

EPSE 526 Case Study: Lynne Carlinton

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What is a Learning Disability?

While the definition of a learning disability may vary over time, location and context, the current definition used by the British Columbia Ministry of Education, falls in line with those accepted by the Learning Disabilities Association of Canada and the BC Association of School Psychologists. A learning disabilities refers to multiple conditions that may impair the attainment, retention, organization or use of verbal or nonverbal information. More specifically, they are impairments in the learning of individuals who may otherwise demonstrate average to above average cognitive abilities for thinking and/or reasoning. Learning disabilities are therefore distinct from intellectual disabilities, and are often suggested by unexpected academic under-achievement or achievement that is maintained by unusually high levels of effort and support (BC Ministry of Education, 2011).

These life-long challenges occur in 5-15% of school age children, and are more common in males than females – ratios range from 2:1 to 3:1 (American Psychiatric Association, 2013). They are a result of genetic and/or neurological factors or injury that alters brain function and affect the processes related to thinking, perceiving, remembering or learning. Some of the processes that may be affected are language processing, visual spatial processing, phonological processing, processing speed, memory, attention and executive functions.

Learning disabilities vary in severity and across environments, but typically interfere with the acquisition and use of academic skills related to: oral language, reading, written language and mathematics. It is also possible for learning disabilities to co-exist with other disorders such as attentional, behavioural or emotional disorders, sensory impairments, or other medical conditions (BC Ministry of Education, 2011).

What do Learning Disabilities look like?

Reading Disorder

According to the BC Ministry of Education (2011), students with a reading disorder are generally characterized by challenges with the alphabet, word recognition, spelling, decoding and comprehension. A student with reading disorder might have difficulty with:

- learning the alphabet, including letter names and sequence
- sequencing of letters to create a word, or sound/symbol correspondence
- finding a word in the dictionary, naming the days of the week and months of the year
- memorizing non-phonetic words
- reading words that cannot be translated into a mental picture (and, a, the, etc.)
- reading aloud without repeated mistakes and pauses
- understanding reading material and related vocabulary
- reading numbers and math symbols
- finding the correct words, and organizing them to express thoughts orally
- retelling a story in sequence of events
- comprehending inferences, jokes or sarcasm

In addition, Linan-Thompson & Miciak (2012), also suggest further areas of difficulty:

- identifying small differences between sounds, particularly vowel sounds
- self-monitoring
- using context to identify important ideas
- extreme difficulty building ideas and images
- integrating and connecting new ideas to prior knowledge
- weak vocabulary skills
- difficulty recognizing high frequency words

- reading comprehension is significantly impaired when compared to oral comprehension
- difficulty controlling eye movements across the page.

Writing Disorder

According to the BC Ministry of Education (2011), students with a writing disorder are generally characterized by distorted writing. A student with writing disorder may demonstrate:

- inconsistent or illegible writing
- inconsistent positioning on the page, with respect to lines and margins
- unfinished words or letters, omitted words and many spelling mistakes
- fine motor difficulty
- inconsistent speed in writing
- writing that doesn't communicate at the same level as the student's other language skills
- odd grip, unusual wrist, body or paper position
- pain or muscle spasms while writing
- talking to self while writing, or carefully watching the hand while writing
- refusal, reluctance or extreme stress when asked to complete a written task

Spelling Disorder

According to the BC Ministry of Education (2011), spelling disorders are generally characterized by difficulties with spelling. They originate from poor awareness or memory of letters in words and language structures. Often in conjunction with poor skills in reading and/or arithmetic, a student with a spelling disorder might demonstrate:

- arbitrary misspellings, such as addition, omission and/or substitution of letters in

words

- reversal of vowels and/or syllables
- slow, hesitant or poor written expression
- errors in conjugation and grammar
- phonetic spelling of non-phonetic words
- misunderstanding the correspondence between sounds and letters

Arithmetic Disorder

According to the BC Ministry of Education (2011), arithmetic disorder is generally characterized by difficulty in learning or comprehending mathematics. It affects a person's ability to understand and manipulate numbers. A student with arithmetic disorder might have difficulty with:

- organizing problems on the page (i.e. keeping numbers lined up)
- understanding and solving word problems
- following through on multiple step calculations
- transposing numbers accurately on paper or on to a calculator (turning 56 into 65)
- distinguishing right from left
- using the mathematical calculation signs
- accurately completing calculations
- experiencing anxiety when asked to engage with mathematical concepts
- remembering and applying mathematical functions in various ways, such as:
 - understanding abstract concepts like time and direction, specifically visualizing the face of a clock or places on a map
 - recalling math rules, formulas or sequences

- being able to perform an operation one day but not the next
- checking change, reading analog clocks, keeping score during games
- budgeting, estimating
- recalling dates, addresses, schedules and sequences of past or future event

Additional Associated Features:

In addition to the above diagnostic characteristics, individuals with learning disabilities often exhibit a variety of associated features. This may include an uneven profile of abilities or poor performance on tests of cognitive processing (American Psychiatric Association, 2013) which may be due to difficulties with attention, slower processing speeds, or challenges with working memory and executive functioning (Swanson & Stromel, 2012). These students are also at risk for low self-esteem and suicidal ideation (American Psychiatric Association, 2013).

Memory

Working memory is responsible to storing and manipulating incoming information for a short period of time, in order to allow other information to be processed (i.e. remembering what the sentence was about while sounding out a word; BC Ministry of Education, 2011). For students with reading disabilities, deficits in their working memory are typically related to the phonological loop, which is in charge of retaining verbal information over short periods of time (Swanson & Stromel, 2012). As such, these individuals struggle to retain or access phonological representations, resulting in impairments in reading development (BC Ministry of Education, 2011). In addition, research has also shown that their ability to retain verbal information in their short-term memory is impaired, making it difficult to follow multi-step verbal instructions - even more so when this information must be recalled sequentially. Remarkably, this may be the case for verbal stimuli regardless of the modality in which the information is presented (i.e. even if

verbal information is presented visually; Swanson & Stromel, 2012).

Alternatively, while students with deficits in visual-spatial working memory have shown marked discrepancies in academic attainment research has produced varied results in regards to individuals with learning disabilities. Current theory suggests that for many students with learning disabilities, these deficits may only become apparent when excessive demands are placed on the executive system (Swanson & Stromel, 2012). The executive system is thought to: inhibit irrelevant responses, update and monitor working memory representations and shift between mental sets (varied strategies that have worked in the past). It is the first two areas where individuals with learning disabilities may struggle (Swanson & Stromel, 2012).

Finally, while their long-term memory is intact, there may be deficiencies in the strategies necessary to retrieve information (Swanson & Stromel, 2012), making it difficult to recall information such as arithmetic facts, or how to spell a word.

Attention

Some students with learning disabilities may exhibit challenges with focusing, sustaining and shifting attention. This may be a result of emotional issues, lack of interest or motivation, or from difficulties with self-regulation. It may take the form of poor organization of supplies or management of time, difficulties with social interactions and impulse control, an inability to create a plan and follow through, a weak understanding of self (strengths/weaknesses), or being distracted by sensory stimulation (BC Ministry of Education, 2011). It is also important to note that some students may also have a comorbid biological condition known as Attention Deficit Hyperactivity Disorder (ADHD), which can be investigated and diagnosed by a pediatrician.

Social Emotional & Mental Health

Approximately 75% of individuals with learning disabilities have social, emotional or

behavioural difficulties (Wiener & Timmermanis, 2012). In addition, because learning can be difficult many of these individuals experience frustration with work tasks, become less engaged and less willing to take risks in academic situations (BC Ministry of Education, 2011). As a result, they may become discouraged by their lack of success, and therefore less confident in their ability to learn - resulting in a negative academic self-concept (Wiener & Timmermanis, 2012). These feeling of inadequacy may also result in behavioural difficulties at school as well as outside of it (BC Ministry of Education, 2011), which can in turn decrease the likelihood of high school graduation (Siegel, 2013). Research has also shown, that unfortunately these individuals are significantly more at risk for experiencing thoughts of suicide (American Psychiatric Association, 2013).

Early Indicators (Risk and Prognostic Factors)

Individuals are more likely to have a learning disability if they were born premature or had low birth weight, experienced in utero exposure to nicotine, or have a first-degree relative with a learning disability.

Furthermore, given that learning disabilities are specifically related to key academic skills, they are not typically diagnosed until an individual enters the school system. However, there are often early indicators that may predict difficulties during school years. Specific learning disorder is often preceded by delays in attention, language and motor skills. Moreover, behaviours such as reluctance to engage in learning activities and oppositional behaviour may be observed (American Psychiatric Association, 2013).

Screening Measures

Rather than following the “wait to fail” model, some districts may use universal screenings to identify students that may exhibit early indicators of learning difficulties. The

results of these screenings may be used to decide which students would benefit from small group (Tier 2) interventions and as such begin to remediate deficits before the student falls too far behind. It is important that screening measures are highly sensitive and specific so as to only classify those that are at risk. They are also typically brief and easy to administer and interpret. Linan-Thompson & Miciak (2012), recommend the following screening measures for reading in Grade K-2: letter naming fluency, phoneme segmentation fluency, nonsense word fluency, word identification fluency, oral reading fluency. For an additional list of screening measures from the BC Ministry of Education please refer to Appendix 2.

Prevalence

As definitions and assessment protocols vary across environments, statistics on prevalence are varied as well. For example, the DSM-V states that Specific Learning Disorder occurs in 5% - 15% of school age children (American Psychiatric Association, 2013), while the BC Ministry of Education (2011) states that 3% of students in BC are identified as receiving support for a learning disability.

How do we identify Learning Disabilities?

Assessment

In British Columbia, schools and school boards are responsible for identifying students with special needs. Identifying learning disabilities requires the collation and interpretation of multiple sources of both formal and informal assessment information. These assessments should integrate information from a variety of sources including the family (developmental, medical and family history), classroom teacher, counsellors, learning assistance or support records, formal student records, and any relevant medical reports (such as occupational therapy, physiotherapy,

and speech & language therapy). Moreover, ability, academic achievement and cognitive processes should be obtained through documentation of the student's classroom performance and response to varying instructional approaches, as well as through standardized measurements. It is important to note, that Level B and C assessments should be performed and interpreted by qualified individuals only (BC Ministry of Education, 2013).

Formal Diagnostic Characteristics

Using the information gathered in the formal assessments noted above, a psychologist will then determine if the criteria has been met in order for the student to be given a learning disability diagnosis. According to the DSM-V (American Psychiatric Association, 2013), a Specific Learning Disorder (315.0) is generally characterized by:

1. Persistent difficulties, spanning at least 6 months, in learning keystone academic skills – reading, writing, spelling and math (i.e., reading of single words fluently and accurately, reading comprehension, spelling and written expression, mathematical reasoning and arithmetic calculation).
2. Affected skills are well below average for individual's chronologic age.
3. Learning difficulties are readily apparent in the early school years for most individuals; however, for others, onset is during early years of formal education
4. Not attributable to: intellectual disabilities, other mental or neurological disorders, motor disorder, uncorrected auditory or visual acuity, inadequate educational instruction, lack of proficiency in the language of instruction, or psychosocial adversity.
5. Deficits may be restricted to one academic skill or domain

In the DSM-V (American Psychiatric Association, 2013), this disorder is further broken down into impairments in:

Reading (315.0):

- Word reading accuracy
- Reading rate or fluency
- Reading comprehension

Written Expression (315.2):

- Spelling accuracy
- Grammar and punctuation accuracy
- Clarity or organization of written expression

Mathematics (315.1):

- Number sense
- Memorization of arithmetic facts
- Accurate or fluent calculation
- Accurate math reasoning

These impairments can range in severity as follows (American Psychiatric Association, 2013):

Mild: Minor difficulties learning skills in one or more academic domains, however the individual is able to compensate or function well when provided with support services and the appropriate academic accommodations.

Moderate: Difficulties learning skills in one or more academic domains is evident, and the individual is unlikely to become proficient without intervals of specialized and intensive teaching. Some support services and appropriate academic accommodations may be required, for at least part of the school day in order to complete activities efficiently and accurately.

Severe: Substantial difficulties learning skills across several academic domains, requiring ongoing intensive individualized and specialized teaching. Appropriate accommodations or

support services may not be sufficient enough to allow individual to complete all activities efficiently (American Psychiatric Association, 2013).

How does Lynne meet diagnostic criteria for a Learning Disability?

According to the criteria for a learning disability as set forth by the British Columbia Ministry of Education (2010), Lynne has shown persistent difficulties in acquiring some pre-academic and academic skills. Her mother reported that Lynne's developmental milestones were somewhat delayed in addition to both slower language development and fine motor delays in comparison to other children her age. Lynne's early school years were afflicted with continued fine motor difficulties in first grade, and not meeting expectations in writing while approaching expectations in reading, math and science in grade two. Achievement testing carried out in grade two indicated below average to average range reading skills. Lynne underwent a complete psycho-educational assessment in grade 3 that indicated a full scale score in the borderline range (see Table 1.1 for a breakdown of standard scores). She achieved on average, C level grades from fourth to sixth grade, while receiving pull out support for both math and reading skills. Lynne was given a language assessment while in grade four that indicated a deficit in expressive vocabulary, in following directions and difficulties with auditory memory. Her most recent report card, for the previous year of school, indicates Lynne had met expectations with additional support for reading and math, though it is not made clear the form, frequency, duration or intensity these supports had taken.

	Composite	Standard Score
Cognitive Testing	Verbal Reasoning	81
	Working Memory	83
	Non-Verbal Reasoning	72
	Processing Speed	78
	Full Scale	74
Academic	Word Reading	78

Testing	Reading Comprehension	71
	Numerical Operations	73
	Written Expression	87
	Visual Motor Integration	73

Table 1.1 (Grade 3 psycho-educational testing results)

Further inclusionary criteria outlined by the B.C. Ministry of Education (2010) requires documentation indicating average to above average cognitive abilities. As established on the WISC-IV, Lynne is in the average range for verbal reasoning and in the low average range for perceptual reasoning. However, she scored in the extremely low range on the Cognitive Proficiency Index, the Working Memory Index and the Processing Speed Index as indicated on the WISC-IV (see Table 1.2 and 1.3 for standard scores). The B.C. Ministry of Education (2010) further specifies that average ability be demonstrated by scores at or above one standard deviation below the normal range (85-115). Lynne's cognitive testing revealed scoring within this range, with the exception of working memory, processing speed and visual motor integration. All of her academic scores were at or above one standard deviation below the normal range. Lynne displays significant weaknesses in both her working memory and processing speed, which will have a substantial impact on her learning.

Test	Composite	Standard Score	Classification
Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV)	Verbal Comprehension Index	87	Low Average
	Perceptual (Nonverbal) Reasoning*	81	Low Average
	Working Memory	68	Extremely Low
	Processing Speed	65	Extremely Low
	Cognitive Proficiency Index	61	Extremely Low
Wechsler Individual Achievement Test Third Edition (WIAT-III)	Basic Reading Composite	88	Average
	Reading Comprehension	75	Below Average
	Total Reading Composite	80	Below Average
	Math Fluency Composite	81	Below Average
	Math Composite	78	Below Average

	Written Expression Composite	75	Below Average
Peabody Picture Vocabulary Test: Fourth Edition (PPVT-4)	82	Moderately Low	
Beery Buktenika Developmental test of Visual Motor Integration: Sixth Edition (VMI 6)	58	Very Low	

Table 1.2 (Grade 8 psycho-educational composite test results)

* score pro-rated as she appeared to be unusually anxious during block design task

Test	Subtest	Standard Score	Classification
Wechsler Individual Achievement Test Third Edition (WIAT-III)	Reading Comprehension	72	Below Average
	Word Reading	81	Below Average
	Pseudoword Decoding	96	Average
	Math Problem Solving	75	Below Average
	Numerical Operations	84	Below Average
	Sentence Composition	75	Below Average
	Essay Composition	81	Below Average
	Spelling	81	Below Average
	Oral Discourse	77	Below Average

Table 1.3 (Grade 8 psycho-educational subtest results)

The B.C. Ministry of Education (2010) provides exclusionary criteria to ensure the learning difficulties are not due primarily to sensory deficits, absence of the opportunity to learn, cultural or language differences or any social, emotional or physical health issues. Lynne has had her hearing screened and it has been recommended that her parents have her vision screened as well. Lynne's background information does not indicate that she has experienced or been exposed to any of the exclusionary criteria.

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-5, 2013) outlines specific diagnostic criteria in four categories. The first criterion requires that persistent difficulties in learning have been occurring for at least six months in key academic areas, despite

targeted interventions. In regards to a reading disability diagnosis, the DSM-5 (2013) necessitates inaccurate word reading and difficulty reading what is read. Lynne's recent testing indicates below average scores in both areas. To receive a writing disability diagnosis, a child must present difficulties with both spelling and written expression. As mentioned previously, Lynne has scores in these areas at least one standard deviation below same aged peers. The DSM-5 (2013) specifies difficulties mastering facts, number sense or calculation with respect to addition and subtraction, to be diagnosed with a mathematic disability. On both the math fluency subtests for addition and subtraction, Lynne scored in the below average range with standard scores of 76 and 78 respectively.

The second criterion outlined by the DSM-5 (2013) involves academic skills that are substantially below the expectations for the chronological age of the individual. As her test scores indicate, Lynne is functioning below average in most academic areas including reading comprehension, written expression, math problem solving and math fluency (see Tables 1.2 and 1.3 for score breakdown). Lynne's learning challenges have been apparent since her early school years, and have persisted even with some interventions and support. This warrants Lynne meeting the third criterion of the DSM-5 (2013), which states that learning difficulties were evident early on and have persisted as the individual progresses through school.

The exclusionary criteria set forth by the DSM-5 (2013) considers the learning challenges specific as they are not attributable to an intellectual disability, hearing or vision disorder, or neurological or motor disorders. As outlined above through the B.C. Ministry of Education (2010) exclusionary criteria, Lynne's difficulties cannot be accounted for by any of these points.

Through her psycho-educational assessment, and the aforementioned criteria from the B.C. Ministry of Education (2010), the psychologist has diagnosed Lynne with a learning

disability in reading (comprehension), written expression (sentence composition) and mathematics (math problem solving and math fluency). Further using the DSM-5 (2013) diagnostic criteria, the psychologist states Lynne also meets the requirements for 315.0, a specific learning disorder with impairment in reading, word reading accuracy and reading comprehension. She further meets the criteria for 315.1, a specific learning disorder with impairment in mathematics, memorization of arithmetic facts and accurate math reasoning. Lynne is also eligible for 315.2, a specific learning disorder with impairment in written expression and clarity and organization of written expression. The current severity of Lynne's learning challenges are classified as severe, as several academic areas are affected and she will require intensive individualized and specialized teaching to support her areas of deficit. Both the severity of her needs and the domains affected, including working memory, processing speed and visual-motor integration, will impact all areas of Lynne's academic life and functioning within a school setting.

Lynne has significant challenges in visual-spatial organization, working memory, processing speed and visual-motor integration. These limitations will have a severe impact on not only her specific areas of challenge, reading, writing and mathematics, but all aspects of academic achievement. Lynne appears to have some understanding of phonics, as highlighted by her relative strength in pseudoword decoding on the WIAT-III, as such, her further struggles with word decoding and comprehension could be partly attributed to the deficits in working memory and processing speed. These deficits will also have an impact on her math problem solving abilities, which involve multi-step operations. Until Lynne has developed automaticity with her basic facts in addition, subtraction and multiplication, she will continue to struggle with math fluency as well. Once she has committed the facts to her long term memory, she will not

have to rely on her working memory as much and will not be as heavily impacted by her slower processing speed in this area. Lynne's considerable challenges with visual motor integration will severely impact any paper-pencil activities across all subject areas, not just those specific to her diagnosis.

Outside of her specific areas of difficulty, Lynne's challenges with comprehension, word reading, and both sentence and essay composition will affect all subject areas, including assessment and evaluation, that require reading for understanding and written output. Her deficient visual processing will make understanding new content more time-consuming and challenging when compared to same age peers, as acquiring information combines both processing and reasoning. Additionally, the process of visual tracking, an area of challenge for Lynne, will use more time and energy, resulting in less mental strength for comprehending new content. Due to the amount of energy she needs to expend into simply looking at and processing the visual information in front of her, Lynne is at a significant disadvantage before she even begins attempting to understand new content. In combination with the aforementioned challenges, Lynne's limitations in visual spatial organization will influence her understanding of lecture style instruction, note taking, how she organizes her work and the overall proficiency of accomplishing tasks.

Interventions, Adaptations and Inclusive Strategies

Interventions: Reading

With a diagnosis of a specific learning disorder with impairment in reading, word reading accuracy and reading comprehension, Lynne will require intensive, regular, one to one support or small group interventions to specifically target her areas of challenge. To continue building on her relative strength of pseudoword decoding, Lynne would benefit from a well-researched

phonics based reading program such as Orton-Gillingham, which provides individualized one-to-one direct, multi-sensory instruction to build reading, spelling and writing skills in children with reading disabilities (Academy of Orton-Gillingham Practitioners and Educators, 2012). To be most effective, Lynne should receive this support multiple times a week from a qualified instructor. A key component of the Orton-Gillingham approach is that students are continually monitored through each session, and both challenges and progress are noted and utilized in the current and upcoming lessons. As students master skills, they are moved systematically to more complex language skills, while continuously looping back to skills covered previously (Academy of Orton-Gillingham Practitioners and Educators, 2012). To further monitor Lynne's progress and response to instruction, she could be periodically tested in the areas of phoneme segmentation fluency, word identification fluency and oral reading fluency (Linan-Thompson & Miciak, 2012). The use of multi-sensory, personalized teaching and modelling as well as small chunks of information being presented at one time will reduce strains on Lynne's weak working memory and slower processing speeds.

To support her challenges with reading comprehension, Lynne would further benefit from explicit instruction in this area. Direct instruction in small groups or one-to-one contexts will provide her with a framework for organizing her thoughts as well as generalizing understandings gained to new contexts (Mason & Hagan, 2012). A specific strategy that would support understanding of narrative texts is Story Mapping, which is a graphic organizer of the structure of a narrative text. A Story Map contains the main elements of narrative writing, including setting (characters, time, and place), problem, goal, action and outcome. This intervention has shown significant gains in oral story retelling and improved performance in responding to comprehension questions (Mason & Hagan, 2012). Once Lynne has received direct

instruction and modelling for using this technique, she would be able to use a prompt card (see Appendix 1) to complete work requiring comprehension of narrative writing with greater independence, which would in turn, build her academic self-esteem. The instruction of this technique would require enough small group or one-to-one sessions to ensure Lynne would be able to independently, or with minimal prompting from her classroom teacher, implement the support. The qualified instructor applying the technique with Lynne would need to monitor her success as well as areas of challenge each session to ensure mastery of the strategy prior to independent use in the classroom setting. The classroom teacher would also need to be aware of the steps taught as well as the language used (key words or phrases) to be able to support Lynne in maintaining this strategy successfully. By providing Lynne with a prompt card (see Appendix 1), the strains on her working memory and processing speed will be minimized. Graphic organizers have also been shown to be effective with large post-test effects, for understanding expository text, particularly in science ((Mason & Hagaman, 2012).

The use of a self-questioning strategy would also be beneficial for Lynne to monitor her understanding as she reads or listens to new information. By asking herself questions before, during and after reading, Lynne will be better able to facilitate an understanding of what she is reading. The RAT strategy (Knight, Paterson & Mulcahy, 1998) presented in Appendix 1, provides an example of how Lynne could prompt herself when taking in new content. This strategy would also require small group or one-to-one modelling prior to independent use.

Interventions: Writing

There has been little research in the area of successful writing interventions to support students with learning disabilities. The Orton-Gillingham approach mentioned previously has shown to improve both reading and writing skills, so by having Lynne participate in regular

sessions, she would see improvements in her decoding, word reading, spelling, fluency and written composition. Additionally, the graphic organizers used to gather and organize thoughts while reading can also support structuring, organizing and planning a written piece of work. One model that has been shown to create significant improvements in writing for all students is the Self-Regulated Strategy Development model (SRSD). This model was constructed to support self-regulation challenges in students with learning disabilities, as well as issues such as self-doubt, low self-efficacy, and low motivation and engagement levels. SRSD has large effect sizes in improving quality of writing, understanding of the writing process, approach to writing and self-esteem in regards to writing ability (Reid, Harris, Graham & Rock, 2012). Lynne will require explicit and systematic instruction to master the SRSD strategies well enough to use them independently. This could be done within the classroom setting, benefiting all members of the class, though Lynne may require further, more detailed instruction in a small group or one-to-one setting to ensure full understanding. To successfully implement the SRSD model, "...instruction in the characteristics of good writing, explicit explanation and think-aloud modeling of specific writing strategies, discussion of when and where to use strategies, and extensive guided practice." should be used in combination with the SRSD model. (MacArthur, Philippakos, Graham & Harris, 2012, p. 251). Strategy instruction supports good classroom based writing instruction but it is not a writing instruction program. See Appendix 1 for illustrated examples of SRSD prompts to support reading and writing.

Interventions: Math

According to Lynne's psycho-educational assessment, she struggles with accurate math reasoning and memorization of arithmetic facts. As such, she will require interventions that are explicit and systematic - including instruction, guided practice and independent practice - to

remediate both of these areas. Unfortunately, interventions for math disabilities have not been investigated as thoroughly as those used for reading, and many of the early studies were small, short in duration and did not examine problem solving (Mastropieri, Scruggs, Hauth & Allen-Bronaugh, 2012).

To improve Lynne's basic computation and reasoning skills, behaviourally oriented interventions, as well as metacognitive instruction will be important. Studies on behavioural interventions have shown that reinforcement, peer tutoring, direct instruction, task-analysis, drill and practice, cumulative review, behavioural contracting (Mastropieri et al., 2012) and rule learning procedures (Houten, 1993) can all be beneficial. Additionally, teaching Lynne to use metacognitive strategies such as verbal self-instruction, self-monitoring and self-evaluation will help to make her more aware of the processes involved in learning. These metacognitive strategies would be even further enhanced with the use of manipulatives, as they help to make the learning more concrete. Mastropieri et al. (2012) also indicate that concrete-semi concrete (representational)-abstract models of math instruction may aid in conceptual understanding. Using mnemonic acronyms such as FAST (**F**ind what you're solving for, **A**sk yourself "What are the parts of the problem?", **S**et up the numbers and **T**ie down the sign) DRAW (**D**iscover the sign, **R**ead the problem, **A**nswer (or draw), check and **W**rite the answer), will also be useful in helping Lynne to solve word problems. Visual diagram and schemas can also be used in the same way to support metacognitive problem solving (Mastropieri et al., 2012).

Furthermore, resources such as JUMP Math may also help to support Lynne's learning, as the activities systematically break down mathematical concepts into small units so that they may be taught in logical sequences and then generalized to larger numbers. Finally, Lynne's parents can help by playing games that involve numbers, and by teaching her how to make

change and manage her allowance (Siegel, 2013).

Interventions: Memory

Due to Lynne's working memory deficits it will be difficult for her to learn in certain ways, and to organize her work. More specifically, the working memory difficulties will interfere with comprehension of oral lectures, note taking and general work completion efficacy (Swanson, Kehler & Jerman, 2010).

It may be helpful to introduce her to cueing and rehearsal training in order to improve working memory performance (Swanson, Kehler & Jerman, 2010). According to Swanson & Stromel (2012), studies providing instruction in mnemonic strategies for verbal stimuli have shown an increase in memory performance. However, even with strategy instruction, the results showed that the performance of students who are reading disabled was still below that of an average reader. As a result, it is important to explicitly teach Lynne how to implement a variety of different strategies - as different strategies serve different purposes in varying contexts. It is also recommended that she be taught to monitor her performance, given specific examples of when and where to use a strategy, and provided with practice and feedback as an integrated part of an existing curriculum. (Swanson & Stromel, 2012).

It is important to note that effective memory strategies may not always eliminate processing differences in individuals with learning disabilities. As such, Lynne may be able to sort and organize information using a given strategy without a deeper understanding of the meaning. Moreover, while a non-learning disabled individual may modify a strategy over time, eliminating redundant steps, it appears that individuals with learning disabilities do not do this and are therefore Lynne may be less efficient in strategy use and application (Swanson & Stromel, 2012).

Adaptations: Across subjects

While Lynne is receiving explicit instruction in her areas of need, she will need to be provided with adaptations to ensure successfully functioning and inclusion within the classroom. Across all subject areas, Lynne will benefit from having extra time to complete tasks, reduced visual clutter on any papers she is given and reduction of workload in all classes. Preferential seating will reduce distractions, allowing Lynne to focus specifically on the content and delivery of a lesson. This could include sitting near the front of the classroom, next to a positive peer role model or away from high traffic areas (British Columbia Ministry of Education, 2011). Lynne should have access to regular breaks to prevent mental fatigue as well as alternate ways to present her understanding that do not rely on written output, including oral presentations or exams. Due to her challenges with visual-motor integration, processing speed, working memory and written output, Lynne would need to be provided with notes that she could then highlight, rather than having to take written notes during a lecture style lesson presentation. By pre-teaching new concepts, Lynne will have repeated exposure to the information, allowing her to hear and see the information multiple times reducing the chance of missing key information and providing more opportunities to make meaningful connections. Larger tasks should be chunked into smaller parts to reduce strain on her working memory, accommodating for her slower processing speed and reading and writing challenges.

Access to technology will be essential in allowing Lynne to access the curriculum, ensuring she is functioning successfully within an inclusive environment, while receiving remediation for her academic areas of challenge. Making use of a computer will drastically change Lynne's school experience, providing she has direct instruction on how to utilize the many available features to support her learning. There are many free apps available that Lynne

could access to allow her to dictate her thoughts to a computer, which in turn generates text on the screen. One such example of speech to text technology is VoiceNote, available through Google Chrome. Lynne could make use of this technology in all areas of the curriculum, provided her classroom teachers create a space within the classroom where the noise level was low. Taking advantage of available apps that will convert text to speech for the user would also be beneficial for Lynne. Teachers could provide copies of texts electronically allowing Lynne to listen and complete reading tasks independently. It would also be beneficial for Lynne to learn keyboarding and word processing skills, if she is not already proficient in this area, as another tool to support her low visual-motor integration, processing speed, working memory and written output challenges. An audio recorder could be another tool for Lynne as it would allow the teacher to hear the quality of her ideas without relying on written output (Siegel, 2013).

Social Emotional Considerations

By putting in place the intervention and adaptations outline above, Lynne will be better equipped to function and find success in all subject areas. These supports will also ensure that Lynne is able to see herself as a capable learner, protecting her self-esteem while still participating in areas of challenge. It is important that all of Lynne's teachers create a safe classroom environment where she will feel secure in making mistakes, learning from these errors and in asking for clarification or support as needed. Her teachers should also differentiate their lessons, incorporating opportunities for Lynne to experience success. The teaching of SRSD will also support increased independence and self-monitoring, leading to increased self-efficacy. Moreover, self-statement instruction has also been shown to reduce math anxiety in students with LD (Mastropieri et al., 2012). It is key that Lynne's relative strengths in decoding and verbal comprehension are utilized to support her areas of challenge. She should be made aware of her

areas of strength and how she can employ these to better engage with new content and areas of difficulty. Teachers should also include Lynne's interests where possible to increase engagement and activation of connections to prior knowledge.

Individual Education Plan

According to the B.C. Ministry of Education (2011), an Individual Education Plan (IEP) is a document developed to form a support plan for a student with different learning needs. Within this document, individualized goals, adaptations, modifications, services to be provided, and measures for tracking achievement should be described. An IEP does not describe every aspect of a child's educational program, but instead details the specifics of areas that require individualization (B.C. Ministry of Education, 2011).

Appendix 3 outlines a specific IEP developed to support Lynne both in an inclusive classroom setting and in small groups or one-to-one situations as necessary. This document aims to remediate areas of significant challenge while ensuring Lynne is able to work towards the performance standards of grade eight, with the adaptations required to minimize the impact of the weaknesses in her learning profile. The IEP specifies the intensity, duration, frequency and progress monitoring for each goal area, with each aspect adapted to support Lynne's most significant challenges.

The success of implementation of the outlined goals will depend on the consistency with which Lynne is provided with and utilizing the adaptations suggested in her IEP. Her teachers will need to employ differentiated teaching strategies, including discerning for content (what is taught or learned), process (how students will make sense of the content) and product (how a student will demonstrate understanding of what is learned). Lynne's readiness, interests and learning profile should be understood and taken into account when teachers are planning

instruction. By making use of a Universal Design for Learning (UDL) framework, Lynne's teachers will address areas for differentiation while accounting for student interest and motivation. UDL offers support for all students, not just those with specific learning challenges and makes use of technology as "digital formats can be so flexible" (B.C. Ministry of Education, 2011, p. 25). UDL offers a school wide approach to inclusion, making variety the standard, rather than conformity.

While the consideration of the aforementioned will assist in promoting inclusion, barriers to successful implementation exist. The classroom environment may not be set up to accommodate differences in accessing, processing and synthesizing information, such as use of speech to text or text to speech technology. The level of understanding of specific learning needs will vary across the teaching staff. Some members will have already incorporated UDL approaches and as such, the changes needed to support Lynne will be minimal. However, there will be members of the teaching staff who are regimented in the process, content and products of their lessons and may require more support to ensure Lynne is fully included and able to succeed in these classes. A substantial hurdle for Lynne will be developing self-efficacy skills and becoming an advocate for her own needs. She will need support in recognizing both her areas of strength and challenge, and what the adaptations are that she is entitled to, ensuring successful inclusion in all aspects of school life.

Rating of Individual Education Plan

The Supreme Court of Canada (SCC) ruling in the Moore vs. British Columbia trial, resulted in a list of recommendations that "...legally secures both the diagnosis of Learning Disabilities as a disability under the law and its potential to inflict harm, if unattended."

(Learning Disabilities Association of British Columbia, n.d.). The recommendations list five key

areas (see Appendix 4), the second referring to remediation. Using this information, Lynne's IEP should demonstrate compliance with the ruling, ensuring she is receiving the necessary remediation for her learning disabilities. As Lynne is in grade eight, she will need to access a one-to-one, tier three intervention to receive evidence based multi-sensory phonics instruction for reading, fluency, vocabulary and comprehension, rather than the classroom instruction as specified in the ruling. Had Lynne benefitted from early intervention, she may have been able to access this instruction earlier in education. By including objectives to address her reading comprehension and fluency challenges in the IEP, Lynne will be receiving the remediation she requires to build her abilities in these areas.

Through the development of the IEP by a school based support team, including a qualified specialist, the teaching staff will have access to the expertise and specialised training of a resource or learning support teacher. This will ensure Lynne's care is meeting criteria as laid out by the SCC. The qualified specialist can also ensure that Lynne is receiving appropriate interventions. While the SCC states that a phonics based approach to reading instruction should be incorporated into the classroom, Lynne will require a tier three, pull out program to improve her skills in this area, as mentioned above (Learning Disabilities Association of British Columbia, n.d.). The professional providing this one-to-one instruction should collaborate with the classroom teachers so that they are aware of Lynne's current stage of development and how they can best support this within their classroom. A common language to refer to the content Lynne is learning in her pull out program, will ensure she is able to transfer the skills learned to new contexts. The SCC acknowledges that pull out programs are best utilized for more intensive remediation and students in intermediate or senior grades that continue to have difficulties with reading (Learning Disabilities Association of British Columbia, n.d.).

The SCC further recommends that for severe cases, children should be placed in specialized environments, for the short term, with students of similar learning needs (Learning Disabilities Association of British Columbia, n.d.). This is to address both academic and emotional needs, strengthening these areas, before returning to their original school environment. While Lynne's IEP does not suggest this option, if progress monitoring of her current objectives (including the pull out phonics based program), does not indicate achievement, this may be a consideration in Lynne's best interest.

The final points brought forth under the remediation section of the SCC ruling acknowledge the barriers to success for students with learning disabilities. They are "...lifelong challenges that can significantly have an impact on all areas of education and life..." (Learning Disabilities Association of British Columbia, n.d.). As such, accommodations to minimize the impact of barriers is essential. Lynne's IEP provides a suggested list of accommodations to minimize the influence of her learning challenges across subject areas. By including a self-advocacy section to the IEP, Lynne will also become aware of the accommodations she requires to be successful within the school environment and be able to request these supports as necessary.

Overall, the accommodations, goals and objectives presented in Lynne's IEP addresses her key challenge areas, offer strategies to support her learning in all subject areas and meet the remediation recommendations as set forth by the SCC ruling.

Rating of the Psycho-educational Report

The British Columbia Association of School Psychologists (BCASP) developed a document outlining best practice guidelines in the assessment, diagnosis and identification of students with learning disabilities in 2007. This text specifies components that must be included

in a valid assessment. The first point states that “a specific clear diagnostic statement that the individual has a learning disability, if applicable” (British Columbia Association of School Psychologists, 2007, p.10) should be included. Lynne’s assessment provides both the B.C. Ministry diagnostic criteria as well as that from the DSM-5, clearly stating her specific learning disabilities. Additionally, the assessment provides information about the languages spoken in Lynne’s home, meeting the second component of the guidelines. The psychologist offered relevant medical and developmental history, and mentioned that Lynne’s hearing had been tested, though the results of the test were not included. It can be assumed that Lynne had no issues in this area. They further advised Lynne’s parents to have her vision tested. By outlining this background and exclusionary information, this assessment also aligns with the third component of the recommended best practices for school psychologists. In Lynne’s report, Dr. Particular, briefly outlines some relevant information from other professional evaluations including a previous psychological assessment from grade 3 and the results of some achievement testing from grade 2. As there is no access to Lynne’s file, it must be assumed that Dr. Particular has included all relevant information from other professionals, therefore meeting the fourth criteria. The fifth component as outlined by the BCASP (2007) requires the psychologist includes a statement from the psychologist that states (s)he considers the results of the assessment to be a valid representation of the student's current ability and skills. Dr. Particular includes such as statement in Lynne’s psycho-educational report. Lynne’s assessment include a very brief statement regarding her behaviour during the testing sessions, but there is no mention of or inclusion of observations from teachers or classroom visits. A short statement from Lynne’s parents refer to her as very quiet and then mentions their concerns for her academics, but very little information is provided in regards to Lynne’s behaviour across different settings.

This limits the clarity with which this report aligns with the sixth criteria for best practice. The next section of the BCASP guidelines (2007) states that a report must include:

Reporting and interpretation of formal test results, including a description of the individual's strengths and needs, an indication of how the observed pattern of abilities and achievement demonstrates the presence of a specific disability, and adequately documented evidence as to how an observed processing problems is the presumed cause for the documented learning difficulties. (p. 10)

While Dr. Particular very clearly summarizes Lynne's test results, there is very limited information reported regarding her strengths. The section of the report entitled personal strengths and weaknesses, in fact discusses one small area of relative strength, while the remainder of the paragraph describes areas of weakness. Dr. Particular does however provide evidence from the testing as to how Lynne's processing problems are the presumed cause for her learning difficulties. In the summary section of Lynne's report, Dr. Particular discusses her relative strengths and needs in terms of thinking and reasoning abilities, academic achievement, psychological processes related to learning, and coexisting conditions, meeting the conditions for the eighth component of best practice as outlined by the BCASP (2007). There is a lengthy section of the report that addresses recommendations and interventions in the area of mathematics, however there is little suggested in terms of support for Lynne's written output challenges and there are no indications of how to provide for her reading challenges. The only mention of supports for any kind of self-advocacy skills, is through the use of metacognitive strategies, which relate more to self-efficacy. In regards to the ninth section of the guidelines, Lynne's assessment falls short in this area as the areas discussed are imbalanced or neglected completely. The final criterion set forth by the BCASP (2007), requires a signature and states

that when the results are delivered to the parents orally, the psychologist must be present. It can be assumed that on the original document, Dr. Particular will have signed the report and delivered its results to the guardians.

Overall, Lynne's psycho-educational report meets the majority of the key criteria as laid out by the BCASP guidelines (2007). There were areas that did require further elaboration to better support those who will be implementing the recommendations and providing support for Lynne both at home and at school.

System Wide Service Delivery Model

Rather than considering the optimal delivery model for students with specific learning disabilities, a shift in thinking regarding the delivery of education for all students should be undertaken. Universal Design for Learning provides "a set of principles for curriculum development that give all individuals equal opportunities to learn" (CAST, 1999-2013). It is a flexible instructional approach that can be adapted to meet individual needs (see Appendix 5). UDL considers the differences in how individuals take in information by presenting content in a variety of ways. Further, UDL identifies the unique ways individuals plan and perform tasks, differentiating the ways students can express what they know. How learners engage with learning is considered, as well as personal motivation, is considered in UDL, allowing for multiple means of engagement. According to CAST (1999-2013), "a universally designed curriculum is designed from the outset to meet the needs of the greatest number of users, making costly, time-consuming, and after-the-fact changes to curriculum unnecessary." An important component to UDL is access to effective and appropriate technology; this further supports students with learning challenges as utilizing technology to access information, process information and present understanding of information is common place in a UDL classroom. By

ensuring all students are making use of their strengths and interests through a more personalized curriculum, self-efficacy of all students will improve. Students will begin to appreciate and accept differences, creating a positive and supportive classroom and school environment where all learners are viewed as capable of reaching their fullest potential.

A key aspect to ensuring a consistent mind frame in regards to inclusion for all those who work within the school systems is teacher education. Without educators who understand the diverse needs of students, a curriculum that is accessible to all learners could not be developed nor successfully implemented. Ensuring all learners are successful begins in early childhood with evidenced based high quality classroom instruction, from qualified professionals.

In any service delivery model, it would be integral to screen all students from a young age, and provide appropriate intervention immediately. According to Linda Siegel's research in North Vancouver approximately 25% of students of native English speaking students and 50% of students who had English as an additional language were at significant risk for reading problems. However, with appropriate screening and early intervention (Firm Foundations & Reading 44) only 4% were having reading problems after 2 years in the program, and after 3 years, only 2 % had any reading problems. Finally, by Grade 6, only 1.5% had reading difficulties. Given that current statistics indicate that between 5%-15% of students present with learning disabilities (American Psychiatric Association, 2013), and that 3% are identified and receiving support in this province (BC Ministry of Education, 2011), this research highlights the importance of screening and early intervention from the outset of school. If we are able to minimize the number of students needing intensive remedial supports at older grades, we decrease the impact of the Matthew Effect, and increase the likelihood of graduation. Moreover, we would be able to potentially mitigate against the negative effects of social emotional and mental health challenges

faced by these individuals.

In regards to exam adjudication, students with learning disabilities are still required to demonstrate a discrepancy between cognitive ability and achievement in order to access technology (B.C. Ministry of Education, 2013). This closes doors to many individuals as it limits their access to postsecondary programs. In doing so, individuals may be unable to reach their full potential and follow career goals, which may lead to social emotional and behavioural difficulties as an adult. In an ideal service delivery model students would have access to technology for provincial exams regardless of the presence of a discrepancy, as research has shown that technology does not pose an advantage to students who are not learning disabled, and is therefore would be an acceptable accommodation to ensure the success of students with learning difficulties (MacArthur, 2009).

In such cases of severe learning challenges, it may be necessary for a student to receive intensive support in a specialized environment where both academic and social-emotional needs can be met more effectively, for a short time. The aim would be to build abilities in areas of challenge before returning to the inclusive classroom. This should be the exception, for students whose difficulties were not identified at an early age so interventions could have been in place as soon as possible.

In conclusion, a successful system delivery model would include differentiated instruction as the norm, not the exception. It would provide evidence based, high quality instruction at every grade level, though this is crucial in early education. Regular screening and progress monitoring would identify those at risk at the earliest signs of struggle. Teachers would continue to provide varying ways of differentiating for content, process and product, accounting

for all learning styles and needs. Students would have access to assistive technology and specialized support as needed, with the aim to be inclusive of all learning needs.

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Appendix 1

Examples of Self-Regulated Strategy Development (SRSD) instructional tools to support comprehension of both narrative and expository texts as well as building independence and self-confidence.

R	Read	
A	Ask	
T	Tell	

R	Read a short section to yourself.
A	Ask yourself these questions: Does it make sense? Does it remind you of anything you already know? How does it relate to what you have already read? What is the main idea? What are 2 supporting details?
T	Tell yourself (or a partner) the answer to the questions you just asked yourself.

Who is the main character?

Who else is in the story?

When does the story take place?

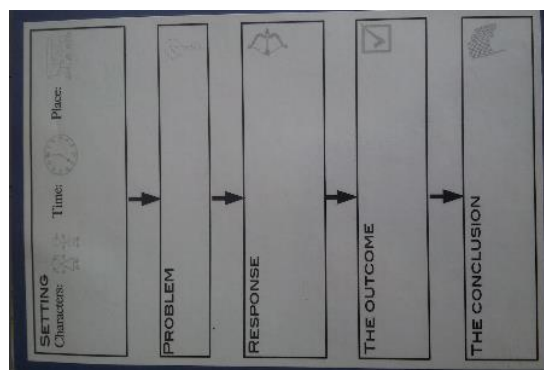
Where does the story take place?

What does the main character do?

What happens when they try to do it?

How does the story end?

How does the main character feel?



FINDING THE MAIN IDEA

Does the paragraph tell:

WHAT or **WHO** the:

SUBJECT is? **ACTION** is?
(single or group) *(category)*

WHY something happened?

WHERE something happened?

WHEN something happened?

HOW something **LOOKS** or is **DONE**?

Note: Some paragraphs may contain a sentence or two that don't tell about the main idea!

A list of universal screening tools as recommended by the BC Ministry of Education (2011).

Pre-Academic Skills	Writing Skills
Kindergarten Screening (UBC-Siegel) Kindergarten Readiness Indicators Checklist Get Ready to Read! Screening Tool Brigance Diagnostic Inventory Readiness checklists Early Literacy Instrument Early Numeracy Instrument	Brigance Diagnostic Inventory Spelling Tests: Graded/Diagnostic Kottmeyer Gallistel-Ellis Test of Written Spelling Independent writing samples with informal Diagnostic Rating Scales/Observations Writing Snapshots
Reading Skills	Math Skills
K/1 UBC Siegel Screening Brigance Diagnostic Inventory Developmental Reading Assessment - DRA PM Benchmarks Running Records Alberta Diagnostic Reading Program John's Basic Reading Inventory - BRI Informal Reading Inventory (Silvaroli) Gallistel-Ellis Decoding/Encoding Fry Word Lists Dolch Word Lists Reading Behaviour Checklists Assessment for Literacy in Education - ALIE	Brigance Diagnostic Inventory Alberta Diagnostic Mathematics Program Enright Math Assessment McKim Middle School Math Light & Rapid Math Assessment Numeracy Nets (Pearson) Test of Problem Solving (TOPS) Math Makes Sense Assessment Package Vancouver Island Net Diagnostic Math Assessment (DMA) Assessment for Numeracy in Education (ANIE)
Cognitive Processing Skills	
<p><i>Language Processing:</i> Language Sample Summary Checklist Brigance Diagnostic Inventory</p> <p><i>Memory:</i> Brigance Diagnostic Inventory (Subtests for Sentence Memory and Following Directions)</p> <p><i>Attention:</i> On-off task with average peer comparison Teacher Rating Scale</p>	<p><i>Visual-Spatial Processing:</i> Visual-Spatial Processing Skills checklist Brigance Diagnostic Inventory</p> <p><i>Phonological Processing:</i> Dynamic Indicators of Basic Early Literacy Skills Brigance Diagnostic Inventory</p> <p><i>Processing Speed:</i> Timed measures of task completion with average peer comparison (speed/accuracy)</p>

Appendix 4

The Supreme Court of Canada ruling legally secures both the diagnosis of Learning Disabilities as a disability under the law and its potential to inflict harm, if unattended. (*EA)

1. Identification

Educators have an obligation to provide individualized programs for individual needs based on appropriate assessment. The SCC decision challenges psychologists to be thorough and accurate in their assessments, diagnosis and recommendations for interventions. (*EA)

2. Remediation

Provide necessary remediation – necessary being determined by whether it is adequate and sufficiently intensive to provide ‘meaningful access’ (SCC) to general education. Children with a language based learning disability (about 90% of all people with LD) need a bottom up approach – i.e. systematic phonological awareness and phonics instruction.

3. Teacher Training

The Supreme Court Decision in Moore challenges teachers to be increasingly diligent in their professional practice to identify and respond. (*EA) Teachers need to be equipped with knowledge about learning disabilities and the tools and resources for teaching basic skills appropriate for children with learning disabilities.

4. Parent Resources

The ruling of the Supreme Court of Canada speaks to the power of [parents](#), diligent in their stewardship of protecting the rights of their child, to change a system to best meet their child’s needs. The need for shared advocacy for the rights of these students in accessing the best of care by educators, parents, community associations and public servants, is validated. (*EA) Parents are an invaluable resource. Engaging their support and input will make a difference in the success of any school program.

5. Accountability

The SCC ruling challenges decision makers to be responsible and accountable for the outcome of funding decisions. (*EA) LDABC acknowledges that the Ministry of Education has good policy development for learning disabilities already but there is a gap between policy and implementation and therefore a need for accountability measures & an accountability process.

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