

**“Everyone is a genius. But if you judge a fish on its ability to climb a tree, it will live its whole life believing that it is stupid.”**

*Albert Einstein*



# Overview

## Some lucky individuals are all-round learners

- Some have preferences towards :
  - i) looking either for the detail or the “big picture” that helps them build up their understanding
  - 2) Representing that information in either words or images
  - So those two dimensions bias their learning
- Some actually have a block in one or more of those preferences that push them to learning difficulties if not helped

# New born knows very little senses fuzzy

- Except sound of mothers voice...
- Which it gradually matches to the sight of her
- Aided by her smell
- The perception of the sights, sounds, smells and movements the baby needs to develop are harnessed by attention, auditory and visual
- Attention that has meaning – mother that stops the discomfort, the hunger, cold or stuck in safety pin. As attention develops cortical myelination is increased.
- This forges the motorway for neural activation

# Aided by genetic proclivities

- To develop in normal sequence the verbal, visual and movements to
- learn the sounds of the language they are going to speak
- the emotional expression face conveys
- The crawling and walking ...
- So that learning mechanisms are all primed by nursery and refined at school to develop child's cognitive potential

# Developmental Issues

Unless there is a hurdle especially at sensitive period

- Birth trauma
- Early ear infections
- Eye problems, astigmatism
- Motor problems – immobilisation, play pens
- By school direct instruction is necessary for the child to acquire the information they need to become a fully participating citizen who can communicate, read & write, calculate, establish friends and family and career

# Non scientific survey

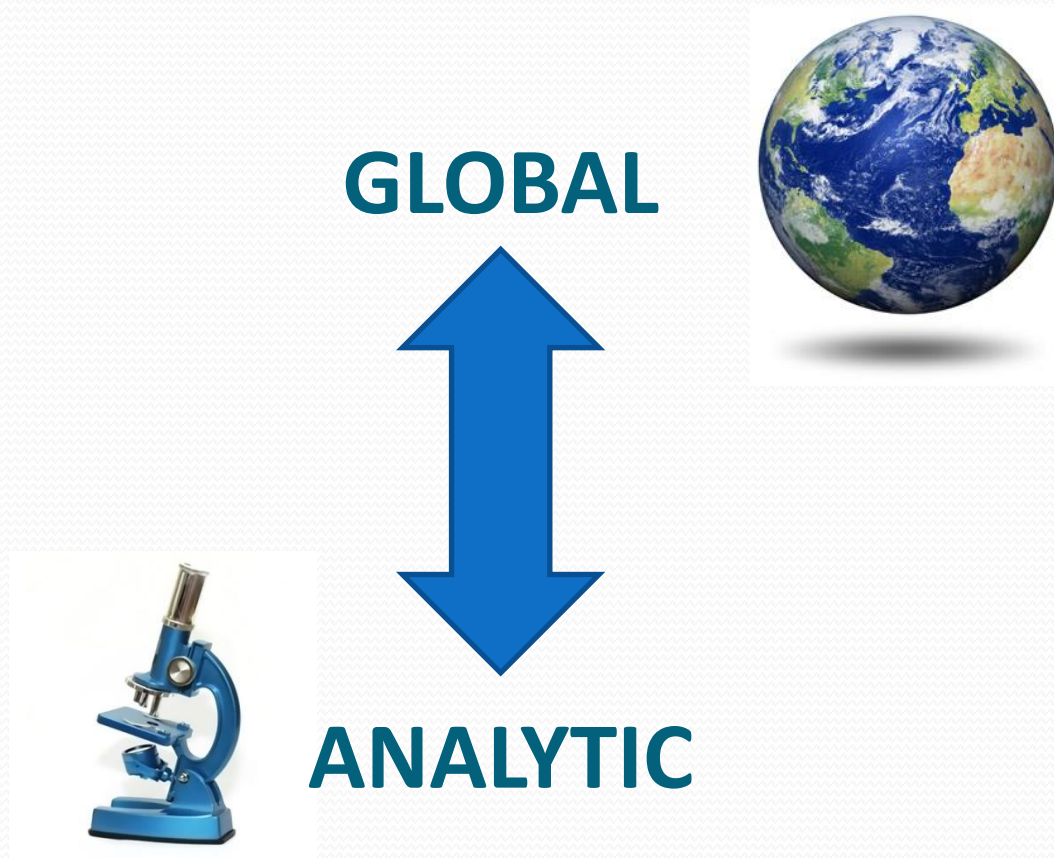
- 30% develop normally and will reach their potential
- 30% also will with the right school and family back-up
- 30% will have a strength that compensates for their weakness, which a good teacher can identify, still all normal variants, “shadow syndromes”
- But of that 30% a lack of understanding means they will be defined by the weakness, and never get the chance at school anyway to develop their strength.
- Today is about them and all of us who have a
- learning imbalance



# Cerebrodiversity

- We all have to process information from the senses and make sense of it, think about it, remember it and solve problems – i.e. how we process and organise it
- There is a progression from parts to whole from the bottom-up to top-down (Wood for trees vs. trees for wood)
- Genetics, attention and experience can bias neural pathways to the bottom-up more of information processing or the top-down

# Executive Function style





# Global Style

- See all aspects of the situation – but more top-down
- Organises the information into loosely clustered wholes – tries to form an overall integrated model of the information, the big picture
- Condenses information – can oversimplify/over generalise to assimilate new learning with stored precepts/memories
- Tendency to gloss over inconsistencies, details
- Visionary gurus, artists, designers, choreographer, PR consultant. Pilot, Captain, CEO

# Analytical Style

- logical, linear
- Likes to build up concepts from initial details , excellent discrimination, sees contrasts, parts of things, concentrates on aberrations, can't see wood for trees
- Step by step bottom-up thinker, will perceive new learning/events as separate from already stored information so doesn't attempt to make links to other concepts – don't go beyond the information given but good at preserving info
- Computer programmers, accountants, mathematicians, fine art –

# Executive Functioning

- Executive Function is the “umbrella term” for various activities mediated by the frontal lobes refers to the coordination and control of motor and cognitive actions to attain specific goals. Together with the basal ganglia, the prefrontal areas of the brain perform executive functions associated with 1) activating the child to start a task 2) sustain their attention on a particular task 3) allow them to screen out irrelevant stimuli and 4) terminate the task when complete. Impairment in any one (or more) of these can diagnose an executive functioning deficit.



# Executive Dysfunction

- describes disorders of planning, organization, problem solving, setting priorities and maintaining attention, and is one of the major areas of cognitive deficit that can impede learning and getting on in life.
- So ability to change plans midway through a task when necessary, ability to judge time, ability to plan a sequence of events and practical task are all compromised to a greater or lesser extent. So also is learning from an unexpected outcome – so you do it differently next time.

# Executive Functions have a brain basis

- Starting, initiating
- Planning/organising the sequence
- Sustained attention
- Monitoring
- Flexibility
- Impulse control
- Emotional control

# Please tidy up your bedroom

- Initiate – start without reminder, critical build up
- Planning – where to start most efficiently, what follows, what could happen that I need to take avoiding action for, make places for items
- Prioritizing – what needs to be thrown out/saved
- Organising – (sort of pattern detection) a place for everything
- Monitor – keep returning things to their place every time they are used

# 1 Difficulties in initiating

- Homework is hell
- Always has to be reminded to start a task
- Trouble coming up with ideas for what to do in free time
- Organising activities with friends but still complains there is nothing to do
- Sits around the house a lot

# What would be the opposite

- Jumps the gun - starts before understanding the task



## 2 Planning, Prioritizing

- Doesn't bring home assignments, materials
- Good ideas but can't get them onto paper or job done
- Overwhelmed by large assignments
- Underestimates time to complete a task
- Starts assignments/chores at last minute
- Doesn't plan ahead
- Trouble carrying out actions to complete a goal, saving
- Can't find things in room/desk
- Has messy room/desk leaves trail of belongings around

# Planning Ahead



# Overplanning

- Never get started



# 3 Sustained attention

- Attention on any learning task not as long as age group
- Has to have other stimulation (music/tv as well)
- Will stop and start
- But annoyingly maintains continuous attention on computer games or minecraft

Vs.

- Hyperfocus – all else cast aside until information acquired (football, dinosaurs, 16<sup>th</sup> century belt buckles)

# Selective Attention Test - no conferring



# Sustained attention

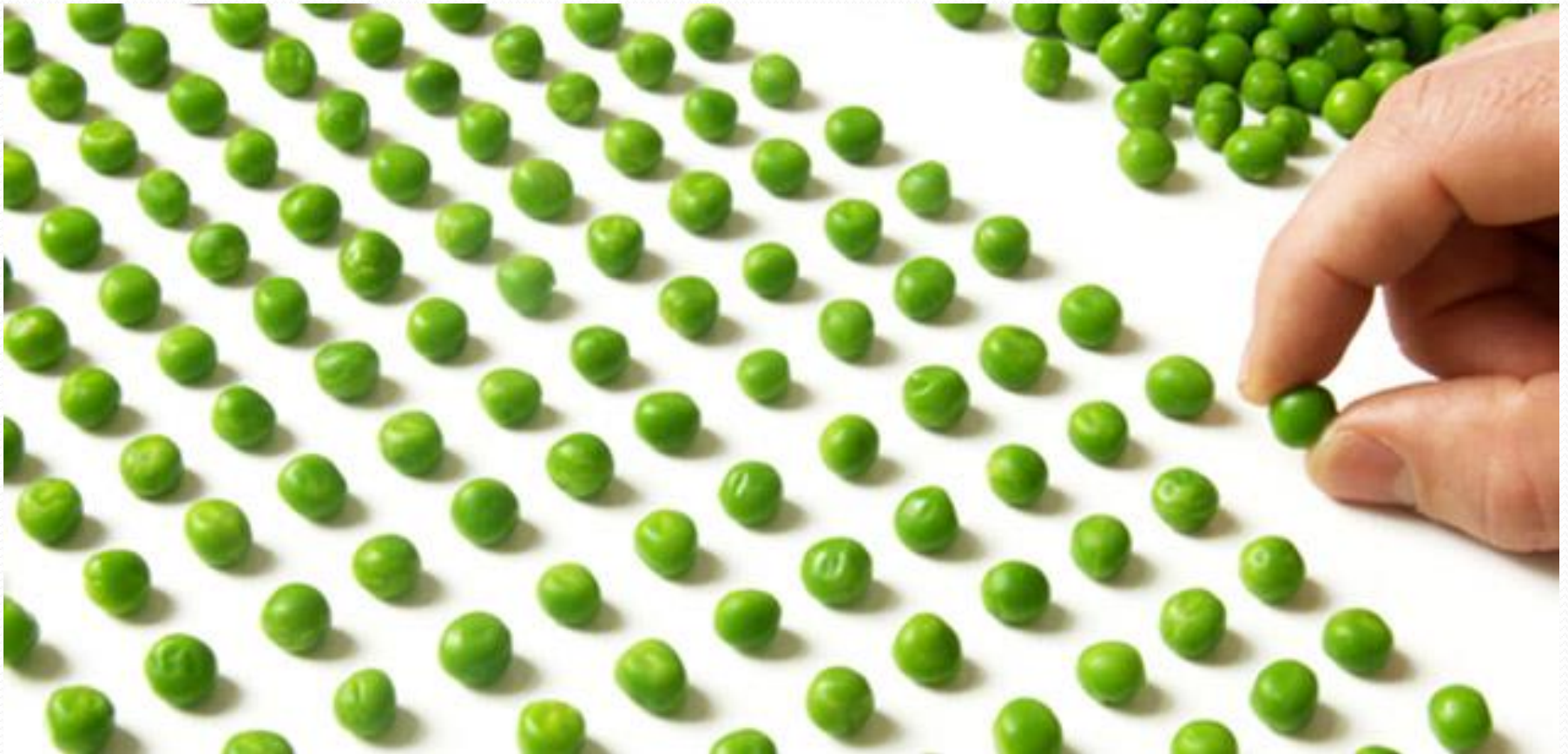
- The longer a 4 year can maintain attention the more likely to be above age-appropriacy in numeracy and literacy by 12 years old
- By 5/6 years old should be able to concentrate on a task of interest to them for 10 to 15 minutes, 5 to 6 minutes at school
- – a rule of thumb – for each year a minutes more of sustained attention for tasks and be able to resist distraction, i.e. 7 minutes for 7 years and so on until adulthood – a U shaped curve with 80 plus year olds back to childhood levels
- Pupils with good attention levels have a 48% better chance of finishing college with a qualification – so important to be trained, like a muscle (neurofeedback)

# 4 Monitoring

- Doesn't check work for mistakes
- Makes careless errors
- Unaware of how behaviour affects other
- Poor understanding of own strengths and weaknesses
- Work sloppy



# Perfectionist





# 5 Flexibility

- Resists accepting a different way to solve problems with schoolwork, friends, chores etc.
- Becomes upset with new situations
- Tries the same approach over and over, even when it doesn't work
- Hates change in routine, have to flag it up in advance
- Thinks too much about the same topic

# All over the place

- Useful solutions abandoned
- Unpredictable worker ...  
    castles in clouds  
    chocolate teapots



# 6 Impulse control

- Acts wilder or sillier than same age others in groups
  - Interrupts others, can't wait for turn
  - Out of seat at the wrong times
  - Gets out of control more than friends
  - Blurts things out
  - Trouble putting on the brakes on own actions
  - Gets into trouble if not supervised by adult
  - Talks at the wrong time
- ....opposite?

# Inhibition

- Rule bound
- Always does the right thing
- Insistence on fairness
- Withdrawn, shy

# 7 Emotional Control

- Over reacts to small problems
- Explosive angry outbursts
- Becomes tearful easily
- Mood changes frequently
- Reacts more strongly to situations than other children
- Mood easily influenced by situation
- Small events trigger big reactions
- Becomes upset too easily

# Pure Reason



# Horses for Courses

- The impulsive, careless non-planner who doesn't focus at school is more likely to be the top down global thinker while the good planner who pays attention to detail and keeps the rules will be the bottom-up analytical thinker
- But most of us can do either according to what's necessary.....but will be more comfortable with one of them –
- 
- But that's not all;

# Transforming sensory input into thoughts

- Once registered by the senses the raw sensory information has to be represented in the brain in order to make use of it – we have two brain hemispheres to aid us.
- The left, which is specialised for language and the right, which mediates visual/spatial information ... another opportunity for bias
- Both genetically biased– many families with genetic relatives all artists or all writers/lawyers .... Beyond nepotism



# Two different ways of representing information

## Left (linear) vs. right (connected)



# Representational Styles

**Verbal**  
Sequential  
Words



**Visual**  
Simultaneous  
Images

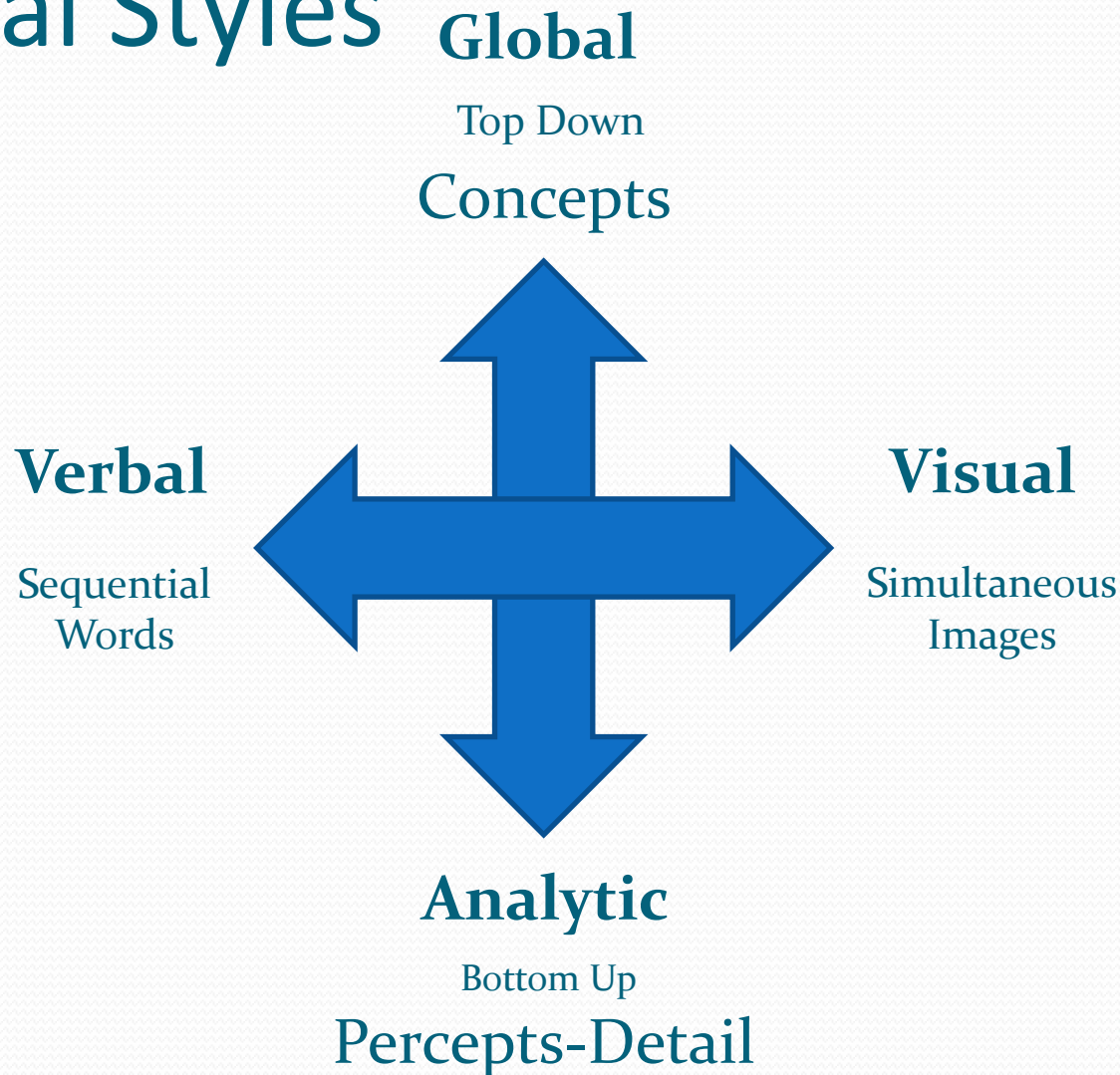
# Verbalisers

- Learn best from words, spoken or written
- Talkers – so sociable, trade off often motor skills
- Conceptually driven – words conceal details (6 x 4)
- Lawyers/teachers/salesmen/librarians  
literature/philosophy/sociology

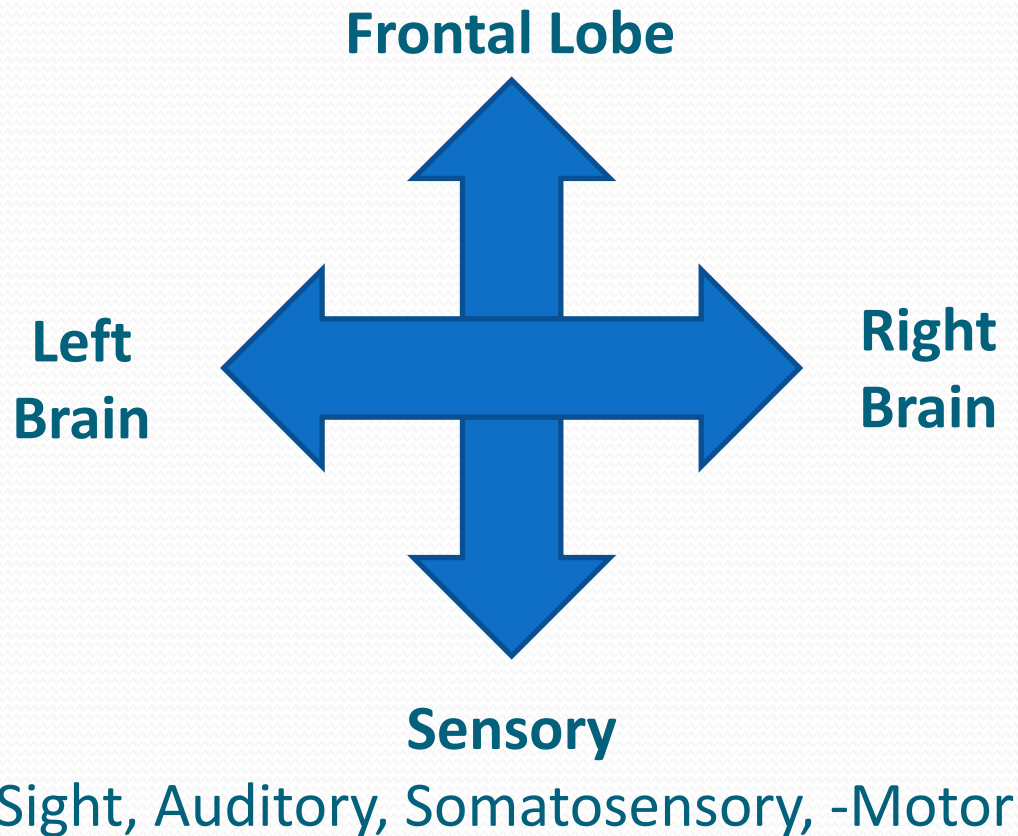
# Imagers

- Think in imagery as a means of representing information - see models and metaphors in their mind – can imagine a working model and predict it's likely performance, mental pictures, good pattern recognition.
- Learn best from pictures and diagrams that represent the information – constantly reinterpreting,
- Engineers, architects, artists, - physics, Art and Design

# Cerebral Styles



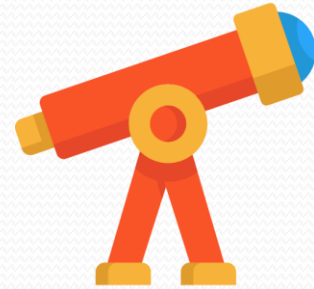
# Neurology



# Occupations biased

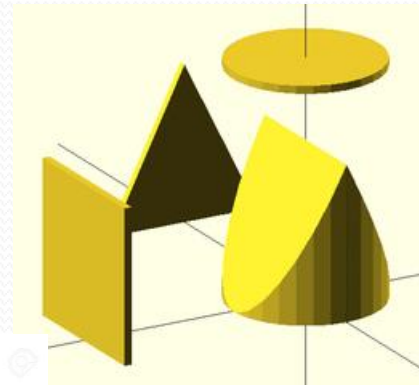
## Global Verbalisers:

Marketing, advertising  
Elon Musk, R.Branson

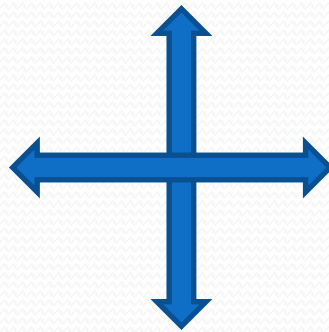


## Global Imagers:

Film, Art, Architecture:  
Picasso, Dali, Munch, Le  
Corbusier, Zahar Hadid



Gross/fine motor  
finger agnosia)



Steven Fry  
(prosopagnosia)



## Verbal Analytic:

Translators, copy writers  
Primo Levi



## Visual Analytic:

Computer programmer,  
Chemists  
Bill Gates

# Where are you on this cerebrostyle

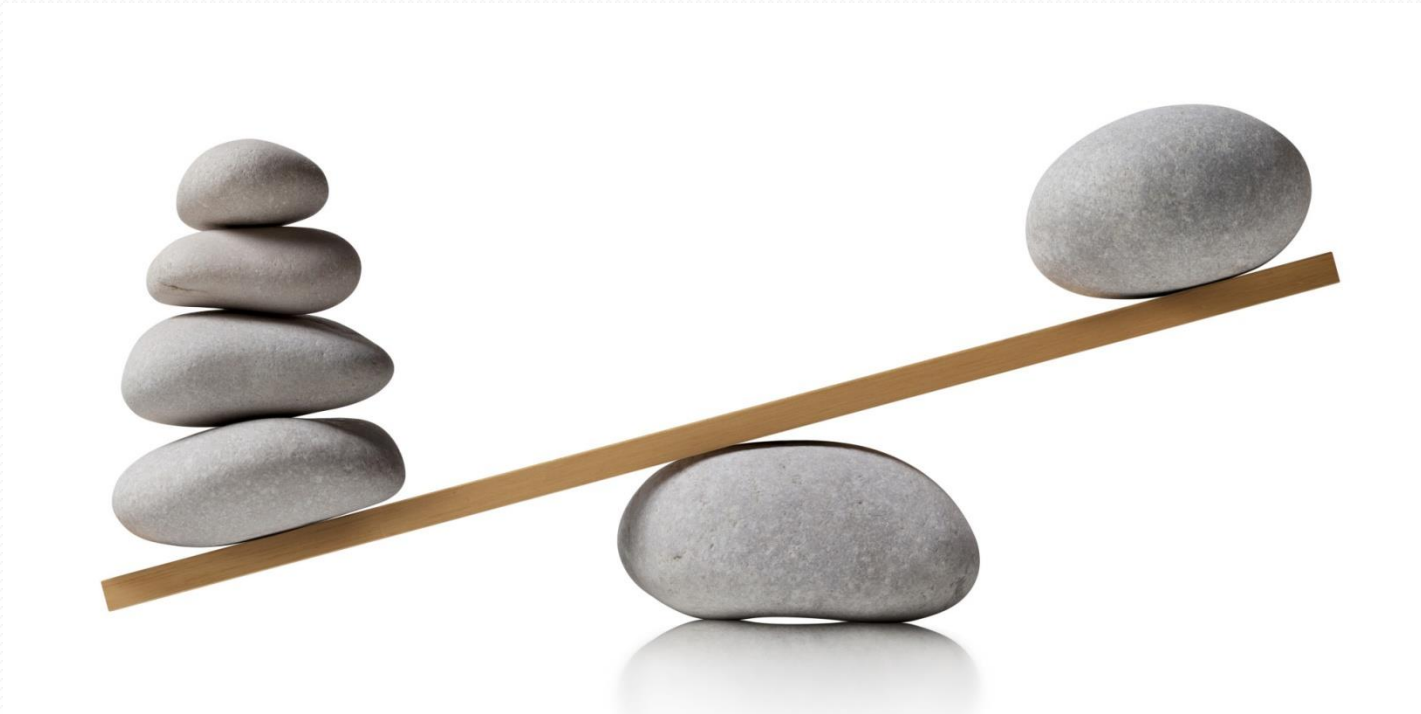
Quick questionnaire in pack:



Shadow syndrome trade offs



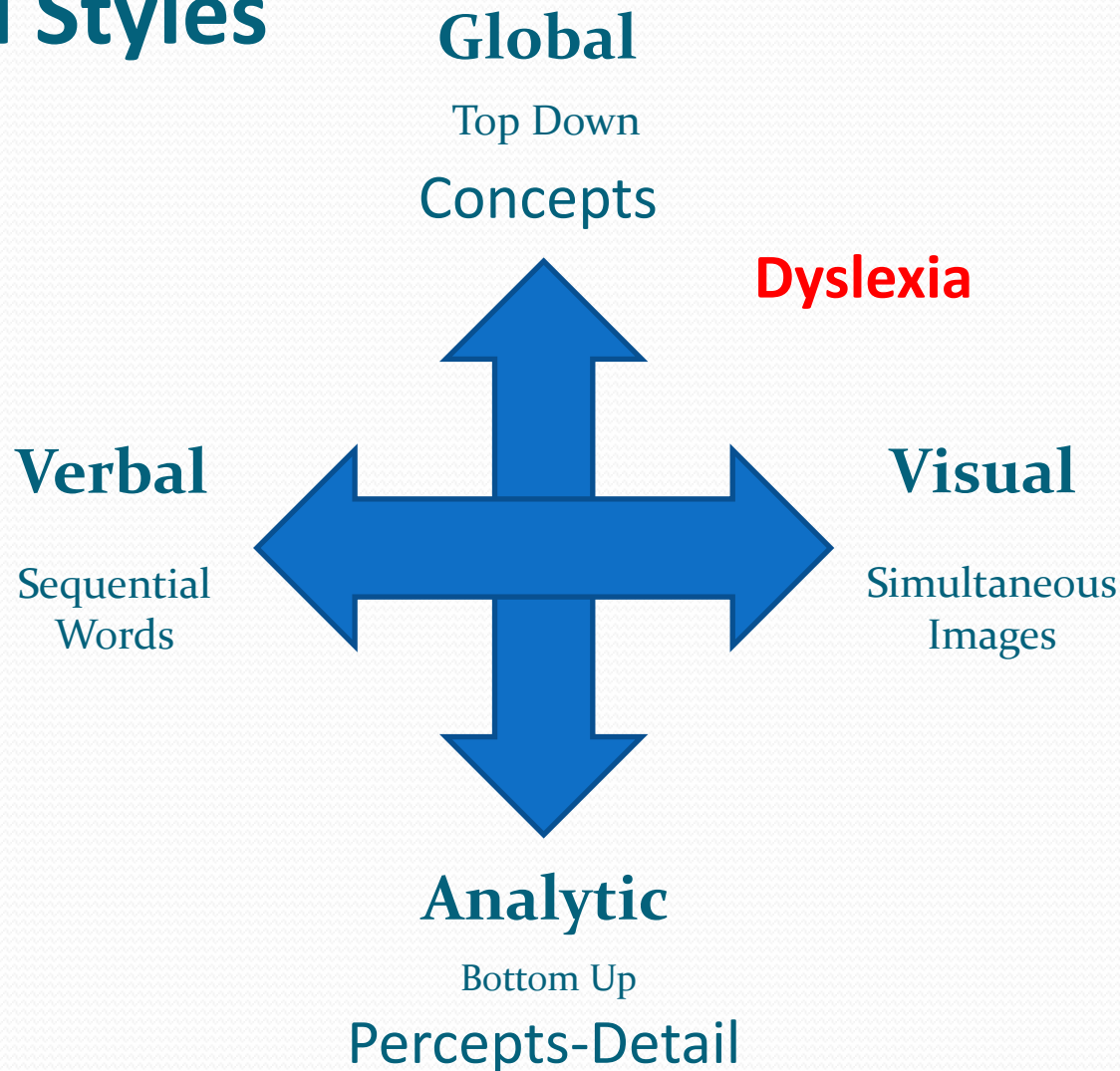
# All strengths have weaknesses



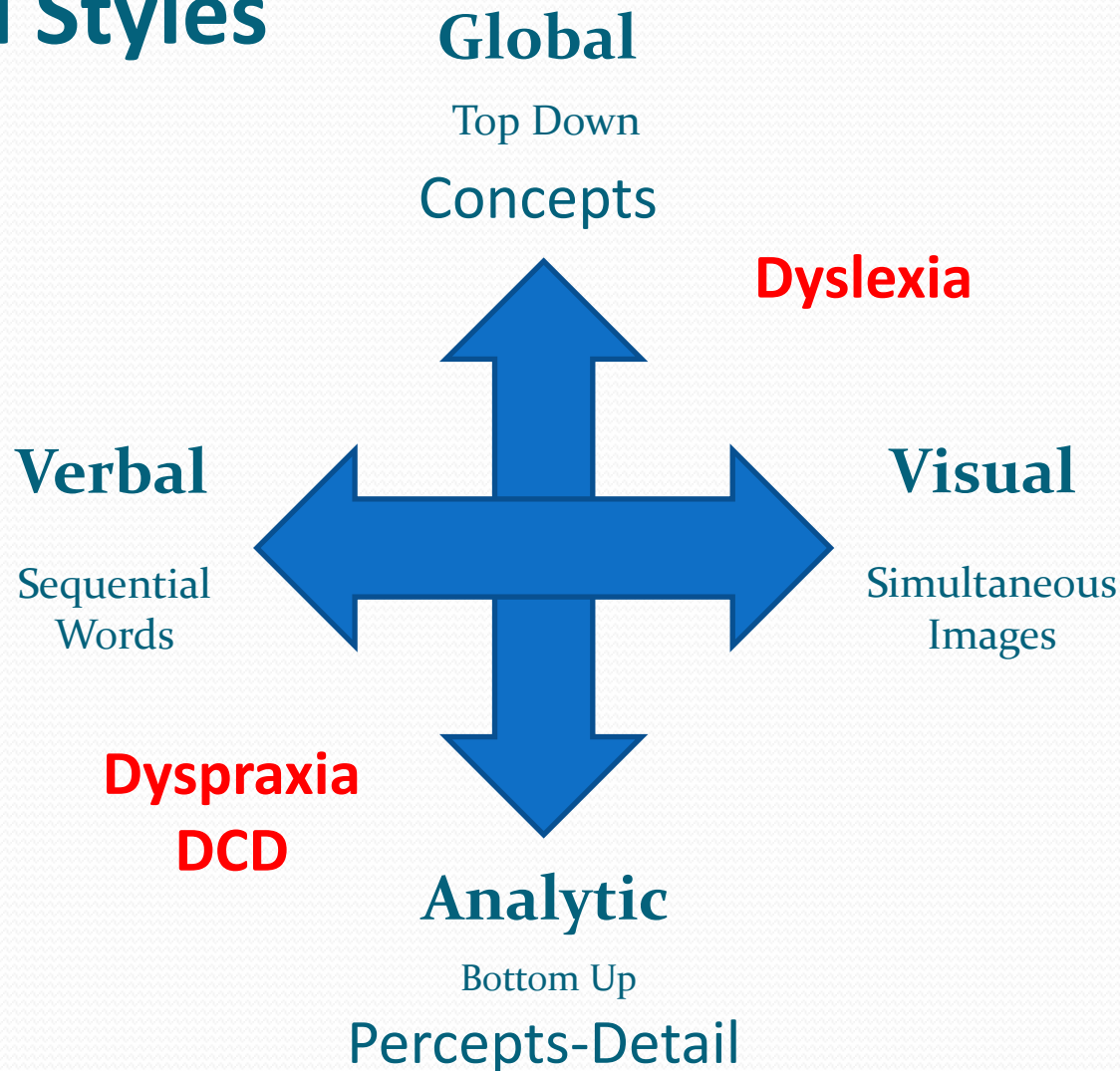
# Now our bottom 30%

- We've seen the shadow syndromes
- Now the brain basis, school and home problems of those whose biases turn at least at school, into difficulties that prevent them achieving their potential

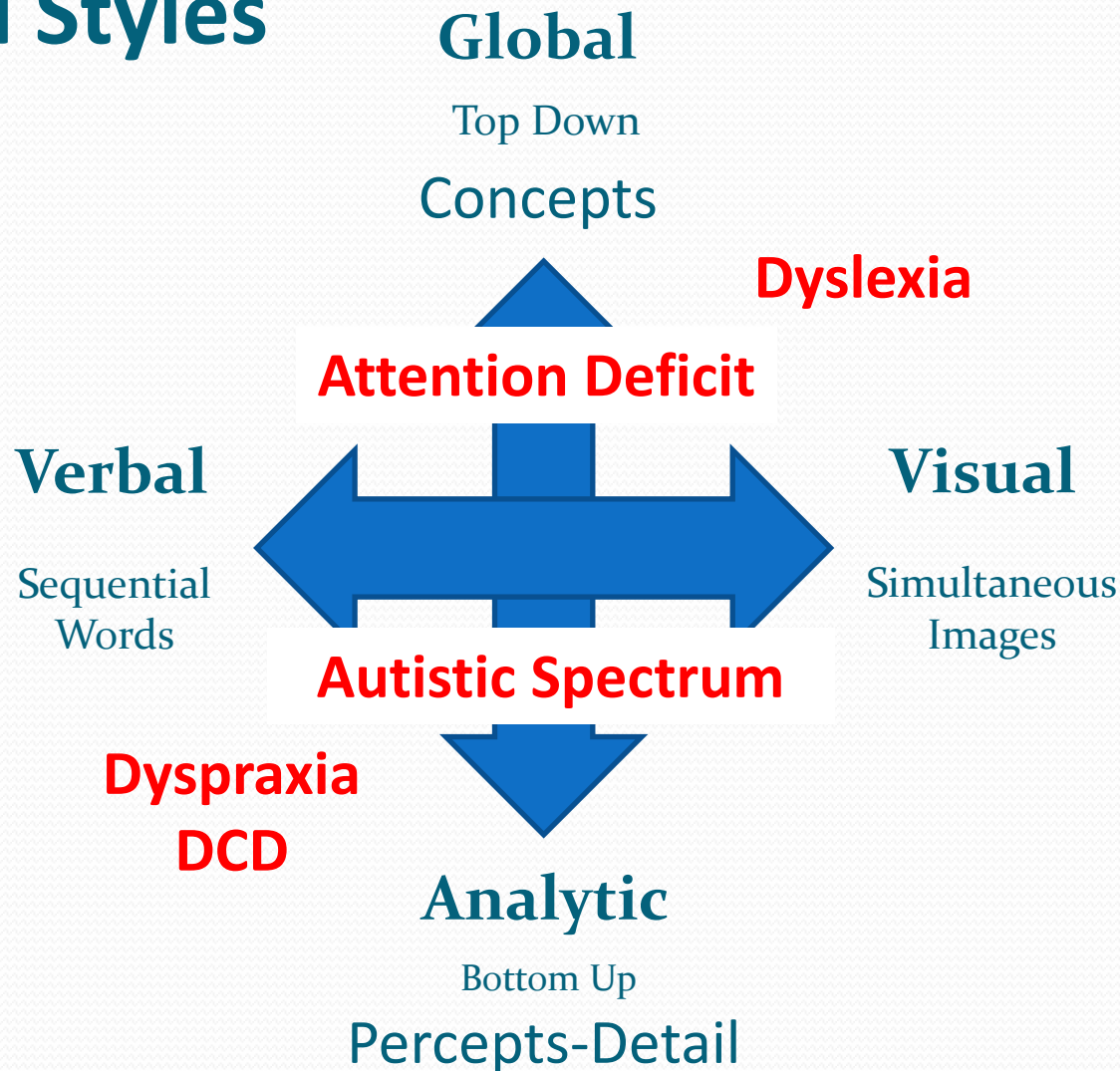
# Cerebral Styles



# Cerebral Styles



# Cerebral Styles



# Extremes turn Cerebrodiversity into brain based difficulties

- **Words - DCD**

not inferences/implications – trade off with non-verbal – body language, prosody, black and white thinker, facts – needs visualisation/motor skills

- **Imagers – Dyslexics**

Think in images but slow to put into words, hands needs reading/writing help

- **Globalisers - ADHD**

blurred, sweeping, distorted perception, impulsive problem solver – needs structure, longer attention span

- **Analytic - Autistic Spectrum**

hung up on details, sequences, can't integrate parts into wholes, see wood for trees – needs overview, social skills

# Mismatch

Complaints, appraisals, tribunals:  
especially if in wrong job

- Dyslexics - too slow at most paper work
- ADHD – too forgetful especially over details
- Asperger's - too eccentric, unsociable
- DCD/Dyspraxia – too clumsy

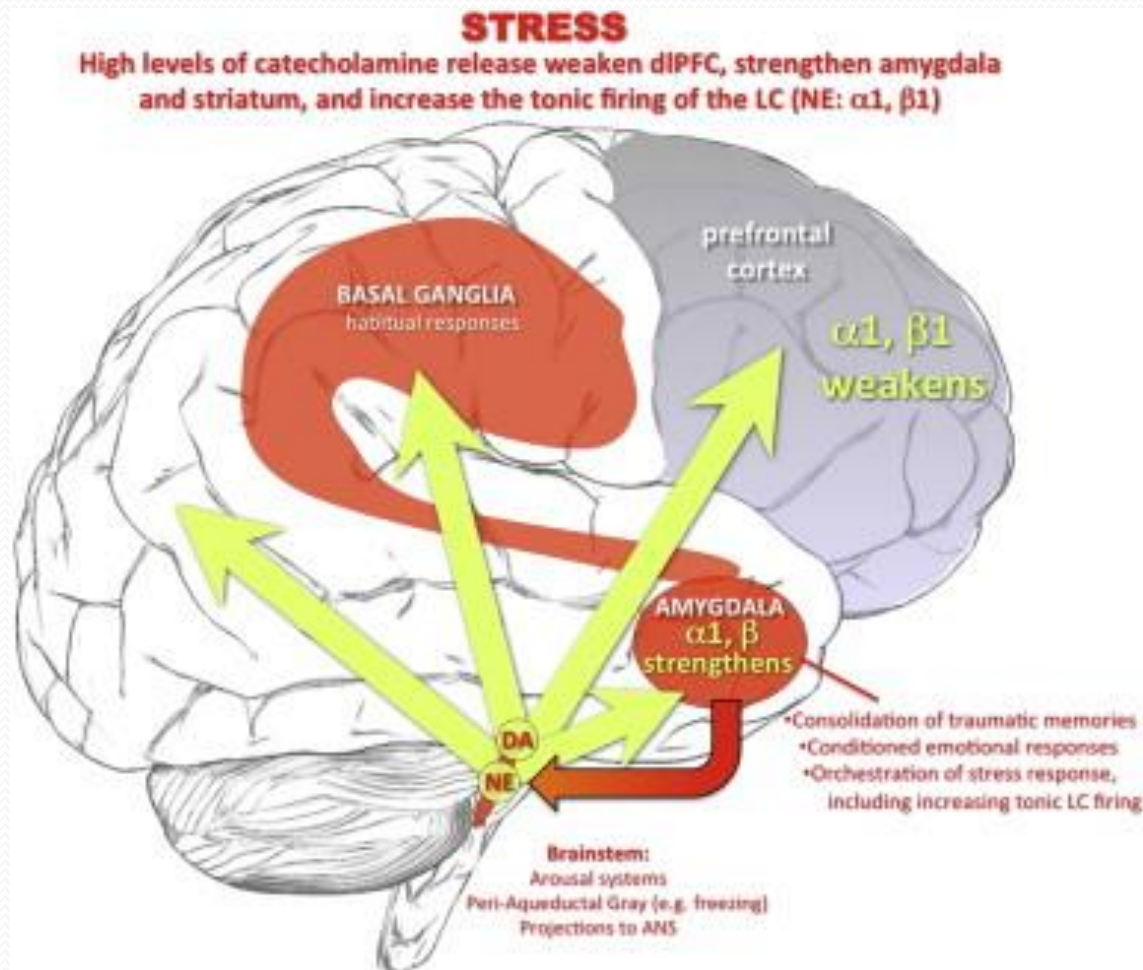


# Stress when having to use different cerebrostyle

- Can be done, but slow, effortful and often mistakes.  
Automaticity is not achieved
- When automaticity in any system has not been achieved the individual must use conscious attention which is not always easily available and is degraded by other stresses, such as illness, fatigue and other demands on attention, anxiety or time pressures. Skills that can be achieved one day may not the next, according to these other stresses.
- Automaticity transfers the mediation of the skill from the cortex to sub-cortical structures that do not take up conscious attention.



# Stressed brain affects frontal lobe most



# Summary

- Some are all-round learners
- Some have preferences towards :
  - i) looking for the detail that helps them build up their understanding
  - 2) Representing that information in either words or images

So those two dimensions bias their learning

- Some actually have a block in one or more of these dimensions that push their weaknesses into learning difficulties

# Some references

- “Flipp the Switch; strengthen executive function skills” by Sherry Wilkins and Carol Burmeister
- For teenagers;
- “Train your brain for success: a teenager’s guide to executive function” by Randy Kulman
- For older students
- “Understand Your Brain: the ADHD executive functions workbook to help you focus attention, control emotions, set priorities, manage time, stay organized, improve memory” by Ari Tuckman