

Does the professional know their supracondylar from their gluteus maximus?

An international multiple centre investigation into nature versus nurture.

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One of the oldest arguments in the history of psychology is nature versus nurture. Applying this to a medical context: are doctors born or can medical education foster the skills required? As pressure on training time intensifies, do we need to focus on finding the natural-born doctors rather than the extra resources required to train the non-natural.¹

The fundamental question is identifying the factors that make a good doctor. Sir Peter Rubin, Chair of the General Medical Council (GMC), set out the need for the doctor to be comfortable with managing risk and dealing with uncertainty.² These macro skills are difficult to isolate and almost impossible to examine. More generic skills such as observation have also been identified by the GMC as prerequisites.³ These skills can be traced back to the father of modern medicine, Hippocrates, who based most of his work on observation.⁴ Further, J Charcot remarked in 1889, 'Let someone say of a doctor that he really knows his physiology or anatomy, that he is dynamic – these are real compliments; but if you say he is an observer, a man who really knows how to see, this is perhaps the greatest compliment one can make'.⁵

Institutions such as Yale and Stanford universities in the US, in their medical education, run courses on honing the art of observation. The Stanford course takes the medical students out of the hospital to the Cantor Arts Center, where visual ambiguity is explored, teaching students to observe without 'rushing to assign meaning to what they see'.⁶ These types of courses are endeavouring to counteract Boudreau *et al*'s two important interdictions in medical observation, 'never-never just at the part; always look at the whole' and 'never confuse the observation and the inference'.⁷

The research group was interested to explore whether undergraduate medical education improved clinical observation

or whether this skill was genetic. The most famous example of observational blindness comes from the expert world of radiology. Twenty-four of these highly trained observers were asked to perform a familiar lung nodule detection task. A gorilla, 48 times larger than the average nodule, was inserted in the last case, and 83% of radiologists did not see it. Eye tracking revealed that the majority of those who missed the gorilla had done so despite looking directly at it, thus demonstrating vulnerability to inattentive blindness.⁸ Similarly, Boudreau *et al* highlighted the dangers of ignoring the bigger picture and focusing on a single small area, leading to error.⁷ This would form the basis of our experiment.

MATERIALS AND METHODS

An online questionnaire was developed to test the observational skills of the participants. The premise of the design was to find similar objects when viewed at a micro level and to ascertain whether participants were able to distinguish between them. First, a pilot study was performed to fine tune the questionnaire using ten medical volunteers from a UK major trauma centre. From this pilot, three pairs of objects were identified as having a sufficiently similar micro-level appearance such that distinguishing between them would provide an excellent measure of observational skills. (A list of all the pairs of images used in the study are available to view online – [Appendix 1](#).) One such pair, as demonstrated in [Figure 1](#), is somewhat surprisingly the appearance of the natal cleft as compared to the medial aspect of the elbow crease when rotated through 180 degrees. In addition, other predictive factors were used to assess the subjects and to allow further comparison. These included position of responsibility, standardised intelligence quotient (IQ) and favourite television programme.

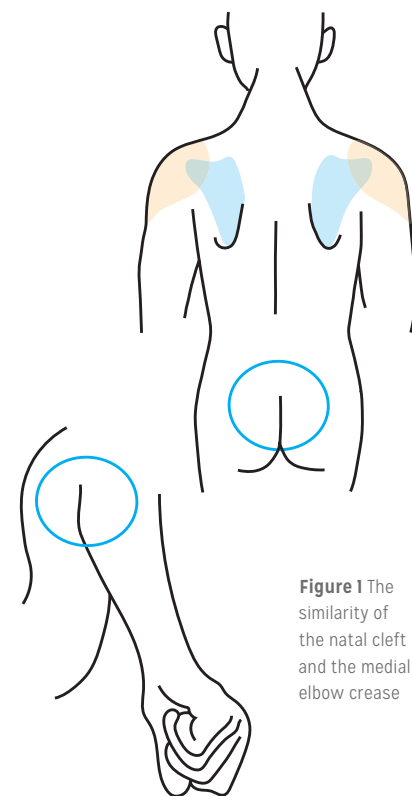


Figure 1 The similarity of the natal cleft and the medial elbow crease

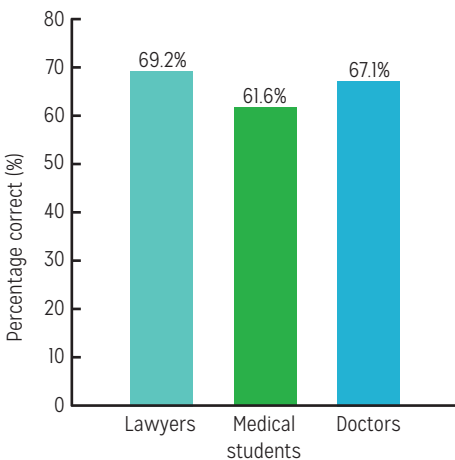
In partnership with hospital centres in Australia and throughout the UK, individuals were invited to participate via electronic communication in accordance with previous studies.⁹ No money or other inducements were offered for participation, although it was decided that the deployment of strong moral begging was acceptable under local and international guidance.⁹

Lawyers were used as the out of profession control group, principally because of ethical concerns towards the suggested rat control group, as there are some things that even rats should not be made to undertake.¹⁰ Thus, lawyers were identified as a satisfactory comparison group as they require a similar level and duration of training as doctors, they are routinely required to use observational skills in their practice and are not subject to the same ethical concerns as doctors.

We measured intelligence using a standardised IQ test. By definition, the average

Table 1 Range of intelligence quotient, maths ability and entertainment preference of the three groups

Factor	Medical students	Doctors	Lawyers
Age: Mean	23.4	35	46.2
Range	19–27	25–65	28–59
IQ: Mean	112.8	118.2	119.7
Range	109–134	112–121	105–141
Preferred TV show	<i>Made in Chelsea</i>	<i>Made in Chelsea</i>	<i>The X Factor</i>

Figure 2 Proportion of correct responses when individuals were shown photographs of supracondylars versus gluteus maximus

IQ of the general population is 100, with a standard deviation from the mean (SD) of 15. We used a shortened test of seven questions to formally test IQ. We collected the data using SurveyMonkey and then collated them in Excel, using XLSTAT to analyse. We examined both IQ and anatomy questions for normality using Shapiro-Wilk, and then used T-test statistical analysis to assess significance.

RESULTS

A total of 237 responses were received. Unsurprisingly, the medically qualified personal (35 years, SD: 25–65 years) had a higher age than the medical student population (23.4 years, SD: 19–27 years), while the lawyer control group ($n=15$) were

comparatively ancient (46.2 years, SD: 28–59; $p=0.034$).

The responses to the observational questions showed that lawyers outperformed the doctors and medical students (Figures 2 and 3). Intelligence did not differ significantly between subject groups ($p=0.882$; Table 1), although knowledge of anatomy did ($p=0.018$).

Other soft markers were used to distinguish between the groups. Media preference was probed in a non-invasive manner. Both the medical students and the doctors expressed a preference for *Made in Chelsea*, whereas the lawyers' top choice was *The X Factor*. In response to the question 'Mary, who is 16 years old, is 4 times as old as her brother. How old will Mary be when she is twice as old as her brother?', lawyers achieved a 100% correct response rate, with doctors scoring 92.8% and medical students scoring 89.6% (Table 1).

DISCUSSION

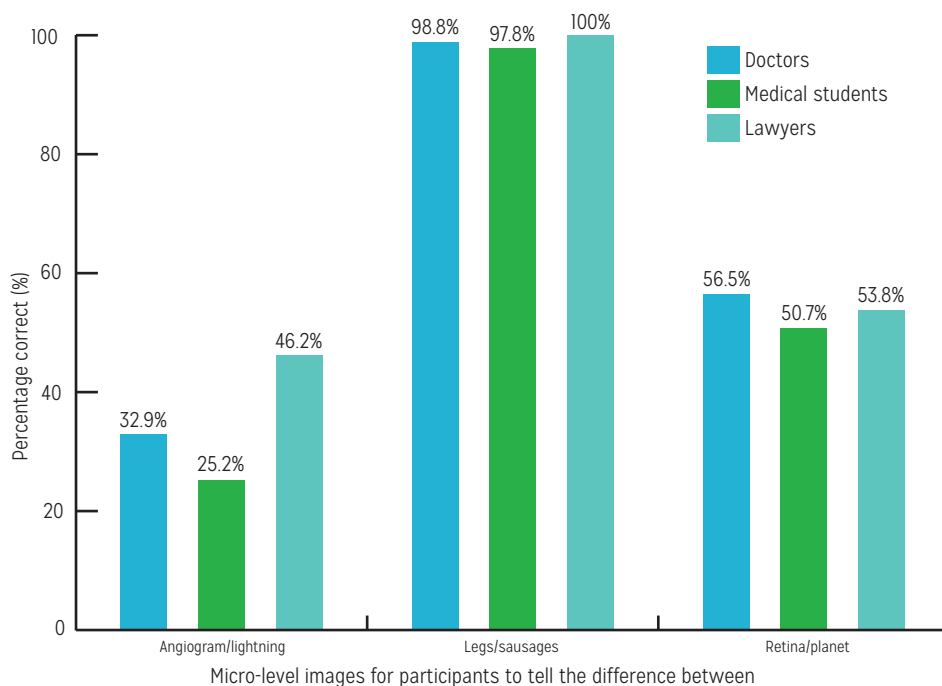
Despite the quiz having a distinct medical leaning, the lawyers outperformed both the fully qualified doctors and the medical students. Perhaps, as the lawyers were significantly older than their medical opponents, this result could merely demonstrate that experience is a key element to achievement and that observational skills require time to hone. We certainly have evidence that experience matters in surgery. Duclos *et al* concluded, in their study on outcomes following thyroid surgery, that surgeons aged 35–50 years performed best.¹¹ The lawyer cohort fits most neatly into this age bracket, while the medical students, who were our worst performing group, were all far too young to compete.

Maybe the success in this survey comes down to something resembling the 'Wembley effect'.¹² It has long been argued that being bestowed Wembley football stadium as your home venue in football is a poisoned chalice.

Teams coming to the 'home of football' up their game and perform better due to a sense of occasion. The competitive beast of the visiting team is awoken while the home team suffers from the pressure of expectation. Perhaps inviting lawyers into a 'competitive' environment with medically trained people caused them to raise their game, ensuring that they studied the pictures more closely, enlarged the images or pondered them for longer? Maybe the chance to 'beat' medics on their home patch caused them to raise their game, while the medics failed to spot the threat. It would be nice to believe that the beating of the medical students by the qualified doctors represents a validation of the training they have completed over the fresh young minds still to be shaped by the system. Educationalists would definitely be in favour of this view. However, it could simply be due to age and life experience, as suggested above.

The maths question came towards the end of the survey and, while simple, the apparent lack of a 100% score by the medical students and doctors may further emphasise question fatigue and complacency to a quiz they expected to win versus the dogged determination of the lawyers to beat their opponents across the board. The competitive edge argument for the lawyers' success may be supported by their TV preference. Both medical students and doctors preferred the *Made in Chelsea* programme. The *Guardian* described the show as 'enlightening and extraordinary',¹³ and suggests that it targets young people who either want to switch off and let it wash over them or enjoy the social media commentary of it. This may suggest that outside work, medical people prefer down time and relaxation rather than engaging in yet more competitive activities such as observational quizzes. Lawyers, on the other hand, like *The X Factor*, a long-running TV show with brutal judges' reviews and the public voting off a loser each week, with eventually a

Figure 3 Differences in rate of correct responses to images of medical investigations and anatomy



winner declared at the end. Further proof that lawyers like a challenge and enjoy competitions, perhaps such as taking on and humiliating medics in a medically themed observational survey?

CONCLUSION

Our study demonstrates excellent powers of observation among our cohort of lawyers. Our younger cohort of qualified doctors underperformed against them but successfully saw off the challenge of the medical students. Perhaps medical training and the passing of time can result in medically minded people achieving lawyer-like levels of observation skills, and maybe someday medics will be able to tell their arse from their elbow.

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