Twenty Questions game performance at medical school entrance predicts clinical performance near graduation

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Introduction: This study is based on the premise that the Twenty Questions game tests the knowledge people acquire through their everyday lives and how well they organize and store that knowledge so that they can effectively retrieve, combine, and use it to address subsequent environmental challenges. As such it may be a useful indicator of how effectively medical student applicants will organize and store knowledge they acquire during medical training to support the work that they will do as doctors. The goal of this study was to determine whether Twenty Questions game performance at entrance into medical school predicts performance on a standardized patient based clinical performance examination near graduation.

Methods: This prospective, longitudinal, observational study involved all students in one medical school class playing a game of Twenty Questions on a non-medical topic during the first week of medical school. Near graduation these students completed a 14 case standardized patient based clinical performance examination. Performance on the twenty questions task at entry into medical school was compared to performance on the standardized patient examination.

Results: The 24 students who exhibited a logical approach to the Twenty Questions task performed better on all senior clinical performance examination measures than did those 26 students who used a random approach. Approach to the twenty questions task was a better predictor of senior examination diagnosis justification performance than was the Medical College Admissions Test (MCAT) Biological Science score and accounts for a substantial amount of score variation not attributable to a co-relationship with admissions test performance. Getting the right answer on the Twenty Questions task did not predict high performance on the clinical performance examination.

Discussion and Conclusions: It is no surprise that getting the right answer during a Twenty Questions game failed to predict high performance on a clinical performance examination near the end of medical school as only a small number of participants got the right answer. What was a surprise was the degree to which participant approach to a single 15-minute Twenty Question Game predicted performance on all four senior clinical comprehensive examination measures. The study should be replicated to assure that the results transfer across medical schools and classes. Conceptually, the Twenty Questions task is a measure of know how rather than just knowledge. It measures students’ effectiveness in processing and storing knowledge acquired in their everyday lives and their facility in retrieving and organizing knowledge to address subsequent environmental challenges. It provides information about how well applicants have profited from earlier instruction and learning encounters and how well their knowledge is organized to support real work.

Conclusion. Twenty Questions may be a useful predictor of how medical student applicants will process knowledge acquired during medical training. It adds value to MCAT results and can be fitted easily into one slot of a Mini Medical Interview as part of the admissions process.
assessed using Cronbach’s α and generalizability theory.

**Results:** In total, 2306 evaluations representing 291 departments were included. Exploratory factor analysis showed a 9-factor structure containing 35 items: teamwork, role of specialty tutor, coaching and assessment, formal education, resident peer collaboration, work adaptation to residents’ competence, patient sign-out, educational atmosphere and accessibility of supervisors. This structure explained 65.5% of the total variance. The fit was acceptable for the department level (CFI=0.89, TLI=0.88, SRMR=0.06, RMSEA=0.04) and acceptable to good for resident level (CFI=0.92, TLI=0.91, SRMR=0.04, RMSEA=0.04). Inter-scale correlations ranged from 0.32 to 0.52 for the resident level, and from 0.37 to 0.66 at the department level. Corrected item-total correlations ranged from 0.41 to 0.75 at the resident level, and 0.53 to 0.84 at the department level. Cronbach’s α for subscales ranged from 0.71 to 0.86 at the resident level and from 0.80 to 0.91 at the department level. Three resident evaluations were needed to assess the overall learning climate of a department and a minimum of eight residents to assess the subscales.

**Discussion and Conclusions:** Overall, the new D-RECT structure reflects the original questionnaire. Seven themes from the original questionnaire remained similar. Two new constructs (educational atmosphere and accessibility of supervision) emerged due to the rearrangement of the initial constructs. Statistical analyses showed that the instrument is internally valid and reliable on both the resident and department levels. The D-RECT remained multi-dimensional, which was appreciated when planning quality improvement activities. Furthermore, the D-RECT constructs can be fitted within a broader theoretical framework, covering the affective, cognitive, and instrumental facets of climate.[2] This study provides evidence of the reliability and internal validity of the D-RECT in measuring learning climate in residency training on both resident and department levels. Due to a reduction in items and the updated structure, the instrument is more accessible for practice and better suited for smaller departments. Future research could continue to provide validity evidence, including the response process and relationships with other variables.


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The relationship between outcomes on a non-academic entrance test and medical degree programme exit outcomes: a prospective UK-wide cohort study

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**Introduction:** Although being a doctor is not just about academic performance, the traditional methods of assessing non-academic factors in medical school selection have been heavily criticised (e.g., Cleland et al., 2012). To address the need to assess non-academic factors in medical school selection robustly, non-cognitive tests were included in the UK Clinical Aptitude Test (UKCAT: http://www.ukcat.ac.uk). We investigated the relationship between performance on these non-cognitive tests with performance during and on exit from medical school.

**Methods:** This was a quantitative study grounded in post-positivist research philosophy. We sampled all medical students from the 30 UKCAT consortium schools who graduated in 2013. We included the following in our analysis: candidate demographics, UKCAT non-cognitive scores, the Educational Performance Measure (EPM: medical school performance data) and UK national exit situational judgement test (SJT) outcomes. Data were compiled and analysed using SPSS 22. Pearson’s or Spearman’s correlations and ANOVA, Kruskal-Wallis or Mann Whitney as appropriate were used to examine the relationships between variables and SJT and EPM scores. Multilevel modelling was used to assess relationships between variables and adjust for confounders.

**Results:** 6294 students with UKCAT, EPM and SJT data were entered into the analysis. There were four types of non-cognitive test: 1) libertariancommunitarian, 2) NACE - including narcissism, aloofness, confidence and empathy, and NACE total score, 3) MEARS resilience score: self-esteem+optimism+control+self-discipline+emotional-nondefensiveness (END)+faking domains, 4) an abridged version of 1 and 3 combined. Multilevel regression showed that, after correcting for demographic factors, END predicted SJT and EPM decile. Interestingly, both aloofness and empathy in the NACE negatively influenced the SJT score.

**Discussion and Conclusions:** This is the first national study examining the relationship between performance on the UKCAT non-cognitive tests and that on medical school exit assessments. The emotional non-defensiveness (END) part of the MEARS test seemed to be the most useful test. However, the data reveal a pattern of relationships
between non-cognitive factors and medical school performance which do not fit neatly with theoretical expectations. Further research is required to scrutinise these relationships further.


Discussion and Conclusions: Medical students do experience anxiety relating to communication training and to clinical communication but the sources of this anxiety differs between the two contexts. Negative attitudes towards clinical communication training were associated with higher levels of perceived stress or social anxiety, difficulty in expressing anxiety to peers or within medicine and lower help seeking behaviour. This could suggest that students who would benefit most from support with communication-related anxiety are the least likely to seek such support. These results chime with medical student perceptions regarding mental wellbeing difficulties as a sign of weakness within medical culture[2]. This study highlights the role of communication-related anxiety in medical student attitudes towards clinical communication training. Medical schools should aim to create an environment whereby all students are confident in seeking support for such anxiety.