Assessing spatial dysfunction in O&M and the classroom

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TSBVI Coffee Hour – 13 February 2023

# What is spatial cognition?

Making sense of space, getting your bearings, continually updating as you move, mental mapping, self-to-object relationships, object-to-object relationships, orientation.

Spatial concepts: Lines, angles, 2D & 3D shapes, parallel, perpendicular, adjacent, diagonal, tessellation, nesting, layers, left, right, contralaterality, clockwise, anticlockwise, under, over, behind, in front, longer, shorter, bigger, triangulation, dead reckoning.

# Recognising spatial dysfunction in O&M

Observe: imprecise hand reach, groping & hand-trailing, ricochet wayfinding, easily disorientated, veering, foot-shuffling, uncertain at turns, rarely a fluent, graceful traveller.

When teaching O&M: Vague/wrong about directions, can’t point accurately, difficulty following route instructions, trouble learning new routes, needs chaining, rote learning, lots of practice, difficulty retracing steps or reversing a route, hates maps

Life choices: Likes accompanied travel, travels in social places where help is available, uses live assistance apps, great social skills, prefers familiar, limited life-space, not anxious about being lost - pervasive disorientation is normal

What’s happening in the brain? - Neuropsychology assessment

Left side of the brain: WAIS; Speech and language: verbal understanding, verbal memory, learning a word list, learning a short story, memory for instructions; Writing

Right side of the brain: Look for fragmentation of space in visual-spatial tasks: Block Design subtest, Rey Complex Figure; Blindfold tasks: 3D Block Constructions; Stuart Tactile Maps.

What about braille?  
Language centres in left brain need to connect with spatial cognition in right brain.

Language disorder OR spatial dysfunction can cause problems learning braille.

# Spatial fragmentation – Oliver Zangwill

Father of British neuropsychology – worked with Soldiers with traumatic brain injury in WW2. Damage to RIGHT parietal lobe showed: spatial disorientation, difficulty with constructional tests, neglect, left homonymous hemianopia.

Rey Complex Figure Test shows fragmentation.

# 1. Parietal lobes

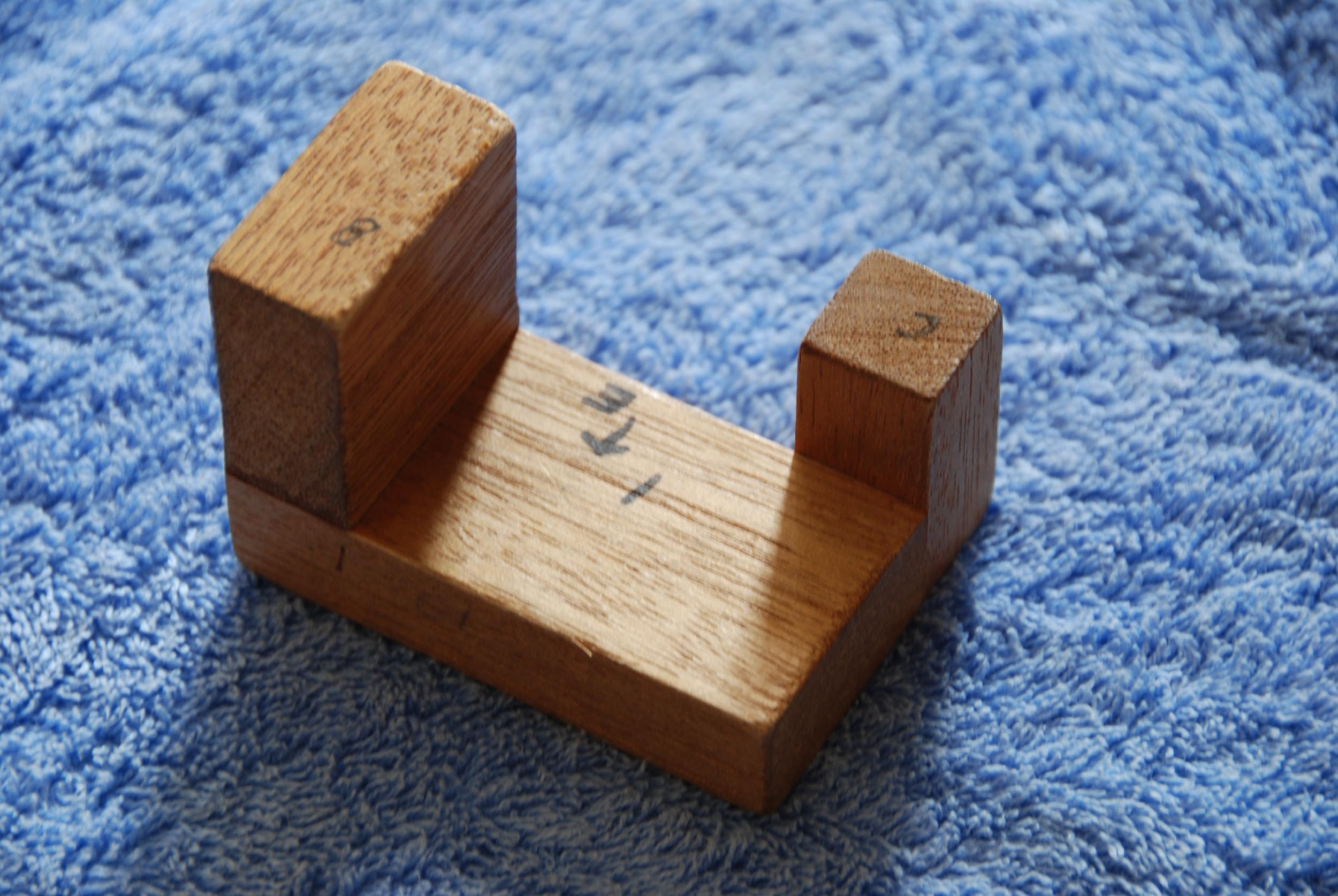
Sensory perception and integration in real time (no memory)

Left parietal: Language integration; Damage… spoken/ written language deficits

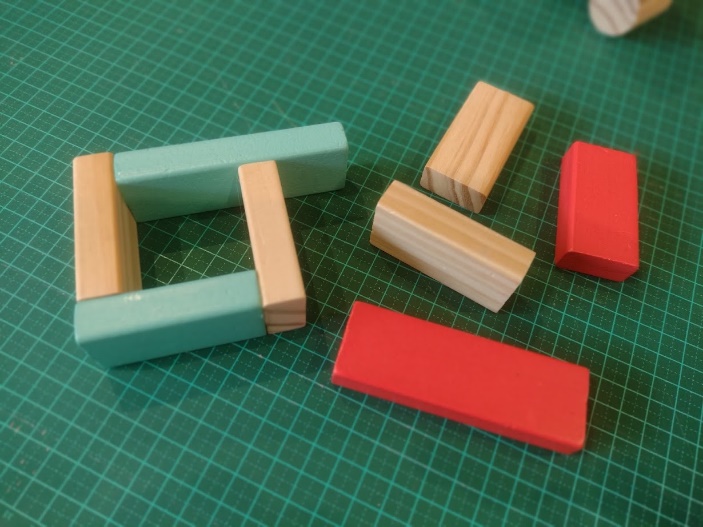
Right parietal: Spatial integration; Damage… visuo-spatial deficits

# 3D Block Constructions

Spatial assessment test created by Ian Stuart. Copy the fixed model with the loose blocks: Two hands, free exploration; actively comparing - no memory needed; sequenced complexity.



Hey kids – try this at home! Make your own 3D block models from commercially available blocks and craft glue, or head to the shed and crank up the power tools. Right angles are simpler than triangles, cylinders and spheres. Stick with cuboids when assessing spatial dysfunction – don’t try to build the Taj Mahal!

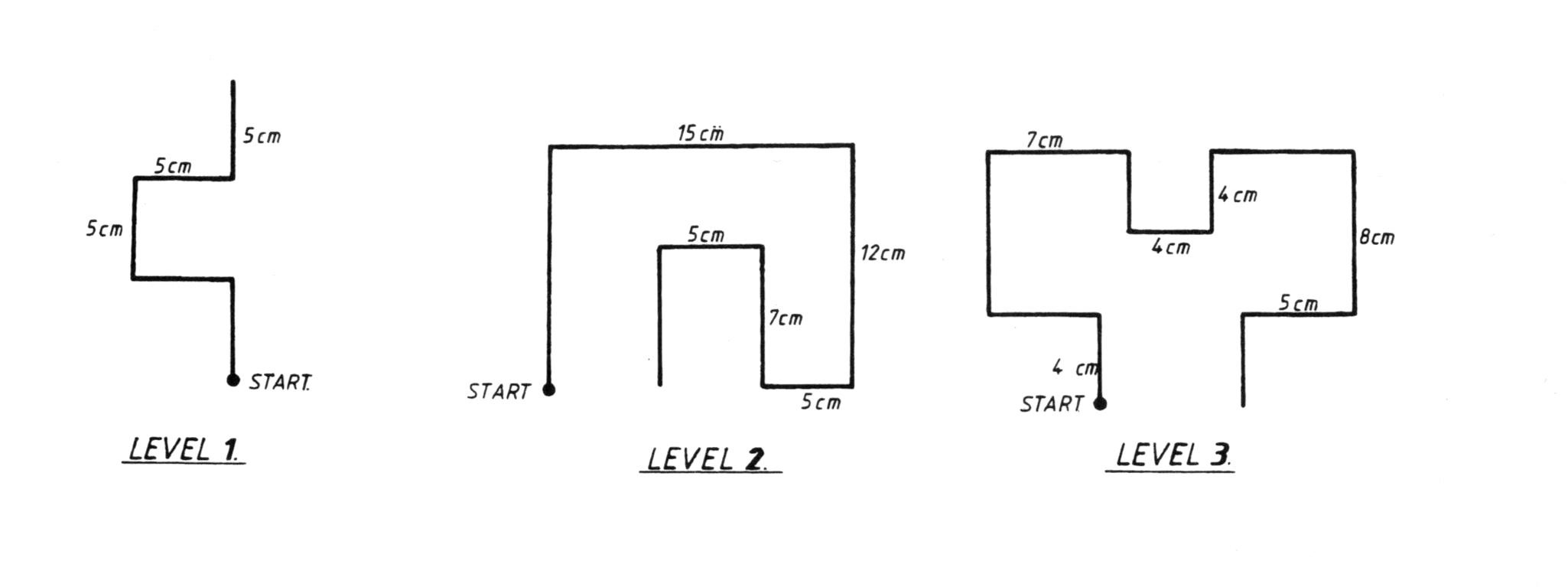


# 2. Hippocampus

Memory for recent events; Susceptible to brain damage

Right hippocampus: spatial memory = mental mapping

# Stuart Tactile Maps

Can s/he remember a sequence of lines/turns? How complex? How much practice is needed?

Stuart Tactile Maps - Assessment kit is available through [www.lildeverell.net](http://www.lildeverell.net) and includes Instruction manual, Map Sets A & B, Non-slip mat, Blindfold. (Or you can make your own.)

Cost AUD$55: approximately US$60, CAD$80, €55, £50, ¥350, NZ$70

# In summary

Parietal lobe understands the spatial relationships (3D blocks); Hippocampus glues the information together (STMaps)

Understanding + some glue = might learn a spatial map

No understanding + no glue = cannot learn a spatial map - Need wayfinding methods that don’t use mental mapping, and consider the implications in the classroom.

# Wayfinding without mental mapping

Ricochet wayfinding, Shorelining, Rote learning, Counting steps, Kinaesthetic learning, Landmark recognition (beacon navigation, echolocation, Google streetview), Self talk, GPS apps – audio directions, Taxi, Uber, rideshare, Landmark lists (written, audio, story, song, photos, Compics, video, sequenced objects); Social navigation (social places, human guide, live apps – Aira), Dog mobility…

# References

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