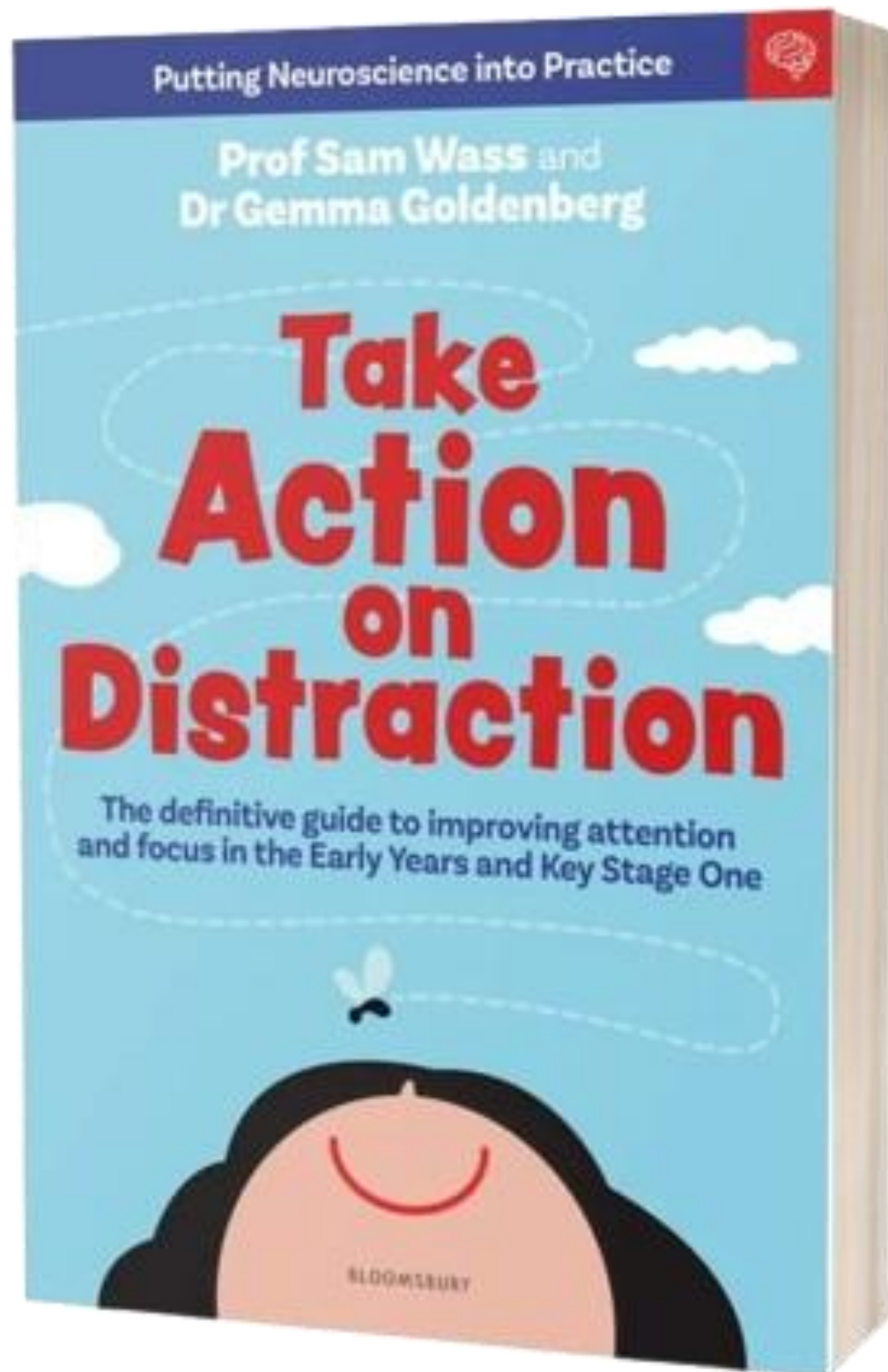




Take Action on Distraction

Supporting focus and attention in school

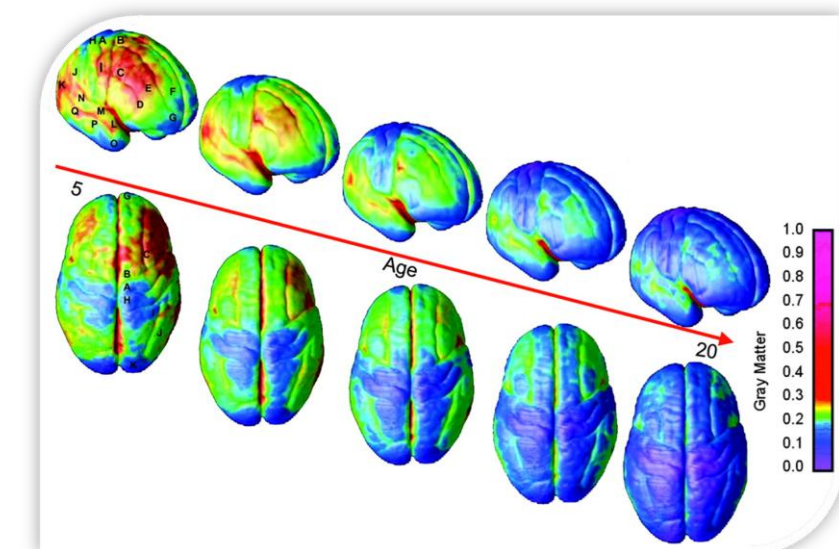
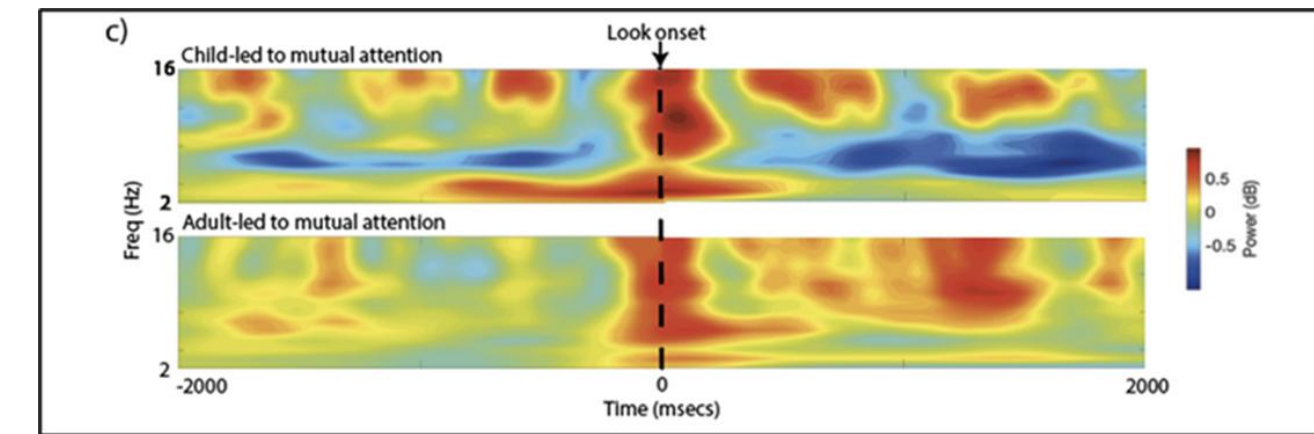
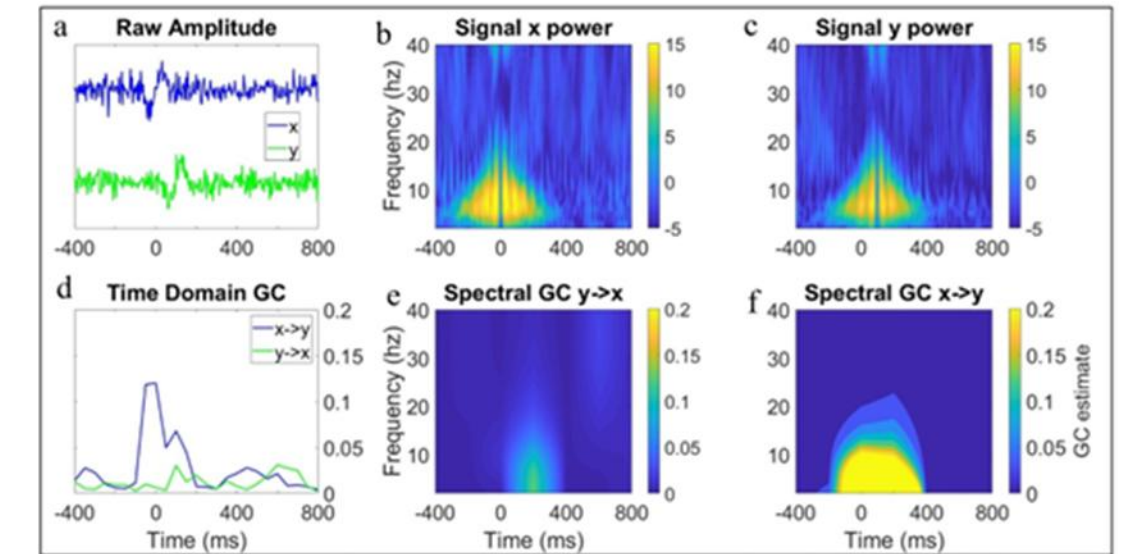
Dr Gemma Goldenberg

ISEY - Institute for the Science of Early Years and Youth



INSTITUTE FOR THE SCIENCE OF EARLY YEARS & YOUTH

www.isey.org



“Needs to avoid distractions and take more care”

“Must ensure he is engaged and on task at all times”

“Struggles with focus in lessons and frequently needs to be corrected for not engaging”

“A next step is to make sure he knows that there is an appropriate time for talking with friends and an appropriate time for listening.”

“Must work on maintaining focus”

“Needs to increase his focus in lessons in order to complete set tasks”

Why can't they just pay
attention?????

Write the letters of the alphabet in order.
At the same time, count out loud, backwards from 100 in **5s**.

How easy or difficult was it?
What made it easy or hard for you?

What did you drop first? The writing or the counting?

What felt hardest? Getting started or sustaining it?

This task represents what we ask pupils to do very often in school:

Hold one thing in mind mentally, while physically doing something else

(Remember the sentence you want to write, while writing it neatly, and thinking about spelling, punctuation etc)

(Listen to the story and also sit up straight)

(Play the game and remember to wait for your turn)

Resist distractions

Keep going when it gets difficult

Follow an instruction

Do something even if you don't feel like it

Risk getting something wrong, in front of someone else

These things might have affected how easy or hard you found the tasks. Which factors affected you today?

Feeling tired

Hungry or
thirsty

Confidence
counting
backwards

People nearby
watching you

Your working
memory
capacity

The room being
noisy

Feeling
stressed

Experience with
multitasking

Whether the
task instructions
were clear

Internal self talk
'I'm bad at
maths'

Task difficulty

Feelings of pain
or illness

Distractions or
interruptions

Unclear
expectations
about speed vs
accuracy

People nearby
completing it
faster

When we try to concentrate on something, there are 3 areas that can influence how well we pay attention:

Factors **within the environment**

Factors **within ourselves** (our body and brain)

Factors **within the task**

Which factors are within:
The **environment**, the **task**, and within the **person**?

Feeling tired

Hungry or
thirsty

Confidence
counting
backwards

People nearby
watching you

Your working
memory
capacity

The room being
noisy

Feeling
stressed

Experience with
multitasking

Whether the
task instructions
were clear

Internal self talk
'I'm bad at
maths'

Task difficulty

Feelings of pain
or illness

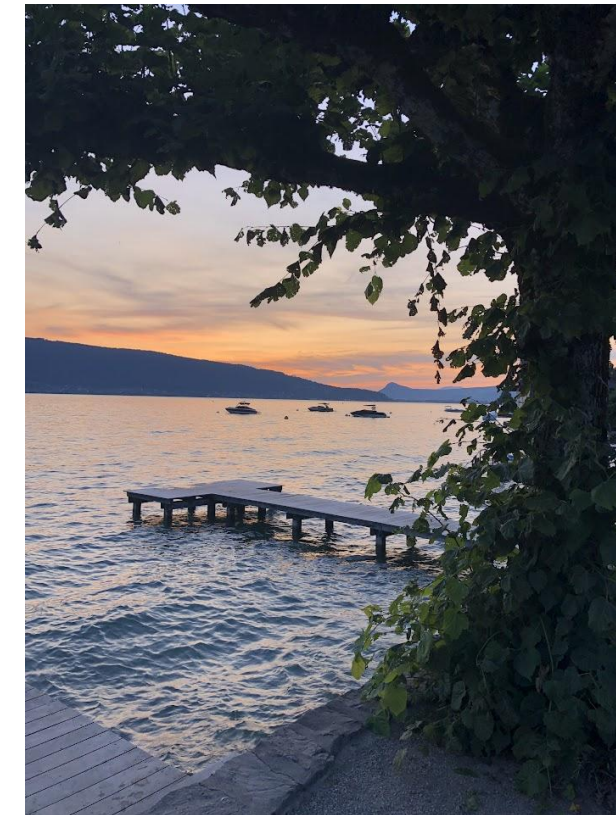
Distractions or
interruptions

Unclear
expectations
about speed vs
accuracy

People nearby
completing it
faster

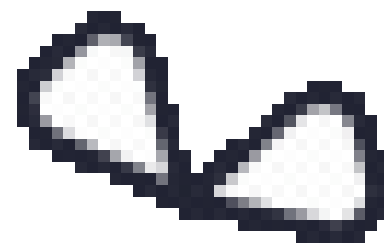
What was the point?

Because attention is about so much more than just what's happening **inside the brain**



When a child is struggling, we need to look at the **whole picture**

- The child
 - The task
 - The environment
- AND, how these interact with each other





**Paying attention isn't just about what's going on
inside the brain.**



**It's also about the environment around you,
what's pulling your attention towards it, and how
much control you have over that 'pull'....**

2 different types of attention:

Attention Capture

Attention Control

**Movement, sound, bright lights and
colour grab our attention instinctively**



This is for evolutionary reasons

We are born with this
instinct, and nowadays
it's exploited in many

ways



This 'attention **capture**' is effortless
and hard to resist.

In contrast, attention **control** is our
ability to **choose** what to pay
attention to.



As adults, we can control our attention like a spotlight, choosing what to pay attention to and what to ignore.



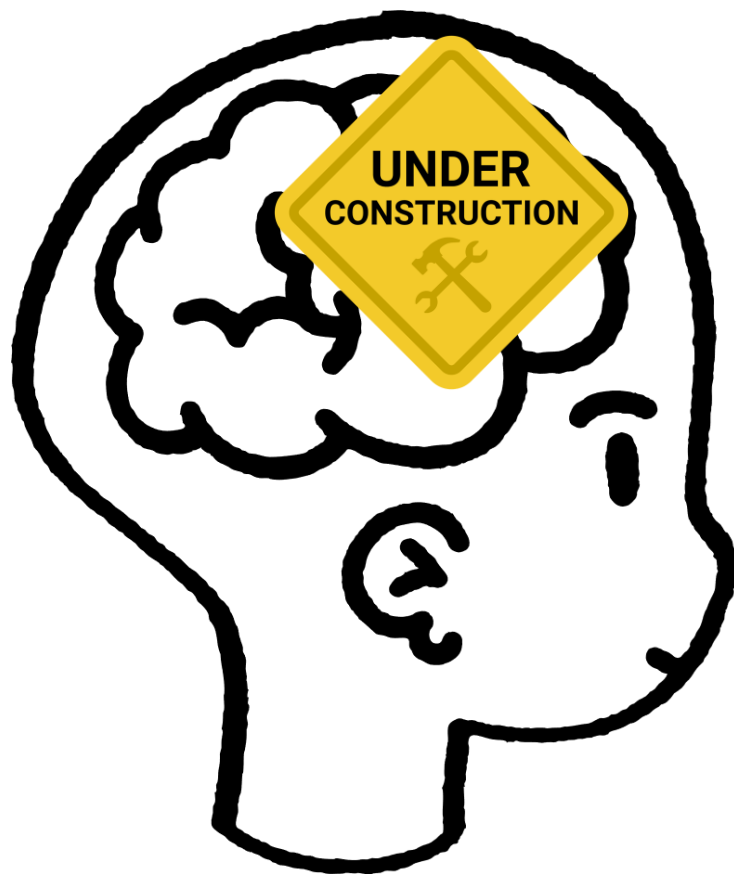
This is essential because attention is
a **limited resource**.

We can't pay attention to
everything, so we have to **block out**
some things to focus on others





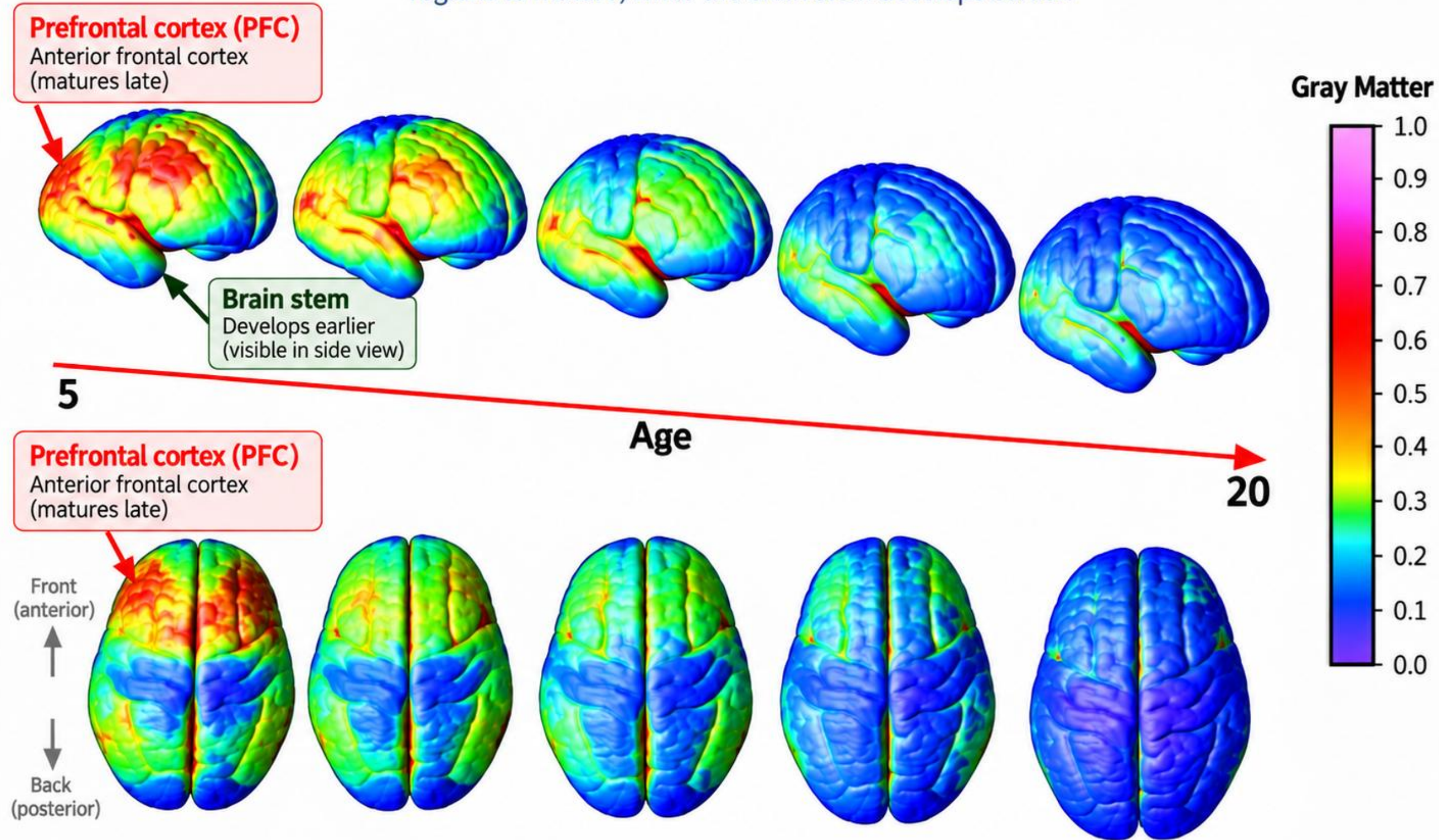
But... the parts of the brain needed for
attention control are some of the
slowest to develop



The brain does not
finish developing
until around 20
years old

Cortical Gray Matter Development from Childhood to Early Adulthood

Gray matter decreases across childhood and adolescence, with the prefrontal cortex (PFC) among the last regions to mature, while the brain stem develops earlier.



Studies have shown that
children find it MUCH harder to
ignore distractions than older
children and adults

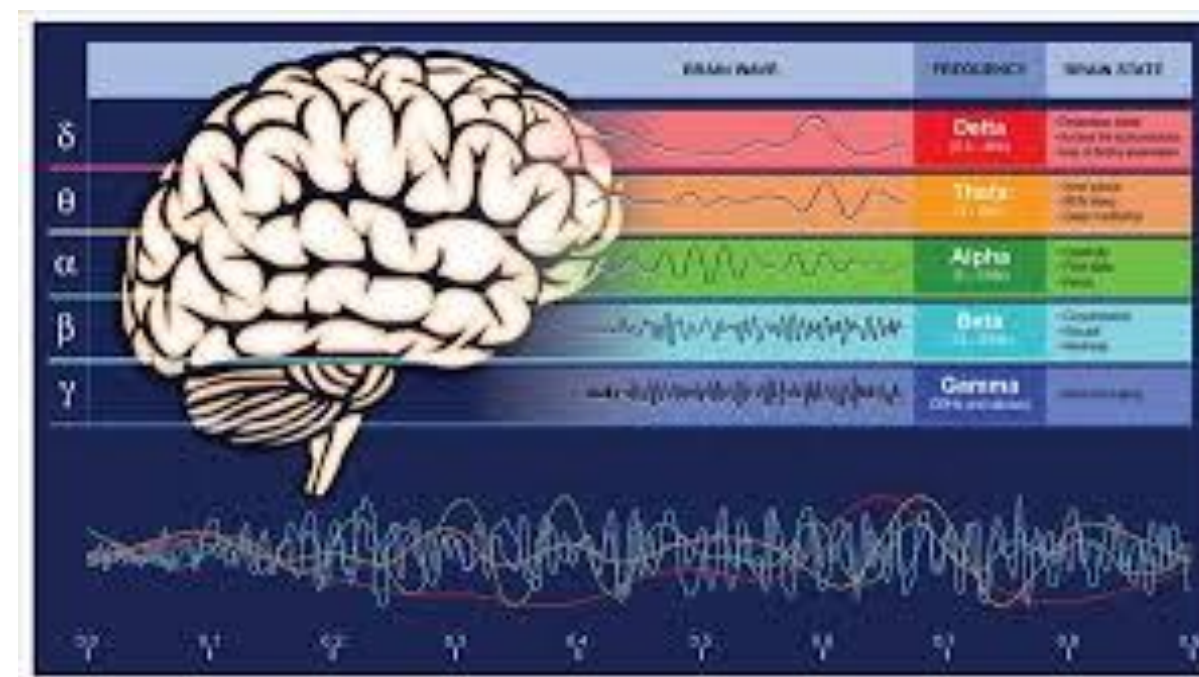


Beeps played during a story registered more strongly on
younger children's brain activity than they did on older
children's

(Stevens et al, 2015)



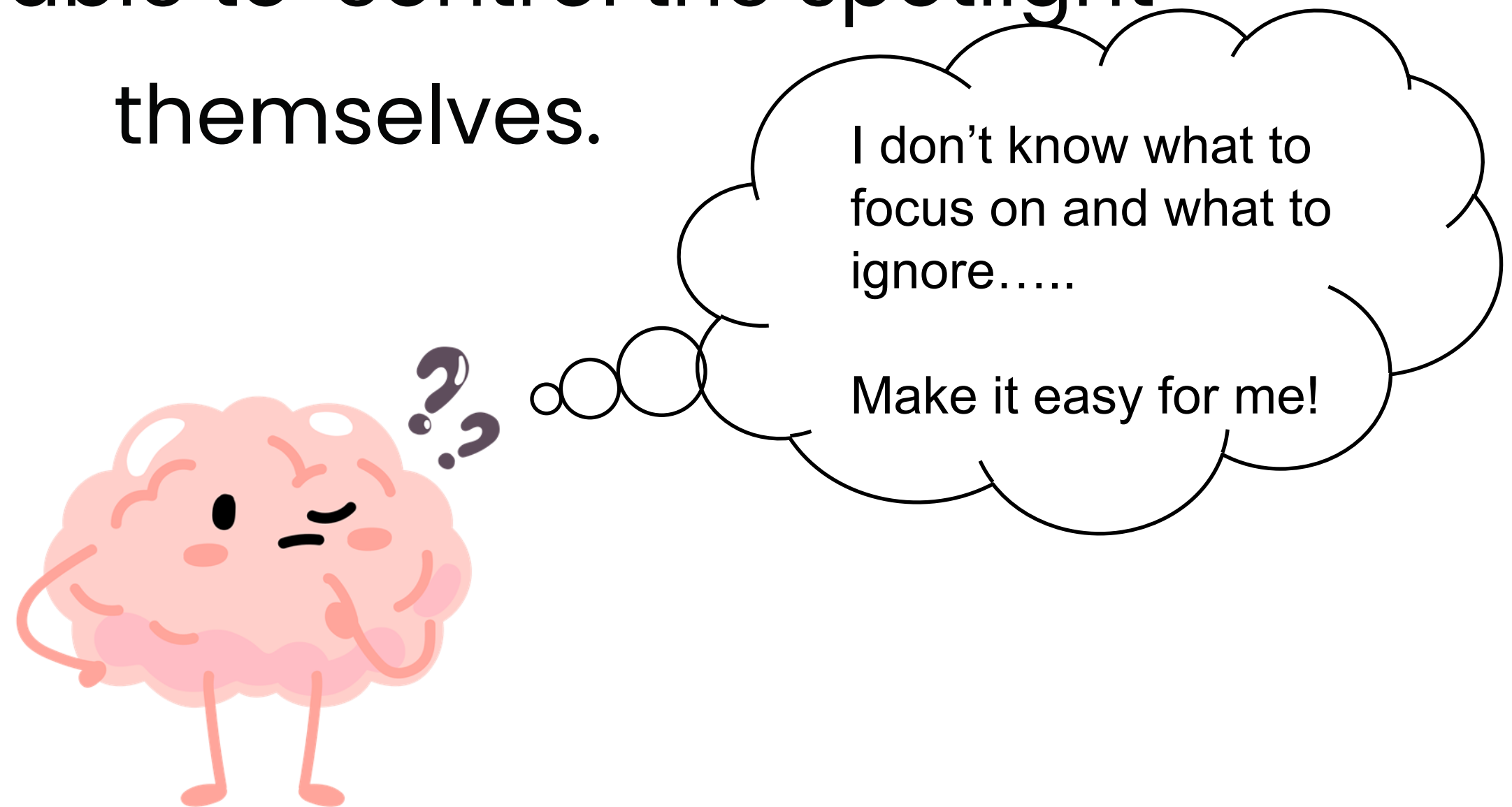
7-12 year old's brain rhythms are more influenced
by speech they're trying to ignore than speech
they are trying to listen to
(Van der Ghinst et al, 2019)





The ability to filter out background
chatter and focus in one voice doesn't
fully develop until children are around
13-14 years old
(Leibold, 2017)

This means that younger children and those with attention struggles often rely on **us** to **guide** their attention, rather than being able to 'control the spotlight' themselves.



Despite this, they are often in very busy, noisy, visually complex learning environments..





Movement

Colour

Light

Proximity



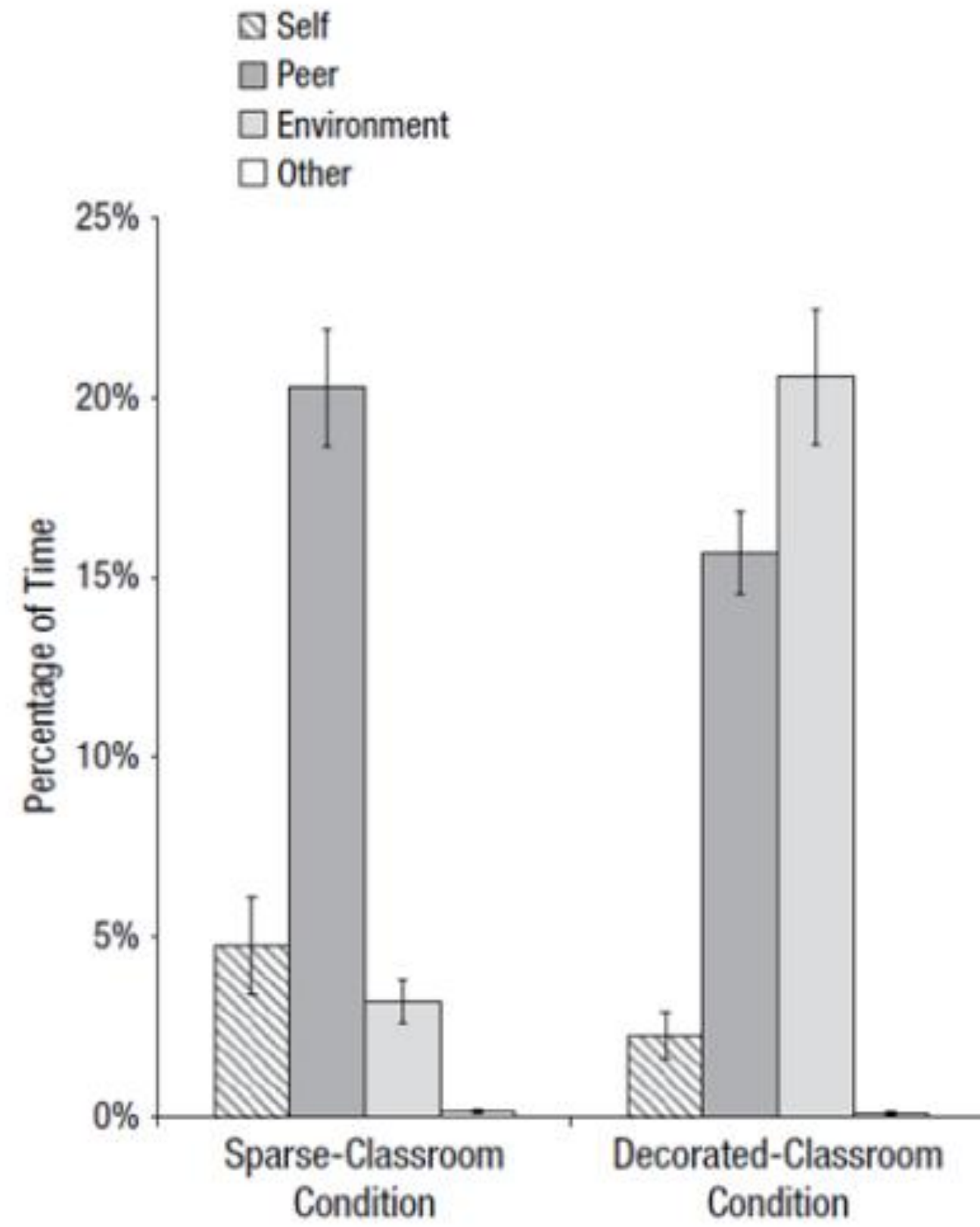
Wall displays have been found to be a distraction for over 85% of children in studies – leading to more time off-task and lower learning outcomes (Fisher et al, 2014)

a

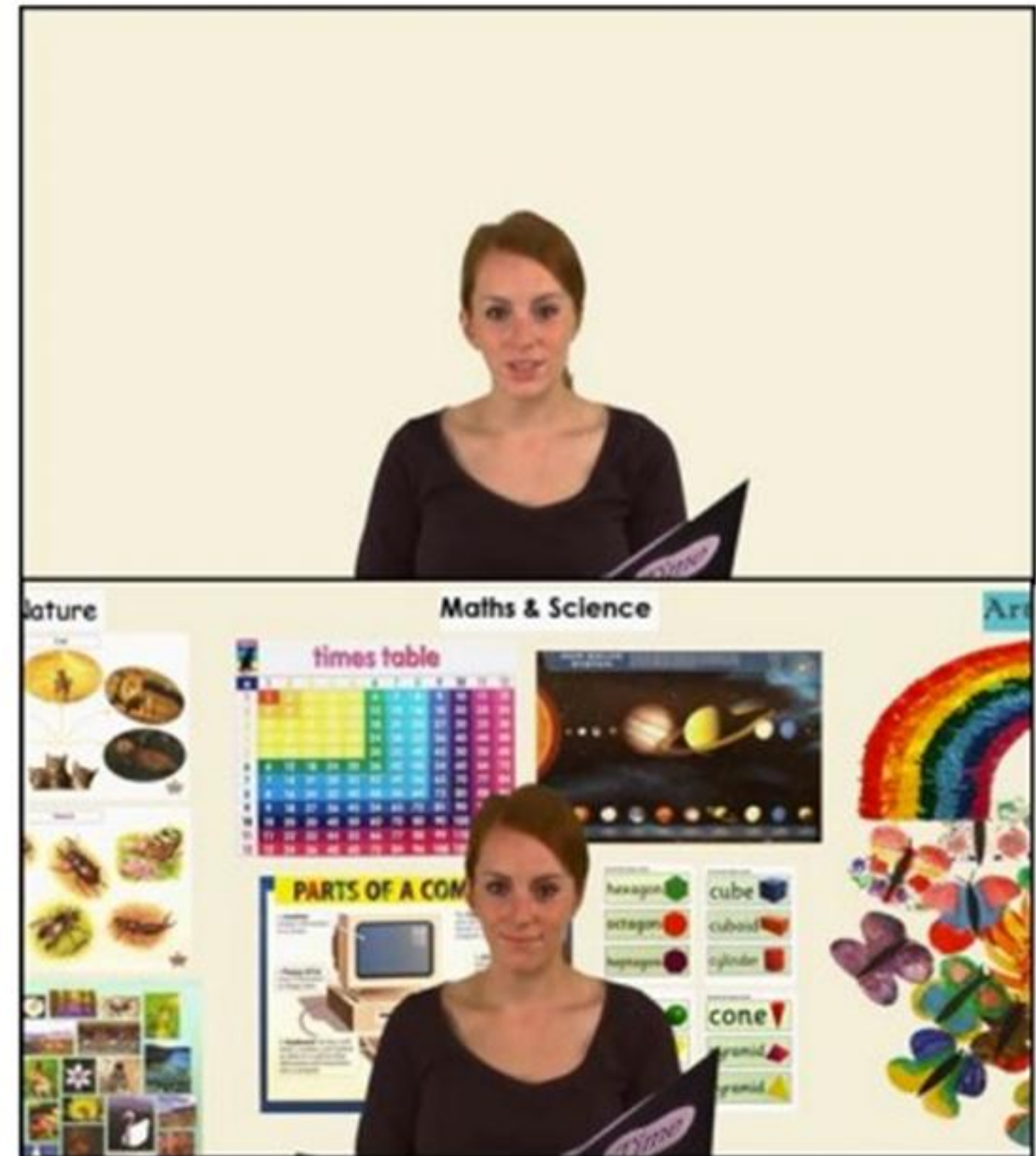


b

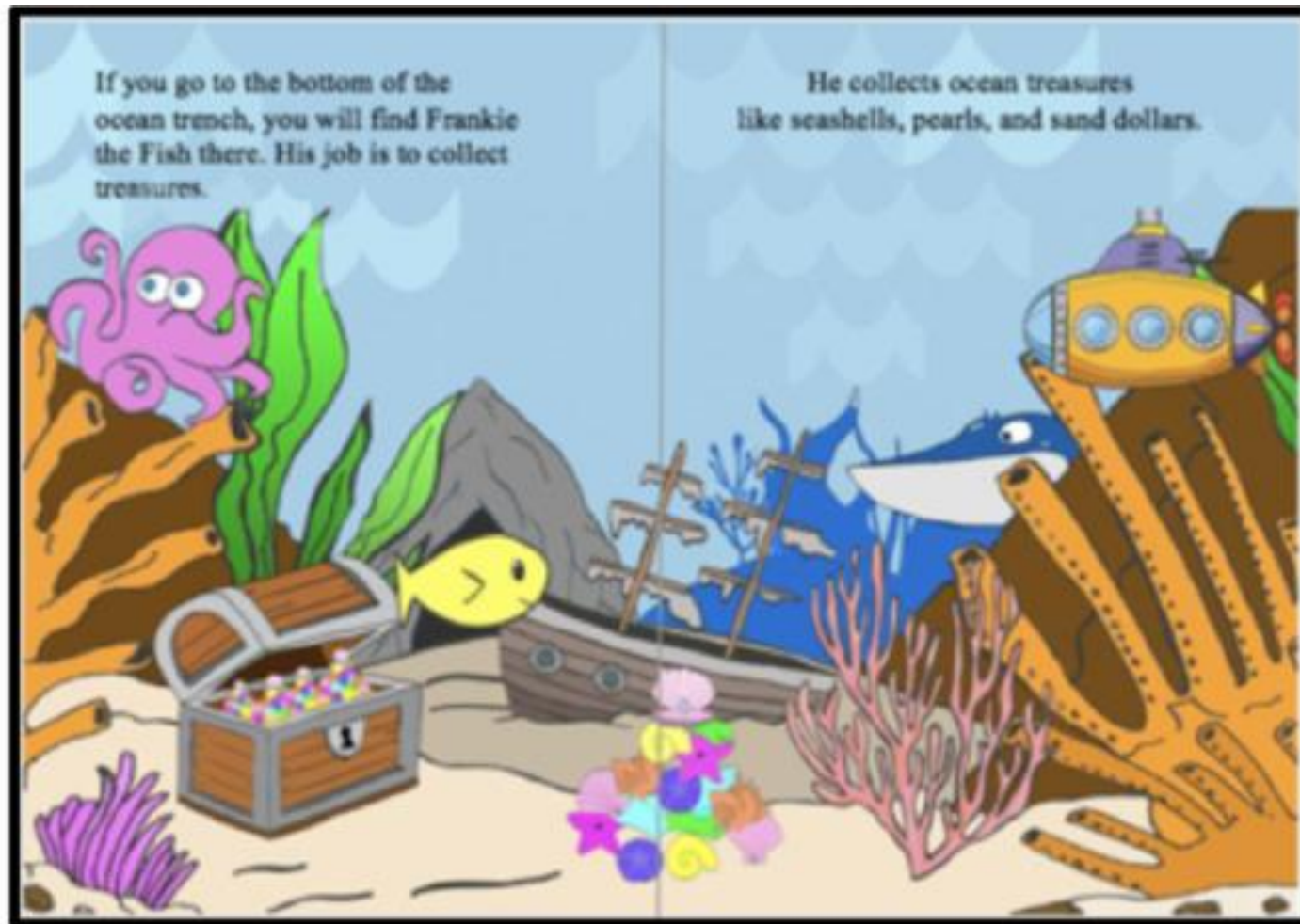




Visual distractions present a bigger
challenge for some learners
(Hanley et al, 2017)

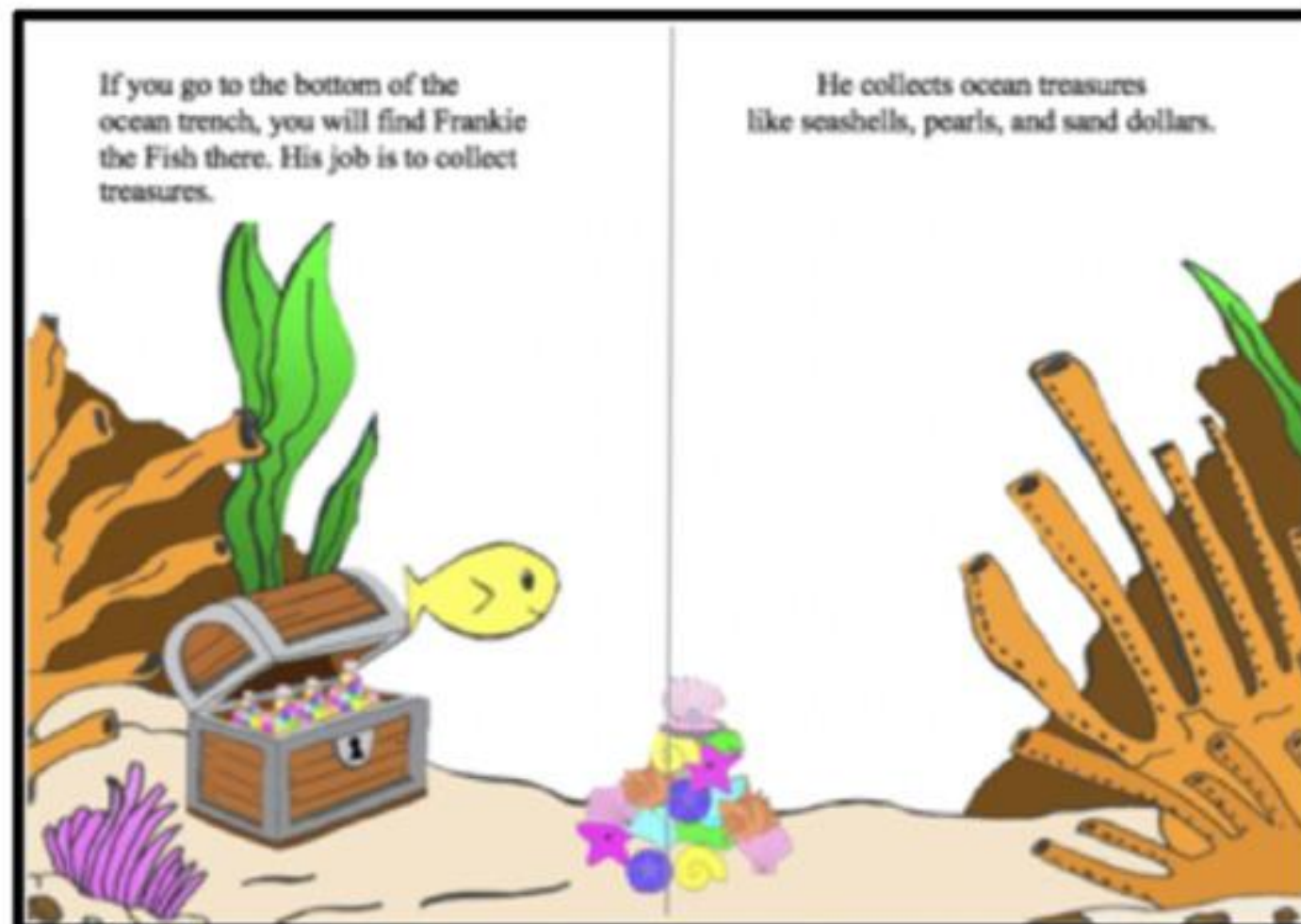


a

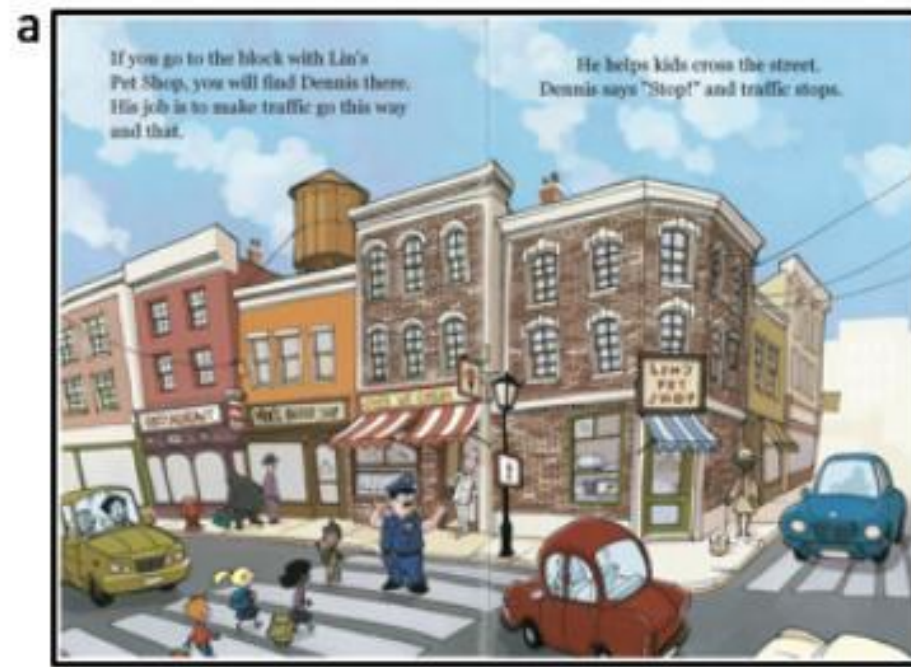


Attention: children made an estimated **16.85 gaze shifts away from the text per page in the Standard condition versus 4.54 in the Streamlined condition**

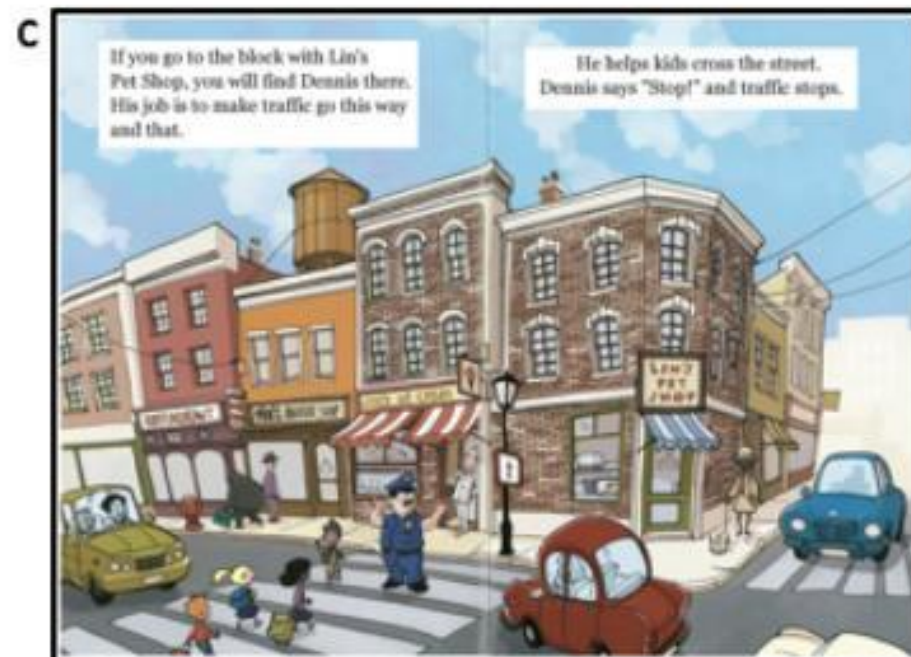
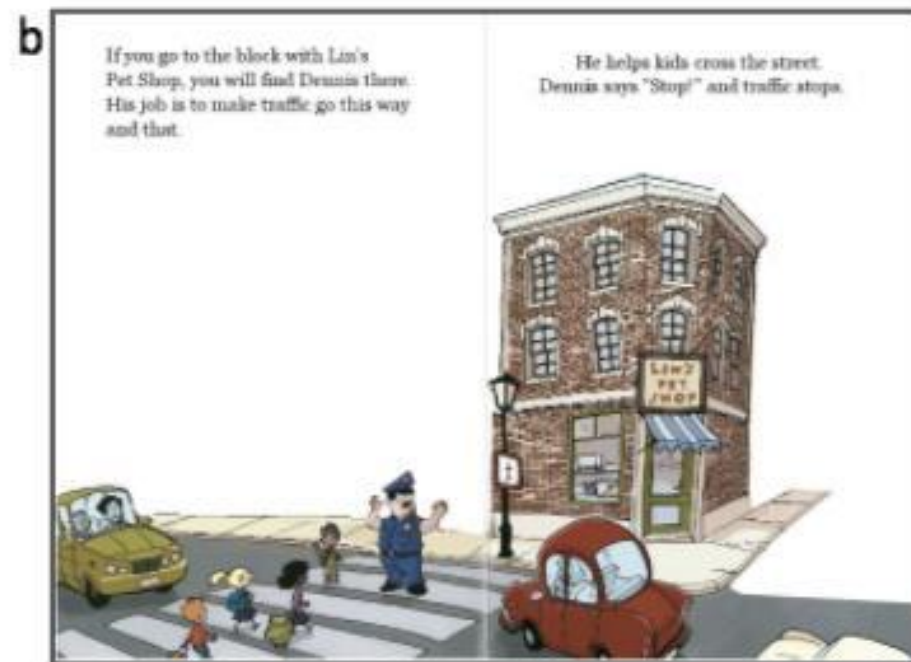
b



Comprehension: Mean comprehension was **46.83% with the standard illustrations versus 79.69% with the streamlined illustrations, a 32.86 percentage-point improvement**



AOI Legend	
	Relevant Illustrations
	Extraneous Illustrations
	Text



Example pages utilized in the study of the

- (a) Standard condition
- (b) Streamlined condition
- (c) Featureless Background condition
- (d) Eye Tracking Areas of Interest (AOIs)

from a book in the "Hooked on Phonics®" curriculum.

"Hooked on Phonics®" is a trademark of Sandviks HOP, Inc.

The optimal amount of visuals supports children's reading

Eng, Godwin & Fisher (2021) | 117 Year 1/2 children | Eye-tracking study

Not too many.
Not too few.
Just right.

Text Only

No illustrations

Sam had a big box.
He put it on the table.
What could be inside?
Sam opened the box.

Comprehension



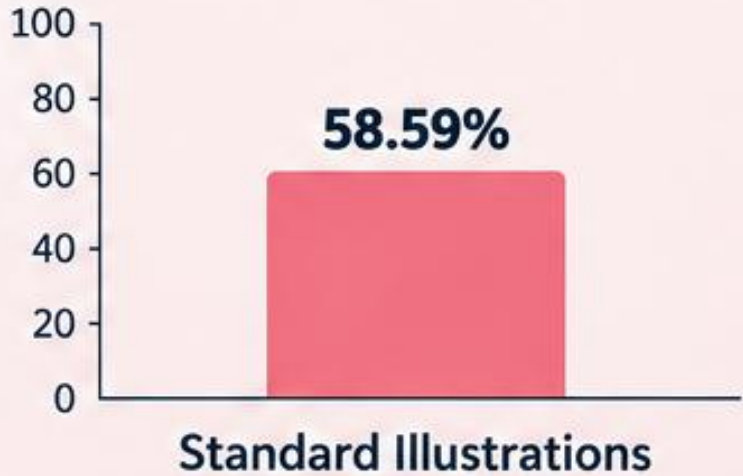
Standard Illustrations

Relevant + extraneous (busy) details



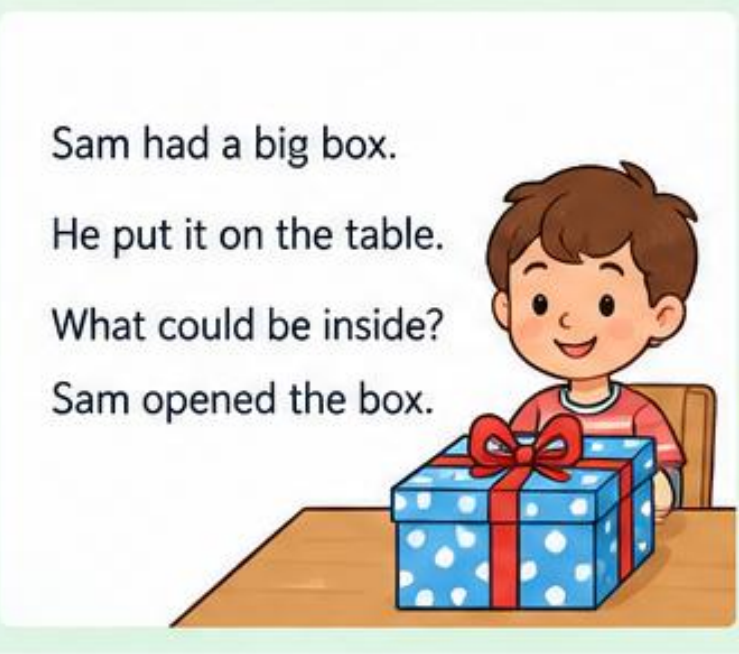
Sam had a big box.
He put it on the table.
What could be inside?
Sam opened the box.

Comprehension



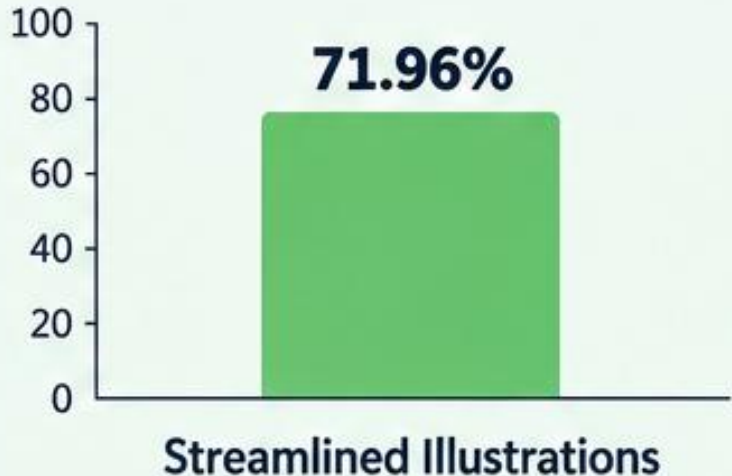
Streamlined Illustrations

Only relevant details



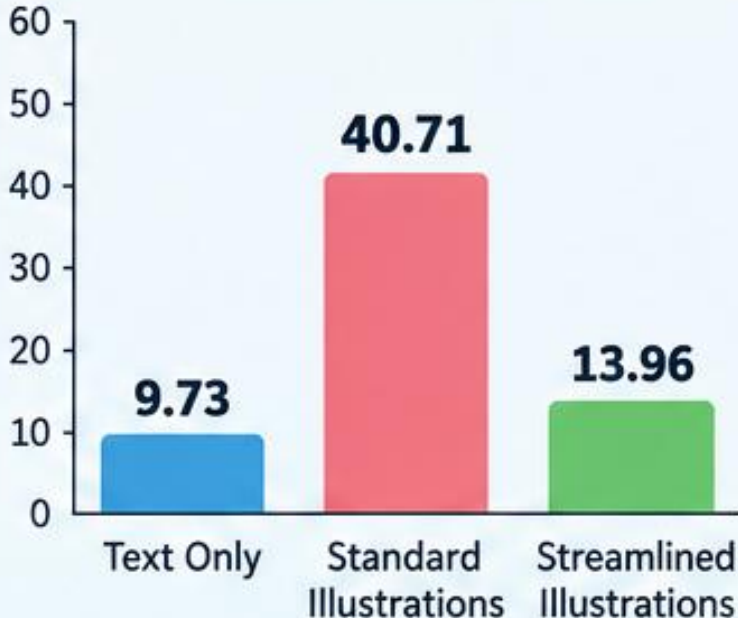
Sam had a big box.
He put it on the table.
What could be inside?
Sam opened the box.

Comprehension



Gaze shifts away from text

Average number per page



Enjoyment (child self-report)

Similar enjoyment for Standard and Streamlined



Standard Illustrations



Streamlined Illustrations

In a nutshell....



Children are excellent at attention capture – they are grabbed by noise, light, colour, movement, and proximity – as well as whatever naturally interests them

BUT

They are not always good at attention control yet.

Importantly...

This is not deliberate or their fault.

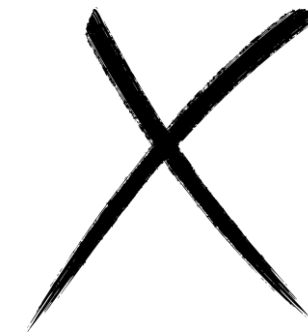
The brain networks responsible for
attention control are still under
construction and not 'fully online' yet

This is why these things
don't tend to work....

Rewards for paying
attention



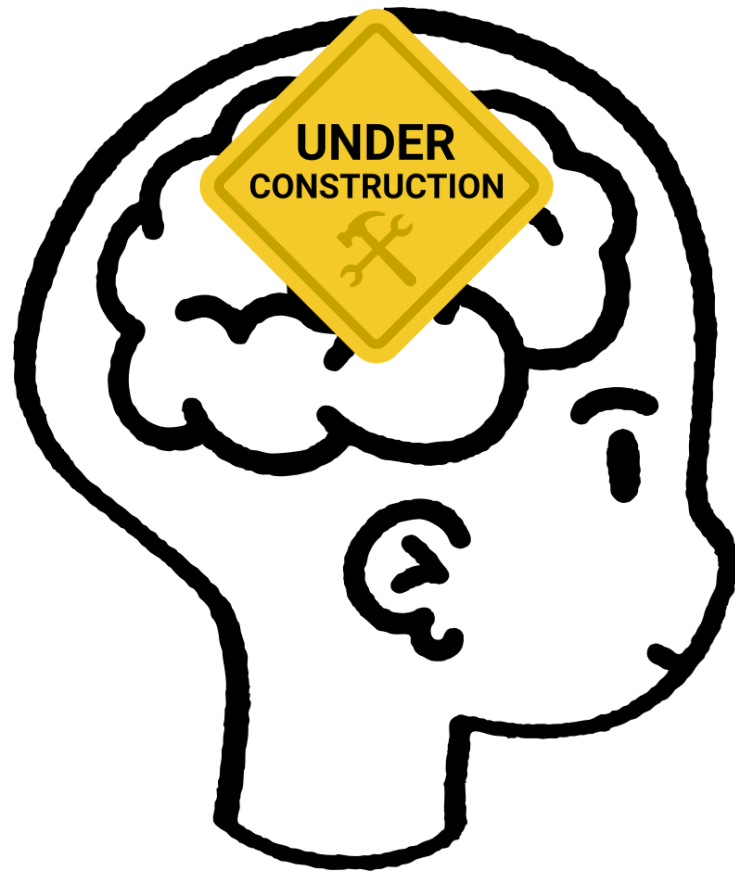
Repeated reminders to
focus



Being told to try harder to
concentrate



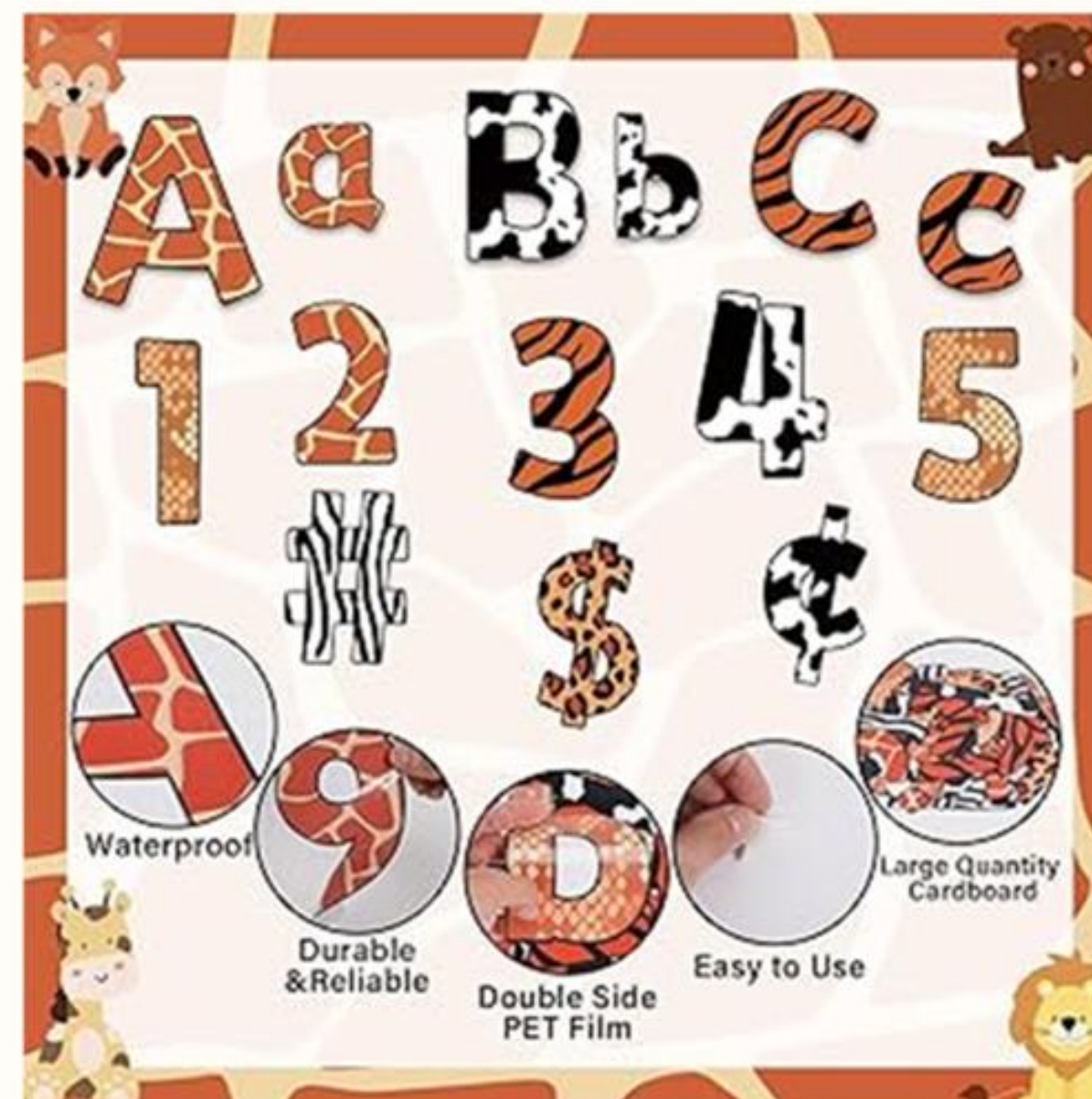
So what can we do
about it?



Make the 'signal' more distinct
from the 'noise'

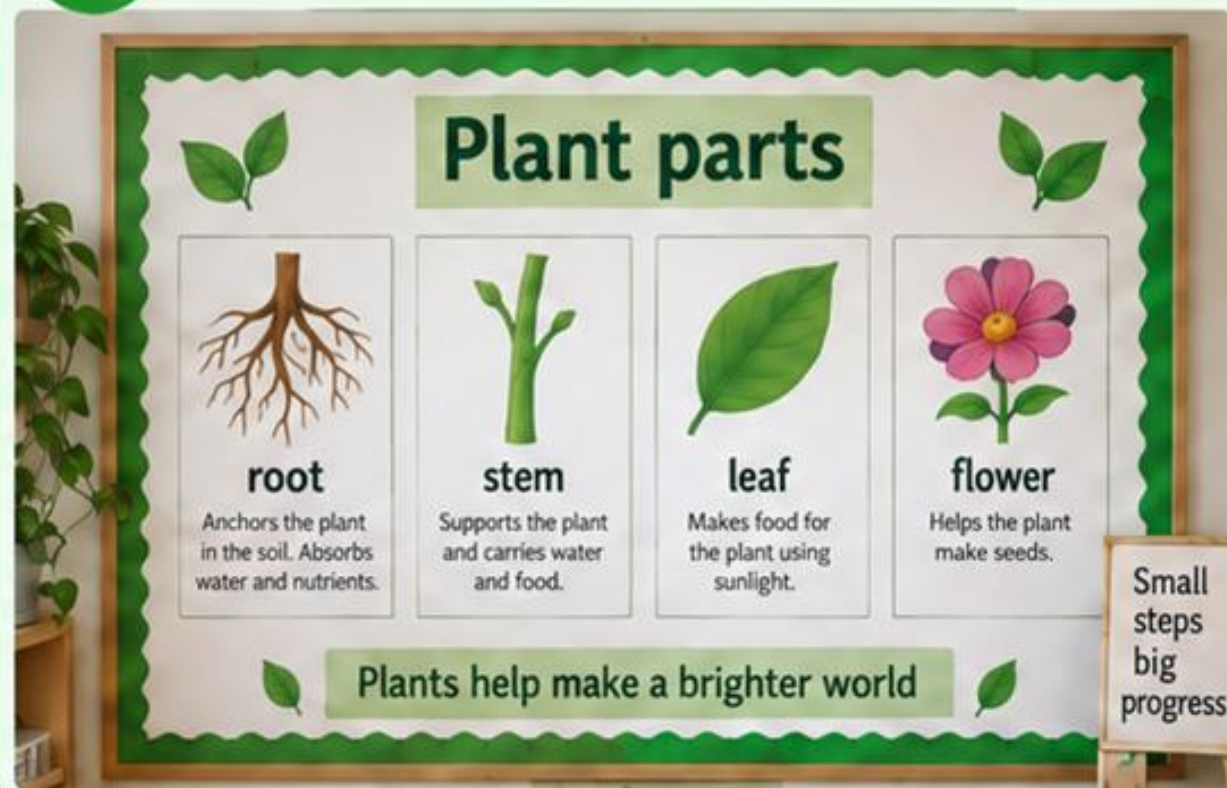


Which features might be 'noisy' for some children?





Clear signal to noise classroom wall display



- ✓ Clear learning focus
- ✓ Relevant visuals only
- ✓ Low visual clutter



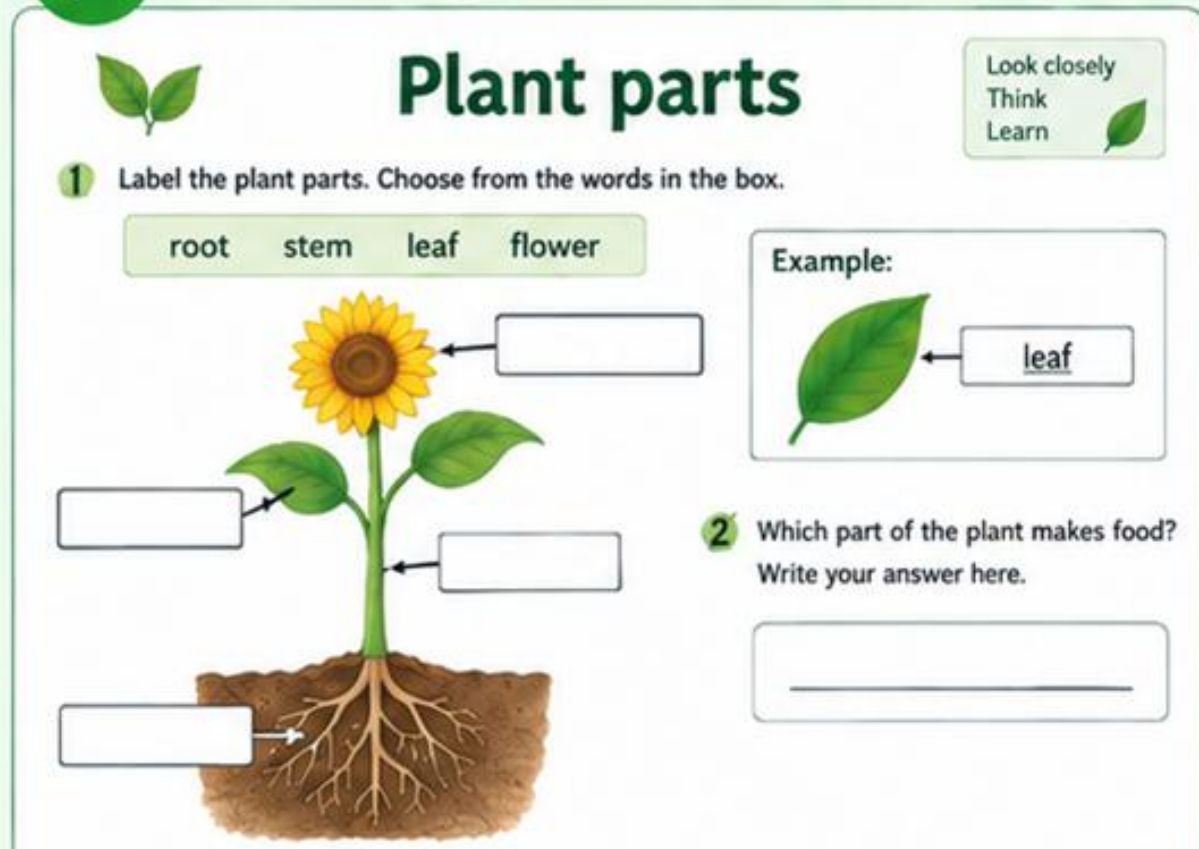
Poor signal to noise classroom wall display



- ✗ Too many competing elements
- ✗ Irrelevant decoration
- ✗ Learning focus unclear



Clear signal to noise worksheet



- ✓ Clear instruction
- ✓ Simple layout
- ✓ Easy to see what to do



Poor signal to noise worksheet

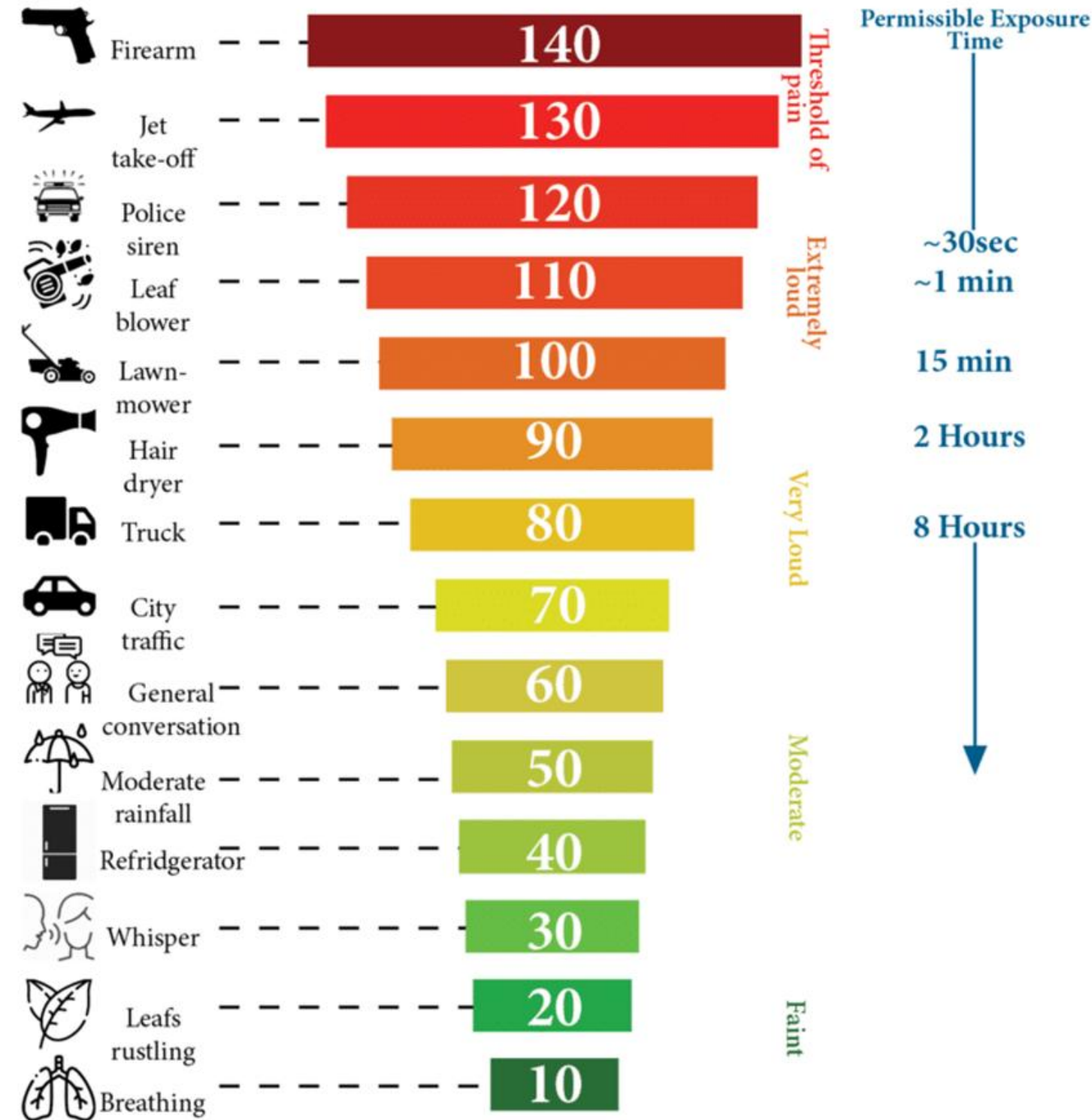


- ✗ Crowded page
- ✗ Too much going on
- ✗ Hard to see the task

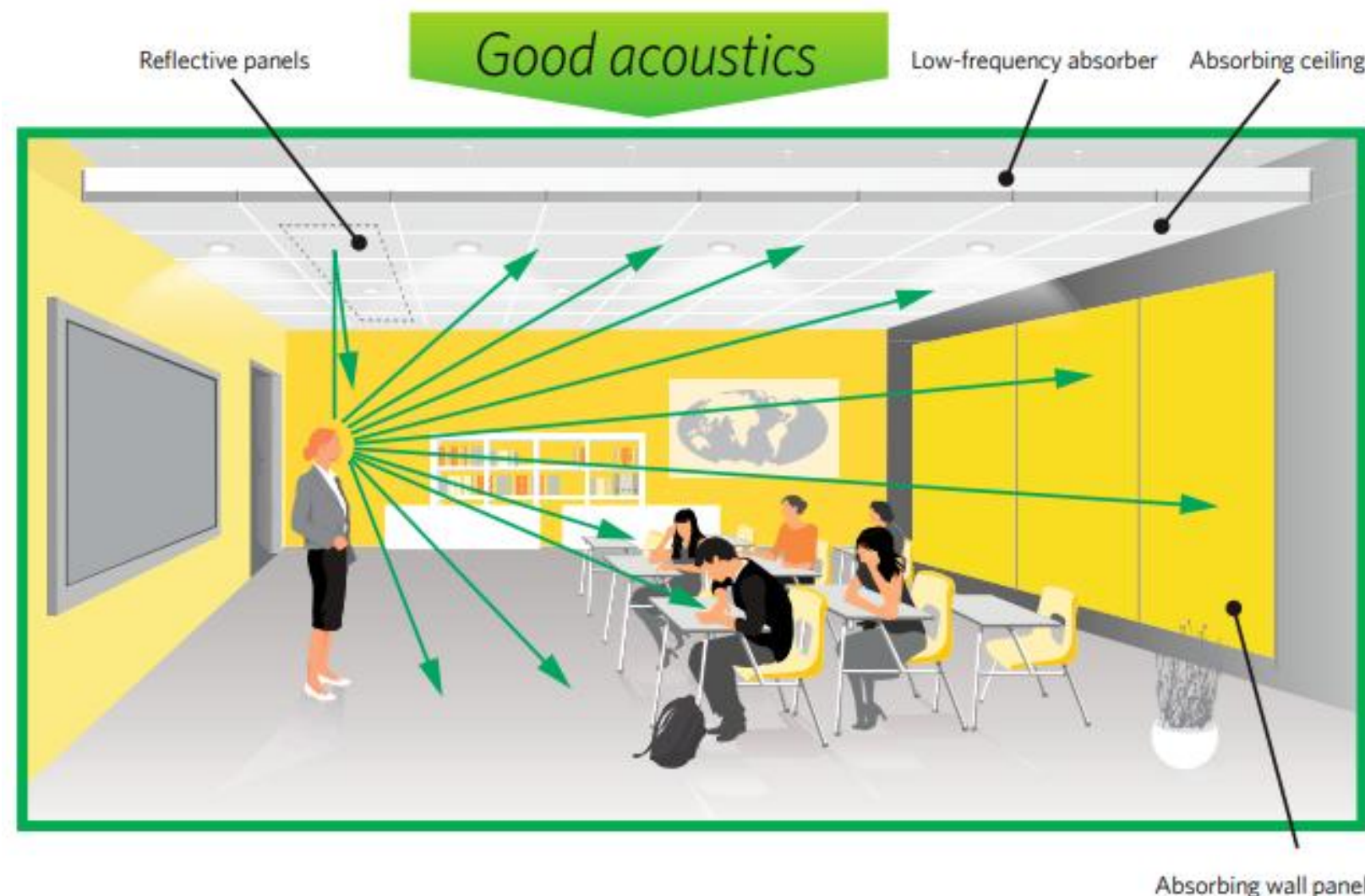
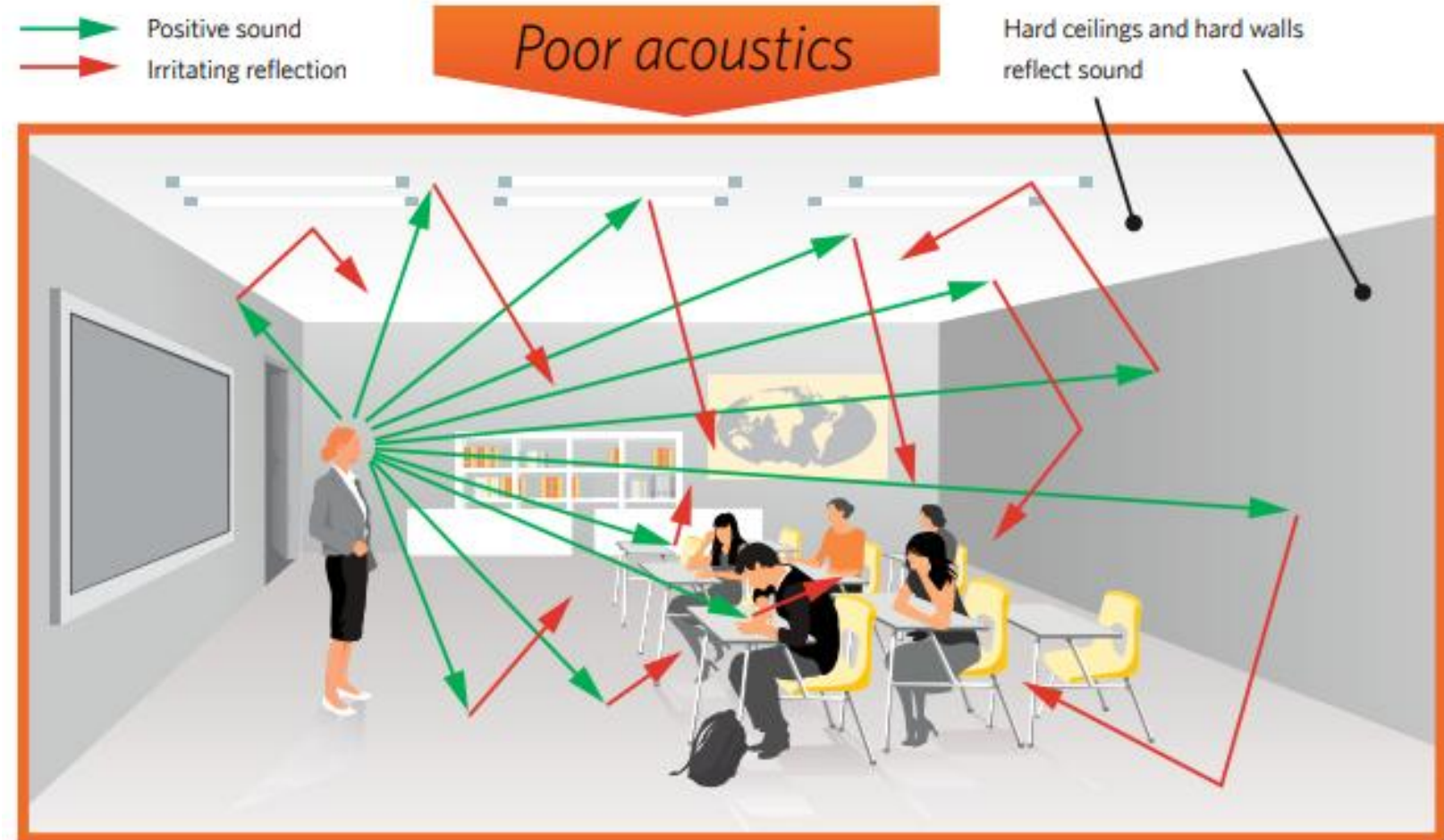


Noise levels of common sounds

Any sound above 85 dB can lead to hearing loss, though it depends on how long and how often a person is exposed



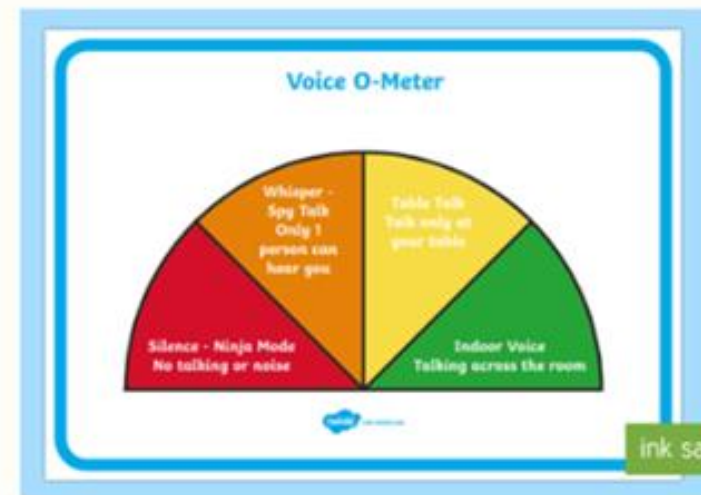
Salem Audiology Clinic



Reducing
reverberation



Reducing
excess noise



Help communication in noisy environments

Small changes.
Big difference.



Increasing clarity



Showing whole face



Only part of the face visible



Whole face visible



Proximity



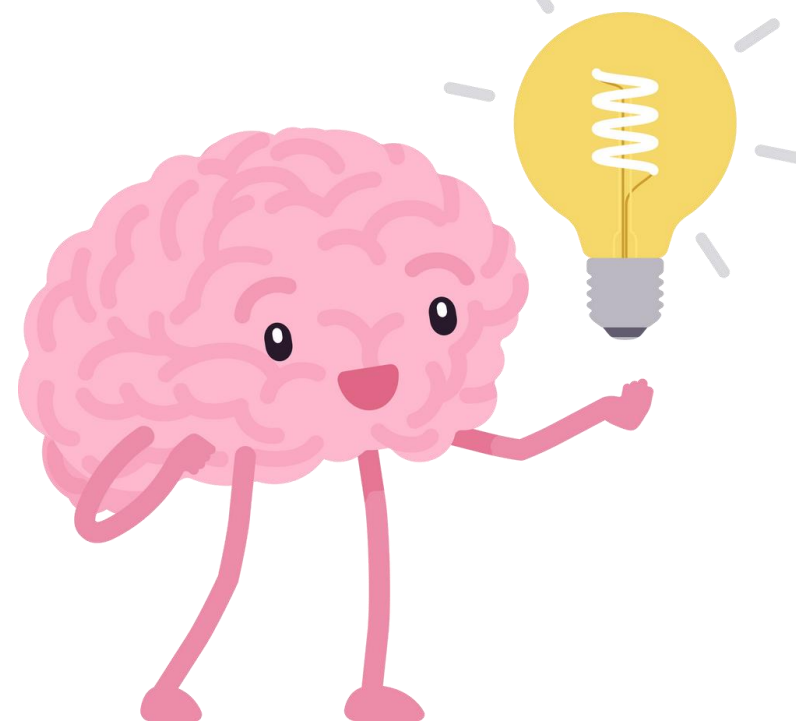
Visual clues

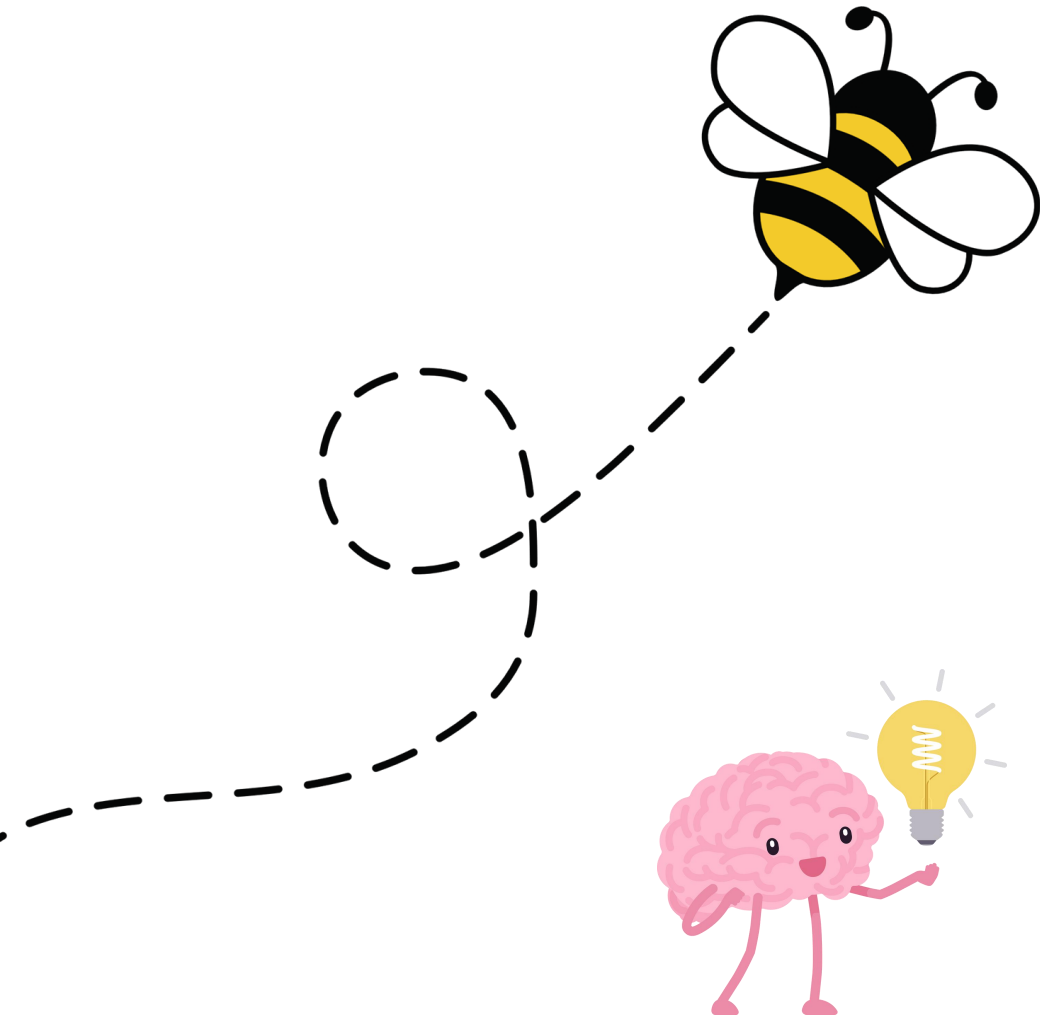


Today's Steps:

- ① Read
- ② Discuss
- ③ Write
- ④ Share

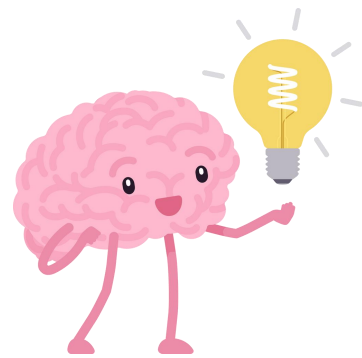
What else do we know about
children's brains, which can
help us design tasks and
strategies which support their
attention?





2 key strategies:

Predictability



Repetition



Predictability

Our brains are prediction machines –
we predict what will happen next,
test to see if we were right, and make
adjustments for next time if we
weren't.



Even right now, you are predicting
what I am going to...

It's easier to pay attention to
something we are expecting.

So predictability, helps children pay
attention.

If the brain knows what to look out for, it can direct
attention more easily by making predictions and
'latching on' to the right information.

For example....

How many words on the last slide began
with the letter 't'?



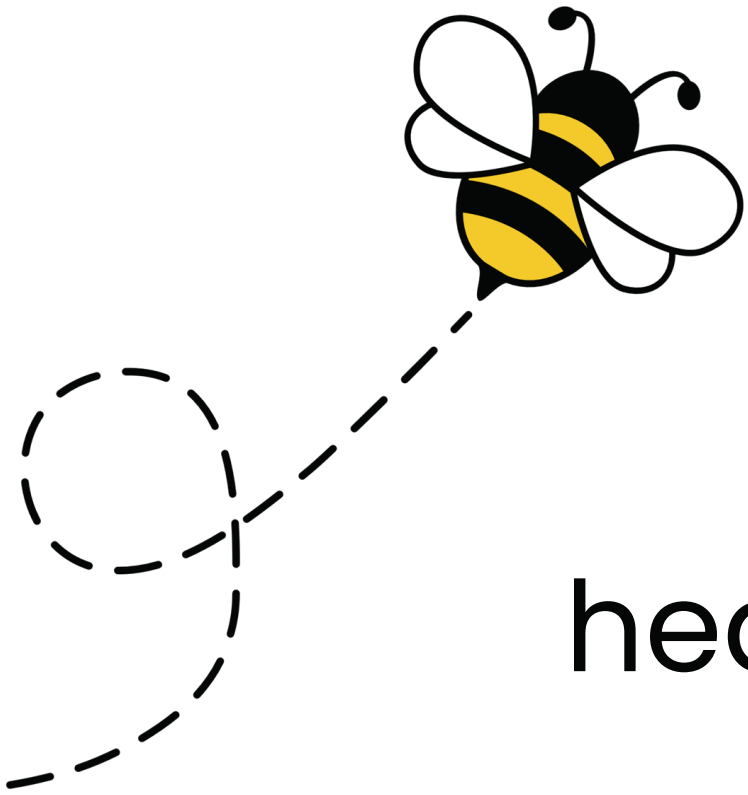
Weren't you paying
attention???

Pre-warning children about what to look out for, helps with focus and attention e.g.

‘When I read this, listen out for any words that start with the sound ‘t’....’

‘I’m going to give you an important instruction...’

‘We’re going to learn a new method of division today...’



Guessing the answer to a question before
hearing the right one, improves attention to the
answer when it arrives

and

When we ask a question, we pay better attention
to the answer than if we are just told a fact

This is because in both cases, our brain is
predicting the answer.

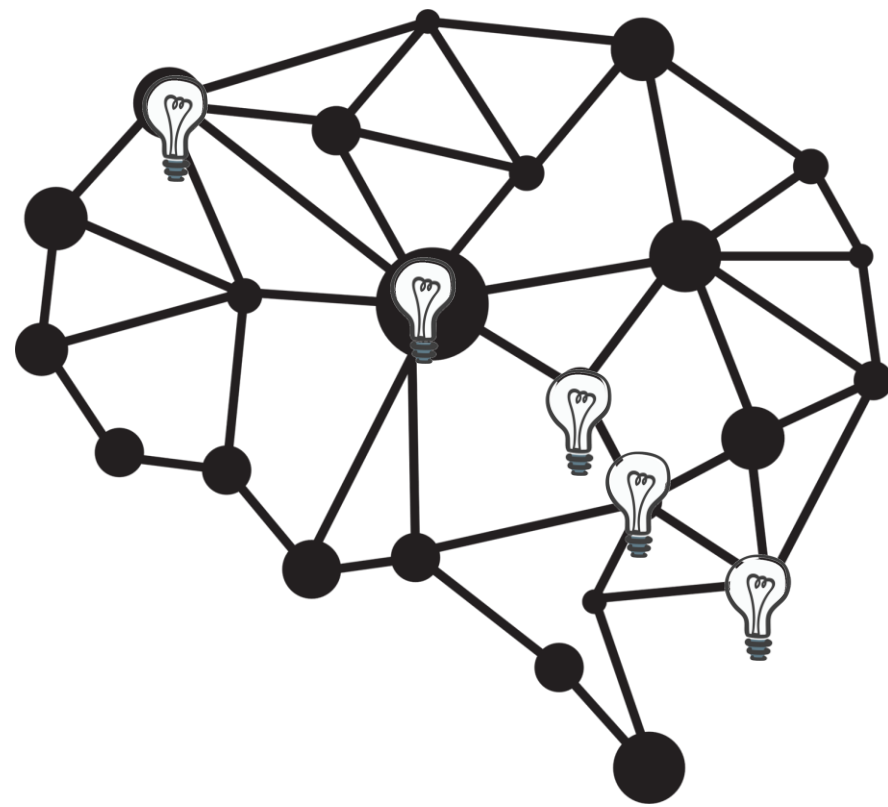
A large, irregular, yellow shape with a soft, organic border, resembling a watercolor splash or a cloud. It is centered horizontally and vertically on the page.

Repetition

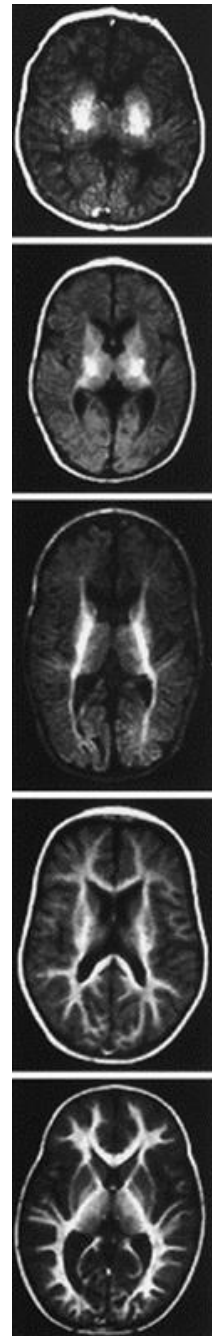
Scientifically, 'learning' is a process of working out which neurons need to respond to a task

The more a pathway is activated, the stronger it becomes. Over time, the pathway becomes a

'super highway'



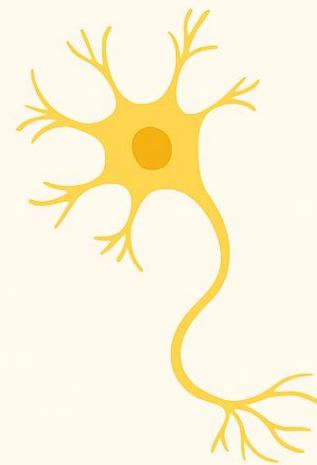
These super highways are so strong and efficient, the task starts to feel effortless (this is when we have built ‘white matter’)



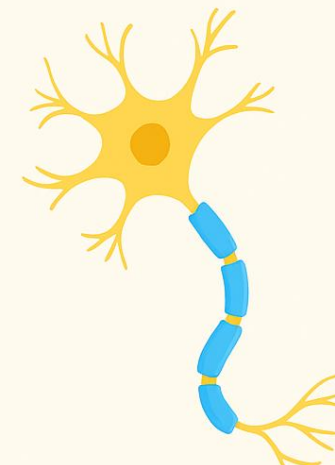
Birth

12 months old

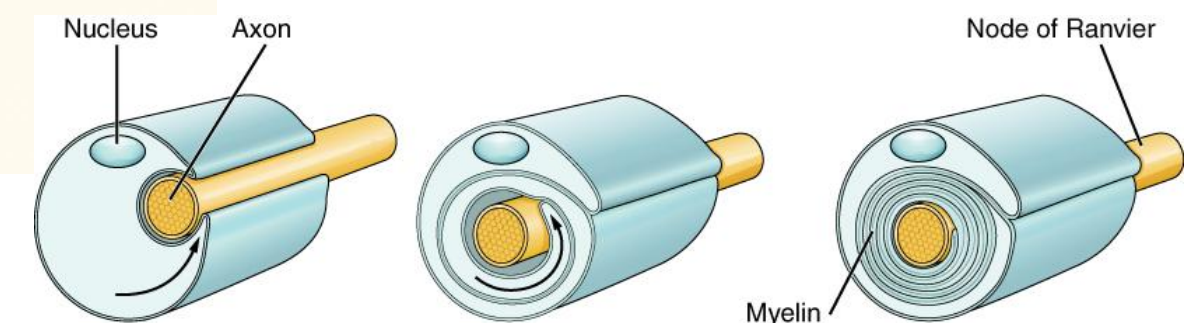
Unmyelinated vs. Myelinated Nerve Axons



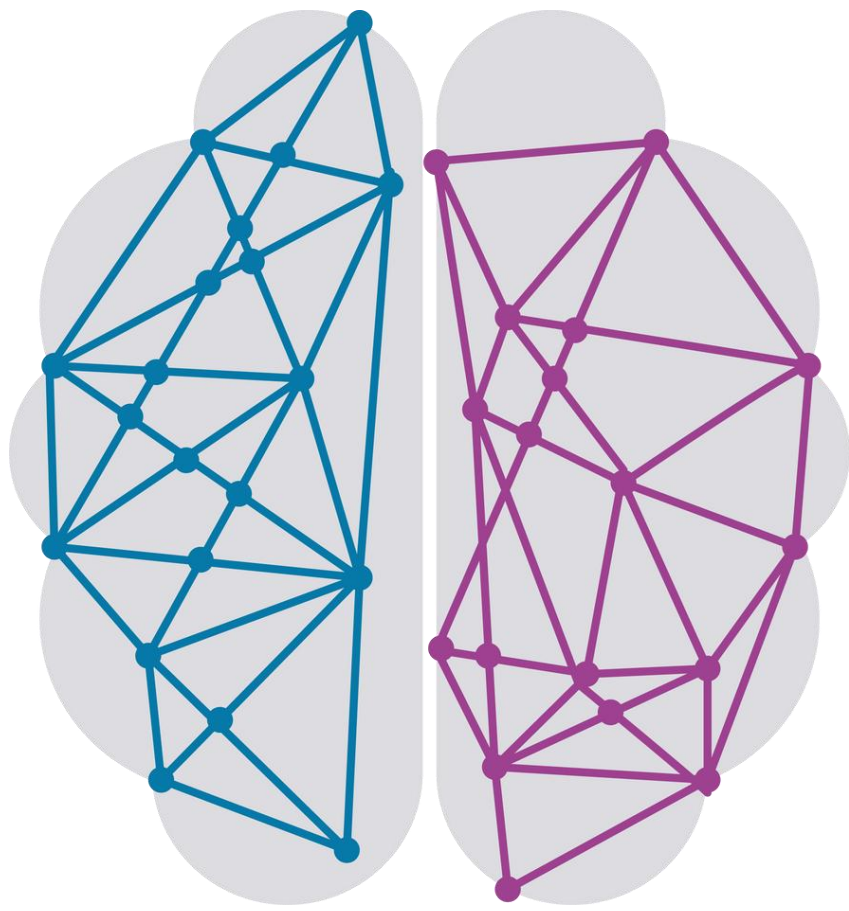
Unmyelinated Nerve Axon



Myelinated Nerve Axon

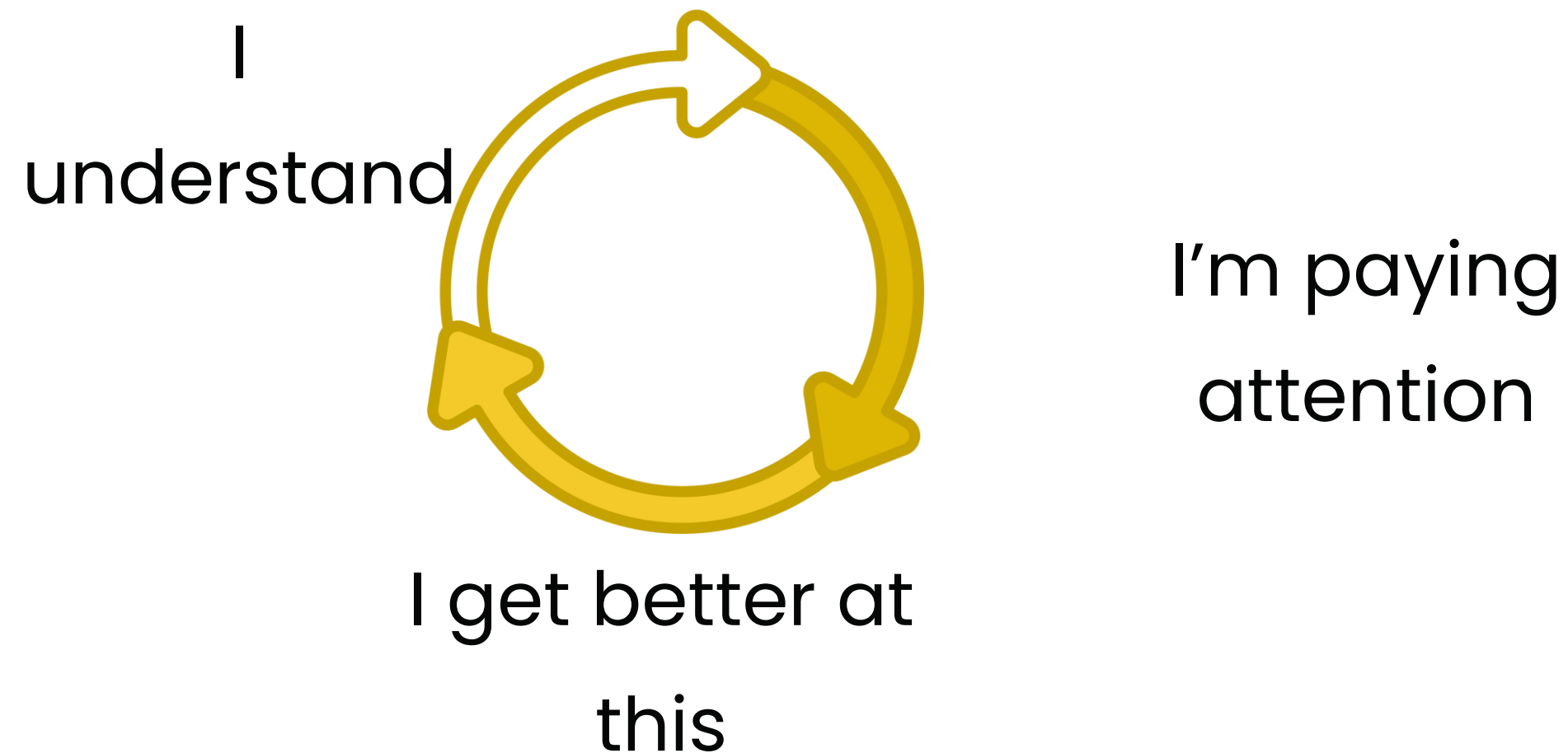


Repeated experiences help children to build white matter (strong and stable pathways in the brain that work efficiently)

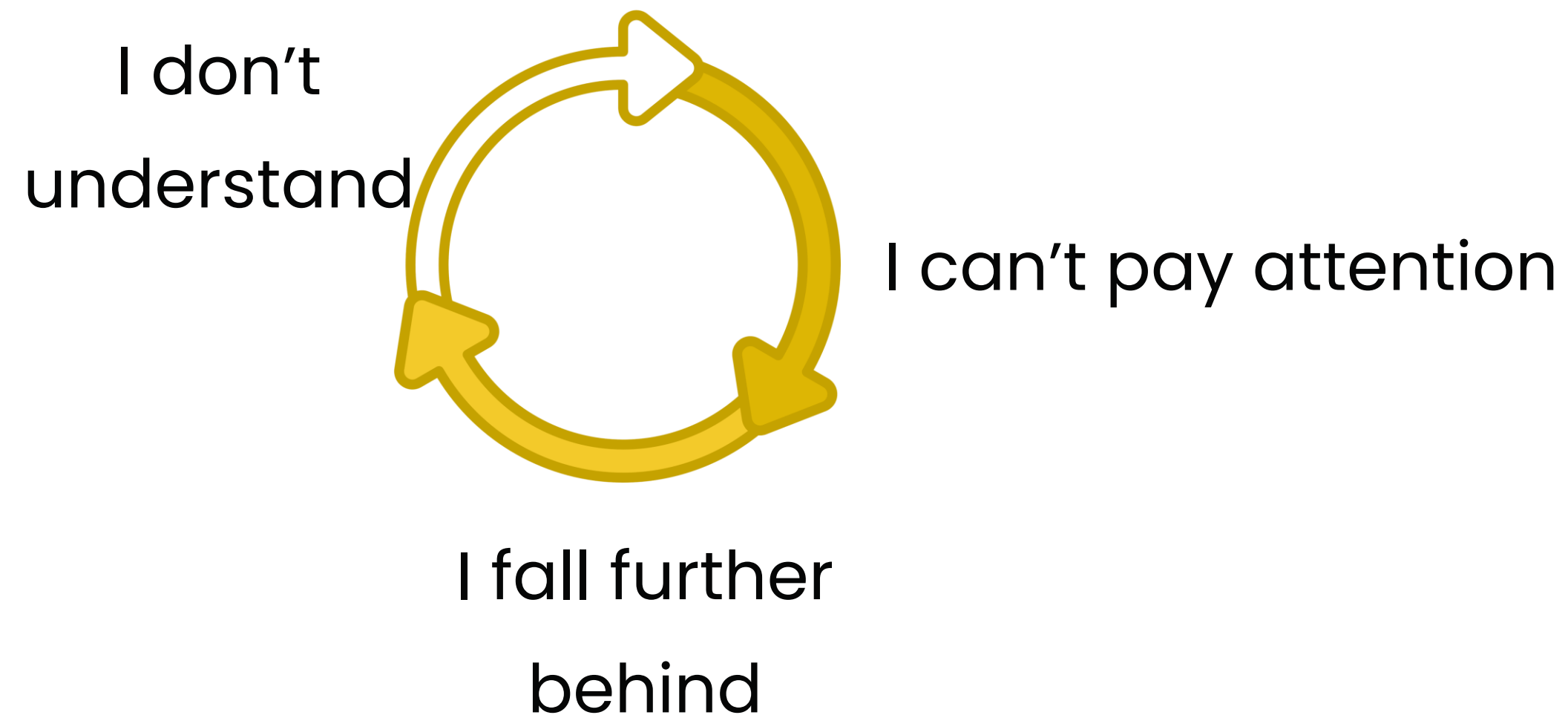


Repeating the same activities enables children to
'take in more' each time and build understanding.

Things we understand well, are easier to pay
attention to



What looks like an attention problem can often be a problem with understanding, which then creates a vicious circle:



In these situations:

Reduce the difficulty of the content

or

Provide more scaffolding and support

or

Slow down the pace

Then gradually increase difficulty/pace/remove
scaffolding once attention has improved



Younger children cannot focus for as long as older children.

Start small and build up gradually.

Praise what children can do instead of getting frustrated by what they can't.

“Needs to avoid distractions and take more care”

“Needs to avoid distractions and take more care”

“Reducing the number of questions to complete has helped Anaya stay more focused and complete her work to a higher standard. We will be gradually increasing this next year to build stamina.”

“Struggles with focus in lessons and frequently needs to be corrected for not engaging”

“Struggles with focus in lessons and frequently needs to be corrected for not engaging”

“Movement breaks and streamlining the classroom environment have worked really well to support Ben’s focus this term. A next step is to begin identifying for himself, when he’s struggling with focus.”

“Must work on maintaining focus”

“Must work on maintaining focus”

“We’ve noticed that Kyle is really focused and engaged during outdoor learning and we are supporting him to bring this focus to indoor sessions by offering more practical, hands on tasks.”

Summary

- Children's brains are different to adults
- Attention control is hard! It will improve with age
- Factors affecting attention include those related to the environment, the child and the task

Summary

- Try to make the 'signal' distinct from the noise
- Predictability helps – get children to ask questions and predict answers. Warn them of what's coming up next.
- Repetition helps – resist moving on too quickly, support understanding to build attention.

Thank you for listening



INSTITUTE FOR THE SCIENCE
OF EARLY YEARS & YOUTH

Stay in touch:

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 @isey_uel

 ISEY – Institute for the Science of Early Years

 Gemma's Instagram about outdoor learning: @phd_and_three

 g.goldenberg@uel.ac.uk