The Utility of Cognitive Testing in the Nurse Anesthesia Admission Process as a Novel Predictor of Situational Awareness and Academic Success

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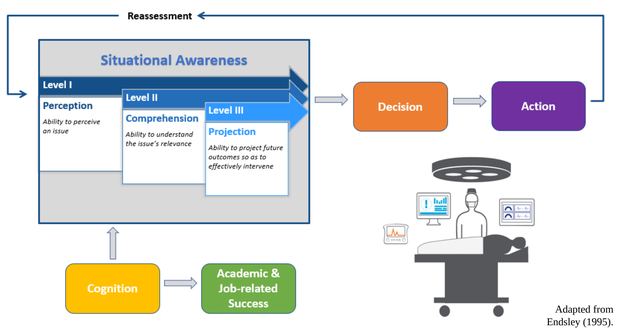
INTRODUCTION

- CRNAs must be prepared to manage the complexity of anesthetic practice where crisis can rapidly lead to catastrophe.
- Key to effective care is situational awareness (SA), without which, medical error may arise with costly consequences.
- In academia predicting potential students' abilities to develop SA is a challenge confounded by limited evidence-based admission criteria and a need to graduate efficient clinicians.

LITERATURE REVIEW

- SA is defined as one's ability to perceive an issue, understand its significance, and project future events so as to aptly intervene.
- A recent review of critical incident errors revealed anesthesia provider SA loss to account for 81.5% of errors. Higher levels of SA result in optimized outcomes and reduced human error.
- Personal attributes may be predictive of one's SA. It has been shown that as cognitive level increases, so too does level of SA.
- In student nurse anesthetists (SRNAs), among variables of memory, automaticity and cognition, only cognition was able to demonstrate a significant correlation with SA ($p < .05$).
- Other studies have demonstrated cognition's predictive implications for academic and job-related success.
- No studies have demonstrated cognitive testing utility in the SRNA admission process to predict SA and academic success.



Adapted from Endsley (1995).

RESEARCH DESIGN

Part I:

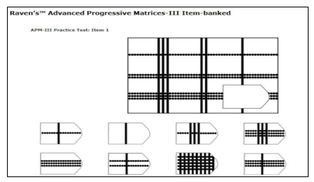
- IRB-approved retrospective, quantitative, correlational design examining the relationship between cognitive and admission status and their associations with traditional admission indices (GPA, ICU experience, CCRN score, interview score).

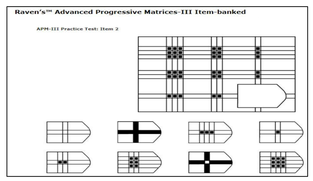
Part II:

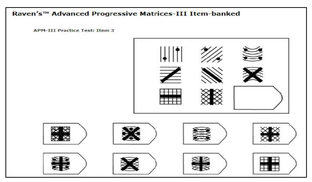
- Qualitative study of admission committee perceptions post-admission decision to assess the value they ascribe to SA, cognitive scores, and cognitive testing in the admission process.

METHODOLOGY

- After interviews, 37 candidates voluntarily completed the computerized, item-banked Raven's Advanced Progressive Matrices (APM-III) to assess cognition (examples below).
- Participation and scoring had no impact on admission decision as the admission committee was blinded to both. All results were strictly deidentified.
- Post-admission, the committee reviewed APM-III score reports and ranked projected performance. Data was compared with actual interview scores and admission outcomes.







RESULTS

Part I:

- No significant difference seen between APM-III scores of those admitted vs. not admitted.
- Admitted students had significantly higher interview scores ($p < .05$).
- No significant association seen among APM-III scores and traditional indices.
- Insignificant, negative associations among admission vs. CCRN, GPA and ICU years.
- APM-III scores and interview scores were positively correlated, though insignificant.

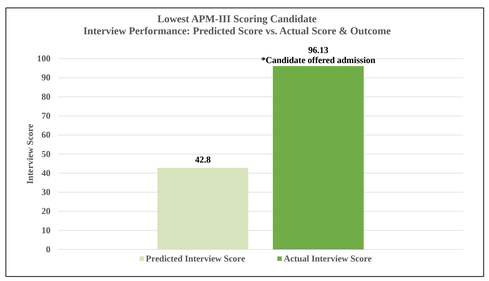
Part II:

- 88% believed SA to be "extremely important", while 53% felt current criteria predicts SA development "moderately well".
- 87% responded that level of cognition was "extremely important", and the majority felt an objective cognitive report would enrich overall evaluation.
- 83% rated the candidate with the lowest APM-III score as "below average". This candidate was offered admission (see below).

APM-III Score Report

Candidate Percentile 1%
Interpretation of Results:
This individual is likely to struggle with the level of perception and high-level clear thinking required to extract meaning out of confusion or ambiguity. In comparison with other individuals from the specified norm group, this individual is likely to:

- define the basic elements of most problems or situations; misperceive some of the key elements of complex situations.
- find it challenging to recognize some evident relationships among complex situations, events, or ideas.
- miss opportunities to integrate relevant information from a variety of perspectives when developing arguments.
- inadequately recognize or anticipate some of the key strategic implications of actions or decisions.
- have difficulty detecting complex cause-effect relationships.
- inadequately identify several of the key underlying causes of complex problems.
- overlook some relevant information that would be helpful to evaluate and make effective decisions regarding complex problems.
- draw conclusions that are insufficiently supported by available data or facts.
- find it challenging to learn complex concepts.
- develop insufficient insight into complex issues and situations.

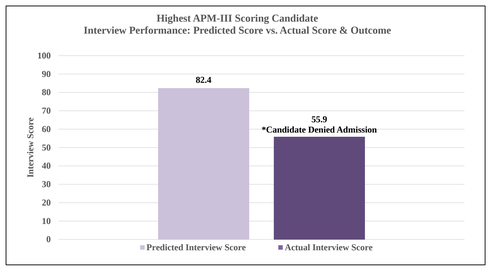


- 88% rated the candidate with the highest APM-III score as "above average". This candidate was not offered admission (see below).

APM-III Score Report

Candidate Percentile 62%
Interpretation of Results:
This individual would likely be able to generally handle the level of perception and high-level clear thinking required to extract meaning out of confusion and ambiguity. In comparison with other individuals from the specified norm group, this individual is likely to be able to:

- define the general elements of most complex problems and situations clearly and objectively.
- recognize most relationships among complex situations, events, or ideas.
- build arguments that integrate several pieces of relevant information from diverse perspectives.
- recognize several strategic implications of decisions and actions.
- identify several of the underlying causes of complex problems, although may miss some causes that are especially subtle.
- use most of the available relevant information to evaluate and make effective decisions regarding complex problems.
- draw accurate conclusions from information in most situations.
- effectively learn complex concepts but might occasionally miss a full grasp of some complex concepts.
- develop sufficient insight into complex issues and situations



CONCLUSIONS

- Insignificant results & lack of correlations suggest that cognition is not a formally measured admission metric.
- While traditional measures are used to predict success, as CCRN scores, GPA, and ICU years increase, admission chances decline.
- The only criterion with a significant impact on admission was interview score, a subjective measure.
- Results demonstrate a lack in current admission criteria guidance, while raising the question of whether candidates with the greatest cognitive potential are being admitted.
- Lack of associations are underscored by the distribution of scores and candidate admission status. Notably, the candidate with the highest score was denied admission, whereas that with the lowest score was offered admission.

PRACTICE IMPLICATIONS

- Measuring cognition in the interview process may provide an objective metric that captures applicants with superior potential to develop SA and succeed academically amidst current admission criteria lacking in evidence.
- The committee found potential in the utility of cognitive testing such that future use of APM-III cognitive reports would influence their overall appraisal of candidates.
- Use of this tool may also yield positive financial impact as the admission of more qualified candidates may reduce costs associated with both attrition and future clinical errors.
- Further investigation of personality testing traits that may affect interview performance & SRNA tenure is warranted.

REDUCE COSTS **IMPROVE CARE**

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