

Understanding Non-Verbal Learning Disabilities: From Diagnosis to Intervention

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Queen's University

Quiz: You discover that a student in your class has been given a diagnosis of NVLD. You now know:



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- A. That they have a very predictable group of skills and deficits and you can easily apply known strategies that exist to remediate/accommodate their needs.
- B. That someone somewhere thought this student had some problems in some areas, and that they probably have better verbal than non-verbal intelligence, but that is about it.

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- B. That someone somewhere thought this student had some problems in some areas, and that they probably have better verbal than non-verbal intelligence, but that is about it.**

No standardized way that NVLD diagnosed



- Not a diagnosis in any recognized code book (e.g., DSM, ICD)
- Not included in LDAO/LDAC definition
- Some researchers argue that NVLD is useless as dx (Fitzgerald & Corvin, 2001; Spreen, 2011)

- Internet sites not reliable sources for information about NVLD
- Often conflate non-diagnostic signs or symptoms with laundry list of “NVLD” characteristics
- Many typically reported “NVLD” symptoms not rooted in scientific investigation
- Even some popular press books written about NVLD are based on subjective clinical opinion rather than actual research.

Myth #1: A big VIQ>PIQ split is a sign of NVLD



- Lots of non-disabled individuals have better verbal vs nonverbal skills. In fact, in people with IQ's over 120, 36% of normal, non-disabled people have verbal IQ skills *significantly better* than nonverbal.
- “Significant” difference means only that it is a real difference, not that it is pathological or diagnostic.
- #1 thing you need to diagnose any type of LD is academic impairment, defined as performing below 16th percentile in domain of skills (not just one subtest).
- So just having VIQ>PIQ or VCI>PRI does not prove this

Misinterpretation of normal variability in performance



- All people have variability in cognitive functioning.
- Higher the IQ, greater the variability.
- More tests you give, greater chance of a few low scores just by chance alone

Table 3. Percentages of normative participants with 10 or more, 15 or more, 20 or more, and 25 or more point discrepancies between WAIS-IV Index scores by IQ level

Amount of discrepancy	Verbal comprehension–perceptual reasoning	Verbal comprehension–working memory	Perceptual reasoning–processing speed	Verbal comprehension–processing speed	Perceptual reasoning–working memory	Working memory–processing speed
Full scale IQ ≤ 79						
10 points	40.8	36.5	37.1	45.0	36.0	41.3
15 points	19.0	13.8	21.2	28.0	11.6	25.9
20 points	7.4	6.4	9.0	14.8	6.8	9.6
25 points	3.7	1.0	4.2	8.5	2.1	5.3
Full scale IQ 80–89						
10 points	45.9	45.9	49.5	55.9	42.0	40.1
15 points	21.9	20.3	30.7	38.6	22.5	31.6
20 points	10.1	6.7	15.2	22.5	11.6	19.5
25 points	3.6	3.0	7.6	13.6	4.5	10.0
Full scale IQ 90–109						
10 points	45.9	42.4	51.6	53.0	46.6	49.2
15 points	26.2	25.0	30.8	33.8	25.8	29.2
20 points	15.1	12.5	18.8	20.1	15.1	17.2
25 points	6.7	6.0	9.5	11.4	6.4	10.7
Full scale IQ 110–119						
10 points	45.7	50.8	56.9	56.9	55.9	54.0
15 points	31.2	27.9	38.8	35.9	30.6	37.5
20 points	17.3	15.1	24.2	24.2	15.9	24.5
25 points	8.8	8.0	13.0	15.4	8.8	15.4
Full scale IQ ≥ 120						
10 points	53.5	54.0	59.5	59.0	52.5	42.0
15 points	35.5	32.5	39.5	37.5	31.0	35.5
20 points	18.5	16.0	28.0	26.5	16.0	22.0
25 points	9.5	9.5	16.0	16.0	5.5	15.5

Myth #2: NVLD can be diagnosed if a processing disability is identified



- Online website will tell you that people with NVLD have problems with: organization, attention, executive function, non-verbal communication, motor skills.
- In fact, these symptoms describe people with ADHD, not NVLD.
- Problems learning to tie shoes, ride a bike, tell time, are all non-specific and occur in both many disabled and “normally developing” children.

Myth #2: NVLD can be diagnosed if a processing disability is identified



- Low scores on measures of processing skills alone are not sufficient to diagnose any type of LD.
- #1 thing you need is impairment in academic skill. Defined as performing below 16th percentile in domain of skills (not just one subtest).
- There is no such thing as a LD in “processing speed”, “working memory”, “visual memory”, etc.

Myth #3: low scores on math tests prove a NVLD



- While math skills **must be impaired** in order to diagnose NVLD, having a low score on a standardized math test does not prove NVLD.
- EQAO scores show that the majority of students in Ontario these days have weak math computation skills.



Toronto

Ontario elementary students' math scores declining: EQAO

Report comes day after province says new teachers must score 70% on math test

[Allison Jones](#) · The Canadian Press · Posted: Aug 28, 2019 10:20 AM ET | Last Updated: August 28, 2019



Just 48% of Grade 6 students met standard

Fewer than half of Grade 6 students — 48 per cent — met the provincial math standard during the last school year, which is down from 61 per cent in 2009.

For Grade 3 students, 58 per cent met the standard. In the 2009-2010 school year, at least 70 per cent achieved the standard.

The EQAO also said that the Grade 9 results are relatively consistent, but there is a persistent gap between students in the applied and academic courses — 44 per cent and 84 per cent of them met the standard, respectively.

Literacy results were also fairly consistent with the past several years, except for a decline in the number of Grade 3 students who met the provincial writing standard.

This past year, 69 per cent of Grade 3 students met that standard, down from a recent high of 74 per cent in 2015-2016.

The other literacy test results saw 74 per cent of Grade 3 students meet the provincial reading standard, 81 per cent of Grade 6 students meet the reading standard, and 82 per cent of Grade 6 students meet the writing standard.

But there is also a large gap between applied and academic courses, with 41 per cent of students in the Grade 10 applied course meeting the literacy standard, and 91 per cent of students in the academic course meeting it.

Myth #3: low scores on math tests prove a NVLD



- While math skills must be impaired in order to diagnose NVLD, having a low score on a standardized math test does not prove NVLD.
- PISA scores show that the majority of students in Ontario these days have weak math computation skills.
- Need lifelong history of being unable to learn basic math concepts (telling time, value of coins, greater than/less than relationships, understanding fractions, charts) not just difficulty with math computation.

Myth #4: One or two low scores in a psychoeducational assessment proves a LD

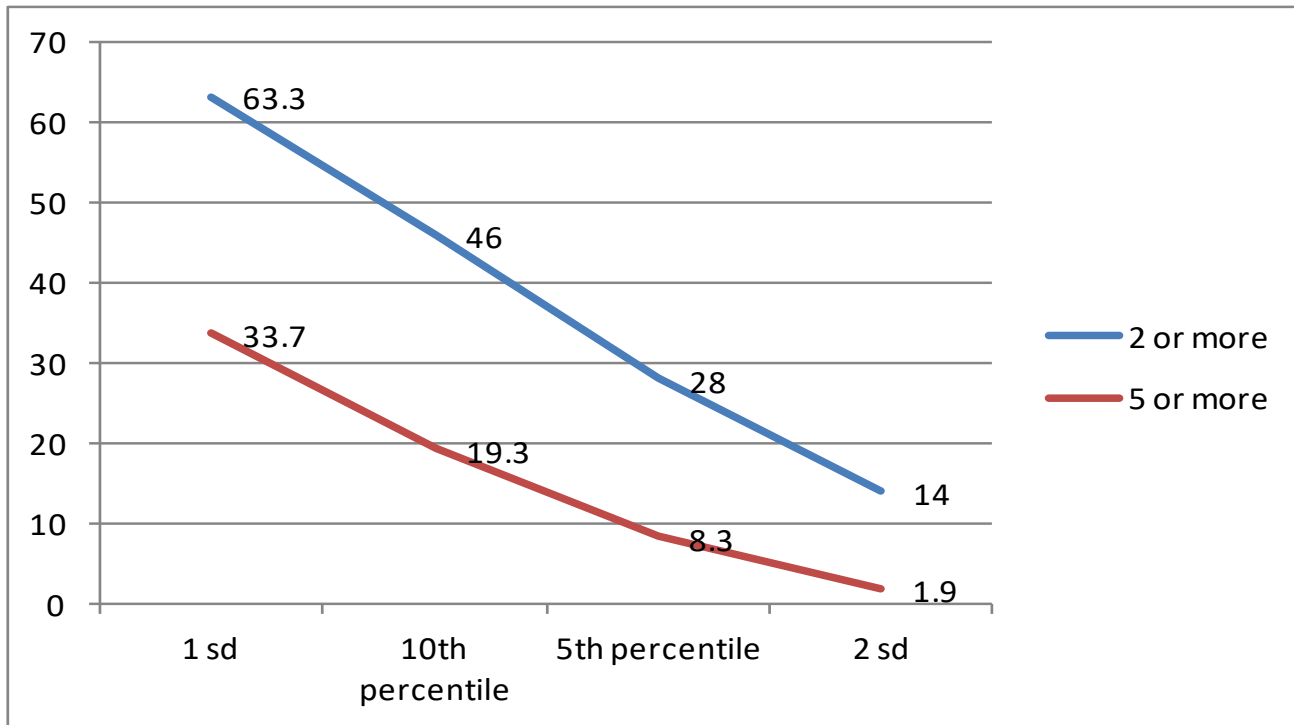


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- In any test battery, it is very common for most normal, non-disabled people to have at least 2 low subtest scores normally.



Prevalence of low subtest scores on the WAIS-III/WMS-III across different cutoffs.



Iverson & Brooks, 2008

Misinterpretation of normal variability in performance



- Zakzanis & Jeffay (2011) showed that, depending on tests given, up to half of university professors have at least **two** cognitive test scores below 16th percentile.
- Conclude that cognitive variability (and even a few impaired scores) alone cannot be used to determine disability or impairment.

- 61.2% of general normative sample scored below 90 (25th percentile) **on at least one academic cluster:**
 - total achievement, basic reading skills, reading comprehension, math calculation, math reasoning, basic writing, and written expression.
- Implies that a much higher percentage would have at least one score below 90 on individual subtests!
- Similar to findings of Binder et al looking at WAIS normative sample, and Iverson's findings with the NAB

Origin of NVLD concept



- The term nonverbal learning disability (NVLD) was coined by Dr. Byron Rourke in the early 1980s.
- Rourke was studying children with profound math learning disabilities who also demonstrated other perceptual, motor, and social skills deficits.
- Rourke contended that NVLD deficits could be attributed to white matter disease or dysfunction (1987; 1995), and presented much data to this effect in his book (1989).

- Hypothesis that NVLD occurs when there is a problem with:
 - A. White matter in the brain
 - B. Right hemisphere processing
- Adverse conditions in early childhood are more likely to affect right hemisphere processing abilities because:
 1. Right hemisphere has higher proportion of white matter than Left
 2. Right hemisphere is dominant in infancy

What is white matter?



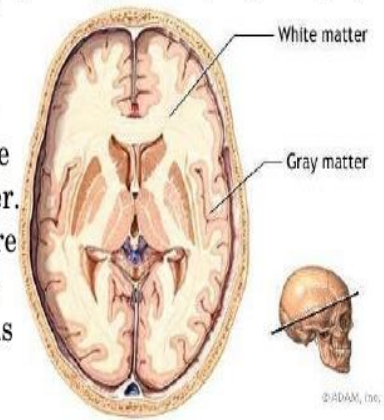
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- Like insulation on wires
- Connect thinking parts of brain
- Allows for faster transmission of signals
- Allows signals to travel longer distances without dying out
- More white matter covering longer distances in Right vs Left hemisphere

WHAT IS WHITE MATTER?

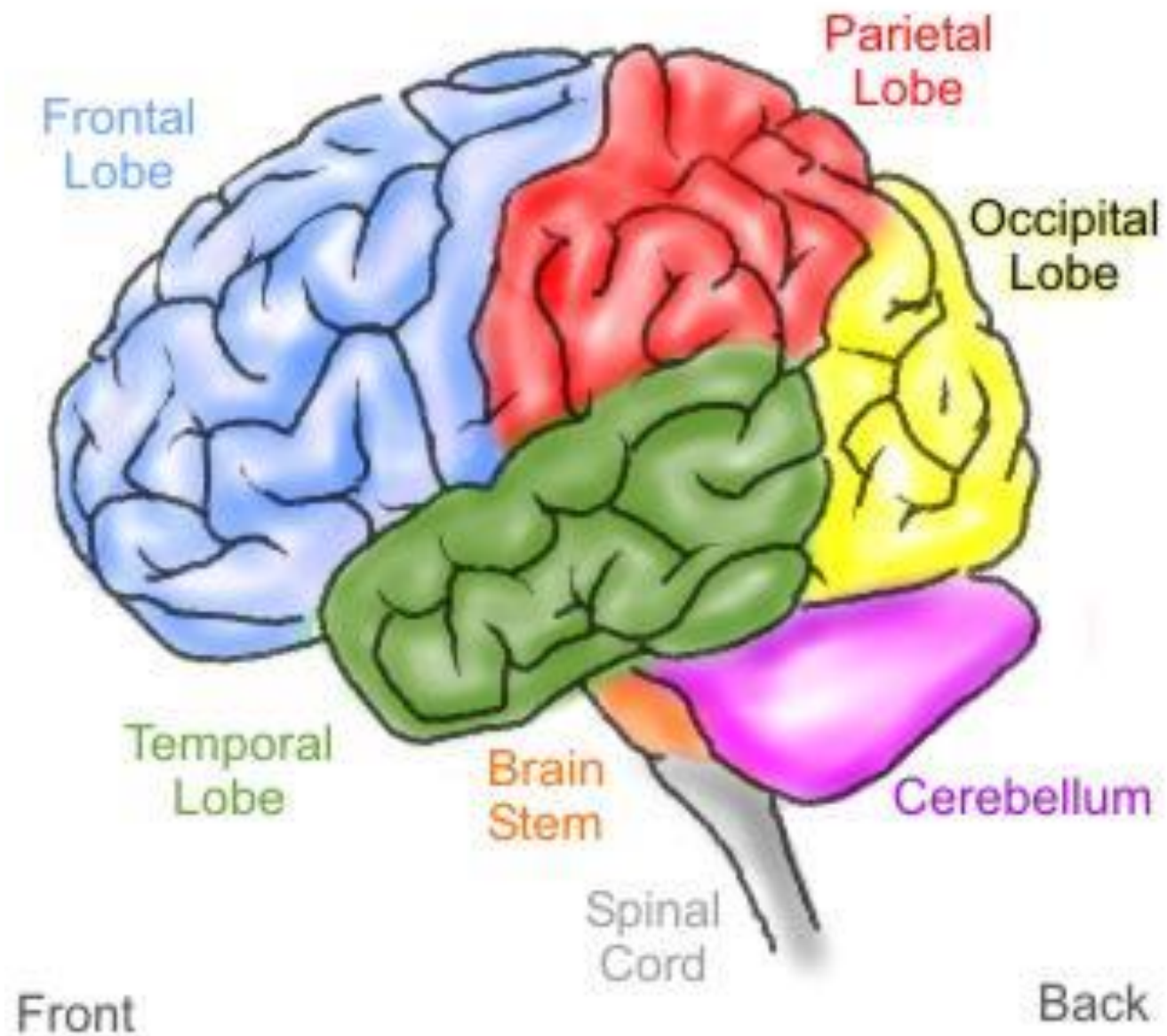
It is the fatty tissue located between the gray matter in the brain's nerve fibres (axons). Basically, gray matter covers the nerve fibres and white matter connects one nerve fibre to another. Metaphorically, gray matter can be thought as the computer and white matter is 'connect the computers'.

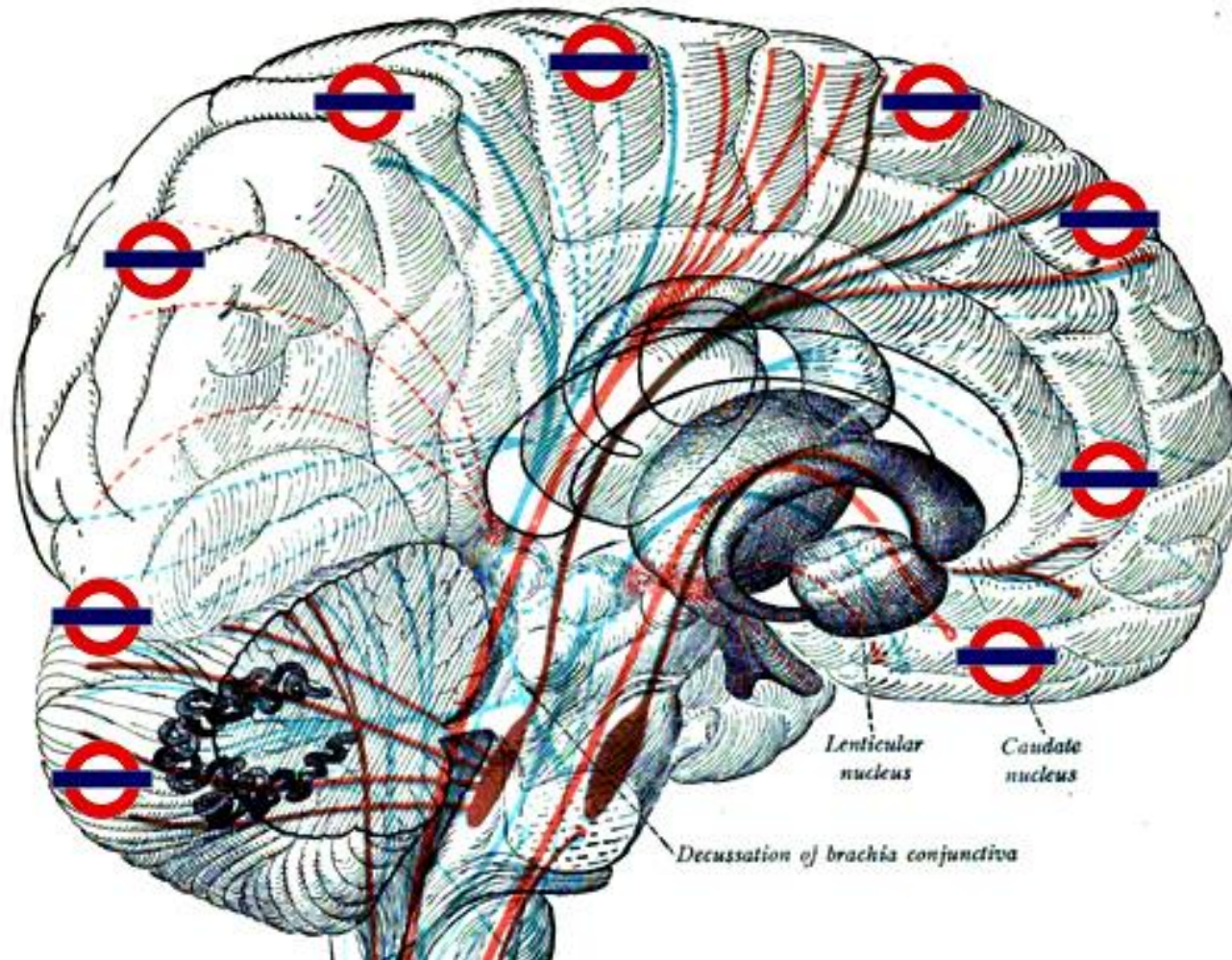
These 'wires' are coated in myelin, an electric insulation that helps the neurons send signals to one another. When the myelin degenerates, there are problems that occur within the brain and therefore are classified as 'demyelinating diseases'.

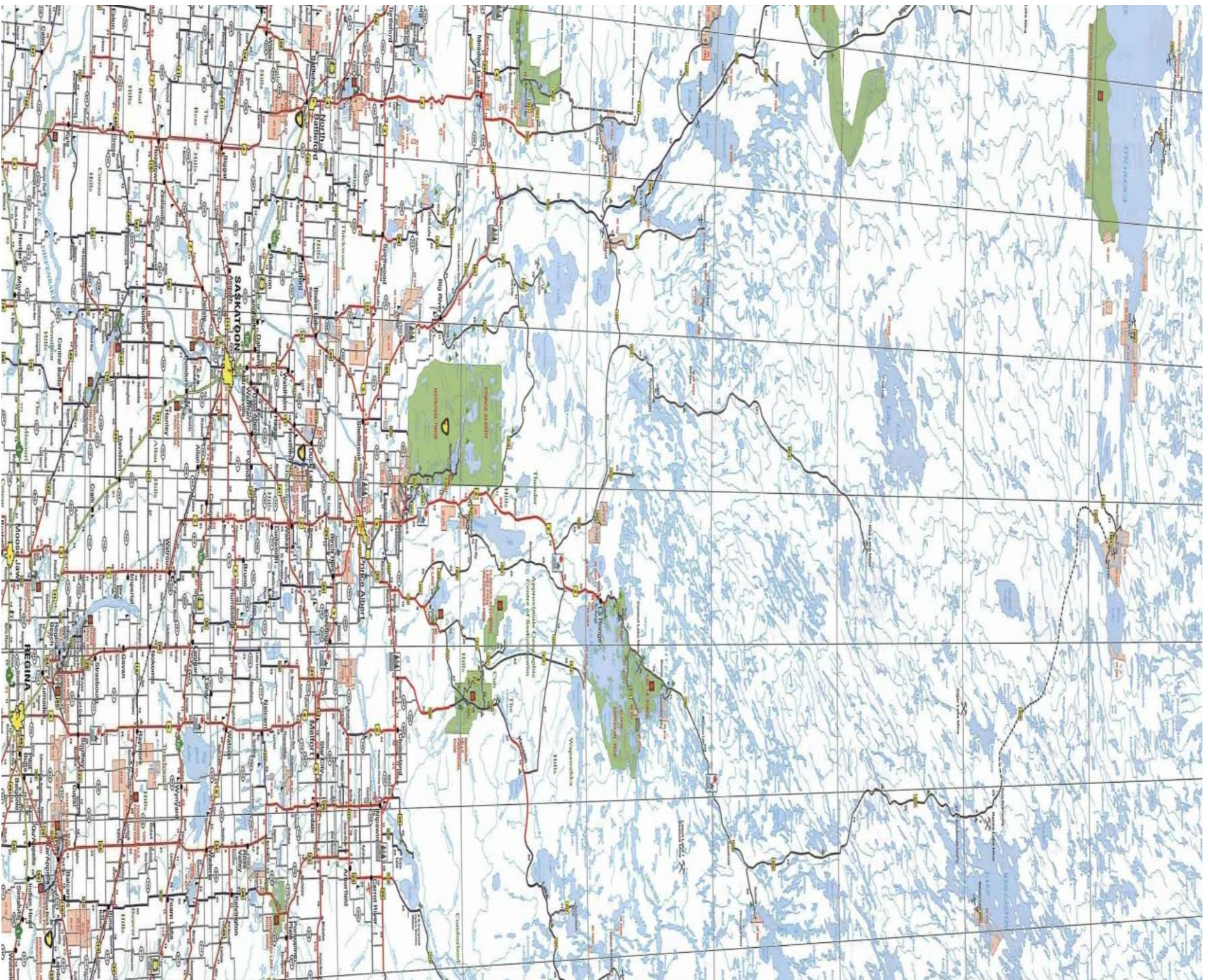




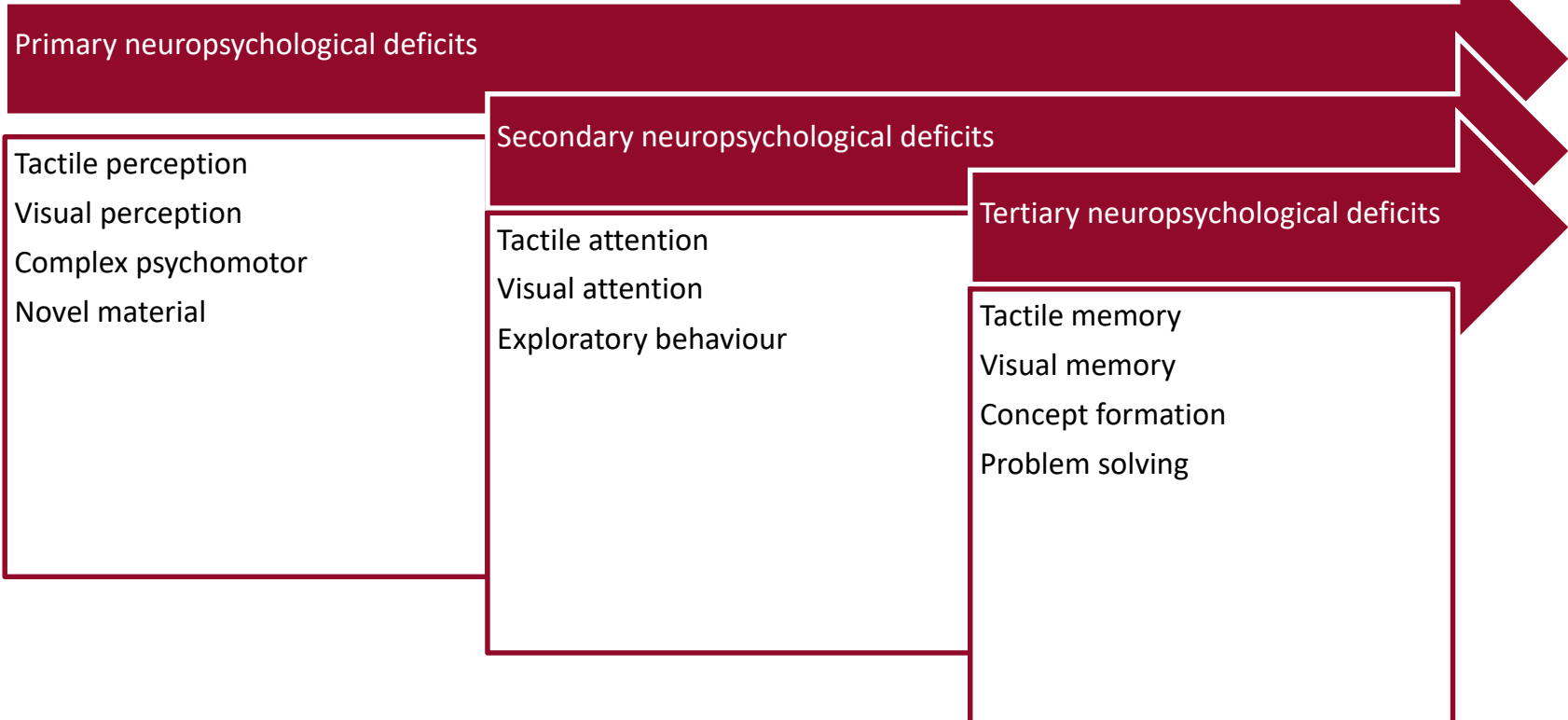
Regions of the Human Brain

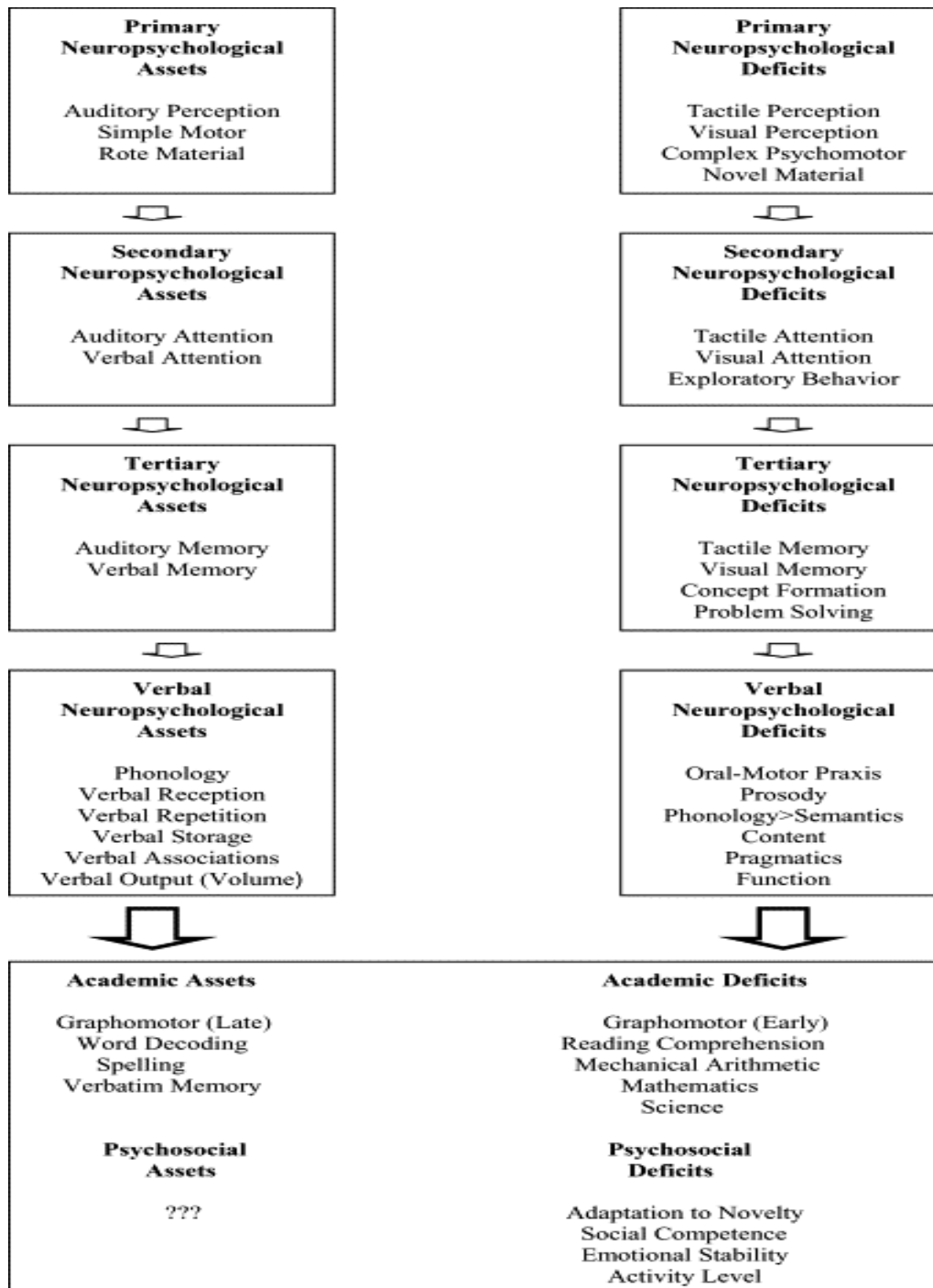






Rourke's hierarchical system





NVLD diagnosis requires neuropsychological testing (Casey, 2012)



- 1. Tactile perceptual tests (with less than 2 errors on simple tactile perception) and astereognosis composite greater than 1 SD below the mean; (meaning below the 16th percentile)
- 2. Target test at least one SD below the mean;
- 3. Two of vocabulary, similarities, and information on the WISC/WAIS are the highest verbal scales
- 4. Two of WISC/WAIS block design, object assembly, and coding subtests are the lowest of the performance scales;
- 5. Standard score for word reading on and achievement test such as the WRAT is at least eight scaled score points greater than basic arithmetic (with arithmetic being impaired relative to most other individuals);
- 6. Tactual performance test: right, left, and both hand times become progressively worse vis-à-vis the norm;
- 7. Grip strength is within one standard deviation of the mean or above compared to Grooved Pegboard test performance, which is one standard deviation below the mean;
- 8. WISC/WAIS VIQ>PIQ by at least 10 points.

- As summarized by Casey (2012), positive findings for **all of points one through five** are needed to confirm the diagnosis of NVLD.
- Seven or eight of these features (in total), *including impaired arithmetic performance*, would also support a definitive diagnosis of NVLD, whereas five or six of these features are associated with probable NVLD.
- Three or four of these features are questionable in making the diagnosis, and positive findings on only one or two suggest *low probability* of diagnosis.

Problems with Rourke's NVLD theory



- Rourke studies primarily children with extremely rare injuries or who were survivors of treatments for other medical/neurological diseases/disorders

Many of children in Rourke's studies had:



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- Sustained moderate to severe closed head injuries in childhood
- Suffered hydrocephalus with delays in appropriate tx or unsuccessful tx
- Received large doses of radiation therapy to treat Acute Lymphoblastic Leukemia (which kills white matter)
- Congenital absence of corpus callosum with no other demonstrable neurological disease
- Significant surgical removal of tissue from the right cerebral hemisphere

- One of the main concerns has been its lack of specificity
- Label of NVLD has been applied as an umbrella term covering different pediatric disorders, including ASD, math disorder, ADHD, developmental coordination disorder, Turner syndrome, velo-cardio-facial syndrome, callosal agenesis, and other neurological conditions (Spreeen, 2011; Pennington, 2009).
- Maureen Dennis commented that *“the NVLD umbrella includes practically every pediatric disorder, many of which have diametrically opposed features”*. (Spreeen, 2011)

- Small samples and relative rarity of the NVLD profile in independent studies outside of Rourke's lab (Dunham, Multon, & Koller, 1999; Spreen & Haaf, 1986; Hendriksen et al., 2007).
- White matter etiology hypothesis has largely been discredited for non-specificity and lack of evidence from any imaging study to date.
- Finally, and perhaps most importantly, there has yet to be convincing clinical evidence of utility of the NVLD label beyond treatment for math difficulties.

Overlap with Asperger's syndrome



- Rourke once said that “virtually all people with Asperger’s syndrome exhibit definite or probable NVLD”

If student presents with



- Significant impairment of motor skills
- Social skills deficits
- Possibly some learning difficulties
- Possibly some significant Verbal>Nonverbal IQ
- **Definite** restricted range of interests or repetitive routines, rituals or stereotypical behaviour
- Probably has Asperger's/ASD
- Remediate for this condition

Overlap with Dysgraphia/Developmental Co-ordination disorder?



- When younger, children with NVLD often have fine motor and co-ordination difficulties.
- However, unlike those with Dysgraphia, as kids with NVLD get older their fine motor and co-ordination problems improve

Summary: if a child presents with



- Significant impairment of fine and gross motor skills in elementary school
- Visuo-spatial difficulties
- Possibly a significantly higher verbal vs nonverbal IQ
- **No** restricted range of interests or repetitive routines, rituals or stereotypical behaviour
- Then they likely have DCD/Dysgraphia
- Need OT support and computer/voice-to-text

Overlap with Math Disabilities



- If the child has impaired (below 16th percentile) Math calculation and math reasoning skills
- Problems with concepts associated with math learning (e.g., telling time, estimating size, distance, bigger than/smaller than)
- Possibly social skills deficits
- Possibly some significant Verbal>Nonverbal IQ
- **NO** restricted range of interests or repetitive routines, rituals or stereotypical behaviour
- Probably has a Math LD.

Implications for Ontario:



- NVLD is potentially over-identified based on discrepancies between estimates of verbal and nonverbal IQ test scores alone (i.e., solely on a verbal – visual-spatial/performance split in IQ scores) without understanding that a discrepancy alone is not diagnostic and in fact is common in certain populations (e.g., Binder et al., 2009).
- Even more problematic is that it is often identified in the absence of an identified academic area of impairment.
- In addition, highly specialized neuropsychological tests are required when diagnosing NVLD (see Casey, 2012), ones that are often beyond the scope and practice of school psychologists (i.e., tests of tactile perception, astereognosis, grip strength).

- Clinicians should carefully consider the child's academic history and test profile and make a learning disability diagnosis if impairments in specific academic skills are identified.
- They may then additionally determine whether observed social-communication deficits warrant additional diagnostic consideration in this domain (for instance, Autism Spectrum Disorder). This will allow for the better understanding of the individual's specific needs and guide intervention and treatment.

Key take home messages



- NVLD is a very rare diagnosis that should only be made after comprehensive neuropsychological assessment.
- If math skills are a consistent weakness, (i.e., below 16th percentile), consider whether a diagnosis of a Learning Disability in the area of math would more accurately describe the condition and allow for more targeted and appropriate intervention and support.
- If social and/or communication challenges are also observed/reported, consider instead a diagnosis in this other domain (such as Autism Spectrum Disorder)
- If fine motor skills and handwriting are main weakness, consider instead a diagnosis of Dysgraphia and treatment by an Occupational Therapist.

Ideas for teacher interventions/supports



- Remember that you are only one person!
- Providing very targeted and specific interventions on a daily basis may be impossible/unrealistic
- The following are general ideas to assist students with NVLD in functioning more effectively in academic environment.
- Many of these suggestions are good for all kids, including other types of disabilities.
- Parents may need to seek out more specific and targeted help outside of school hours

Interventions for NVLD: What can teachers do?



1. Classroom schedules & routines
 - Create a daily class routine that changes as little as possible

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- Make a laminated card with the student's schedule on it
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- Give student plenty of time to preview and prepare for new activities

Interventions for NVLD: What can teachers do?



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- Give an overview of a lesson before teaching it, and clearly state objective
- Explain figures of speech when you use them (e.g., step on toes)

Interventions for NVLD: What can teachers do?



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 - Break a big project into smaller steps,

Interventions for NVLD: What can teachers do?



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Interventions for NVLD: What can teachers do?



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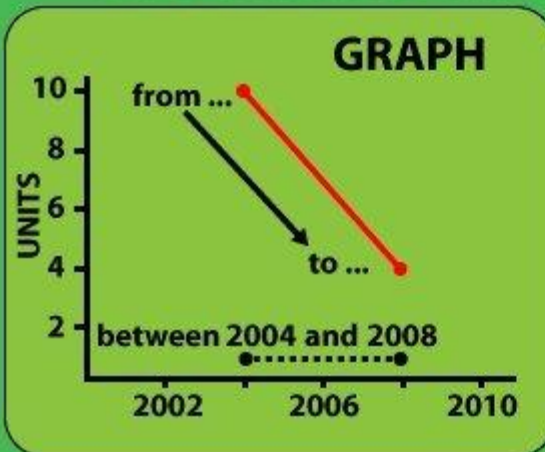
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IELTS Writing Task 1

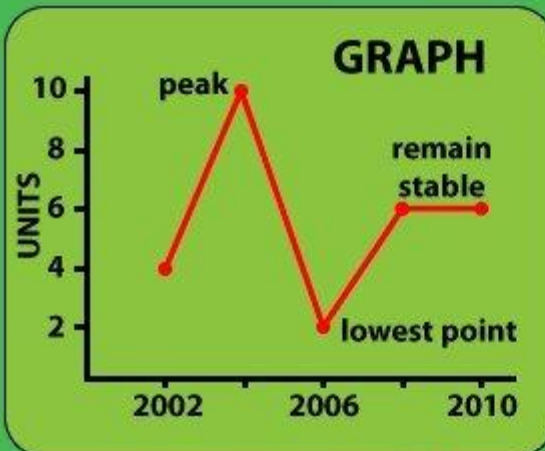
Academic Version



DESCRIBING TRENDS - PREPOSITIONS



A simple description:
It decreased **from** 10 to 4.
There was a drop **of** 6 (units).
It dropped **by** 6 (units).
A decrease in the number of...
Between 2004 and 2008...
From 2004 to 2008...



A simple description:
It started **at** 4 (units).
It peaked **at** 10 (units).
It dropped **by** 8 (units) to its lowest point **at** 2 (units).
It increased **to** 6 (units).
It remained stable **between** 2008 and 2010.
It finished **at** 6 (units) in 2010.



Line Graphs

Definitions and Descriptions

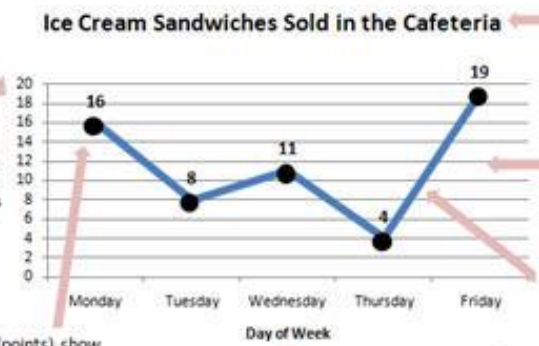
A **line graph** is a kind of graph that uses **lines** to show changes in data. A line graph is a tool you can use to **compare data over time**.

The Parts of a Line Graph

This is called the **scale**. The scale shows the **units** in the graph. This scale is on the **y-axis**. They y-axis is also called the **vertical axis**. The **y-axis** has numbers for the amount of stuff being measured. This scale goes from 0 to 20.

This is the **label** for the **y axis**. The y axis tells what is being measured.

Number of Ice Cream Sandwiches



The **title** tells what the graph is about.

The background is called the **grid**. The grid helps you read the **units**.

These are called **lines**. The lines connecting the dots help show if the data is going up, down, or staying the same.

The **dots (points)** show how many. These points give the facts. (There were 16 ice cream sandwiches sold on Monday.)

The **axis labels** tells about the information on the graph. The days of the week are listed on the **x-axis**. The **x-axis** shows things being compared. The x-axis is also called the **horizontal axis**.

- A line that goes **up** means an **increase** in the number from one point to the next.
- A line that goes **down** means a **decrease** in the number from one point to the next.
- A line that stays the **same** means the data is the **same** from one point to the next.

If someone asks you to **compare data over time**, here are the kinds of things you'll have to know how to do.

- Tell which point shows the most.
- Tell which point shows the least.
- Tell if there is an increase from one point to the next. (The points will be connected by a line that will go up, down, or stay the same.)
- Tell if there is a decrease from one point to the next.
- Add the numbers of two or more points and give the amount.
- Tell how much more one point is than another.
- Tell how much less one point is than another.
- Tell about the trend in the data.

Find the BIGGEST number Greatest number
 Greatest amount
 Highest value
 Highest amount
 Higher

Find the SMALLEST number Least number
 Least amount
 Lowest value
 Lowest amount
 Smallest amount
 Lower

Become a graph master – practice reading graphs and you'll get really good. The more you read the graphs, the easier it becomes.



3. Providing instructions and materials

- Break a big project into smaller steps,
- Write out and number multi-step directions
- Describe graphs in words, talking through what each point represents on x and y axis
- Use manipulatives to help make learning concrete (e.g., Lego to show fractions, percentage)

<https://www.scholastic.com/teachers/blog-posts/alycia-zimmerman/using-lego-build-math-concepts/>

LEGO FRACTIONS



1 whole



$\frac{1}{2}$



$\frac{1}{4}$



$\frac{1}{8}$



$\frac{1}{2}$



$\frac{2}{4}$



$\frac{4}{8}$



$\frac{1}{4} + \frac{3}{4}$

=



$\frac{4}{4}$

=



1 whole



$\frac{1}{10}$

red

$\frac{1}{10}$

orange

$\frac{2}{10}$

yellow

$\frac{3}{10}$

blue

$\frac{3}{10}$

green

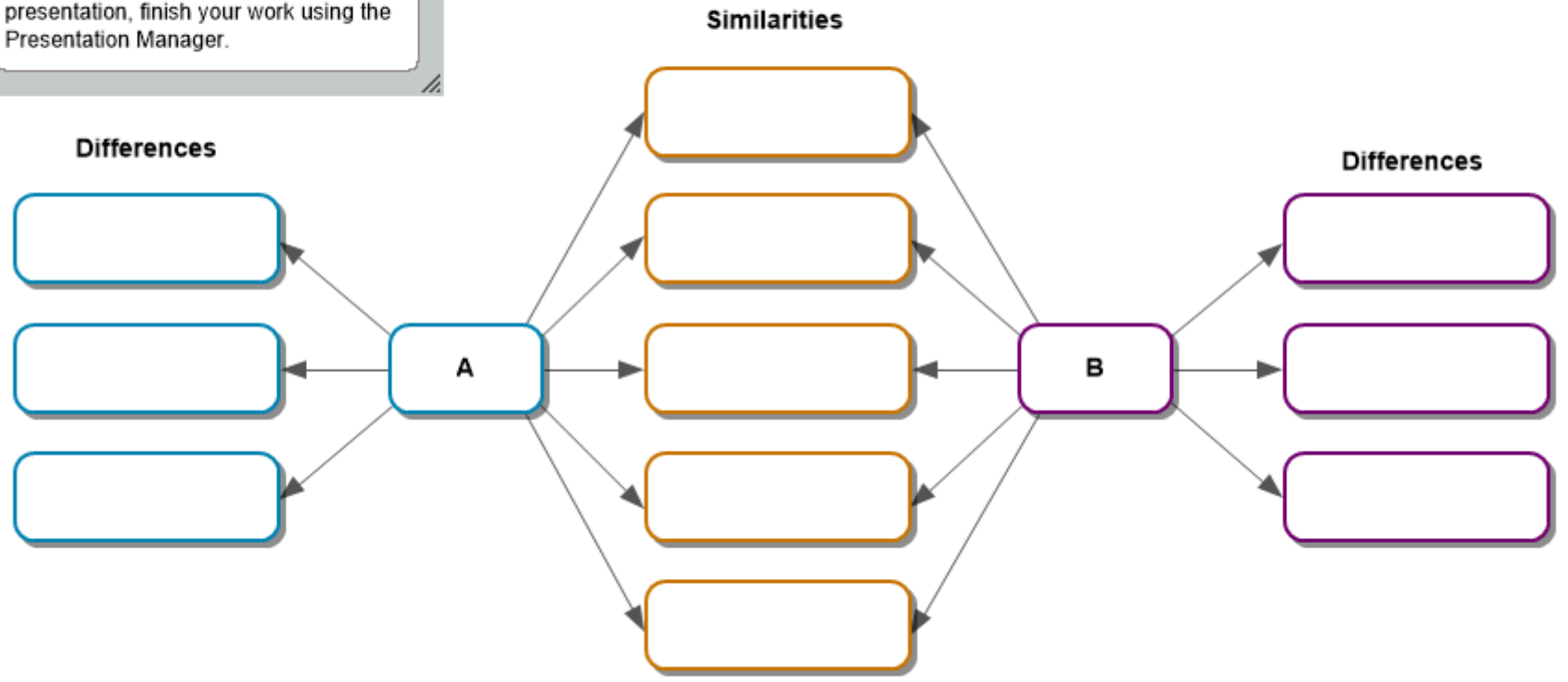
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Compare and Contrast

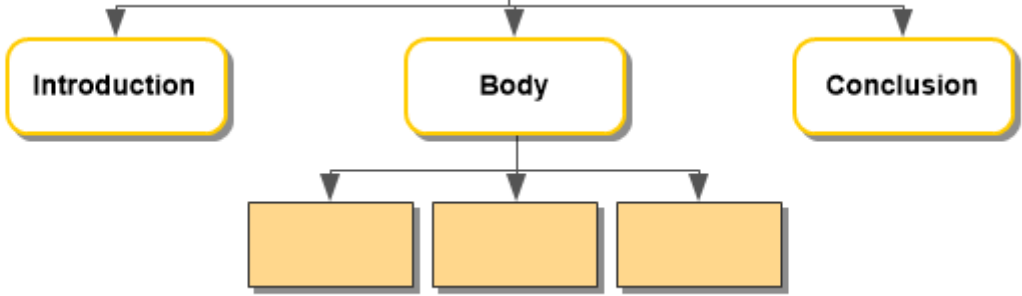
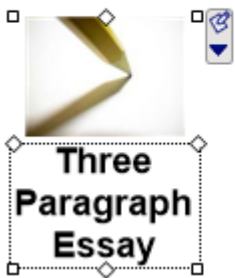
Characterize similarities and differences between two concepts or topics using symbols and text. Build out the graphic organizer, using notes to provide detail. To expand your document into writing, switch to Outline View. To create a presentation, finish your work using the Presentation Manager.

Compare and Contrast



Three Paragraph Essay

Use the outline or graphic organizer to help you learn the structure of a three paragraph essays. Add subtopics to expand your thinking and make connections between ideas, using notes to add detail. Complete the writing process in Outline View, or use the Transfer tool to continue the writing process in a word processor.



Interventions for NVLD: What can teachers do?



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- Use manipulatives to help make learning concrete (e.g., lego to show fractions, percentage)
- Use organizers and mind mapping software (e.g., smart ideas, inspiration)
- For older students, have them use assignment calculator
- <https://libraryresources.senecacollege.ca/assignmentcalculator/>

Assignment Calculator

This calculator will help you break down your assignment or project into manageable steps and guide you to useful services and tools from the Library and Learning Centre. Follow the guidelines for the assignment as discussed in class and consult with your Professor/Instructor if you have any specific questions about the assignment dates.

Date you will begin the assignment:

Date the assignment is due:

Type of assignment:

- Annotated Bibliography
- Business Report
- Exam
- Infographic
- Lab Report
- Literature Review
- Photography Assignment
- Presentations
- Reflection Paper
- Research Essay
- Video Project

Assignment: Research Essay

Starting on: Friday February 7, 2020

Ending on: Friday February 14, 2020

This means you have 7 days to finish.

Step 1: Understand your assignment by Fri Feb 07, 2020

- Seek advice about the [Research Essay](#) to make sure you are ready to start. If you don't understand your assignment, ask your professor. -- <http://inside.senecacollege.ca/learningcentres/resources/tipsheets/writing-skills/tips-for-writing-research-paper.html>
- Check out [Key Terms](#) for essay assignments -- <https://inside.senecac.on.ca/learningcentres/resources/tipsheets/writing-skills/key-terms-in-essay-assignments.html>
- Watch the Lynda.com courses on [Writing Research Papers](#) -- <https://www.lynda.com/Education-Student-Tools-tutorials/Writing-Research-Papers/158319-2.html?org=senecacollege.ca>

Step 2: Select and focus topic by Fri Feb 07, 2020

- Brainstorming is a helpful tool in defining your topic. For a brief explanation watch this [video](#) and try the activity to get a better understanding of brainstorming. -- <http://infoliteracy.senecac.on.ca/brainstorming/index.html>

Step 3: Write working thesis by Fri Feb 07, 2020

- Read about how to write a [thesis statement](#) or watch a Lynda.com video on [developing a thesis statement](#). -- <http://inside.senecacollege.ca/learningcentres/resources/tipsheets/writing-skills/essays-thesis-statement.html>
- Visit the [Learning Centre](#) for help on writing a working thesis. -- <https://inside.senecac.on.ca/learningcentres>

Step 4: Design research strategy by Fri Feb 07, 2020

- Develop a research strategy. This video helps explain [Keywords](#). Use the [worksheet](#) to help you get started by using keywords. -- <https://youtu.be/wUnydDmp6Dg>
- In-depth instructions on research are available through the [How to Research](#) learning modules or the Lynda.com [Learn to Search](#) videos. -- <http://www.tlp-lpa.ca/research/how-to-research>
- You may want to schedule a [research appointment](#) with a librarian. -- <http://seneca.libcal.com/booking/researchconsults>

Step 5: Use Library Search to find books, articles and videos. by Sat Feb 08, 2020

- Use [Library Search](#) to find books, articles and videos -- <https://youtu.be/BQmqHoV3U-k>
- Borrow books from libraries outside Seneca College ([Interlibrary Loans](#)). -- http://library.senecacollege.ca/Borrower_Services/borrow_ill.html

Step 6: Find, review, and evaluate journal/magazine/newspaper articles by Mon Feb 10, 2020

- [Find journal articles](#) or browse the library's selection of [more than 190 databases](#). [What is a library database?](#) -- <http://seneca.libguides.com/content.php?pid=48359&sid=527918>
- Evaluate your search results. Do you [trust this information](#)? Do you need scholarly or popular articles and [what is the difference](#)? For a better understanding view the tutorial link [Popular and scholarly sources explained](#), or check out this [website](#) for evaluating articles. -- <http://seneca.libguides.com/content.php?pid=48359&sid=1180931>

Step 7: Find, review, and evaluate web sites by Mon Feb 10, 2020

- Conduct research on the internet for web sites.
- Be careful to [evaluate web sites](#) to ensure they are acceptable for use in a college project. -- <http://www.tlp-lpa.ca/research/evaluate-for-quality>

Step 8: Outline or describe overall structure by Mon Feb 10, 2020

- [Develop an outline](#) of your essay. -- <http://inside.senecacollege.ca/learningcentres/resources/tipsheets/writing-skills/essays-constructing-an-outline.html>

Step 9: Write first draft by Tue Feb 11, 2020

- Be careful to construct a logical argument, build a strong introduction and conclusion and [cite](#) your sources. -- http://www.senecac.on.ca/library/Research_Help/Citing_Sources/index.html

Step 10: Conduct additional research as necessary by Wed Feb 12, 2020

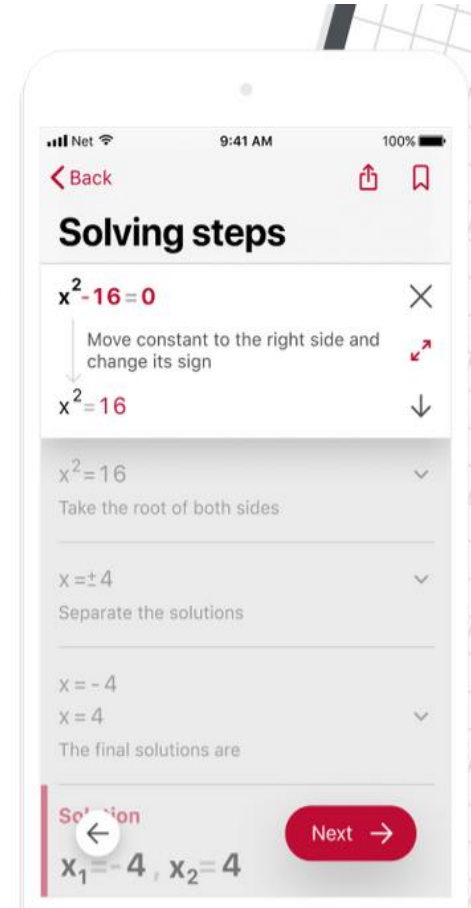
3. Providing instructions and materials

- Break a big project into smaller steps,
- Use organizers and mind mapping software (e.g., smart ideas)
- For older students, have them use assignment calculator
- Use math problem solving app like Photomath
- <https://www.photomath.net/en/>



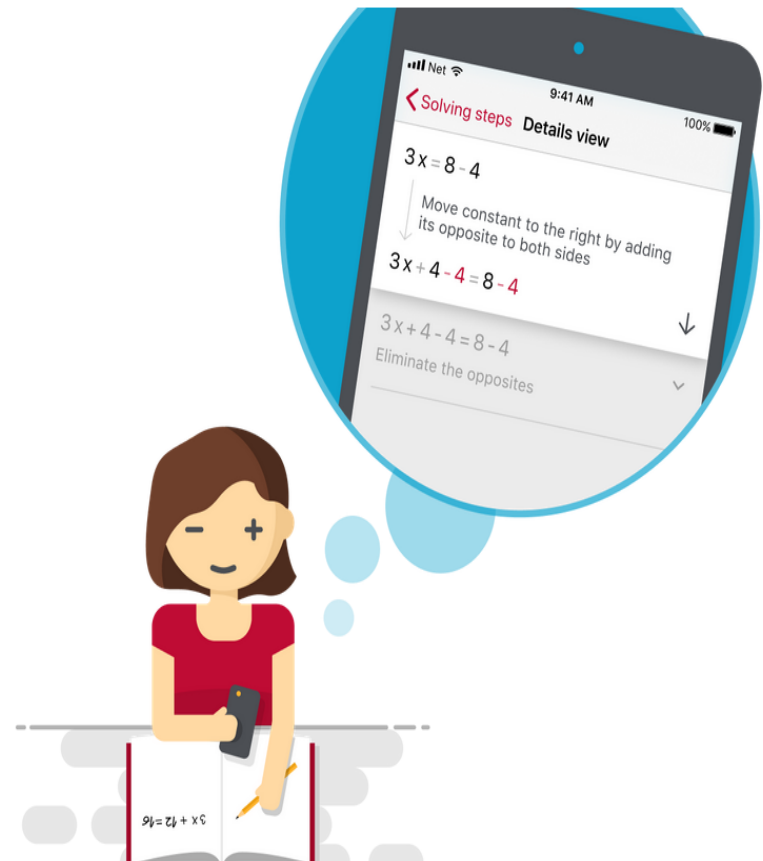
Math Superpowers for Every Student

Award-winning Photomath app makes math easy to understand and master



Our process

Photomath aims to maximize comprehension of core math concepts learned in the classroom. To achieve this, Photomath has a dedicated in-house R&D team of veteran math teachers who research the most effective, contemporary teaching methodologies, develop frameworks for solving math problems, and test and apply these frameworks in live classrooms.



Interventions for NVLD: What can teachers do?



3. Providing instructions and materials

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- Use math problem solving app like Photomath
- Cue cards or Apps to drill basic math facts



Math Facts in a Flash

by Renaissance Learning Inc.

GRADES / Pre-K, Elementary (Grades K-4), Middle School (Grades 5-8)

PLATFORMS / Web Browser

<http://www.renlearn.com/mf/>

About Reviews

Case Studies



Summit Reflections



Math assessment program that builds basic fluency for grades 1-6

Overview

Project Unicorn Vendor Signatory

Math Facts in a Flash is exactly what its simple title sounds like: straightforward Web-based practice designed to strengthen students' fluency in basic math concepts like addition, subtraction, multiplication, division, fractions, decimals, and percentages. The goal, according to Renaissance Learning (which makes Math Facts in a Flash), is “automaticity” – or unconscious mastery, in which a student moves from calculating an answer to just “knowing” it as fact, similar to the effect one might get from [using flash cards](#) (a fair off-line comparison for this product, and surely no coincidence with the word Flash in the name).

The product has been around since 2002, first as a CD-ROM product that moved onto the Web in 2005, and is being used by about 11,000 schools in the United States and the United Kingdom, who pay a little more than \$1/student for school subscriptions. A Spanish version of the product is also available.

Starting with a 40-item timed test, students then work from that baseline (online or on printed worksheets/flash cards) on the math facts that proved most difficult and receive immediate feedback on those skills – then continue to re-take timed tests until they answer all problems correctly within a short period of time (about 2 minutes) and move onto the next level.

3. Providing instructions and materials

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- Cue cards or Apps to drill basic math facts
- Use graphing paper to line up numbers

Interventions for NVLD: What can teachers do?



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- Cue cards or Apps to drill basic math facts
- Use graphing paper to line up numbers
- Direct instruction in use of strategies for identifying main ideas (e.g., underlining/highlighting key words, asking questions, summarizing key points)



Launching young readers!

Reading Rockets

Teaching Reading ▼

Helping Struggling Readers ▼

Reading Topics A-Z ▼

Research, Guides and Resources

Our PBS Shows

Video

Blogs

Fun Stuff

[Home](#)

Literacy Apps

Comprehension

The ultimate goal of reading is good comprehension. We've gathered information about apps that provide practice with specific comprehension skills, including sequencing, differentiating between fact and opinion, developing word awareness (through antonyms, synonyms, and homophones), as well as several mind mapping apps. Mind maps are visual diagrams that help students represent words or ideas and can be used in reading and writing.

Many of the reviews we link to are from [Common Sense Education](#), a trusted resource for learning about apps and other edtech tools.



Main Idea - Sentences 4+

Reading Comprehension Skills

Janine Toole

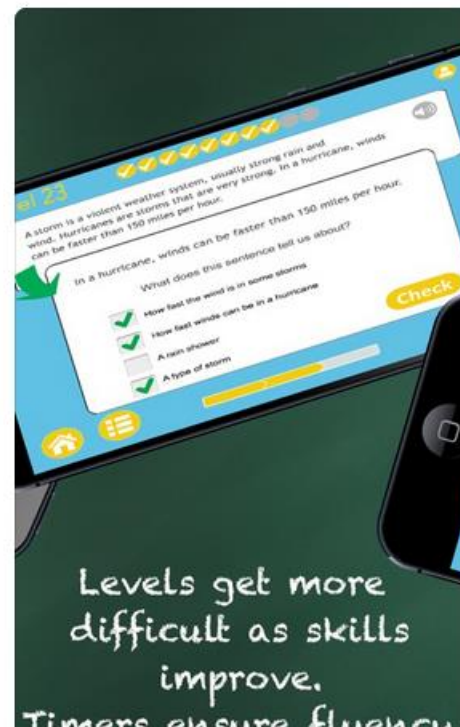
★★★★★ 3.9, 17 Ratings

Free · Offers In-App Purchases

'Main Idea – Short Texts' is targeted to children in Grades 2-5 who can read the words (decode), but don't understand what they read. Beginning readers in earlier grades can also benefit from the targeted skill development.

'Main Idea – Short Texts' teaches learners how to identify the main idea of a paragraph. The skill is built incrementally using visual guides.

Screenshots [iPhone](#) [iPad](#)



Interventions for NVLD: What can teachers do?



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- Cue cards or Apps to drill basic math facts
- Use graphing paper to line up numbers
- Direct instruction in making reading process more active (e.g., read aloud, previewing and questioning, using chapter summaries or study guides)

Interventions for NVLD: What can teachers do?



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- For older students, have them use assignment calculator
- Use math problem solving app like Photomath
- Cue cards or Apps to drill basic math facts
- Use graphing paper to line up numbers
- Seeing AI APP



Seeing AI



Seeing AI is an artificial intelligence application developed by Microsoft for iOS. Seeing AI uses the device camera to identify people and objects, and then the app audibly describes those objects for people with visual impairment. [Wikipedia](#)

Developed by: [Microsoft Corporation](#)



Person

Recognizes friends and describes people around you, including their emotions

Interventions for NVLD: What can teachers do?



4. Assist with self-regulation & social skills
 - Help them identify signs of overstimulation or frustration (e.g., 'what tells me/how do I know that I am feeling anxious? Worried? Etc)
 - Teach relaxation skills to cope with anxiety

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- Help them identify signs of overstimulation or frustration (e.g., 'what tells me/how do I know that I am feeling anxious? Worried? Etc)
- Teach relaxation skills to cope with anxiety
- Provide direct instruction in social skills such as:
 - Social rules such as how close to stand to people when asking questions
 - Looking someone in the eyes when speaking to them (Trick of looking in between eyebrows when speaking to someone)

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 - Social rules such as how close to stand to people when asking questions
 - Looking someone in the eyes when speaking to them (Trick of looking in between eyebrows when speaking to someone)
- Create and use social scripts for basic conversations
- Self-advocacy such as telling people right up front that they don't pick up on non-verbal cues or indirect comments

Worst career paths



- Students with NVLD want to **avoid** jobs that require:
- Lots of problem solving
- Interpretation of body language/non-verbal cues
- Inferential/deductive reasoning
- Math

Worst career paths



- In my experience, I've seen students with NVLD do worst in:
 1. Early Childhood Education
 2. Personal Support Worker
 3. Health Care Aid
 4. Nursing
 5. Political Science
 6. Teaching

Best career paths



- Jobs that require:
 - Rote learning/memorization
 - Predictable routines
 - Large vocabulary
 - Good spelling
 - Good knowledge of grammar/punctuation
 - Knowing and quoting the rules

Best career paths



- In my experience, students with NVLD have done best in:
 - Library assistant
 - Museum assistant
 - Programming/coding
 - Paralegal
 - Law clerk
 - Court transcriptionist
 - Editing/proofreading

Questions?

