Enhancing Care for Older People Webinar Series. Session number: 38

Date: Wednesday 28th January 2026 1.20 – 3pm

Title:
Beyond the eyes: Understanding and managing visual-perceptual deficits in people living with dementia

Presenter : David Knight, Advanced Clinical Research Optometrist, Newcastle upon Tyne Hospitals NHS foundation Trust

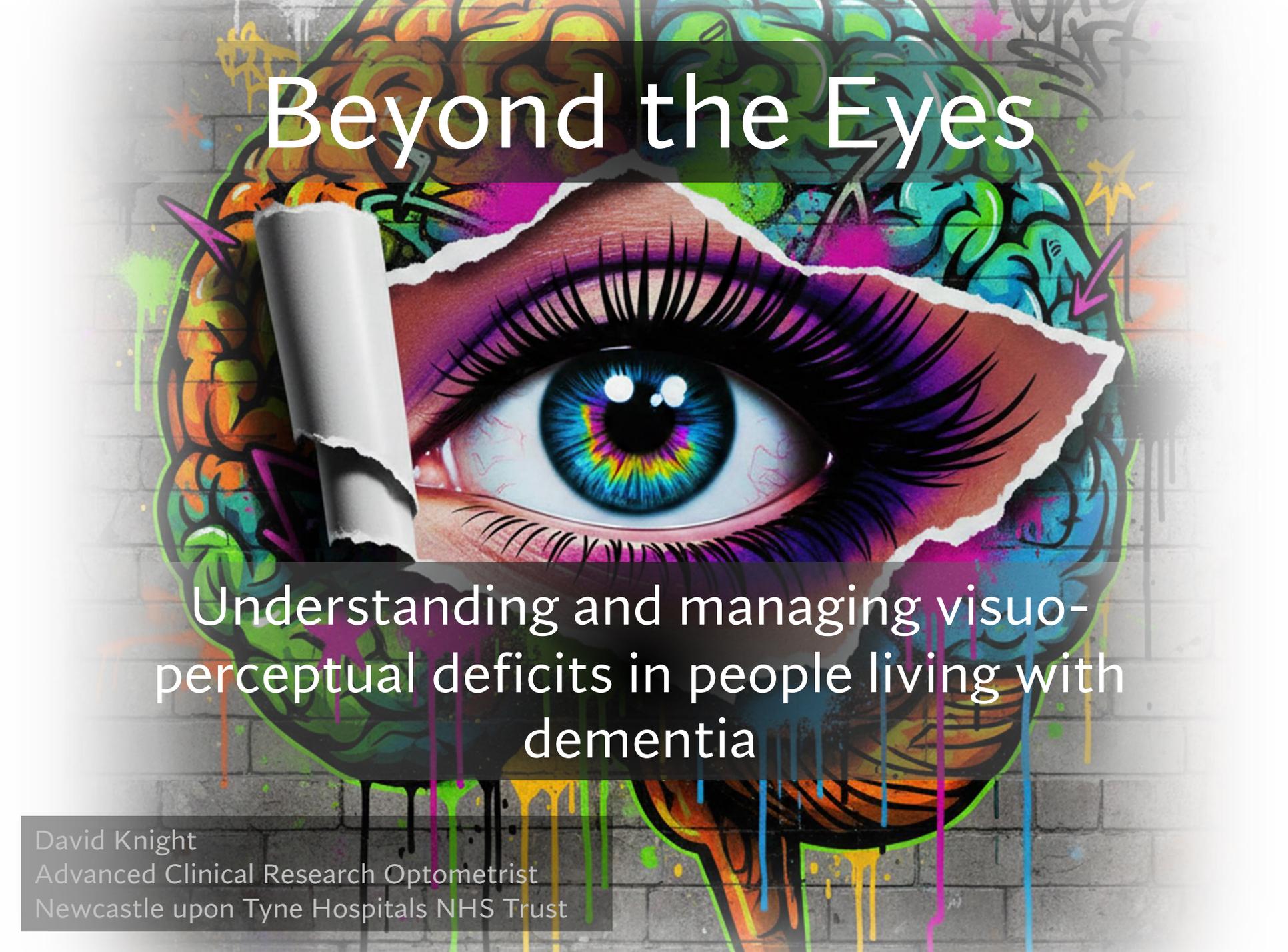**EnCOP Strategic Lead: Lynne Shaw**

Housekeeping

- Please ensure microphones are muted and during presentation cameras are turned off.

- The event will be recorded and shared.

- The webinar recording and presentation will be circulated and uploaded on to the website following the event.

- If you have any questions during the session then please use the chat facility. We will attempt to address questions, if we can't then we will follow up after the event.

- Please also use the chat facility to inform us of any technical issues as this will be monitored closely throughout by one of the EnCOP team.

- Occasionally you may have difficulty seeing or hearing video clips that are played, this will usually be due to your own device or software settings and not something we can influence during the webinar session. Please be assured all content will be shared following the event so you will have an opportunity to view afterwards.

- If you need to take a break at any time throughout the session please feel free to do so.

Declarations/Disclosures

Lead author of book chapter: "Visual Dysfunction in Dementia and Cognitive Decline" in A New Approach to Dementia (Taylor & Francis, 2025).

Member of International Medical Advisory Panel for Astrazeneca

Honoraria received from Astrazeneca and Samsara

Lecture outline

Visual perception mechanisms

Pathophysiological changes in Dementia

Clinical Phenotypes

Management and Ethical considerations

Learning Objectives

Distinguish Ocular vs Cognitive Visual Dysfunction

Understand the visual pathway and neurobiological mechanisms underlying visual dysfunction

Recognise clinical phenotypes

Practical evidence-based management strategies

EnCOP Domains

Core Domains

A.   Values, Attitudes, Safe and Ethical Practice

B.   Partnership Working and communication with older people, families, and others

D5.   Ageing Well – Promoting & Supporting Independence, Autonomy & Community Connectivity for Older People

Advanced Domains

1: Advanced Clinician

2: Advanced Leader

3: Advanced Influencer

Vision = eyes?

- Vision is NOT just eyes!
- It's the brain interpreting light
- Eyes are critical for transduction of light into an electrical impulse. (i.e. the "camera")
- Failure to interpret this signal correctly can lead to functional/cortical blindness or visual agnosia.
- 30-50% of brain processing involves visual information (Zeki, 1993)

Zeki, S., Watson, J.D. and Frackowiak, R.S., 1993. Going beyond the information given: the relation of illusory visual motion to brain activity. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *252*(1335), pp.215-222.

What do you see?

How do you know it's a bowl of fruit?

- Your brain is detecting features from the image such as shape, relative position, movement, focus. This is bottom-up processing.

- But it's missing colours!

- Your brain uses memory and context (colour knowledge) to identify the object. This is top-down processing.

Top-Down vs Bottom-Up Processing
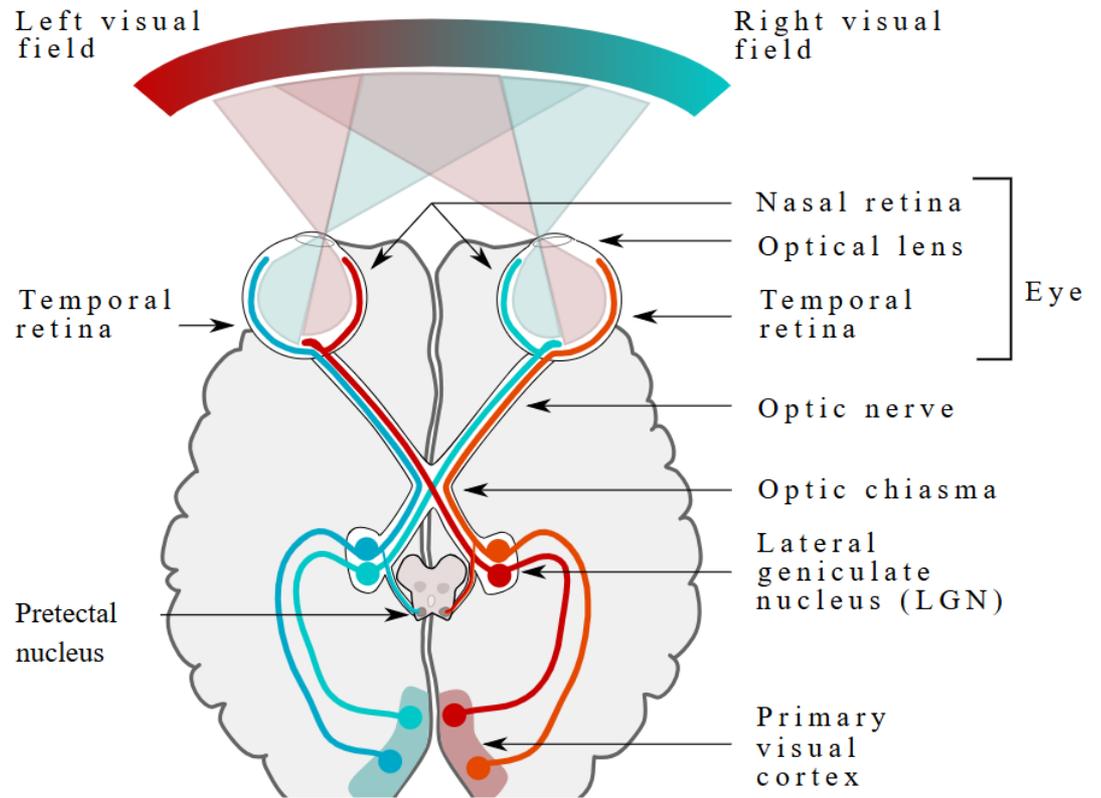
Bottom-up:
- Sensory-driven; automatically assigning features/attributes
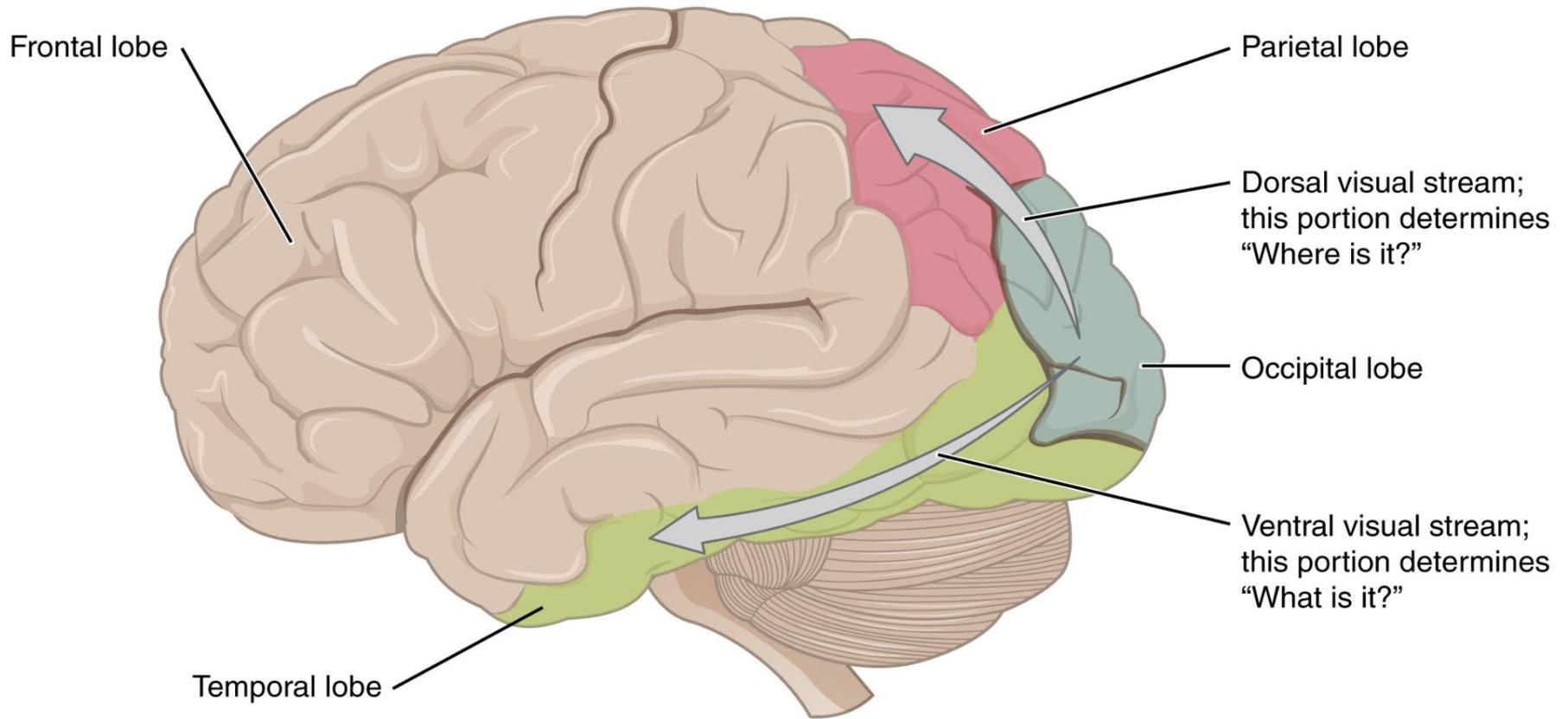- Retina -> V1 -> Ventral/Dorsal streams

Top-down:
- Executive-driven; Contextualisation using memory and knowledge.
- PFC -> modulates visual areas via feedback connections

Friston, K. (2005). A theory of cortical responses. Philosophical transactions of the Royal Society B: Biological sciences, 360(1456), 815–836.

Classical Visual Pathway

This is primarily bottom-up processing.
What happens next?

Frontal lobe

Parietal lobe

Dorsal visual stream;
this portion determines
"Where is it?"

Occipital lobe

Ventral visual stream;
this portion determines
"What is it?"

Temporal lobe

Visual Streams

This is not 3D

- Bottom-Up processing tells us it is 3D
- Top-down processing tells us this is an illusion
- Dorsal "Where" stream
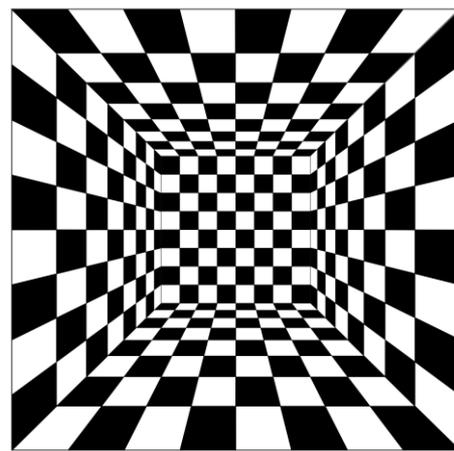 - Navigation
  - Spatial awareness
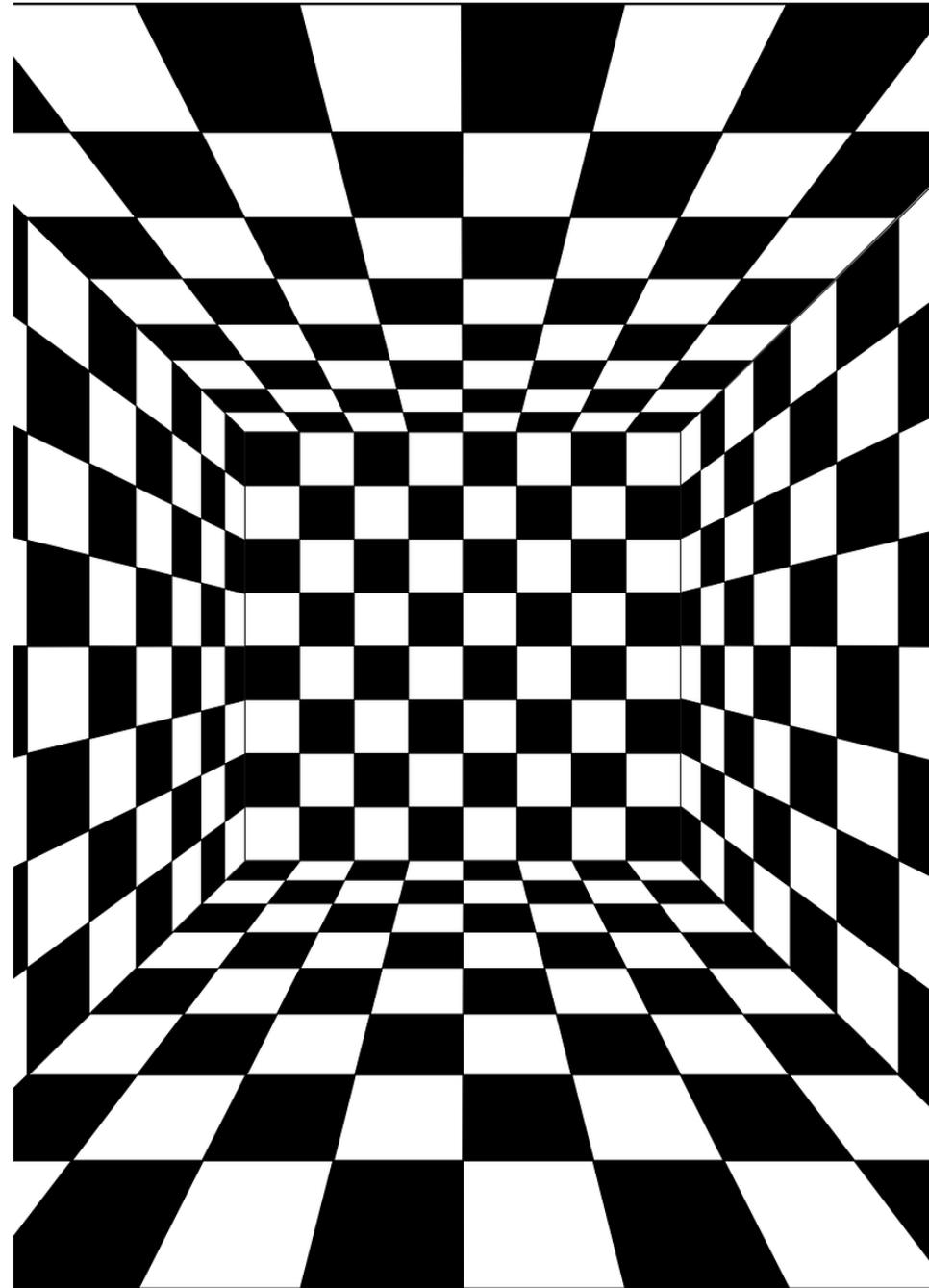
This is not the Prime Minister

- Ventral "What" stream
  - Object recognition
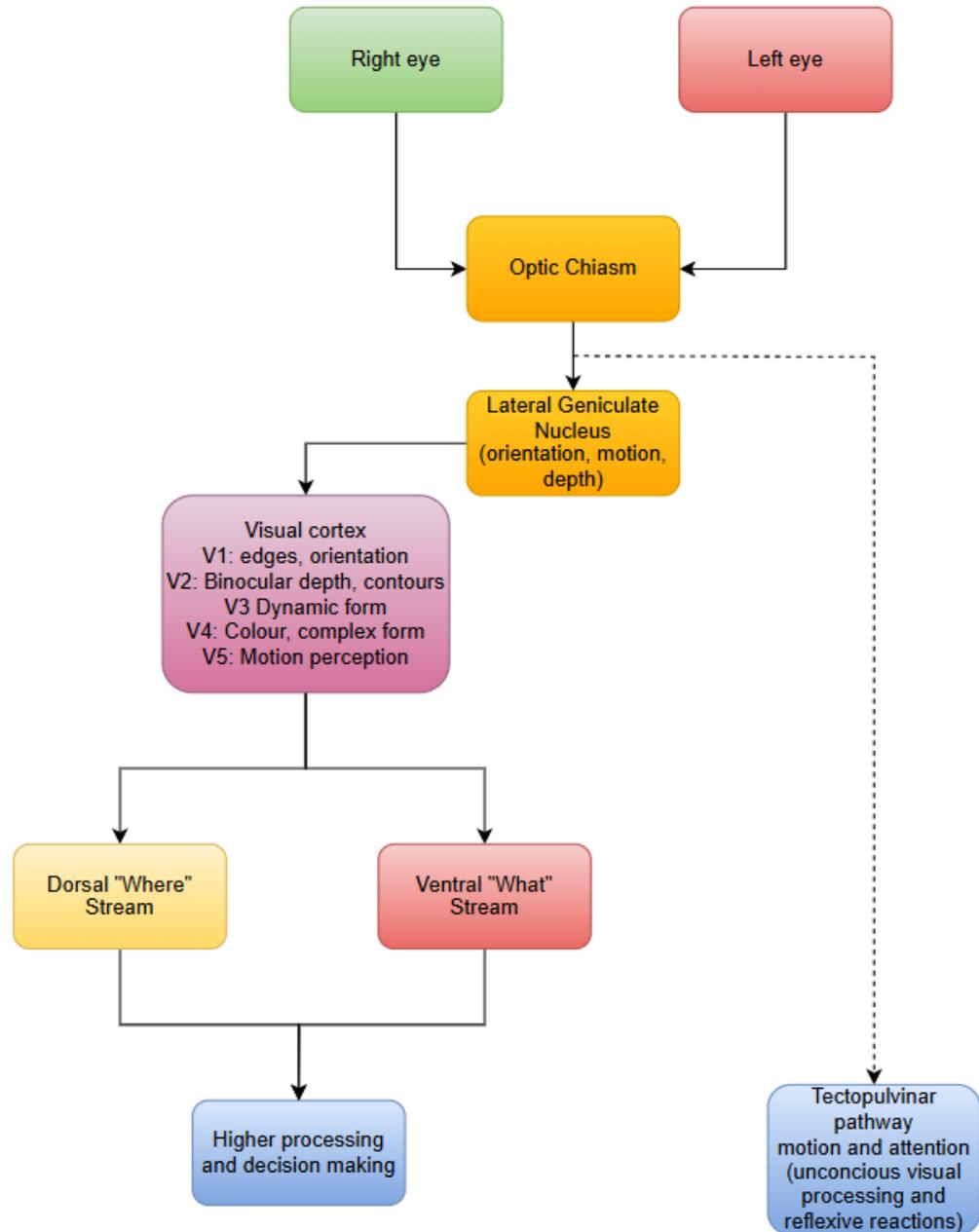 - Facial recognition (Fusiform Gyrus)

Layers of Visual Processing

1. Basic visual input: shapes/regions, textures, colours, edges

2. Movement: Motion detection

3. Object/figure-ground discrimination: distinguishing one object from another

4. Integration: spatial relationships

5. Recognition: object identification

6. Meaning: memory, context, emotion

Visual Pathway

Right eye

Left eye

Optic Chiasm

Lateral Geniculate Nucleus
(orientation, motion, depth)

Visual cortex
V1: edges, orientation
V2: Binocular depth, contours
V3 Dynamic form
V4: Colour, complex form
V5: Motion perception

Dorsal "Where" Stream

Ventral "What" Stream

Higher processing and decision making

Tectopulvinar pathway
motion and attention
(unconcious visual processing and reflexive reactions)

Tectopulvinar "Reflex" pathway

Subconcious visual processing

Motion-sensitive input

Retina -> Superior Colliculus -> Pulvinar -> Extrastriate Cortex

Directs attention and gaze to novel peripheral stimuli

May compensate for cortical deficits in dementia

Bottom-up processing problems affect ADL

This is why people living with dementia stop eating if the plate matches the tablecloth/food. More common in advanced ADD/PCA.

Simultanagnosia – the inability to separate the object from surrounding clutter.

Dunne, T.E., Neargarder, S.A., Cipolloni, P.B. and Cronin-Golomb, A., 2004. Visual contrast enhances food and liquid intake in advanced Alzheimer's disease. *Clinical nutrition*, *23*(4), pp.533-538.
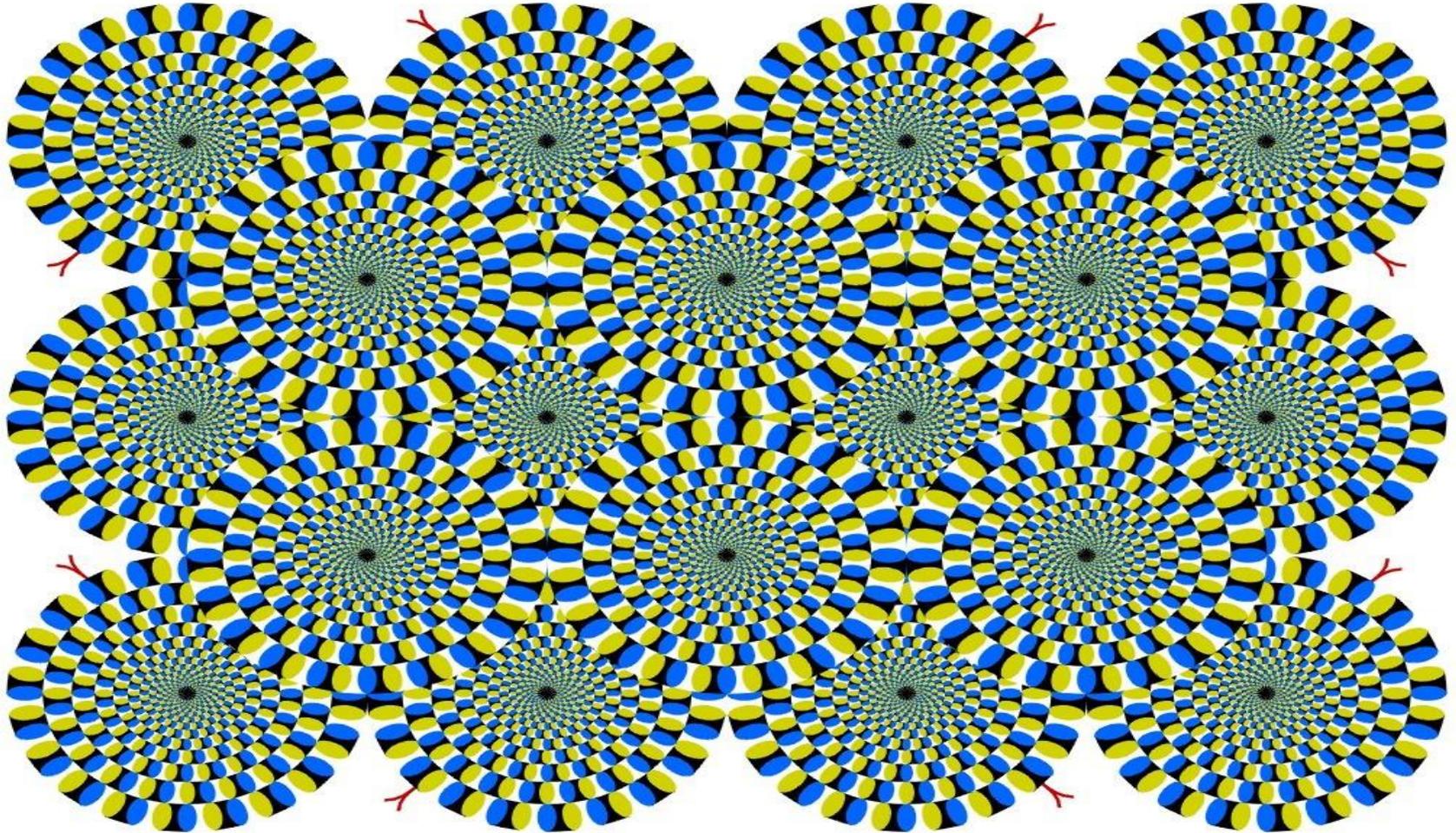
Top-down processing problems affect ADL

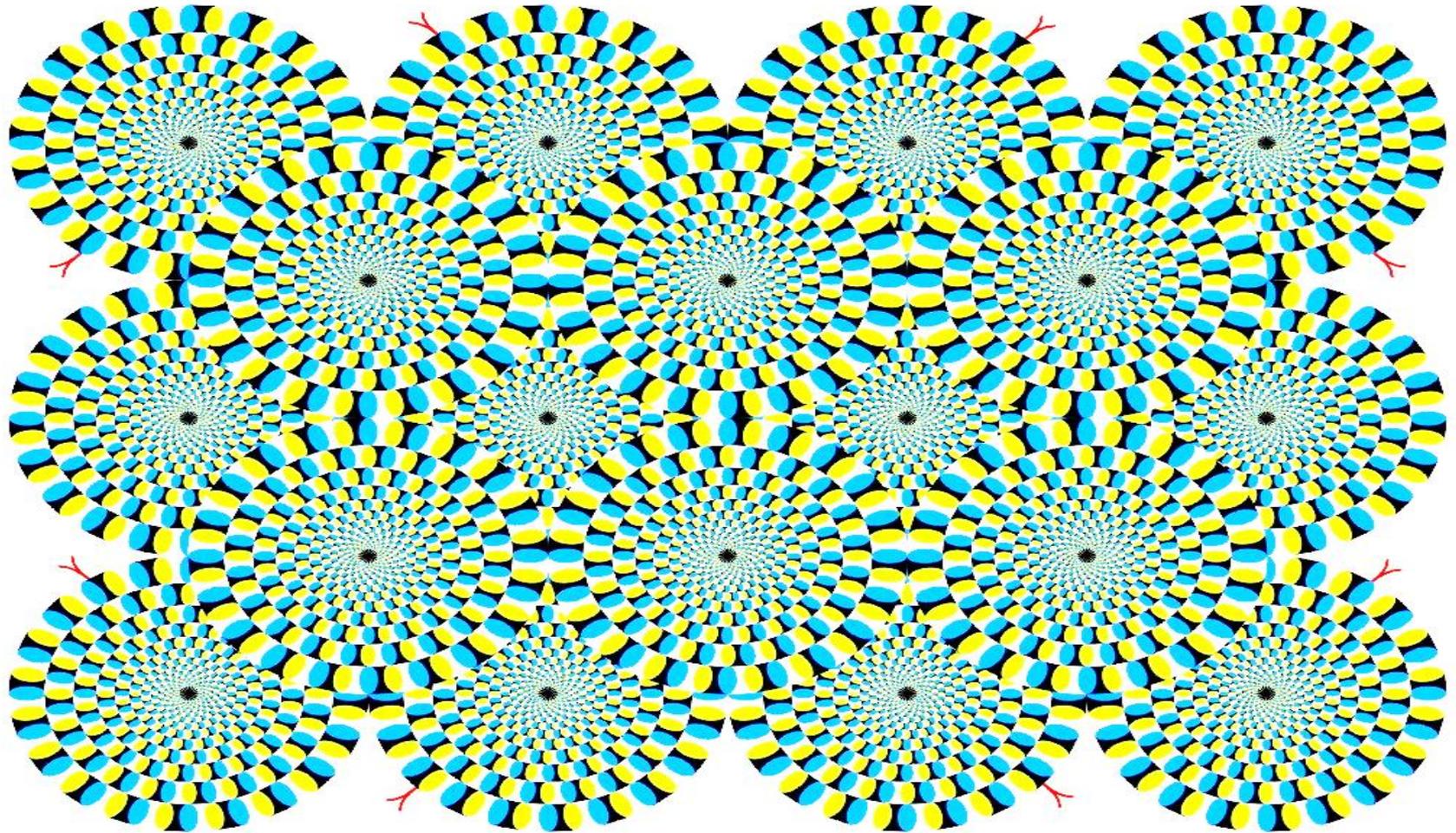Vision is not just data; it is emotion and memory.
Impaired conceptual visual association – the inability to link meaning and significance to a visual stimulus
A person living with ADD may see their daughter but fail to recognise the emotional significance; semantic knowledge is missing.

The illusion of movement

The illusion of movement

Rotating Snakes Illusion: The role of the Prefrontal Cortex

With many visual illusions, our bottom-up processing gets "tricked"

Normally, your PFC provides a "reality check" (top-down)

In DLB, impaired LGN function amplifies visual noise. The PFC is impaired by cholinergic deficits = pareidolia

Shine JM, Halliday GM, Gilat M, Matar E, Bolitho SJ, Carlos M, Naismith SL, Lewis SJ. The role of dysfunctional attentional control networks in visual misperceptions in Parkinson's disease. Hum Brain Mapp. 2014 May;35(5):2206-19. doi: 10.1002/hbm.22321.

Pareidolia vs Charles Bonnet Syndrome (CBS)

Feature	Pareidolia (Top-Down)	CBS (Bottom-Up)
Cause	Misinterpretation of real stimuli	Visual deprivation
Eyes closed	Persists	Stops
Lighting	Worse in low light	Worse in low light
Insight	Often absent	Usually present

Attentional Control in Vision

Dorsolateral PFC: Working memory ("Look out the window")

Two complementary systems:

- FOCUS system (Anterior Cingulate Cortex, adjacent to the PFC)
  - Supresses bottom-up noise
  - Amplifies the signal that matches reality
  - Failure = paraedolia
- FILTER system (OrbitoFrontal Cortex within the PFC)
  - Supresses distractions
  - Failure -> stimulus-bound behaviour (bvFTD)

Both require intact arousal and depend on neurotransmitters (acetylcholine for ACC, dopamine for OFC)

Clinical phenotypes - DLB

- Pathology: Alpha-synuclein aggregation in cortex + substantia nigra
- Neurotransmitter: Severe acetylcholine deficit (ACh critical for attention and visual processing)
- Increased visual noise from LGN/ACC disruption
- Arousal fluctuations -> unstable attention control
- Visual hallucination **(~80%)**
- Pareidolia (seeing faces/patterns in noise)
- Complex, formed hallucinations (people, animals)
- Worse in low light, often non-threatening initially
- Mechanism: Fusiform face area hyperactivity + impaired reality monitoning (PFC-temporal disconnection)

McKeith IG et. al., Diagnosis and management of dementia with Lewy bodies: Fourth consensus report of the DLB Consortium. Neurology. 2017 Jul 4;89(1):88-100. doi: 10.1212/WNL.0000000000004058.

DLB

Clinical phenotypes - bvFTD

- Pathology – Frontotemporal neuronal loss, TDP-43/tau protein
- Key affected areas: OFC, anterior insula, ACC
- Neurotransmitter: Serotonin disruption
- Visual symptoms:
  - **Stimulus-bound/utilisation behaviour**
  - Impaired visual social cue reading
  - Loss of salience
  - No hallucinations as no effect on LGN

Clinical phenotypes - ADD

- Pathology: Amyloid plaques + tau tangles
  - Posterior > anterior initially
  - Parietal cortex particularly vulnerable
- Global degeneration, typically hippocampus -> parietal -> temporal cortex
- Neurotransmitter: Acetylecholine deficit (affects DLPFC "working memory")
- Visual symptoms:
  - Dorsal "where" stream dysfunction predominates:
    - Depth perception loss
    - Spatial disorientation
    - Motion perception impairment
    - Visual attention deficits
  - Ventral "what" stream dysfunction later:
    - Object/face recognition
- Progression:
  - Early stage (colour discrimination, contrast loss, peripheral inattention)
  - -> Visual-spatial (visual fixation/tracking, hand-eye coordination)
  - -> visual-perceptual (drawing, processing visual information)
  - -> visual-recognition (loss of meaning)

Cronin-Golomb A, Corkin S, Growdon JH. Visual dysfunction predicts cognitive deficits in Alzheimer's disease. Optom Vis Sci. 1995 Mar;72(3):168-76. doi: 10.1097/00006324-199503000-00004.

Clinical phenotypes – PCA

- Also called visual variant ADD
- Pathology: ADD proteins (amyloid/tau) but posterior distribution
- Affects: Occipital and posterior parietal/temporal cortex
- Typical age: 50-65 years
- Visual symptoms severe, but memory initially preserved
  - Reading difficulty (alexia)
  - Object recognition (agnosia)
  - Spatial disorientation
  - Simultanagnosia (cannot see whole scene)
  - Optic ataxia (miss reaching for objects)
- Cognition: Memory relatively preserved until late

"I have the opposite of a superpower; sometimes I cannot see what is there. I see the teacup with my eyes, but my brain refuses to send me the teacup message"

Sir Terry Pratchett

Clinical phenotypes - VaD

- Pathology – microvascular disease -> ischaemia -> localised white matter degeneration and synaptic disconnection
- Pattern: "disconnection syndrome"
  - Intact cortical areas but disrupted connections
  - Subcortical ischaemia affects processing speed
  - Stepwise decline correlating with vascular events
- Visual symptoms:
  - Slowed visual processing (bradyphrenia)
    - Like a video running at 5fps instead of 30
    - Long pauses needed to "buffer" complex/new visual scenes
    - Can't read subtitles – too quick!
  - Affects top-down and bottom-up systems
    - Visual features arrive at different times
    - ACC cannot coordinate attention fast enough
  - Fragmented, sequential rather than simultaneous processing

Crutch et. al., Alzheimer's Association ISTAART Atypical Alzheimer's Disease and Associated Syndromes Professional Interest Area. Consensus classification of posterior cortical atrophy. Alzheimers Dement. 2017 Aug;13(8):870-884. doi: 10.1016/j.jalz.2017.01.014.

Putting everything together

Dementia Type	Primary Dysfunction	Key Visual Symptoms
ADD	Dorsal > Ventral	Spatial, depth, motion, general peripheral inattention, recognition
PCA	Ventral, Dorsal, Visual Cortex	All visual, preserved memory
DLB	Top-Down control (ACC)	Complex "real" hallucinations, fluctuating severity
bvFTD	Filtering (OFC)	Visual stimulus-bound, social cues
VaD	Processing speed	Slowed visual integration

Case 1 - Nigel

76yo, ADD

Problem: Eyesight is 20/20 but he gets lost in the hallway

Potential mechanism: Dorsal stream failure, struggling to map the 3D space

Possible intervention: High contrast borders, picture signs, remove patterned rugs (may look like holes)

Suzuki et. al., Dementia Care Research and Psychosocial Factors. Alzheimers Dement. 2025 Dec;21 Suppl 4(Suppl 4):e103943. doi: 10.1002/alz70858_103943.

Case 2 - Doris

68yo bvFTD

Problem: She can't finish her meal, she stares at the birds outside or watches television instead.

Potential mechanism: Tectopulvinar/OFC failure; unable to gate the motion of birds/TV.

Possible interventions: Reduce visual distractions (Close curtains during meals, plain crockery, turn off TV), structured meal times.

Case 3 - Tina

80yo, unspecified dementia

Problem: She reaches for her cup and knocks it over. She halts at changes in flooring.

Potential mechanism: Spatial integration deficit – loss of depth perception/hand-eye coordination

Possible intervention: Pour liquids into high contrast cups. Consistent flooring, even room lighting.

Case 4 - Simon

72yo, Posterior Cortical Atrophy (PCA)

Problem: He walks past his wife like he doesn't know her but his vision seems fine otherwise.

Potential mechanism: Ventral stream dysfunction; prosopagnosia (face blindness)

Possible intervention: Family education. Voice recognition strategies, wife wears familiar clothes, name tags.

Ethical and Legal Context

Mental Capacity Act 2005 principles:

- "Assume capacity unless proven otherwise"
- Least restrictive and best interests decisions
- Formal capacity assessment for high-risk decision (e.g. care transition)

Safeguarding:

- Misinterpreting hazards - *perceiving patterned floors as holes*
- Self-neglect - *Not perceiving food/drink*
- Risk of exploitation/abuse – *dependency or confusion from visual misinterpretation*

Ethical and Legal Context

Freedom of movement:

- Balancing safety and autonomy – enable mobility while minimizing risk
- Lighting and visual clutter may restrict safe mobility – de facto depravation of liberty
- Any restriction must comply with DoLS and Human Rights Act principles

Equality Act 2010:

- Ensure environments are inclusive and non-discriminatory
- Reasonable adjustments (non-patterned flooring, high contrast clear, good lighting)

Consent and best interest decisions:

- Involving person and family in environmental changes
- Document rationale for restrictive measures – review regularly

Management and Psychological Impact of Distressed Behaviours

Anxiety and agitation from misinterpreted stimuli

Pareidolia in LBD

Strategies:

- Reassurance and validation
- Familiar environments and routines
- Sundowning often has visual component – poor lighting may trigger confusion
- Link to personhood: Preserve identity and dignity.

Claire et. al., (2021) Effectiveness of Dementia Care Mapping™ to reduce agitation in care home residents with dementia: an open-cohort cluster randomised controlled trial, Aging & Mental Health, 25:8

Communicating with families/carers

Education:

- "The eyes work, but the brain struggles to interpret"
- Specific examples from their loved one's phenotype

Emotional support:

- Validate experiences ("I know it's frightening...")
- Avoid arguing about hallucinations
- Shared decision-making

Environmental modifications:

- Lighting: Bright, even, avoid shadows
- Contrast: High contrast for important objects
- Clutter: Minimise visual noise
- Flooring: Avoid patterns that look like holes/steps

Compensatory strategies:

- Labels with words and pictures
- Verbal cueing ("Look at your cup, it's the red one")
- Familiar objects/clothing
- Routine paths through home

Evidence-based Tips

- **Contrast** (Strong colour differences around objects)
- **Consistent Lighting** (Even, bright lighting, no shadows reduces visual noise)
- **Clutter** (Reduce visual noise/utilisation behaviour)
- **Familiar** objects/clothing/environments
- **Flags**: Verbal cues, labels/signs for rooms/objects
- **Fragmented tasks**: Simplify/break down complex tasks, avoid multitasking

Evidence-base for Environmental Interventions

- High-contrast tableware: 24% increase in food intake

- Dementia-friendly design: 30% reduction in agitation

- Lighting optimisation: Reducing sundowning in 58%

- Visual clutter reduction: Improved wayfinding in 70%

Dunne TE, Neargarder SA, Cipolloni PB, Cronin-Golomb A. Visual contrast enhances food and liquid intake in advanced Alzheimer's disease. Clin Nutr. 2004 Aug;23(4):533-8. doi: 10.1016/j.clnu.2003.09.015. PMID: 15297089.

Marquardt, G., Bueter, K. and Motzek, T., 2014. Impact of the design of the built environment on people with dementia: An evidence-based review. *HERD: Health Environments Research & Design Journal*, *8*(1), pp.127-157.

Figueiro, M.G. and Kales, H.C., 2021. Lighting and Alzheimer's disease and related dementias: Spotlight on sleep and depression. *Lighting Research & Technology*, *53*(5), pp.405-422.

Passini, R., Pigot, H., Rainville, C. and Tétreault, M.H., 2000. Wayfinding in a nursing home for advanced dementia of the Alzheimer's type. *Environment and Behavior*, *32*(5), pp.684-710.
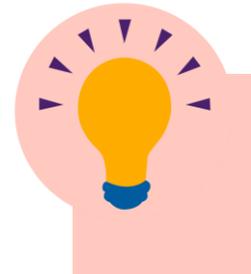
Thank you

Main reference:

Tales, A., Kremlacek, J., & Richards, E. (Eds.). (2025). A New Approach to Dementia: Examining Sensory and Perceptual Impairment (1st ed.). Routledge. https://doi.org/10.4324/9781003464136

Contact:

David.knight29@nhs.net

Consolidating Learning:

Reflection on the session & considering application to practice & what this means 'your people'

- Think about this session in relation to your own role

- How much of this was revision?

- What have you learned today ?

- How will this help you in your role ?

- Think about your EnCOP self–assessment; consider which performance indicators this session may relate to and how this can be used as part of your own development / competency achievement.

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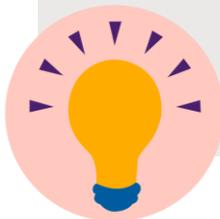
Reminder of linked EnCOP domains

Domain A : Values, Attitudes, Safe and Ethical Practice
Domain B: Partnership Working and Communication with Older People, Families, and Others
Domain C: Inter-professional and Inter-organisational working, communication, and collaboration
Domain D2: Ageing Well – Assessing, Planning, Implementing and Evaluating Care and Support with Older People
Domain D3: Ageing well: Promoting and supporting holistic physical health and wellbeing with older people
Domain D4: Ageing well: Promoting and supporting holistic psychological health and wellbeing with older people
Domain D5: Ageing Well - Promoting and Supporting Independence, Autonomy, and Community Connectivity for Older People
Domain D6: Ageing Well: Promoting and Supporting Medicines Optimisation with Older People

Year – 2025 Month	Session Title	Presenter(s)
Wednesday 25th February	Recognising and managing treatable eye disease in people living with dementia	David Knight Advanced Clinical Research Optometrist Newcastle upon Tyne Hospitals NHS Trust
Thursday 19th March 2026	Delirium and Dementia: Bridging Gaps in Recognition and Care	Professor Mani Santhana Krishnan, Tees Esk and Wear Valley Mental Health NHSFT, Anna Wilson, Lead Dementia Nurse, South Tees NHSFT, Dr Ahmad Khundakar, Teesside University
Thursday 23rd April 2026	NHC FT Decaf Project	Claire Collins , EnCOP Clinical Educator , Northumbria Healthcare FT
May TBC	Falls	
Wednesday 24th June 2026	Bowel and Bladder – Continence Title TBC	Jo Smith , Occupational Therapist , Bowel and Bladder Team , South Tees NHS Foundation Trust
Tuesday 21st July 2026	Narrative Medicine for the Wider Workforce	Dr James Fisher , Consultant Geriatrician , Northumbria Healthcare Foundation Trust

OCCUPATIONAL THERAPY CONFERENCE

FRIDAY 27 MARCH 2026
08.30 – 12.00

STRIVE Academic Centre
The James Cook University Hospital,
Marton Road, Middlesbrough, TS4 3BW

Join us for a **FREE half-day event** showcasing the creative and innovative work delivered by our **Integrated Occupational Therapy Service**. Discover how early, proactive support helps people live well and reduces pressure across the system

LEARNING OUTCOMES

- Gain a deeper understanding of clinical specialities across the partnership
- Learn from real-world experiences in service development
- Explore how occupational therapists act as **changemakers**, leading innovation and improving access for us all
- Understand the life-changing impact of Occupational Therapy
- Hear from experts across a wide range of clinical specialities

TARGET AUDIENCE

- Occupational Therapists and OT Support Staff
- Allied Health Professionals
- Service Managers and Leaders
- Students and Educators in Health and Social Care
- Commissioners and Partnership Stakeholders
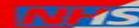- Health and social care staff

Right Support, Right Time: Unlocking the Power of Occupational Therapy

Stalls and **exhibits** featuring the latest clinical developments, ongoing projects, equipment and assistive devices will be **available for viewing** throughout the day

events.southtees.nhs.uk

TO BOOK VISIT

NHS
University Hospitals Tees

Better mealtimes for people living with dementia
Sustainability and cultural diversity

❑ We have developed a care homes training course about good practice in mealtime care. We have recently received funding from NIHR for a new project, which will make sure the training leads to lasting improvements, and is meaningful for staff and residents from diverse cultural backgrounds.

❑ We would like people to give us advice on how to do this new project well. People with relevant experience and insight into the topic.

❑ This could include people living with dementia, carers of people living with dementia, care home residents, care home staff, and other health and care professionals

❑ Your involvement means the project is more likely to lead to real benefits for people living with dementia. And helps to ensure that taking part in the project is a positive experience. We would also love your help with looking at the project findings, and making sure they get turned into something practical and helpful for the care homes community.

❑ We expect there to be about 4 meetings in total, and they will take place every few months. There will be different options for meeting up, to suit people's preferences. E.g. in-person, online, in a group, or one-to-one. We can reimburse reasonable travel expenses and provide gift vouchers in acknowledgement of people's time.

To find out more please contact **James Faraday** on james.faraday@nhs.net or 07513702894

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Enhanced Care for Older People

Feedback about today's session and any future sessions you may like to see included in our webinar series….

All feedback welcomed; You may want to consider the following –

Was it easy to book onto the session?
Did you find the session went well in this online format ?
Was the content of the session relevant to your area of practice / job role?
Did you enjoy the session?

Thinking about future webinar's, which topics linked to older person's care would you be most interested in? Please put any suggestions in the chat.

Please comment in the chat today or feel free to email us: ghnt.encop@nhs.net

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More information can be found within the Frailty icare website

www.frailtyicare.org

Our EnCOP pages are located in the workforce section

EnCOP Library of Learning & Development Resources can be found at:
EnCOP Assessment Toolkit Domains « I-Care (frailtyicare.org.uk)

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