Matchsticks Design & Memory: a 'culture fair' test of visuo-spatial learning & memory

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Study Aims:

Provide a test of visual learning and memory, appropriate for use with people from non-Western cultural communities, and derive preliminary psychometric data.

- Tasks were designed to be a fair parallel for existing tests
  - complex figure copy and recall formats e.g., ROCFT
- but not require facility with a pen/pencil, or drawing skills
- using familiar and low-cost materials.

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Background

Culture Specific Test Sets

- Research at UEL over last 10 years
- deriving and trialling short test batteries, for local communities
  - e.g., Polish, Turkish, Sylheti-Bengali, Urdu, Panjabi, east African Arabic
- working with BSc and MSc students from those communities.

- Translate new or existing materials, modified for cultural appropriateness
- Collect pilot data on *feasibility* (scores) and *acceptability* (feedback)
- Amend test set in light of pilot work, and then collect 'norms'
  - NB: very small convenience samples, built up slowly over time.

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Background

Domain	Test
Attention: selective & sustained	Shape scanning
STS & Working Memory	Forward & backward digit spans
Executive, verbal	Category fluency
Executive, visual	Flower Test
Executive, abstraction	Analogies or Relations
Language	Body-part and picture naming
Visuo-spatial	Matchsticks
Memory, verbal	Story immediate and delayed recall
Memory, visual	Matchstick Memory Test

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The problem

Sylheti-Bengali sample
with Fahmida Khanum

- Community-dwelling older adults
- N=31
- Sex: 16 female, 15 male
- Age: 65-77 years (M=70)
- Education: 0-10 years (M=5)

Rey-Osterrieth Complex Figure Test
- Score /36

- Copy Trial M=24.4 (12.57)
- N=25
- typical mean for age is ≈31

- Immediate M= 8.6 (9.73)
- N=25
- typical mean for age is ≈17

- Delayed Recall M= 6.9 (8.47)
- N=13
- typical mean for age is ≈16

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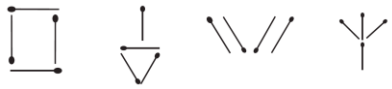
Background

Stick Construction Tests

- Miller & Tippet 1996: problem-solving with matchstick puzzles
- Matute et al 200o: literacy effects on stick construction tasks
- Baiyewu et al 2005: Stick design test of visuo-constructional ability



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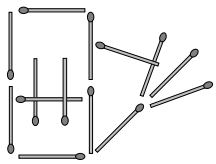
Stimuli

Older adult: 14 matchsticks



Copy

- Show design and ask examinee to copy, with model present.
- When complete, record and then scramble matchsticks.

Immediate

- Remove design and ask examinee to make the design again from memory.
- When complete, record and then scramble matchsticks.

Delayed

- After c20 minute interval, ask examinee to make the design again from memory.
- When complete, record and then remove matchsticks.

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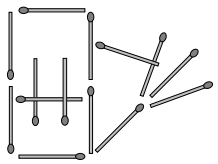
Stimuli

Scoring



- 14 matchsticks
- Each matchstick placed scores 1 or 2 points; total out of 28
  - 1 point if recognisable present in the location
  - 1 point if also properly placed:
    - head in correct position
    - angle correct
- Is tricky to score on the go:
  - take a photo of each reproduction with mobile phone.

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Pilot Data

Sylheti-Bengali sample
with Mahjabin Choudhury

- Community-dwelling older adults
- N=25
- Sex: 14 female, 11 male
- Age: 65-80 years (M=72)
- Education: 0-16 years (M=6)

Matchstick Design & Memory
- Score /28

- Copy Trial M= 22.0 (5.81)
- N=25

- Immediate M= 17.00 (5.01)
- N=25

- Delayed M= 13.76 (4.65)
- N=25

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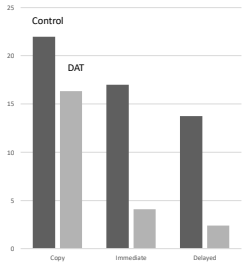
Pilot Data: known group

Sylheti-Bengali MAS attenders

Matchstick Design & Memory
- Score /28

- MDT diagnosis of DAT
- First cognitive assessment
- N=6
- Sex: 3 female, 3 male
- Age: 67-82 years (M=74)



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Summary 1

Visual Test of Learning & Memory

- Bangladeshi older adults struggled with a conventional task (ROCFT)
- Improved engagement & performance with matchsticks format
- Preliminary data, on known group validity, suggests clinical sensitivity

- Needs evidence of psychometric dependability
  - Structured norms
  - Reliability e.g., test-retest, inter-rater
  - Validity e.g., associations with other memory tests

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Summary 2

COVID19 and testing remotely

- After scrambling the matchsticks, the format leaves no trace for the participant
  - cf paper copy, if drawn
- Needs preparation - having matches available
  - So far, everyone has been able to find a box
- Screen size issues are reduced compared to an abstract design
  - familiar matchsticks provide their own 'calibration' for visual angle
- Record each reproduction with a print screen (screen grab)
  - consider recording remotely administered sessions.

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