PREMIUM ISSUE EIGHTY AUGUST 2022

Dyslexic Advantage
PREMIUM MAGAZINE

SKY'S THE LIMIT
FINDING SELF-EFFICACY

- BUILDING SPATIAL TALENTS
- ACTOR STEPHEN GRAHAM
- DYSLEXIC SUPER LEARNERS
- THE LANGUAGE OF MATH
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Dyslexic Advantage is a 501(c)3 non-profit organization and one of the world's largest online communities for dyslexia.

Our mission is to transform the way dyslexic people are understood, educated, and employed by identifying and using strengths that are the core features of the Dyslexic Mind.

Dear Friends,

For some, it may be a lifelong quest for really arriving at a point of self-efficacy, that is, you feel that accomplish whatever you set out to do - but it's so important to find that because the strengths of dyslexia are like a continually blossoming flower - you will continue to flower the more flowering you do.
Fernette

Link for this issue on Joomag: **https://joom.ag/7Wed**
password: flyhigh10

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DYSLEXIC ADVANTAGE PREMIUM MAGAZINE
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SKY'S THE LIMIT
FINDING SELF-EFFICACY

"If I have the belief that I can do it, I shall surely acquire the capacity to do it even if I may not have it at the beginning..."

- Mahatma Gandhi

More people may have heard about self-esteem than self-efficacy, but self-efficacy may be a more important quality that will predict how a person may make personal life goals and meet challenges in the future.

Self-esteem relates to how one values oneself. Self-efficacy, on the other hand, is a belief in how you can be successful or achieve something in the future.

MAJOR INFLUENCES ON SELF-EFFICACY

Dr. Albert Bandura, a pioneer in the study of self-efficacy, states that the major influences on self-efficacy are:

- mastery experiences (starting out as a beginner at something, then developing more mastery)

- role models or examples of people similar to ourselves who we see succeed

- imaginings and visualizations of a success - visualizing yourself as being successful or effective in different situations.

- current emotional or physiological states (for instance stress, depression, or anxiety could affect how effective we perceive ourselves)

- persuasion of others - influential people in our lives like parents, teachers, and friends can influence how effective we perceive ourselves

THE CHALLENGES TO SELF-EFFICACY

From a recent paper on self-efficacy, dyslexia and foreign language instruction:

"...students built their self-efficacy through modelling, that is, observing the others and interpreting their experiences...when a learner gets 50 out of 100 points in a test and discovers that other classmates obtained fewer points, it is likely that a student's self-efficacy will increase. On the other hand, when the student learns that the other classmates received more points, the learner's self-efficacy will decrease."

Once a dyslexic student starts school, they may be keenly aware that fellow students don't seem to require as much effort to achieve more - especially in activities like reading and writing, but also with skills like proficiency with math facts or even answering quickly to on-the-spot questions. When an educational approach is a poor fit to a dyslexic student, the challenges to self-efficacy are magnified.

In the above paper, the author sought to explore the effect of instructing a dyslexic student in a second language with multisensory methods as well as a conscious effort to support self-efficacy.

That meant trying to encourage mastery experiences (for instance, scaffolding successes rather than having students perform repetitive tasks that emphasize failures), providing creative activities that allow the student to build on his interests, knowledge, and be successful.

SELF-EFFICACY

EXTRA SUPPORT TO STRENGTHEN SELF-EFFICACY

The take-home point for this particular research paper (it is only a case report), is that it is possible to begin to turn around self-efficiacy with some individualized tutoring that provides the right level of challenge and awareness of how to use the student's interests and multisensory sensory instruction to support learning.

The student in this case was a 13 year old boy who strongly disagreed with the statement that foreign language learning was easy and also assessed himself as a weak student in this area. He scored 2.3 on a 1-4 point scale (4 being strong) of self-efficacy.

A graduate student met with him for six 45-minute sessions conducted once a week.

The following tutoring methods were employed:

- Week 1: Taboo game for vocabulary. Assessment using a YouTube video and text. Student was able to write only 4 out of 20 words correctly.

- Week 2: Flash cards with two languages. Tutor reads words aloud with the student echoing. Then the tutor describes the meaning, writes each word down, draws a picture, then make a story.

The student enjoyed the drawing and story making. He recalled 18 out of 20 learned words correctly. During the creation of the story, the student asked more questions, but the tutor could see that he was enjoying the activities and recognized that he was experiencing more success.

- Week 3: Flash cards with different

- Week 4: Underlining words, then discussing ones he didn't know in the assigned reading. Tutor discussed them and also had him apply some multisensory techniques as described earlier. The tutor gave the student a bookmark which was used while reading to reduce line skips. The tutor read the passage first, then the student, then the the passage was discussed in the native language. Afterward, the student summarized the text in the program Storyboardthat.com

- Week 5: The listening session involved text, previously-prepared vocabulary cards, listening, then reading with listening. Clarification of vocabulary and text with the tutor, with selected multisensory supports like saying aloud and writing in sand.

- Week 6: By the time of the last session, the student showed greater willingness to speak and read aloud in a foreign language. He selected the bookmark given to him by the tutor when reading. The modal verb exercises were performed well with only a few mistakes. His score on the self-efficacy survey increased to 2.9 and he agreed with the statement "I could get better grades if I worked more."

Now, one could imagine a similar support being helpful for students whether in the setting of a small group, tutoring after school, or resource room activity.

It is a bit sad thinking about this student no longer having this type of support once the graduate student finished the project and focused on writing her paper. It's not so much time or very specialized materials - but rather a positive flexible person who has a variety of multisensory strategies at their disposal who can provide the exact feedback when needed so that students learn the logic behind certain language patterns and can learn the words and structures in a way that suits them best.

SELF-EFFICACY

DEVELOP MASTERY AND LOOK FOR SUCCESS OPPORTUNITIES

If there is a child in your family or classroom who isn't experiencing success or the joys of mastery at whatever level, then that should be a priority when planning for the future for this student.

Children need to experience some area of mastery whether its success at reading or learning a foreign language after all their hard work like this example, or some other non-school activity like sports, service, friendships, or hobby.

When our son was young and struggling with severe dysgraphia, he loved art and art museums although his fine motor skills could do little that his mind could imagine. It was still exciting for him to visit art museums, ask for behind the scenes tours (just called up the docent office), and go to art fairs where he could talk to practicing artists. The love of art and artistic expression and admiration of others who were practicing art (role models) helped him sustain and persevere with making art even though he was disappointed for years with what his hands could create. We needed to give him many pep talks over the years and finally when he was older, he could see what his efforts could produce. He also learned that many other artists battled self-doubt and imposter syndrome.

If you are reading this article on self-efficacy and realize that it may apply to you, then this self-knowledge may be especially helpful.

In the last few months, as we were doing some last interviews for an update to our book, The Dyslexic Advantage, a recurring message that people with all sorts of different backgrounds were telling us was that they had to overcome burdens for their earlier life that held them back and attacked their confidence.

Some advice for building self-efficacy:

- Open yourself up to new challenging situations

- Embrace your curiosity and discovery

- See failure as a learning opportunity

- Celebrate your learning and keep track of your successes

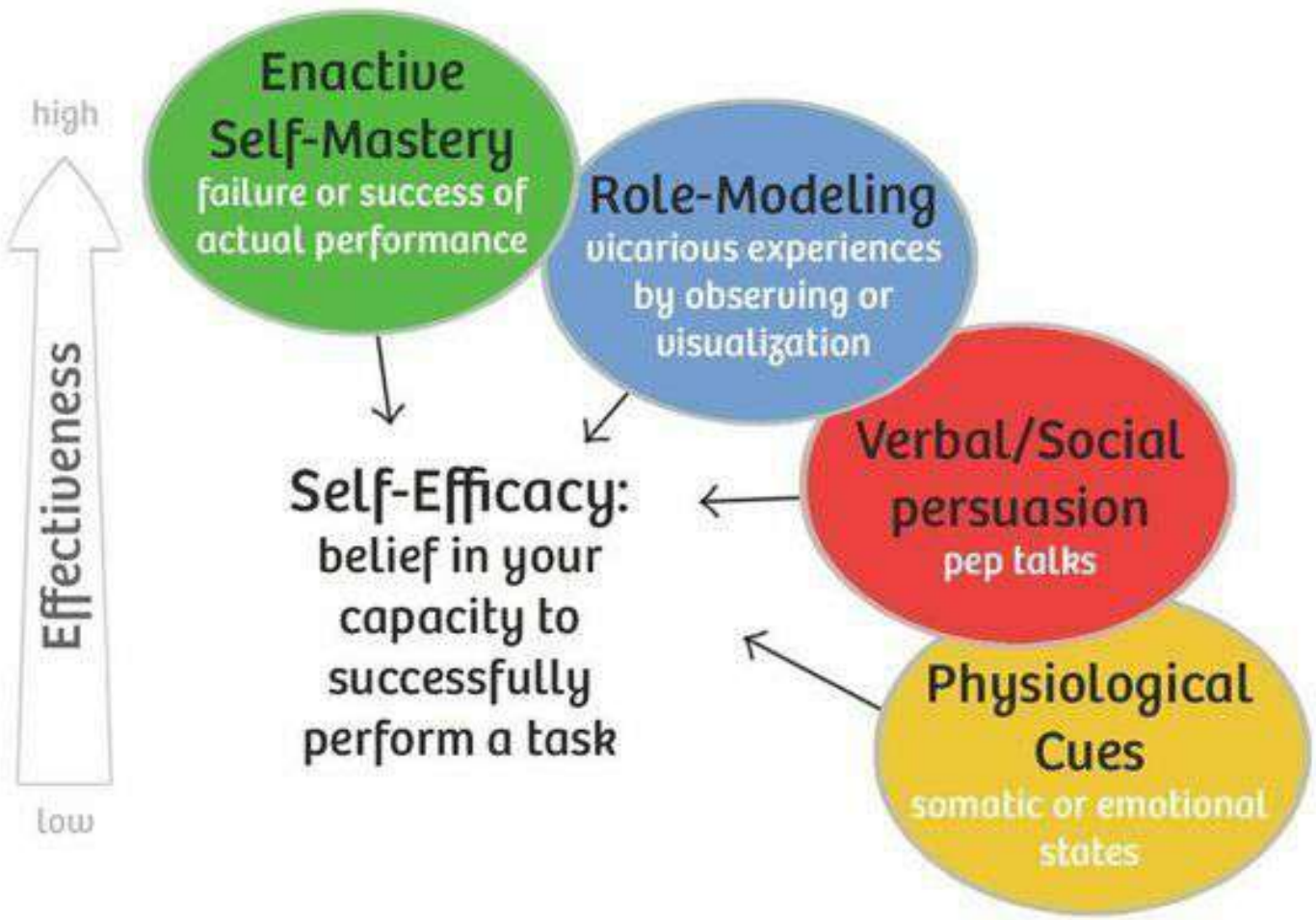
- Seek out mentors and people who inspire you

- Avoid people who bring you down or who could be stifling your growth

- Recognize others who bring out the best in you and support you

- Learn about self-compassion and practice it a little be every day

Learn more about Self-Compassion here.



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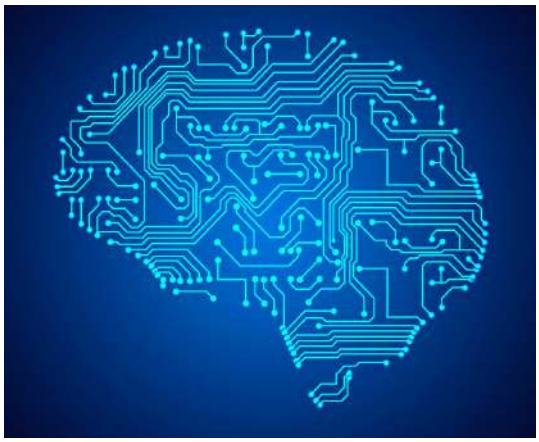

BUILDING SPATIAL TALENTS

"...Spatial reasoning has been key to numerous scientific advances, such as the discovery of the double-helix structure of DNA and the epidemiological research using maps to discover the true source of cholera outbreaks. It is also essential to many 21st-century careers, particularly in science and engineering...But are we able to see and support these particular kinds of talent in our classrooms?"

- Lakin and Wai, Phi Delta Kappan

What are spatial talents? In short, they are talents that involve visualizing objects and places in 3d and being able to manipulate them at will. These are talents that seem rich within the dyslexic community, but may be overlooked or neglected in conventional school activities.

It's an important strength set to recognize because it tends to be undervalued in conventional school work. The reason may be the tendency for particular talent sets to separate out into very different disciplines. Among K-12 teachers in general, spatial abilities appear noticeably low. This is no indictment of teachers. In fact, I have low spatial ability. It's wise to be aware of different talent sets and the careers they are found in to avoid spending a lot of time in an environment poorly optimized to one's talents.

On average, students entering education programs to become teachers have spatial abilities 0.5 standard deviations below their verbal abilities, whereas engineering students have spatial abilities 0.5 standard deviations above their verbal abilities (Wai, Lubinski, & Benbow, 2009).

What are spatial building talents?

This is by no means a complete list, but if it's helpful to have some suggestions:

- building (LEGO, Minecraft, Roblox, forts, woodworking, RC cars, kits (things that fly or roll, dollhouses, furniture) and taking apart, block towers, STEM activities - robotics, egg drop, roller coaster, drones, car restoring or repair
- drawing, painting, sketching, photography, filmmaking, fashion, pottery, digital art, 3d art, animation
- games (computer games, board games, chess, sim games, puzzles) and sports (soccer, football, basketball, golf, tennis, volleyball)
- navigation, camping, hiking, vacation planning, climbing, GPS
- crafting - papercraft, origami, leathercraft
- making and reading maps
- gardening, landscaping

One thing that parents of school age children may not know is that expensive computer software for 3d modeling, video gaming, animation, or digital art may be completely free... at least while they're still students. If your student has an interest, it may be valuable to have them experiment with the programs. All of the softwares have beginner tutorials and usually there are many YouTube videos to add to the learning over time. Teachers are also eligible for free licenses.

Examples of software in this category includes programs from **Autodesk, Sketchup, Blender, Unity,** or **Gamemaker.** These are more challenging software, so are appropriate for middle grade and up in most cases, but for certain children, younger ages may also be fine with some help.

FIND ROLE MODELS

Find role models to look up to. This applies whether you're thinking about your daughter or son, or thinking about yourself and a career change you would like to make.

SPATIAL

Even if you have a natural spatial talent, there will be benefits for developing those talents over time.

Our careers don't look like everybody else's, so why should our education? The paths for education and careers of dyslexic people can be very non-linear and unpredictable.

If you are parents and not spatial yourselves, but you want to cultivate what you think are spatial talents, then look outside for potential role models or contacts.

Consider extended family members, neighbors, friends, and people in the community who might have a match in talents. Consider this to be just information gathering and see if people might consider a brief phone or Zoom call or visit in person.

- Search for specific information about a career track for your student. Often websites provide information about people's backgrounds for becoming what they are today.

- If you are interested in competitve spatial careers, search for dream jobs to learn about skills (certain software packages or computer languages) that may be necessary to be a realistic candidate for those types of jobs.

Do not be discouraged whatever point you find yourself. To quote from **20 Comics Commandments**, you cannot get worse at something you do every day. There are plenty of free video tutorials that have a "draw with me" component and even some apps like **SpatialKids** (for iPad) that are currently free that teach spatial drawing principles in little baby steps. A free teacher account is available **here**. An example of the app with its automatic grading and hints can be seen at right.

DYSLEXIA FOR TEACHERS ONLINE COURSE

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THE LANGUAGE OF MATH

The meanings of words in general usage are often very different from their mathematical meanings."

- Marilyn Burns

Educational leaders are becoming increasingly aware of the importance of teaching the language of math in order to raise understanding and performance. There can be extensive reading and writing demands associated with math learning and dyslexic students may be
at particular disadvantages learning because they may have trouble reading word problems, dual tasking (listening while taking notes), and confusion with symbols.

A paper by Riccomini and colleagues recalled some of the difficulties associated with learning the language of math:

- Words that have different meanings in contexts (a foot = 12 inches vs. foot of the bed)

- Homonyms (pie vs. pi)

- Concepts that may be verbalized different ways (15 minutes past the hour vs. a quarter past)

- Terms with specific math contexts (polygon, imaginary number)

- Words that have different meanings in the context of math vs. every day life

Needless to say, these difficulties can also cause significant difficulties for English Language Learners. There are many examples of words with different meanings. As an a example: "even" meaning smooth or flat vs. divisible by 2, or "series" as a group or tv episodes, sports games, or sum of terms in an infinite series.

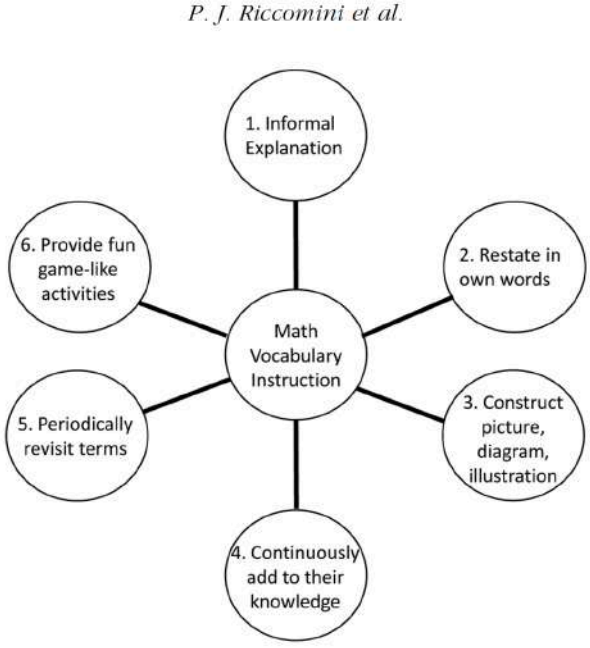
for English Language Learners. There are many examples of words with different meanings. As an a example: "even" meaning smooth or flat vs. divisible by 2, or "series" as a group or tv episodes, sports games, or sum of terms in an infinite series.

Some lists of these words can be found in this **Quia flashcard set**, a math teacher **discussion thread**, or **ESLPrintables**.

Math educator **Marilyn Burns** has argued that it's important for students to understand the concepts first before teaching them the vocabulary. Dyslexic students are good with pattern recognition, and her example has students do activities to recognize a pattern first, then put a name to it. In the linked article, admittedly, Marilyn uses an example for young children (the word "polygon"). The principle is sound, but could be difficult to implement as the number of new terms increases.

In a previous issue (**July 2020**), data scientist Dylan Lynn shared how she keeps a math notebook with confusing terms (including words with multiple meanings) that helps in her daily math work.

In their paper, Riccomini et al., suggest the following approach to math vocabulary instru



MATH

This paper also suggests a "key word strategy", but the reality is these strategies can fail and a better strategy is teaching students to learn to recognize what type or category of math question is being asked .

Powell and Fuchs have a nice description of the use of schemas in math word problem instruction. They include the table below which describes how key words can fail.

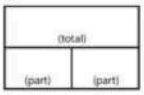
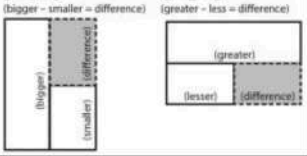
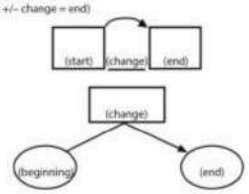
Table 1

Sample Key Words, Associated Operations, and Key Word Fails

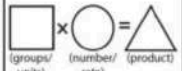
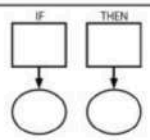
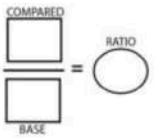
Key word	Associated operation	Problem in which the key word strategy fails
altogether	addition	Alice bought 4 cartons of eggs with 12 eggs in each carton. How many eggs does Alice have *altogether*?
more	addition	Colin had some crayons. Then, he bought 12 *more* crayons. Now, he has 90 crayons. How many crayons did Colin have to start with?
fewer	subtraction	Paulo picked apples. Zach picked 12 *fewer* apples. If Zach picked 20 apples, how many apples did Paulo pick?
left	subtraction	Liz shared 55 candies equally with 3 friends. After sharing, how many candies were *left* over?
each	multiplication	Miles had 3 trays of building blocks with the same number of blocks on *each* tray. If Miles had 75 blocks altogether, how many were on *each* tray?
double	multiplication	Margaret bought *double* the songs as her sister. If Margaret bought 12 songs, how many songs did her sister buy?
share	division	Sal collected 18 quarters to *share* equally among his friends. After sharing, he had 3 quarters remaining. How many quarters did Sal share?
divide	division	Cam *divided* 5 pieces of paper into fourths. How many pieces of paper does Cam have now?

Especially for dyslexic students, it is best to use an approach that does not have exceptions or ambiguities. Key words may work for many situations, but learning through schemas is more consistent.

Examples of additive schemas (top figure) and multiplicative (below) from the paper.

Schema and Definition	Equations and Graphic Organizers	Examples			Variations
Combine (Total; Part-part-whole) Parts combined for a sum	P1 + P2 = T (part + part = total) 	*Sum unknown:* Lyle has 11 red apples and 18 green apples. How many apples does Lyle have altogether?	*Part unknown:* Lyle has 29 red and green apples. If 11 of the apples are red, how many green apples does Lyle have?		*More than two parts:* Lyle has 34 apples. Of the apples, 11 are red, 18 are green, and the rest are yellow. How many yellow apples does Lyle have?
Compare (Difference) Sets compared for a difference	B – s = D (bigger – smaller = difference) G – L = D (greater – less = difference) 	*Difference unknown:* Sasha wrote 85 words in her essay, and Tabitha wrote 110 words. How many fewer words did Sasha write than Tabitha?	*Bigger/greater unknown:* Tabitha wrote 25 more words than Sasha. If Sasha wrote 85 words, how many words did Tabitha write?	*Smaller/lesser unknown:* Tabitha wrote 110 words in her essay. Sasha wrote 25 words fewer than Tabitha. How many words did Sasha write?	(None)
Change (Join; Separate) An amount that increases or decreases	ST +/– C = E (start +/– change = end) 	*End (increase) unknown:* Jorge had $52. Then, he earned $16 babysitting. How much money does Jorge have now? *End (decrease) unknown:* Jorge had $52. Then, he spent $29 at the ballpark. How much money does Jorge have now?	*Change (increase) unknown:* Jorge had $52. Then, he earned some money babysitting. Now, Jorge has $68. How much did Jorge earn babysitting? *Change (decrease) unknown:* Jorge had $52 but spent some money when he went to the ballpark. Now, Jorge has $23. How much did Jorge spend at the ballpark?	*Start (increase) unknown:* Jorge has some money, and then he earned $16 for babysitting. Now, Jorge has $68. How much money did he have to start with? *Start (decrease) unknown:* Jorge had some money. Then, he spent $29 at the ballpark and has $23 left. How much money did Jorge have before going to the ballpark?	*Multiple changes:* Jorge had $78. He stopped and bought a pair of shoes for $42 and then he spent $12 at the grocery. How much money does Jorge have now?

Material collected from: Griffin & Jitendra, 2009; Fuchs et al., 2014; Fuchs, Seethaler, et al., 2008; Fuchs et al., 2010; Jitendra, 2002; Kintsch & Greeno, 1985; Van de Walle, Karp, & Bay-Williams, 2013.

Schema and Definition	Graphic Organizers	Examples			Variations
Equal Groups (Vary) A number of equal sets or units		*Product unknown:* Maria bought 5 cartons of eggs with 12 eggs in each carton. How many eggs did Maria buy?	*Groups unknown:* Maria bought 60 eggs. The eggs were sold in cartons with 12 eggs each. How many cartons of eggs did Maria buy?	*Number unknown:* Maria bought 5 cartons of eggs for a total of 60 eggs. How many eggs were in each carton?	*With rate:* Maria bought 5 cartons of eggs. Each carton cost $2.95. How much did Maria spend on eggs?
Comparison One set as a multiple or part of another set		*Product unknown:* Malik picked 7 flowers. Danica picked 3 times as many flowers. How many flowers did Danica pick?	*Set unknown:* Danica picked 3 times as many flowers as Malik. If Danica picked 21 flowers, how many flowers did Malik pick?	*Times unknown:* Malik picked 7 flowers. Danica picked 21 flowers. How many times more flowers did Danica pick?	*With fraction:* Malik picked 25 red and yellow flowers. If 1/5 of the flowers were yellow, how many were red?
Proportions (Percentages; Unit Rate) Relationships among quantities		*Subject unknown:* Sally typed 56 words in 2 minutes. How many words could Sally type in 7 minutes?	*Object unknown:* Sally typed 56 words in 2 minutes. How many minutes would it take Sally to type 192 words?		*With percentage:* Watson received an 80% on his science quiz. If the test had 40 questions, how many questions did Watson answer correctly?
Ratio		*Base unknown:* Justin baked cookies and brownies. The ratio of cookies to brownies was 3:5. If he baked 15 cookies, how many brownies did he bake?	*Compared unknown:* Justin baked cookies and brownies. The ratio of cookies to brownies was 3:5. If he baked 25 brownies, how many cookies did he bake?	*Ratio unknown:* Justin baked 15 cookies and 25 brownies. What's the ratio of cookies to brownies?	*With unit rate:* Paula bought 5 boxes of markers. She spent $9.75. What is the price of one box of markers?

Material collected from: Jitendra, DiPipi, & Perron-Jones, 2002; Jitendra & Star, 2011; Jitendra et al., 2009; Van de Walle et al., 2013; Xin, Jitendra, & Deatline-Buchman, 2005; Xin & Zhang, 2009.

DYSLEXIC SUPER LEARNERS

"This isn't how I think either; this is how I have trained myself to think, because it works."

- Kevin Horsley, World Memory Champion and author of **Unlimited Memory**

It seems surprisingly common that dyslexics are found among the world's super-learners. It might be that all share a passion for understanding their memory strengths after suffering what may have been years in the school system, not realizing how to use their gifts.

It also might be that dyslexics as a group have strengths in metacognition, especially when studied in selected groups like those found in universities. When Kirby and colleagues **studied** dyslexic and non-dyslexic students in college, his study group of dyslexic students were more likely to use metacognition (i.e. thinking about their thinking), and deep learning strategies. It might be that university-level academic work selects for this type of learning among dyslexic students, but it also may provide a glimpse into the work habits and traits of students who may go on to pursue professional careers.

From Kevin's book:

"Questions are the answers to improving curiosity. Before you start reading or learning, ask yourself motivational questions....You want to ask energy enhancing questions that get you engaged in information. Ask yourself, "How is this relevant and applicable to my life right now? How will this information help me achieve my goals? How can I apply this information to improve my work? ...Get curious about your mind and how it works."

Connor Dibblins is now in his final year of medical school. He has shared his journey of being dyslexic to becoming a super learner who now produces video blogs about his study hacks. Connor goes deep. He knows what his weaknesses and temptations are (for instance procrastination), but has become an expert in himself in order to optimize his learning and fulfill his dream of becoming a doctor.

Here's an example of one of his posts:

Connor talks about his technique of breaking down information into bits, the putting the information into electronic notecards that involve spaced repetition (a cognitive way to optimize memory). There are a a variety of apps that you can use for this, but he uses **Notion** (available in **Mobile** or **Desktop**).

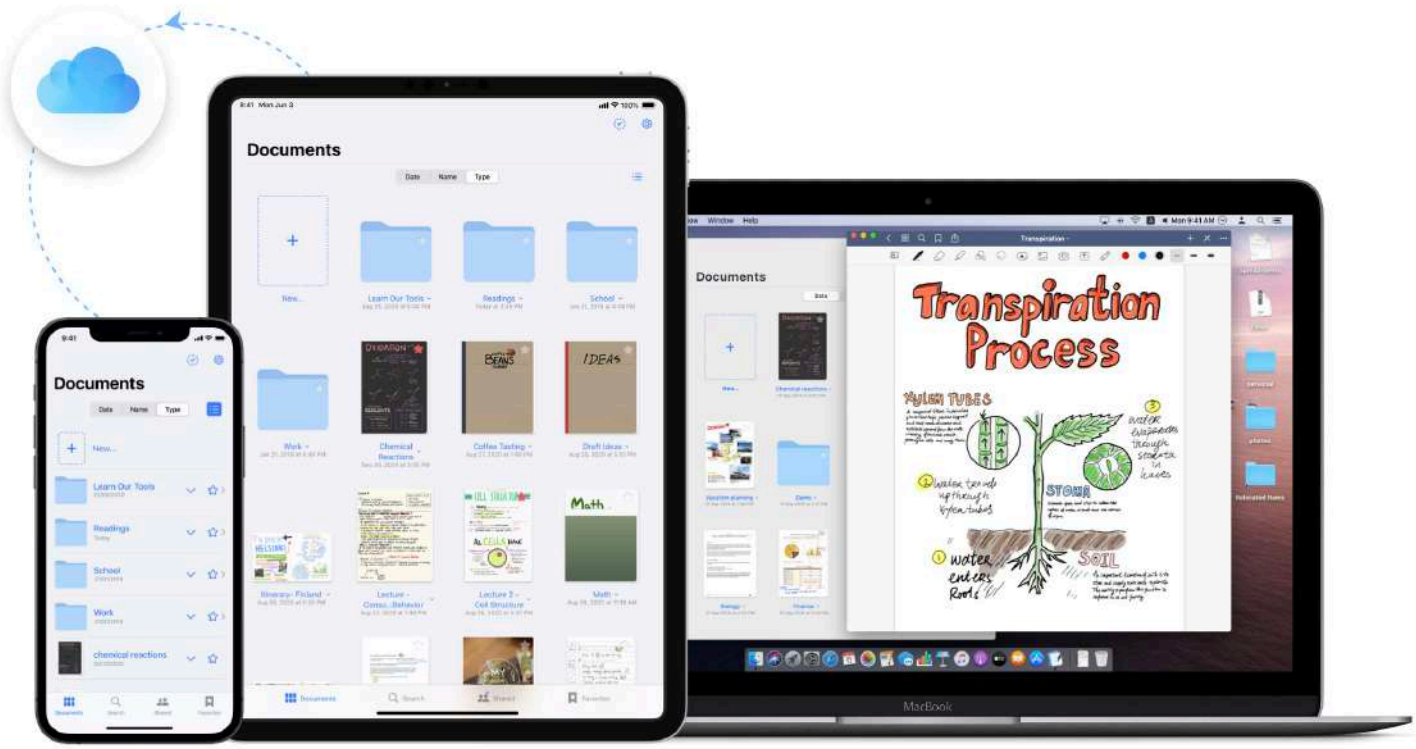
Here his Notion dashboard with templates (**here**).

LEARNING

Connor has clearly thought a lot about planning and scheduling with his ideas about due dates and completing "microtasks".

"You don't know what works for you until you give it a go."

For those who like to write and draw, the idea of an app with a limitless sketchpad might be a great option. The first three notebooks with GoodNotes app are free.



I also loved that Connor shared his tips about sound-cancelling headphones. Problems for dyslexics due to auditory distractions are real and they can be often overlooked or worse ignored by those who don't have a similar issue.

Connor is such a great example of a dyslexic super learner who became a scientist to understand himself and became a super strategic learner.

If you are interested in a career in the medical or other health professions, check out his general video blog at **https://doctordibblin.com/**

In truth, there is a lot that the world doesn't understand about learning trajectory and optimization among adult dyslexics and when people share their stories and life lessons, it can help the entire community move forward.

Recently, I came across this interesting **article** in which educational researchers were trying to understand how college students with dyslexia were able to succeed despite continuing difficulties at the single word reading level.

Although dyslexic college students were weaker in phonological tasks, reading fluency, and spelling, they performed just as well on reading comprehension tasks involving complex texts compared to non-dyslexic college students.

dyslexic students had a better visual spatial span than non-dyslexics

How did they do that? The researchers are not completely sure, but they noticed that their dyslexic students had a better visual spatial span than non-dyslexics. They also found that "general knowledge explained text reading comprehension scores in dyslexic readers better than in skilled readers, thus suggesting that the former group relies heavily on semantic information (possibly as a compensatory mechanism) when understanding written texts. Surprisingly, and contrary to our expectations, neither word reading, pseudoword reading, text reading fluency nor reading span explained text reading comprehension scores at a significant level.

A provocative thought that what these researchers are seeing is part of an evolving dyslexic advantage. Ironically, dyslexia is perceived as a learning disability, but considerable learning strengths are associated with the cognitive difference if they are optimized and leveraged.

People who are constantly working to connect information and understand in context will eventually have deeper knowledge about many things and in so doing, make significant contributions to the world.

ACTOR STEPHEN GRAHAM

Actor Stephen Graham has been described as one of the most talented actors the United Kingdom has ever seen. Yet, he almost didn't get a chance at his breakthrough role in Snatch when the director Guy Ritchie, asked whether he had come to read for the part.

Stephen had just come along to support his friend who was trying to get the job, but when Guy found out that he was also an actor, he encouraged him to give it a try. Stephen told him that because he was dyslexic, he couldn't do a cold read. I don't know whether he knew that Guy Ritchie is also dyslexic - but fortunately for Stephen, Guy asked him to improvise the scene instead and he completely smashed it and won the part.

Stephen had a lifelong talent picking up different accents, and he's now had a wide diversity in roles in movies like This is England, The Irishman, Boardwalk Empire, Line of Duty, Dead Men Tell No Tales, and Peaky Blinders.

In a spectacular effort, Stephen was also involved as the head chef in Boiling Point, a movie that was filmed phenomenally in one unbroken shot, days before the first national lockdown happened due to COVID in 2020.

At home, Stephen says that his wife, Hannah Walters, reads through prospective scripts for him and helps him decide which ones to accept. He and his wife recently heard the good news that the mini-series that he executively produced and that they both starred in (Time), won a BAFTA (British Academy of Film and Television Arts) for best mini-series.

Grateful for his success, Stephen says he tries never to forget where he came from. In his thank you at the awards, he thanked the "phenomenal cast of working class men who were absolutely outstanding...every single one of them. This is why I wanted to be an actor as a kid...to tell stories that have a social commentary."

An interview with Stephen, his BAFTA awards speech, and the official trailer for his prison mini-series Time.

UNDERSTANDING DYSLEXIA AS AN EVOLUTIONARY ADVANTAGE

"Approaches to explaining developmental dyslexia must account for both the difficulties and the enhanced abilities that are typical of people with developmental dyslexia. All the proposed strengths... relate in some way to seeking out the unknown, often at the expense of exploiting known information. A useful framework for tying together these observations is cognitive search, which involves a trade-off between exploration–exploitation."

- Helen Taylor and Martin David Vestergaard

In an extraordinary article in Frontiers in Psychology, two Cambridge University scholars have put forth a paradigm-shifting concept of dyslexia that integrates over a century of research from diverse perspectives. It is a tour-de-force that might help society put dyslexia in its proper context.

From the paper (the simple term "dyslexia" is substituted for developmental dyslexia for ease of reading):

"...many aspects of cognition can be viewed from the perspective of search, characterized by a trade-off between exploration and exploitation (Hills et al., 2015). We challenge the traditional view that the cognitive attributes of individuals with dyslexia result from incorrect development. Instead, we propose that the features of this form of cognition were strongly selected for. It follows that what have traditionally regarded as deficits are trade-offs, and that these are balanced by specialization and enhanced abilities in complementary areas of cognition..."

The paper goes on to review previous clinical, scientific, and educational approaches to studying people with dyslexia and examines proposed areas of enhanced ability associated with dyslexia.

The challenge of the whole field has been trying to characterize or define dyslexia with a single measure that results in such a restricted view that it almost fails to identify any whole person with dyslexia at all. Science and K-12 education also by their very natures share tendencies to want to develop expertise in narrow areas so that, for example, reading teachers have very little training about the memory, writing, foreign language, and math challenges typical of young dyslexics.

EXPLORATION AND COGNITIVE SEARCH

What is this exploration and cognitive search the paper refers to?

In an evolutionary sense (from the **paper**): "Animals need to identify information and resources that have survival value. Since the availability of resources and information varies with time and location, the optimal search strategy will also vary. Moreover, uncertainty caused by environmental variability may obfuscate the optimal strategy. Any search thus involves navigating the trade-off between spending time and energy exploring new possibilities versus exploiting existing information.

Tipping the balance too far toward either exploration or exploitation puts the animal at risk of not obtaining the resources – or knowledge – needed to survive. Exploring endlessly without exploiting what has been found can be inefficient, whereas focusing too much on exploitation may be suboptimal or result in failure to adapt to change. This trade-off arises in many seemingly unrelated areas of endeavor, from evolution to the economy to artificial intelligence."

So, for example, dyslexic traits like diffuse attention to the environment (auditory and visual), different ways to process and find information (non-automatic memory, preference for episodic or personal memory), all can contribute to benefits in search for limited resources, finding unconventional answers to important questions, and creating new ideas, products, and industries. What is so compelling about this proposition is that its analysis is both comprehensive and broad. It make sense of many seemingly unrelated research findings that have been confirmed in independent ways.

DYSLEXIA AND AN EXPLORATIVE BIAS

From the paper again:

"The explorative bias for people with DD can be seen at multiple levels of analysis. Proposed strengths cluster around explorative behaviors such as big-picture, long-term thinking and inventiveness. "

The association between dyslexia and an explorative tendency certainly is in agreement with our experience. The authors mention that they hope their paper will encourage more students to test their hypotheses and we hope for that as well.

Certainly, there are many famous explorers who are dyslexic (including some who name as the greatest explorer of this century, Robert Ballard. Dyslexics also seem over-represented as start-up founders who have played critical roles in new industries (for example Douglas Merrill, Yoky Matsuoka, and Astro Teller of Google, and Nicholas Negroponte of the MIT Media lab, to name a few).

The authors also rightly touch on the mismatch between the status quo educational system and exploratory bias and dyslexia.

The authors present several examples of how different theories of dyslexia "cite weaknesses in aspects of cognition or neurology that are related to exploitation of information...(and how) most education and academic systems strongly favor less exploration. Education systems that primarily assess an ability to reproduce information that is known, as opposed to using information to develop new solutions and to explore the unknown, put more explorative individuals at a significant disadvantage. In Western academic systems, reward is based on the quantity of written output, and narrowly specialized local search tends to traditionally be favored over interdisciplinary global search. Thus, although academic research is ostensibly explorative, the cognitive style of explorative academics is generally not rewarded.

Given these factors, it is unsurprising that individuals with a more explorative cognitive style would struggle in academic environments. Activities that are valued and linked to assessment and advancement highlight their weaknesses; at the same time, they are given little opportunity to express and develop their strengths, causing frustration, stress, and anxiety...

The need to balance explorative learning along a continuum with learning through exploitation to reach optimality is well known in other fields such as organization and machine learning. This contrasts with the more narrow view of learning in education where the emphasis is on acquiring (exploiting) existing knowledge."

They add, "it would be logical and beneficial to develop and introduce approaches in education and academia that nurture an explorative orientation toward learning (**Mulgan, 2021**)."

Do read Taylor and Vestergaard's full paper. It also addresses seemingly opposite differences between dyslexia and autism and some overlapping features with dyslexia and ADHD and lower working memory. It's a tremendous work with far-reaching implications - and as someone who has worked in the field for decades, it's amazing to see how well it ties together so much research and personal observations.

RECOVERING FROM PANDEMIC LOSSES

As we all hope the worst of the pandemic is behind us, the schools must all anticipate an even greater variability in reading, writing, and math levels for students due different degrees of pandemic loss and social and emotional stress.

Educational researchers and school psychologists are **warning** parents and teachers that the diagnoses of learning disabilities may be especially prone to errors: "When education has been disrupted by COVID-19, rigid adherence to DSM-5 criteria for initial diagnosis of a specific learning disorder entails substantial risk of error. In the past two years, most youth have experienced some loss of academic instruction. Many have also experienced psychosocial adversity (such as death of a loved one or decreased social support). Interventions might not have been available within any given six-month span within the pandemic. These factors would seem to rule out the diagnosis of a learning disorder on the basis of the DSM-5 criteria. As educational disruption persisted, some schools altered the curriculum by eliminating content; consequently, it is increasingly difficult to know whether observed learning difficulties and/or low achievement scores reflect an underlying learning disorder or lack of instruction. This difficulty is confounded if standardized academic assessments use pre-COVID-19 normative data to assess COVID-19 era progress."

Read the report for the full details, but briefly, they suggest taking into account factors such as a family history and "pervasive delays in language acquisition" in addition to low reading scores, the allowance of "provisonal diagnoses" and advocacy particularly on the basis of "youth impacted by racial and economic disparities." They state that IDEA criteria should remain in place so that students with low achievement are still eligible for remediation "regardless of whether clinical criteria for a learning disorder have been met."

These calls, while understandable, will undoubtedly cause some disruption in some services for students. Intervention groups may be larger and schools may waive dyslexia screening for the upcoming year. Upside changes may also occur though. More classes in-general will receive literacy support and the **American Rescue plan** will boosted their funds for after school tutoring. Be aware, though that there will be a great deal of ongoing pressure for teachers and there are severe substitute shortages in many areas.

WHAT TO DO?

The summer is a much-needed time of respite and recovery, but it can also be a time to maintain or boost skills a bit so that the start of the school year in the fall will not be stressful. What you choose to do, depends on your student.

If a little bit of interest-based reading along with audio can help, then setting aside some regular time for it would be helpful. Some families may choose summer school or a little work with a tutor that might be easier to schedule in the summer than school year.

Consider a family storytime that could involve each person reading a character's dialogue (dialogue is usually easier than descriptive text) or even listening to audiobooks and then talking about what happens or decisions that an author made.

When our kids were young, we would sometimes take a scene from the **Internet Movie Script Database** and dole out character voices. The nice thing is that you can choose a movie that everyone in the family knows and loves and scripts by their very nature have plenty of white space between lines to make for easier reading.

If you have a student who has been working hard at a structured literacy program, but still has a way to go, then taking an individual lesson-type approach and helping them do a little bit at a time may help them feel like they are making more progress and give them more confidence along the way.

For instance, if you notice your student has recurring trouble with the silent "e" pattern, it can be a boost at just the right time. A brief lesson, learning of the patterns, card sort practice, and it's done. If parents are also dyslexic and share their similar troubles, it can also be very empowering.

As an example, sample pages from All About Learning below.

Touch under the e. "This is Silent E." d i m e

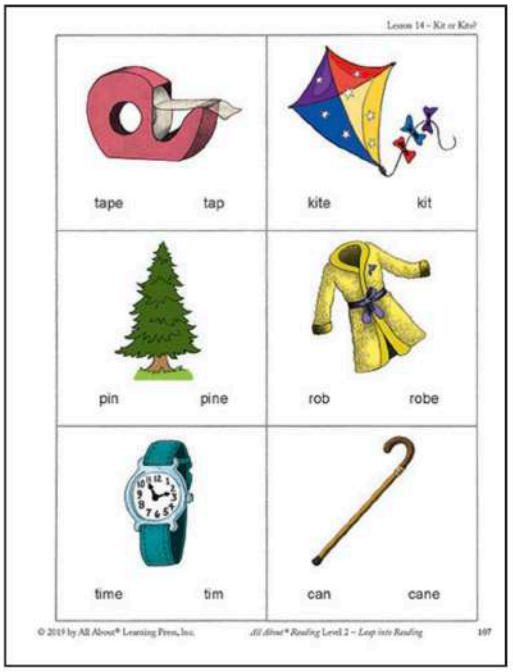
Now go back to the beginning of the word. Slide your finger under the letters d-i-m-e and say *dime* slowly.

d i m e

Finally, read the word *dime* at a normal pace as we do when we speak.

Using the same procedure for blending, have your student sound out the word *kite*.

k i t e



And what about emotional recovery?

Psychologist Tamar Chansky has a nice post about Healing Our Way Out of the Pandemic:

"Each of us separately and collectively are the heroic protagonists of our own stories. Only we can know what we went through. While it is hard to look back, we can draw strength from having prevailed.

We don't exactly know our stories, yet—because we've been too busy surviving them. We need to look at what we've come through and incorporate our strengths, our courage, our dignity, our humanity into our legacy from this time."

The arts or time in nature may help some people recover. It may even be combining the two (keeping a nature sketchbook) aid may the recovery process. Finding something that's enjoyable and that allows you to lose yourself in terms of time (being in "flow") is something that can benefit everyone.

Tamar concludes by talking about the concept of post-traumatic growth which is different from resilience. Post-traumatic growth involves a deeper shift in how a person views themselves and life itself. It involves "a new sense of personal strength, a deepening appreciation for our relationships, and an elevated sense of purpose in life."

To read more about Post-Traumatic Growth from Tamar read her blog here.

Tamar, again:

"We have a great opportunity to help each other heal. Together, summoning what I think of as our "lotus vision" —our capacity to understand that by witnessing and supporting each other's journey through the collective "mud" of this time, we all benefit in a collective growth. We will make sure that true healing happens in our circles, in our families, and that this healing ripples out into communities across the globe, cultivating strength for a more compassionate, meaningful, and interconnected future, ready to face the inevitable challenges ahead. "

"We propose that the cognitive differences observed in individuals with Dyslexia are not simply reflective of variation in the population. Rather, the strong clustering between exploratory traits and trade-offs suggest that these differences are part of a pattern of specialization and were selected for during human evolution...we argue that the form of cognition represented by Dyslexia plays an essential role in enabling humans to adapt."

- Helen Taylor and Martin David Vestergaard, 2022