Justin exhibited considerable frustration during the fluency subtests, frequently correcting his answers while muttering to himself.

Of all the academic skills necessary for success in the classroom, written expression is Justin's weakest area. He had trouble spelling words correctly, combining two or more sentences to formulate one new sentence while maintaining the meaning, generating correctly formulated sentences using a target word, and writing an essay. His lower scores can be attributed to uncorrected spelling errors, lack of organization when expressing his ideas, and minimal written production. His handwriting is barely legible and he required considerable encouragement to stay on task to completion.

Justin's problems associated with writing may create significant barriers to classroom success as he moves into secondary school with higher expectations of taking notes and demonstrating knowledge through writing. His difficulties with writing contribute significantly to his level of frustration. In class, he is often unable to receive

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credit because he is required to reveal his knowledge through writing. While his academic achievement as measured by the WIAT-III is lower than expected based on his cognitive strengths, his executive functioning deficits, slower processing speed, and graphomotor difficulties significantly affect his ability to demonstrate learned academic skills.

In response to the referral questions, Justin's executive functioning deficits (i.e., impulsivity, inability to sustain attention and effort over time, lack of cognitive flexibility, and poor planning and organization) associated with his AD/HD affect both his learning of new information and his ability to demonstrate what he has learned. His slower processing speed affects automaticity and fluency in reading and calculation and when paired with his difficulties with visual-motor integration and weak graphomotor skills, results in significantly impaired written expression. Accommodations in the classroom as well as specific instructional interventions are warranted so as to build Justin's confidence, to increase his motivation, and to prepare him for middle school.

Based on these findings, the following recommendations are made for Justin:

1. He would benefit from shortened writing assignments and the opportunity to supplement written work or tests with oral demonstration.

2. Provide opportunities for Justin to use the computer for writing-intensive projects/ assignments. This may require additional instruction so that he can develop his keyboard skills.

3. Going forward, it will be important for Justin to have assistance in note-taking though the provision of outlines for lectures, lists of related vocabulary words, or copies of notes from a note taker. He should be provided any information that students are requested to copy from the board or text.

4. When possible, time pressure on writing tasks should be reduced. Emphasis should be placed on accuracy and content rather than speed. If the purpose of a homework assignment is extended practice of a new skill and that goal can be met with oral rather than written practice, allow Justin to complete the assignment verbally.

5. Justin still needs to master his math facts and sight words to a level of automaticity. Visual/oral drill rather than written is recommended. He might enjoy and benefit from practicing his math facts set to music.

6. Justin requires direct and explicit instruction in strategic problem solving, reading fluency, and organizational strategies. For example, teach him how to use graphic organizers to plan writing assignments or to enhance reading comprehension. Help him improve his visual imagery so as to support visual working memory, and show him how to use mnemonics such as acronyms, acrostics, and pegwords to learn new information.

7. Justin's parents may wish to reopen the discussion of a medication trial with his pediatrician.

The results of this evaluation, including recommendations, will be shared with Justin, his parents, and his teachers at the IEP committee meeting.

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