What’s my ViBe?

Visual Behaviours (ViBses) in autistic spectrum disorder

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overview

• Summary of traditional visual performance in ASD
• Introduction to two models of visual perception in ASD
• Two questions to ask in clinic
• Two essential examination tools
DO AUTISTIC CHILDREN have vision problems?

“Autism is an umbrella term – except some people get rained on more than others”

Luke Jackson
Do children with ASD have reduced vision?

• Acuity - no
Do children with ASD have problems seeing?

- Strabismus 11%
- Accommodation lag 17%
- Astigmatism 24%
- Hypometric saccades 50%
Do children with ASD have problems seeing?

- Strabismus 11%
- Accommodation lag 17%
- Astigmatism 24%
- Hypometric saccades 50%

Stop thinking WHAT
Start thinking HOW
Do children with ASD have problems seeing?

• Atypical visual processing in early life may be the underlying cause of social communication problems

• Lack of eye contact, theory of mind

• Where is overlap between CVI, ASD, prem, CP, dev delay, OVI..

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Chokron & Dutton 2020
Neuroscience and biobehavioural reviews
You don’t see with your eyes;  
You see with your brain
Vision processing

Functional vision

- aware
- attention
- detection
- identification
- action

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4 groups

Position processors

Central processors

Peripheral processors

Single channel processors
Dunn’s sensory processing framework

Dunn 1997 Inf Young Children
Dunn’s sensory processing framework

Sensitivity
Threshold for detection/perception of sensory stimulation?

Self regulation
Sensory mixing desk
Dunn’s sensory processing framework

SEEKERS

Child who ‘has to touch everything’
Always on the move
Seem to lack focus
Vision appears good
‘like to see’

Seek out things eg wheels spinning

On all the time
Dunn’s sensory processing framework

AVOIDERS
Deliberately look away
You know they can see it, because they react in opposition to what you want

Get stuck on something they like to see
Seem to deliberately not hear you
Specific colours, light gazing
Flappers/chewers

Deliberately ‘off’
Dunn’s sensory processing framework

**SENSITIVE**
Overwhelmed by visual stimulus
Easily distracted
Seem to see everything

‘can see too much’
Have to finish ‘looking’ before moving on
Eg see every detail/read every word
Prefer vision OR sound

‘on more than off’
Dunn’s sensory processing framework

BYSTANDERS

Need things pointing out to them, but lack interest
Notice when you show them
Need reminding they have vision, but not sure what to do with it

Easy going
Drifters

‘off more than on’
Visual Behaviours (ViBes) in ASD

Position processors
Central processors
Peripheral processors
Single channel processors

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## Balancing central and peripheral input

<table>
<thead>
<tr>
<th>Area of vision</th>
<th>Central</th>
<th>Peripheral</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other names</strong></td>
<td>Focal</td>
<td>Ambient</td>
</tr>
<tr>
<td></td>
<td>Parvocellular</td>
<td>Magnocellular</td>
</tr>
<tr>
<td><strong>Visual function</strong></td>
<td><strong>“What”</strong></td>
<td><strong>“Where”</strong></td>
</tr>
<tr>
<td></td>
<td>Acuity</td>
<td>Visual field</td>
</tr>
<tr>
<td></td>
<td>Colour vision</td>
<td>Light detection (night vision)</td>
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<tr>
<td></td>
<td>Spatial discrimination</td>
<td>Movement</td>
</tr>
</tbody>
</table>
Position processors

Central processors

Peripheral processors

Single channel processors

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• Good acuity
• Can only see one part of the page at a time
• Cannot integrate the images they have seen
• Clumsy and trip over things
• Sensitive to flicker

Central processors
Does the child have problems with

- Not seeing things unless they are under their nose
- Strip lights
- Visual search: missing out sections of a page, not seeing something when pointed out to them
4 groups

- Position processors
- Central processors
- Peripheral processors
- Single channel processors
• May not be able to use central sharp vision
  • Sharp central vision “overloads” sensory input and is suppressed
• May not be able to “turn off” peripheral vision to concentrate on central vision
Peripheral processors

• Reduces sensory input – lower quality input
• Reduces sensitivity to light flicker
• May not be able to integrate both parts of visual brain together, so uses only one half
• Induce exotropia
Does the child

- Seem easily distracted by objects out of the corner of their eye
- View objects from the side on, have an unusual head posture
4 groups

Position processors

Central processors

Peripheral processors

Single channel processors
• Normal acuity
• Cannot use vision to determine where they are in space
• Cannot use vision to “learn” new motor skills
Position processors

- Trail hand against the wall
- Bump into people
- Disoriented by new rooms
- Rockers and spinners
Position processors

Does the child have problems with

• Walking with their hands away from their body, or trail their hands along a wall
• Explore a new environment by picking up every object or touching every surface
• Flicker their hand in front of their face
4 groups

- Position processors
- Central processors
- Peripheral processors
- Single channel processors
• “One thing at a time”
• Hypersensitivity to multiple sensory inputs
• Cannot integrate visual, audio, tactile, vestibular, motion
• Strong colour like/dislikes
Single channel processors
• What is the child experiencing?
Does the child

• Look away when someone is speaking
• Turn away from visual stimuli
Saccades

• Fast eye movements
• Shift gaze from one object to another
• Constant correction to keep object in view
• Microsaccades used in reading
• 50% children with ASD known to have hypometric (slow, inaccurate) saccades
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“once upon”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“a time”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“there was ”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“once upon”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“upon a”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“a time”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“was a”
Once upon a time there was a big bear who lived in a castle at the top of the hill.

“time the”
Position processors

Central processors

Peripheral processors

Single channel processors

Hyposensitivity (High Neurological Threshold)

Low Registration

Sensation Seeking

Passive Self-Regulation

Sensory Sensitive

Sensation Avoiding

Hypersensitivity (Low Neurological Threshold)

Active Self-Regulation

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Two essential examination tools

• Look
• Listen
TWO QUESTIONS

• Does the child integrate vision and other senses?

• Does the child integrate central and peripheral vision?
Visual assessment in autism

Before you begin…..

• Head position, body position
• Allow lots of time; “wait for 8”
• Enable “break outs”
• Quiet: simple instruction, softly repeated
• Consider room noise, overhead lighting
• Consider your own clothing, background colour
VIBE8

• Do parent and clinician reports of atypical visual behaviours seen in children with ASD match
• Can you use CVI5 to draw out atypical VIBES in children with ASD?

• 24 participants
• No significant difference between parent and clinician scores on ViBe8
<table>
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<tr>
<td>Becomes visually stuck on an object</td>
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<tr>
<td>Turns their head to look out of the corner of their eye</td>
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<tr>
<td>Is distracted by moving objects alongside them/in their peripheral vision</td>
</tr>
<tr>
<td>Trails a hand along a wall when walking</td>
</tr>
<tr>
<td>Flaps hands in front of their face/rocks in their chair</td>
</tr>
<tr>
<td>Looks away when they are speaking/when they are being spoken to</td>
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<tr>
<td>Is more engaged with sensory activities other than vision eg chewing</td>
</tr>
<tr>
<td>Uses vision on his/her terms – deliberately looking away from or avoiding what you are trying to show them (we call this Visual Avoidance).</td>
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ViBe (visual behaviour) Statements

- Integrates vision and other senses
- Actively uses vision to search and explore
- Vision seems on all the time
- Integrates central and peripheral vision

- Deliberate visual avoidance
- Uses touch rather than vision, looks away
- Uses peripheral vision more than central
- Seems to switch off vision, daydream, disengage most of the time

- Walks over things to find what he wants
- Engages with very specific visual input
- Uses central vision more than peripheral

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