

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?

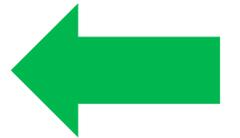
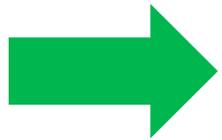
Students with the **potential** to succeed:

- 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”?



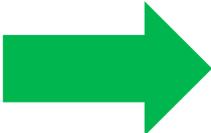
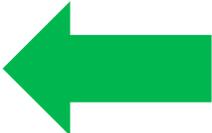
spatial reasoning?

What is spatial reasoning?

One's ability to **visualise, manipulate, maintain**
and **retrieve visual-spatial information**
(including 2D or 3D shapes or structures)

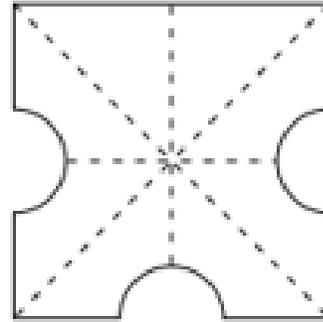
How do you assess spatial reasoning?

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.

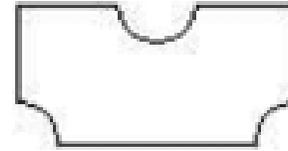


Which of the following is **not** a possible view of the paper after it has been folded along one of the dotted lines?

A



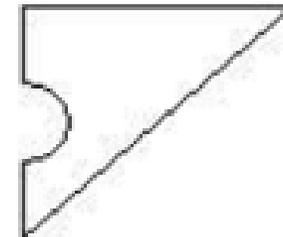
B



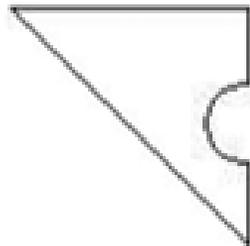
C



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

Results – Problem Solving

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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