

Behavioural Optometry... *another piece in the puzzle*

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Behavioural Optometry is about making sure :

- **that the vision system has the developmental maturity, the strength and the stamina to meet every demand on it,**
- **that the vision system is in harmony with all other body systems, and ...**

Behavioural Optometry is about making sure

- **that the outcome of the vision process satisfies in a comfortable, sustainable way, all of a person's social and personal needs for intellectual and physical achievement.**

6/6 (20/20) is not enough!!

CLEAR EYESIGHT

≠

GOOD VISION

Good Vision
requires good
Visual Skills

Vision Skill #1 **EYE** **MOVEMENT**

- **Tracking: Poor oculomotor function obstructs the development of visual attention, visual discrimination and visual thinking**
- **Saccadics: integration of central and peripheral processing...highly dependent on good spatial awareness**

Eye Gaze

1) a mother and infant



2) lovers



3) two people in an emotional confrontation. (crossing the road)



EYE MOVEMENTS: The new perspective: Bruenech*

- **“neurological delay in eye movements will have implications for posture, balance, hand-eye coordination, and perception”**
- **Eye movements are integrated with the autonomic nervous system**
- **Virtually all 12 cranial nerves are related to eye movement**

*** Biomedical Research Unit , Buskerad College Norway.**

- **Cerebellum is part of the extra-ocular motor system**
- **Reticular formation is part of the EOM system**
- **Unique **Felderstruktur** fibres have been found in humans >5 yrs of age. Responsible for very fine control: 1:1 neuron to muscle fibre ratio. Play a vital role in the development of binocular vision. Related to proprioception of the eyeball.**

Implications for therapy:

Bruenech:

- EOMs go through gradual modification from birth to maturity
- ‘The labile neuromuscular arrangement in the mature system with its polyneural innervation means that training eye movements can be beneficial throughout life’

...there is no critical period for learning complex visual tasks!

Vision Skill #2 **FOCUSSING**

- **Is it clear?**
- **Can you keep it clear?**
- **...as you change quickly and repeatedly from distance to near and back?**
- **Is it comfortable?**
- **Can you understand what you are looking at?**

Breakdown in focussing:

- Blur...usually transient
- Headache
- Sore eyes / rubbing
- Excessive blinking
- Difficulty copying from board
- Poor visual attention
- Fatigue after near work

Vision Skill #3

BINOCULARITY

- Is it single?
- Can you keep it single?
- ... as you change quickly and repeatedly from distance to near and back?
- Is it comfortable?
- Can you understand what you are looking at?

Breakdown in binocularity:

- Sore eyes
- Headaches
- Postural adaptations
- Double vision
- Suppression
- Strabismus

Vision Skills #4

VISUAL PERCEPTION

- ☑ Spatial awareness/directionality
- ☑ Visual-motor integration
- ☑ Visual-auditory integration
- ☑ Visual analysis
- ☑ Visual sequential skills
- ☑ Visual processing speed
- ☑ Visual memory
- ...etc

Spatial awareness/directionality

- **Where am I?**
- **Where is it?**
- **How does it (do I) get there?**
- **Is “3 + 5” the same as “3 x 5”?**
- **Is there any difference between a ‘p’, ‘d’, ‘b’, ‘q’ ??**

Spatial awareness at *SPEED*

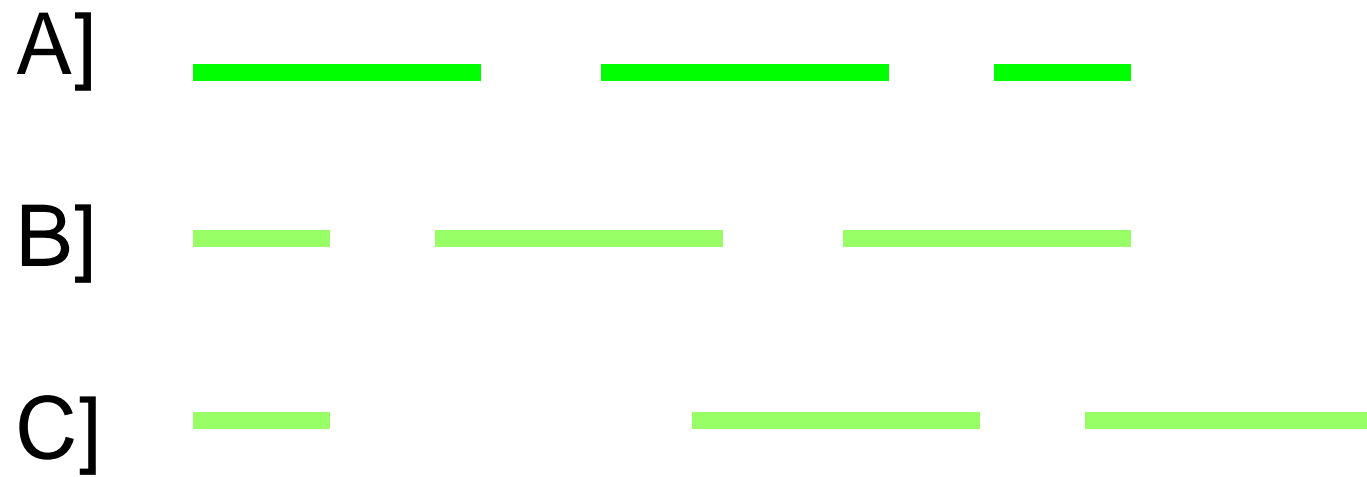
Spatially loaded naming tasks performed at speed exposed a Spatial Loading Factor which clearly differentiates children at risk with reading.

Larter, Herse, Dain 2004

Visual-motor integration

- If I show you this movement
can you do it?
- Can you copy what you see?

Visual-auditory integration



Visual analysis

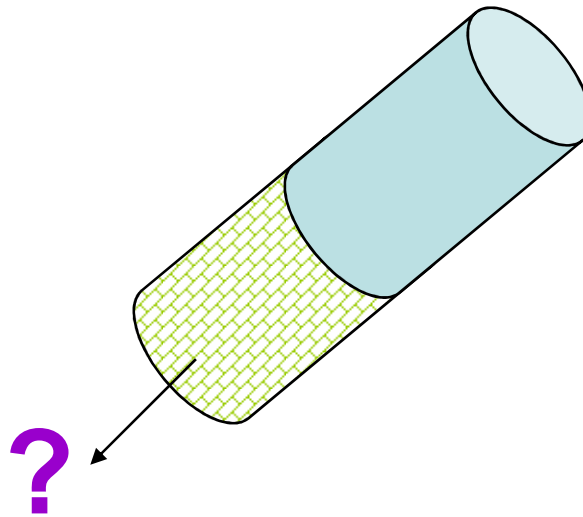
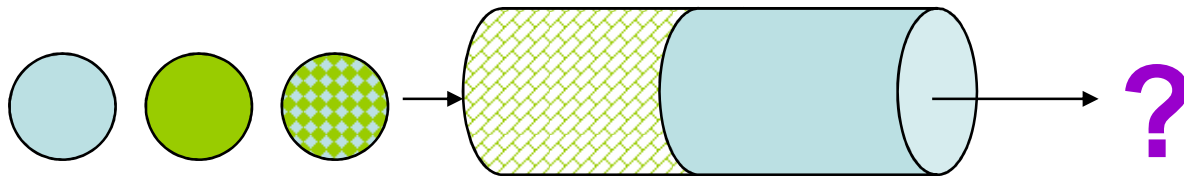
More information from less clues more quickly

Can you read this?

Visual sequential skills

- Logic

→ Comprehension & Visualisation



Visual memory

- Face recognition
- Spelling
- Component of getting around (landmarks)

Interventions:

✓ Lenses 

✓ Prisms 

✓ Vision Therapy

✓ Light / **Colour** Therapies

SUPPORT LENSES

are prescribed to reduce visual stress and are usually quite low in strength.

They are used as a “kick start” to help the eyes and brain recalibrate so that the focusing and eye pointing systems are brought back into balance.

It is useful to think of these glasses as a training tool: the eyes have to learn how to focus and work together better, the glasses put the eyes into a position where this is possible.

Pilot study

- **Support lenses have been shown retrospectively to significantly ($p>0.001$) reduce headaches and asthenopic symptoms in school children.**
- **Distance clinical findings are not significant, but significant changes are seen in near findings (near is where reading and writing happen).**

Yoked Prism

Specialist use of prism to alter perception of space.

Has been seen to improve:

- Confidence when negotiating stairs
- Ability to maintain attention on near work (less visual distraction)
- Ability to maintain place when reading
- Improved ball skills

Vision Therapy

- In-office is best
- Needs practice at home
- Computerised therapy has a place

Components of Vision Therapy

- **Spatial awareness**
- **Motor Planning**
- **Visual Analysis**
- **Sequence**
- **Cognitive load**

...but does it work???

Yes!!

See the following for lists of research abstracts and clinical studies into the impact of Vision Therapy on reading, learning ability and visual dysfunctions

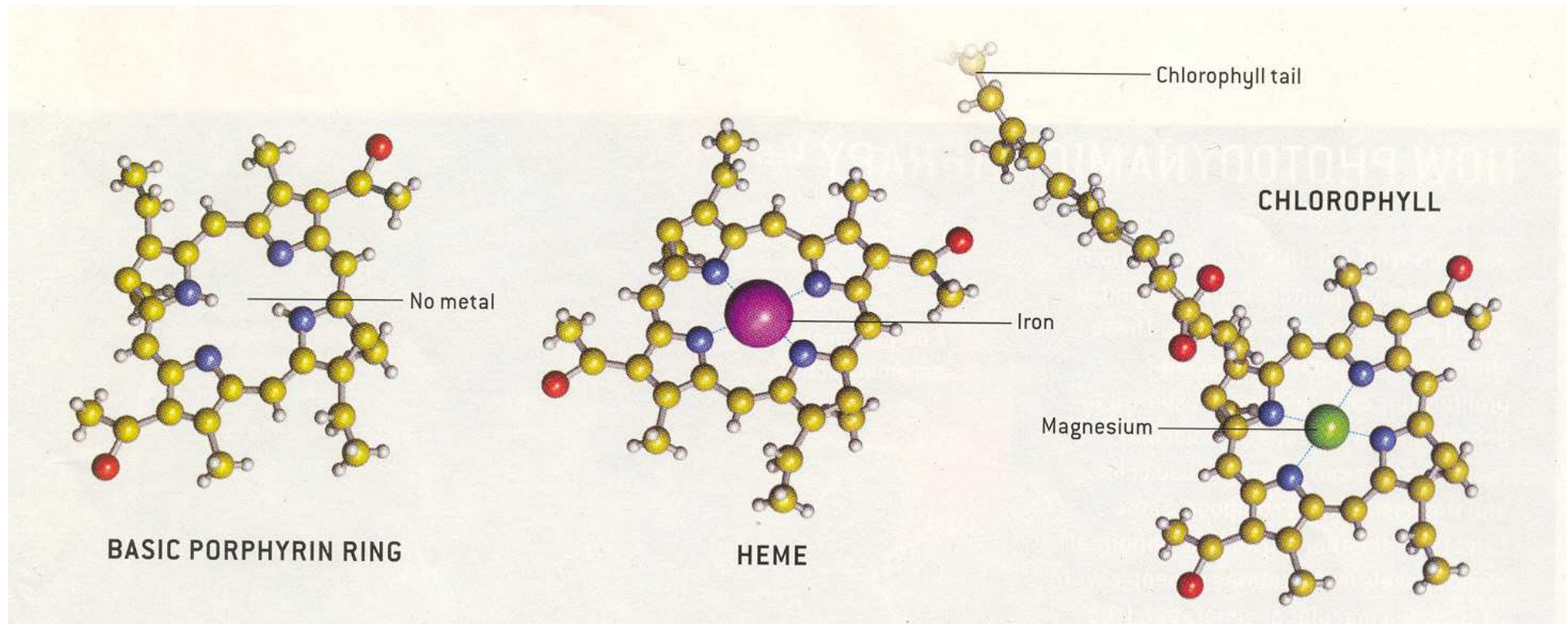
www.covd.org

www.oep.org

Light and Colour

- Tertiary visual pathway : retina to suprachiasmatic nucleus
- “...there is a generalised irradiance-detecting system that regulates a variety of different non-image-forming responses to light” Science vol 295 Feb 2002

the porphyrin ring story



Light and Colour

Clinical applications:

- **Syntonics**
 - Balances autonomic nervous system
 - Calms hypersensitivities
 - Helps with spatial localisation
 - ‘sets the stage’ for Vision Therapy
- **Meares-Irlen filters**
 - Decrease visual disturbance when reading
 - Help with visual processing

Also see www.bioptron.com

Rephrasing Dr Damien Smith:

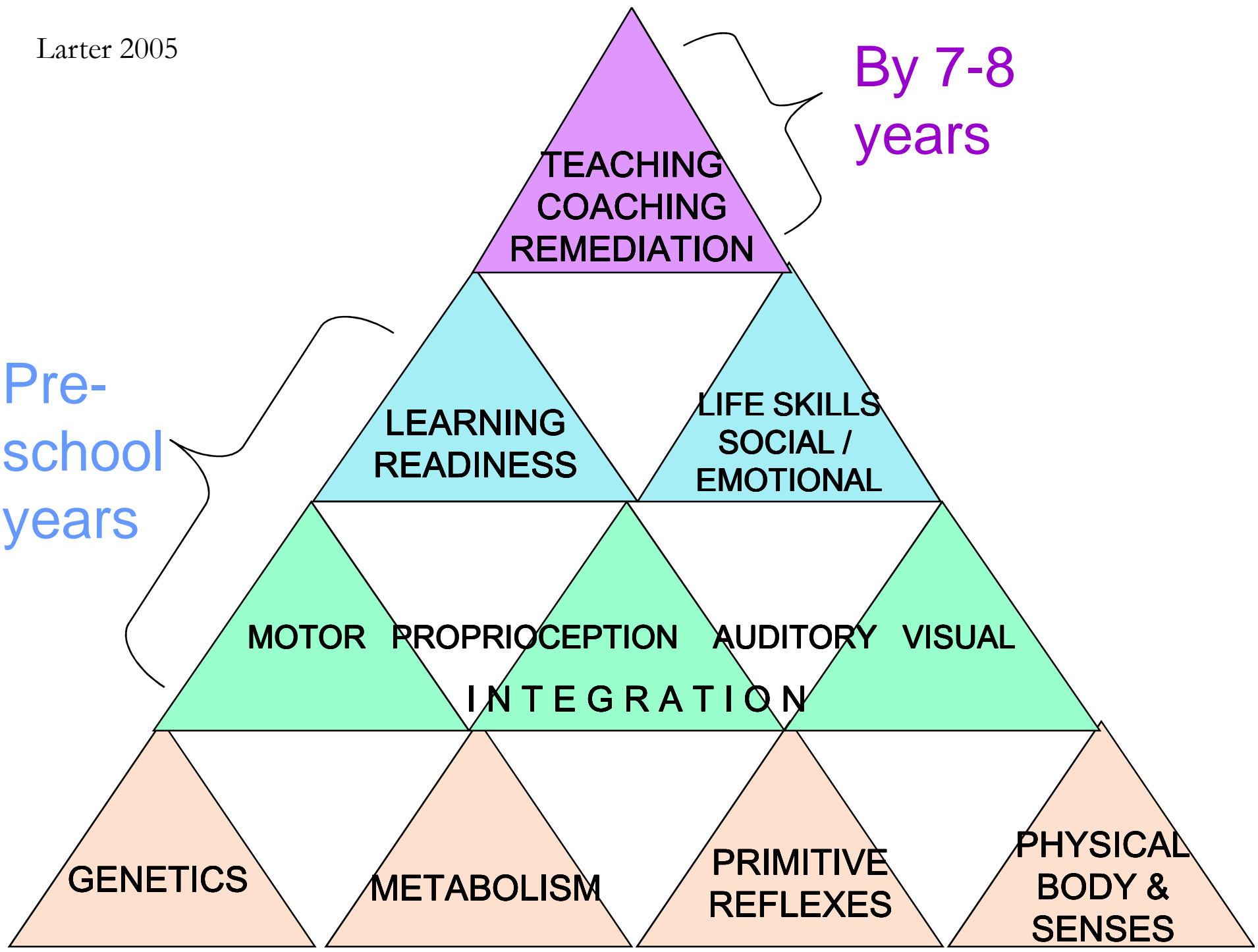
Having an efficient vision system means that life is easier because less effort has to go into seeing and therefore more effort is available for thinking and doing, and Behavioural Optometry offers the therapies to achieve this end.

...however, we do realise that there's more to it...

Larter 2005

By 7-8 years

Pre-school years



For more information

www.acbo.org.au

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