The xQ: A short test that captures the core of fingerprint expertise

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Abstract Body (Introduction, Background, Results and Conclusion)

Introduction

Longitudinal research has shown that it is possible to predict future expertise in fingerprint examination by measuring performance across multiple specialised fingerprint tasks (Searston & Tangen, 2017). Similar multi-task methods for measuring expertise have also been successfully applied in medicine to distinguish among cohorts of high performing medical students (Eva et al., 2004). In this talk, we present the Expertise Quotient (or xQ) — a novel measure of expert performance in fingerprint examination that makes use of these same multi-task methodological principles.

Background

The xQ reduces a series of ten exhaustive fingerprint tasks down to three tasks: recognition memory for fingerprints, finger nomination, and latent fingerprint matching. The original ten tasks were chosen to capture multiple and varied components of the fingerprint examination process and included 603 cases that took over 3 hours for each participant to complete. All ten tasks were completed by 44 Australian fingerprint experts and 44 student, paid, and matched novices who had no prior experience in fingerprints. We pooled the decisions from the novices and compared their 'wisest' judgments with the experts across the tasks. In doing so, we tested all-possible-combinations of tasks (3,628,800 combinations in total) to identify the top three that most optimally discriminated between experts and novices. We then ran all-possible-combinations of cases (over a quintillion combinations in total) within those top three tasks to identify the number of cases needed to optimally classify experts as experts and novices as novices.

Results

We were able to explain a surprising amount of variance among participants using just 34 cases from the top three tasks. The xQ also accounted for far more variance in performance than any one task alone, including latent fingerprint matching. A validation study probing the generalisability of the xQ further showed that this highly reduced measure of performance was able to correctly classify a new sample of fingerprint experts and non-experts.

Conclusion

We discuss the use of the xQ, as a robust and generalisable measure of fingerprint expertise, in training, selection, and competency testing contexts. This measure is just the first step in a large collaborative project with Australia's state and federal police agencies that aims to create the next generation of perceptual experts by improving crime scene evidence interpretation.

References (insert N/A if not applicable)

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