Time to re-think admissions tests?

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Admission to Medical School

- Highly competitive process
- Aim to admit students who are
  - Motivated
  - Empathic
  - Able to communicate effectively
  - Able to make decisions and solve problems
  - Collaborative and able to work effectively in a team
- Usual criteria
  - Academic achievement
  - Cognitive assessment: performance in written test
  - Non-cognitive assessment: performance at interview

Effectiveness

- Pre-admission grades / GPA:
  - predict academic performance
  - evidence for predicting clinical performance inconclusive
- Written tests:
  - MCAT predicts academic performance slightly better than GPA
  - evidence for predicting clinical performance inconclusive
- Interviews:
  - inter- and intra-rater reliability highly variable (regardless of format)
  - evidence for predicting academic or clinical performance inconclusive (despite face validity)

Salvatori (2001)

Aim

- To what extent do students' entry characteristics, particularly performance against specific admission criteria, predict subsequent performance in medical school?
- Performance indicators
  - Academic achievement
  - Clinical reasoning

Setting

- University of Queensland (UQ) & University of Sydney (USyd) medical schools.
- Both offer 4-year, graduate-entry medical programs.
- Admission determined by GPA, and performance at GAMSAT and interview.

Performance Indicators

- Clinical Reasoning Problems (CRPs)
  - Presentation, history and physical exam
  - Two most likely diagnoses
  - Features for/against each
- Diagnostic Thinking Inventory (DTI)
  - Flexibility of thinking
  - Structure of knowledge
- Year 2 examinations - overall score

Participants

Year of Program	University of Queensland	University of Sydney
2	29	50
3	18	30
4	34	28
Total	81	108

Procedure & Analysis

- Collate participants' scores on CRPs and DTI, entry characteristics (age, gender, prior degree, GAMSAT and interview scores) and Year 2 overall examination score
- Compare entry characteristics
  - Participants with non-participants in their year group
  - UQ and USyd participants
- Determine relationship between entry characteristics and clinical reasoning / examination performance

Preliminary Results

- *Participants vs Year Group*
  - No differences for gender, background, GAMSAT or interview scores
  - Participants older than non-participants
  - Higher scores on written communication
- *UQ vs USyd Participants*
  - No difference in interview scores
  - UQ younger, higher GAMSAT score
  - Both showed progressive increase in CRP & DTI scores from Year 2 to Year 4

Performance Indicators

- ***Clinical Reasoning***: CRPs
  - No age- or gender-related differences
  - Non-biological background associated with lower score ($p < 0.05$)
  - Poor correlation with GAMSAT ($-0.18 < r < 0.14$)
  - No correlation with interview (UQ: $r = -0.02$, USyd: $r = -0.05$)

Performance Indicators

- ***Clinical Reasoning***: DTI
  - No age-, gender- or background-related differences
  - Weak negative correlation with GAMSAT ($-0.31 < r < -0.04$) – significant for UQ only
  - Poor correlation with interview (UQ: $r = 0.16$, USyd: $r = -0.13$)

Performance Indicators

- ***Academic achievement***: Year 2 Exam score
  - No age- or gender-related differences
  - Non-biological background associated with lower score (UQ: $p = 0.05$; USyd: $p = 0.07$)
  - Weak correlation with GAMSAT ($0.18 < r < 0.23$) - total and BCS scales only
  - Poor correlation with interview (UQ: $r = -0.19$; USyd: $r = -0.01$)

Summary

- No evidence that age or gender affects performance
- Students with non-biological background perform less well on knowledge-dependent measures
- GAMSAT
  - is a weak predictor of academic achievement
  - does not predict clinical reasoning skill
- Interview does not predict either academic achievement or clinical reasoning skill

Conclusion

- Limitations:
  - Small sample size
  - Sample restricted to those who reached GAMSAT threshold score

Nevertheless, results indicate need for:

- Large scale, multi-institutional analysis of GAMSAT to determine predictive validity
- Trial of other methods of non-cognitive assessment to replace interview.

THANK YOU

Predictors of Performance (1)

UQ N = 81		CRP Mean (SD)	Flexibility Mean (SD)	Structure Mean (SD)	Total DTI Mean (SD)	Year 2 score Mean (SD)
Sex	Male	179.10 (30.97)	88.28 (7.92)	81.54 (9.72)	169.82 (15.12)	69.77 (5.82)
	Female	190.21 (31.86)	89.88 (8.46)	83.05 (9.26)	173.24 (15.37)	69.30 (6.36)
	Significance (p)	0.12	0.38	0.48	0.32	0.74
Age	17-24 years	187.26 (31.98)	89.48 (8.37)	83.02 (9.52)	172.71 (15.09)	69.79 (5.87)
	25+ years	177.05 (30.42)	87.89 (7.67)	80.05 (9.11)	167.95 (15.58)	68.59 (6.83)
	Significance (p)	0.22	0.46	0.23	0.24	0.48
Academic background	Biological	189.30 (31.47)	89.48 (8.60)	82.70 (9.52)	172.38 (15.51)	70.19 (6.04)
	Non-biological	167.00 (25.67)	87.07 (6.07)	79.71 (8.85)	166.79 (13.46)	66.47 (5.37)
	Significance (p)	**0.02**	0.32	0.28	0.21	**0.04**
USyd N = 108		**CRP Mean (SD)**	**Flexibility Mean (SD)**	**Structure Mean (SD)**	**Total DTI Mean (SD)**	**Year 2 score Mean (SD)**
Sex	Male	171.02 (32.24)	89.93 (9.09)	83.05 (7.85)	173.02 (14.36)	0.27 (0.76)
	Female	178.82 (36.03)	85.68 (9.68)	81.54 (10.19)	167.06 (18.13)	0.40 (0.80)
	Significance (p)	0.26	**0.03**	0.42	0.08	0.38
Age	17-24 years	177.20 (38.67)	87.69 (9.54)	82.39 (9.77)	170.08 (17.37)	0.36 (0.77)
	25+ years	173.91 (28.25)	86.73 (9.88)	81.70 (8.82)	168.23 (16.52)	0.34 (0.81)
	Significance (p)	0.63	0.61	0.71	0.58	0.87
Academic background	Biological	180.35 (35.22)	86.86 (9.77)	82.61 (10.03)	169.48 (17.68)	0.42 (0.82)
	Non-biological	163.62 (30.54)	88.48 (9.36)	80.76 (7.21)	168.90 (15.16)	0.17 (0.66)
	Significance (p)	**0.03**	0.44	0.37	0.87	0.14

Predictors of Performance (2)

UQ (N = 80)		CRP	Flexibility	Structure	Total DTI	Year 2 results
Total GAMSAT	Correlation (r)	0.10	-0.28	-0.28	-0.31	0.23
	Significance (p)	0.93	0.01	0.01	< 0.01	0.05
Humanities & Social Sciences	Correlation (r)	0.11	-0.18	-0.12	-0.15	0.06
	Significance (p)	0.34	0.12	0.31	0.18	0.60
Written Communication	Correlation (r)	-0.04	0.01	-0.07	-0.04	-0.03
	Significance (p)	0.75	0.94	0.53	0.70	0.81
Biological & Chemical Sciences	Correlation (r)	0.01	**-0.23**	**-0.22**	**-0.24**	**0.21**
	Significance (p)	0.91	**0.04**	**0.05**	**0.03**	**0.06**
Interview	Correlation (r)	-0.02	0.11	0.16	0.16	-0.19
	Significance (p)	0.88	0.33	0.15	0.17	0.09
USyd (N = 108)		**CRP**	**Flexibility**	**Structure**	**Total DTI**	**Year 2 results**
Total GAMSAT	Correlation (r)	0.04	-0.04	-0.05	-0.05	0.18
	Significance (p)	0.69	0.72	0.59	0.66	*0.07*
Humanities & Social Sciences	Correlation (r)	-0.04	-0.14	-0.09	-0.13	0.13
	Significance (p)	0.70	0.17	0.38	0.20	0.20
Written Communication	Correlation (r)	-0.18	0.06	-0.02	0.03	-0.02
	Significance (p)	0.08	0.55	0.82	0.78	0.82
Biological & Chemical Sciences	Correlation (r)	0.14	-0.01	-0.03	-0.02	0.20
	Significance (p)	0.16	0.89	0.74	0.83	0.04
Interview	Correlation (r)	- 0.05	- 0.10	- 0.14	- 0.13	-0.01
	Significance (p)	0.60	0.30	0.16	0.20	0.91

Method

- ***Procedure***:
  - Complete CRPs and DTI
  - Record Year 2 examination scores
  - Record entry characteristics (gender, age, biological / non-biological prior degree, GAMSAT & interview scores
- ***Analysis***:
  - Compare participants with their year group
  - Compare UQ and USyd participants
  - Determine relationship between entry characteristics and clinical reasoning /