

The national benchmark test as a predictor of academic success in a cohort of medical students

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Background

- ❖ The National Benchmark Test (NBT) is a selection test design to assess academic readiness of students starting university (Marnewick, 2012).
- ❖ Three domains
 - Academic Literacy (AL), Mathematics (MAT) and Quantitative Literacy (QA)
- ❖ NBT are used to select and recommend the level of support students will require (Van der Westhuizen & Barlow-Jones, 2015).
- ❖ Five out of eight medical schools use NBT for selection (Van der Merwe, et al. 2016)
- ❖ The gap is linking the NBT to ongoing performance throughout the degree.



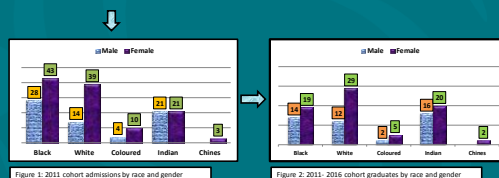
Aims and objectives

- ❖ Aim
 - To explore the predictive capacity of the NBT in the first, third and sixth year of study for the MBCh Programme while controlling for race and gender.
- ❖ Objective
 - To determine which among five predicting variables is or are the best predictor/s of academic success.



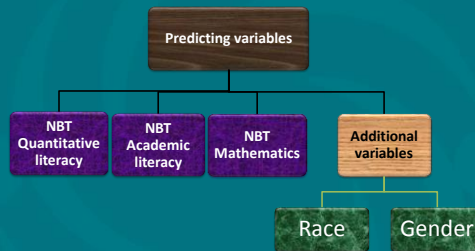
Methods: Sample

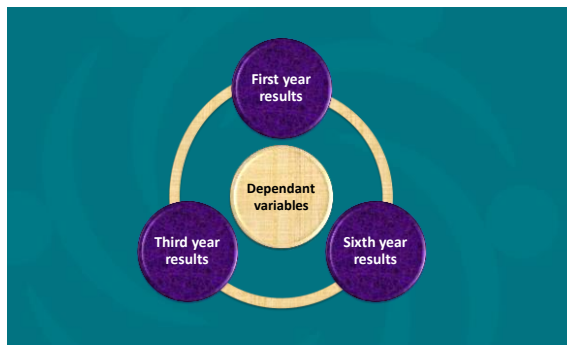
- ❖ A total of 183 students were admitted in 2011
- ❖ All students took NBT
- ❖ Sample comprises of n=121 students who completed MBCh in 2016



Methods: Research design

- ❖ Clusters bar charts were used to show demographics of the cohorts
- ❖ A hierarchical multiple regression was used to explore the predictive capacity of the NBT domains in students' academic success while controlling for gender and race as additional predicting variables.





Methods: Hierarchical Multiple regression assumptions

- ❖ The stem and leaf plots appeared symmetrical signalling that all variables in the regression models were normally distributed.
- ❖ Visual inspection of normal probability plot of standardised residuals, scatterplots of standardised residuals against standardised predicted values showed that the assumptions of normality, linearity and homoscedasticity were met.
- ❖ Two univariate outliers were identified and removed.
- ❖ The critical value for Mahalanobis distance χ^2 for $df = 5$ ($\alpha = 0.001$) of 20.52 for all cases in the data set was not exceeded.
- ❖ ANOVA confirmed the predictive utility of the models



Results: First year

- ❖ In model 1, NBT domains accounted for a statistically significant 35% of the variance in the academic success in the first years of study, $R^2 = .352$, $F(3, 115) = 20.89$, $p = .000$.
- ❖ In model 2, race and gender were added to the regression equation, and they collectively accounted for a significant 8% of the variability in the first year academic success, $R^2 = .360$, $F(5, 113) = 12.78$, $p = .000$.
- ❖ The effect size of the regression model was large ($f^2 = .56$)

Model		Unstandardized Coefficients	Standardised Coefficients	Sig.
		B	Beta	
1	NBT Mathematics	.139	.249	.000
	NBT Academic literacy	.297	.251	.000
	NBT Quantitative literacy	.166	.245	.010
2	NBT Mathematics	.162	.288	.002
	NBT Academic literacy	.229	.242	.000
	NBT Quantitative literacy	.183	.270	.000
	Race	-.446	-.074	.357
	Gender	1.158	.076	.352



Results: Third year

- In model 1, NBT domains accounted for a statistically significant 24% of the variance in the academic success in the third year of study, $R^2 = .243$, $F(3, 115) = 12.31$, $p = .000$.
- In model 2, race and gender were added to the regression equation, and they collectively accounted for a significant 37% of the variability in the third year academic success, $R^2 = .280$, $F(5, 113) = 8.77$, $p = .000$.
- The effect size of the regression model was large ($f^2 = .38$)

Model		Unstandardized Coefficients	Standardized Coefficients	Sig.
		B	Beta	
1	NBT Mathematics	.050	.120	.199
	NBT Academic literacy	.248	.343	.000
	NBT Quantitative literacy	.068	.134	.189
2	NBT Mathematics	.061	.146	.143
	NBT Academic literacy	.174	.240	.000
	NBT Quantitative literacy	.096	.251	.007
	Race	.188	.042	.645
	Gender	2.947	.207	.000



Results: Sixth year

- In model 1, NBT domains accounted for a statistically significant 26% of the variance in the academic success in the final year of study, $R^2 = .268$, $F(3, 115) = 14.03$, $p = .000$.
- In model 2, when race and gender were added to the model, they collectively accounted for a significant 44% of the variability in the sixth year academic success, $R^2 = .312$, $F(5, 113) = 10.24$, $p = .000$.
- The effect size of the regression model was large ($f^2 = .45$).

Model		Unstandardized Coefficients	Standardized Coefficients	Sig.
		B	Beta	
1	NBT Mathematics	.026	.090	.325
	NBT Academic literacy	.173	.346	.000
	NBT Quantitative literacy	.065	.186	.065
2	NBT Mathematics	.008	.033	.171
	NBT Academic literacy	.115	.238	.000
	NBT Quantitative literacy	.088	.252	.000
	Race	.023	.008	.933
	Gender	1.822	.232	.000



Discussion

- ❖ Academic literacy was a constant predictor of success in the first, third and sixth year of study.
 - Why?
- ❖ Gender emerged as an important predictor of success:
 - Female students work more harder than male students (Stoet, Geary, 2015; Zhou, 2014).
 - More female admitted to the MBBCh programme (Spielmanns & Julka, 2004)
- ❖ Social background plays a key role in students admission tests (Simmenroth-Nayda & Gorlich, 2015) and in academic performance (Subotzky & Prinsloo, 2011).
- ❖ Patterns of privilege: Of 119 successful students, 42 attended quintile five schools and 51 attended quintile 6 schools.



Limitations and Implications for future studies

- ❖ Only students with unimpeded academic progress were selected.
- ❖ Other possible predicting variables were not considered in the study
 - Place of origin
 - First generation students
 - Financial assistance
- ❖ Reconsider our position regarding the social justice concept
 - Develop and implement support for students according to the NBT performance levels results in which they were admitted with.
- ❖ Overrepresentation of students who attended quintile five and six schools.

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