On the face of it: Exploring the validity of spatial reasoning in the assessment of problem solving skills in the BioMedical Admissions Test (BMAT)

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Context

Assessments for selection into undergraduate degrees in medicine and related subjects
What are we broadly looking for?

Students with the potential to succeed:

- Ability to apply their curriculum knowledge
- Students with the relevant cognitive skills
- Students with the relevant non-cognitive skills
How do we identify these candidates?

Through assessment…

• But, what curriculum knowledge?

• And, what are the “relevant skills”?

spatial reasoning?
What is spatial reasoning?

One’s ability to **visualise**, **manipulate**, **maintain** and **retrieve** visual-spatial information (including 2D or 3D shapes or structures)
How do you assess spatial reasoning?

Through practical tasks in an assessment (e.g. MMIs)

Through a paper/computer assessment
The diagram shows a square piece of paper with identical semi-circles cut out half way along three of its edges.

Which of the following is not a possible view of the paper after it has been folded along one of the dotted lines?

A  

B  

C  

D  

E
Validity

But is spatial reasoning a valid assessment?

N.B. context
Aims

1. Determine the **validity** of assessing **spatial reasoning** and its alignment with the **problem solving** construct

2. Develop a **justification** for assessing **spatial reasoning** in the context

3. Ensure that the skills assessed are **learnable** by candidates
Methodology

- Quantitative analysis
- Stakeholder engagement
- Literature review
Results – Validity

Research outcomes suggest spatial ability is positively associated with STEM disciplines.

Data analysis of item performance demonstrates items perform well.

Assessment of spatial reasoning may have a positive washback on students, directly relevant and useful to a range of medical studies and professions.
Results – Validity

Stakeholders had differing views on the relevance and its usefulness in undergraduate study.

Test-takers commented on specific curricula areas where it was perceived as particularly useful.
Spatial reasoning is a problem solving skill, with two distinct sub-systems: visual and spatial.

Research also indicates that spatial and numerical thinking are related.

Particular visuospatial tasks are more cognitively demanding than others.
Results – Learnable

Spatial skills are:

- Highly **malleable**
- Can be learnt through **targeted training**

  *e.g. Lowrie, T., Logan, T., & Ramful, A. (2017)*
Where do we go from here?

Spatial reasoning will remain in BMAT section 1

Future research to understand the positive washback on students
Thank you

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