

Implicit assumptions: the expert's Achilles heel



In this intriguing tale of the Getty kouros, **Sean Brady** explores the role that implicit assumptions play in undermining experts' judgement.

Malcolm Gladwell opens his bestseller *Blink* with the story of the J. Paul Getty Museum's kouros¹. The tale begins when the Getty is approached in 1983 by Gianfranco Becchina, who is in possession of a kouros – a 7ft high, marble Greek statue of a young man (Figure 1). Becchina claims it dates from the sixth century BC. His asking price is US\$10M. Given there are only around 200 kouros in the world, it would be a priceless addition to the young museum's collection, but first they needed to establish if the statue was, in fact, genuine.

The Getty took the statue on loan and set about the task. Stylistically, the statue was consistent with other known kouros, being reminiscent of the Anavyssos kouros in the National Archaeological Museum of Athens. And the statue's paper trail (or provenance) stacked up too. While it was unclear where the statue had originated, Becchina's records indicated that the kouros had been in the private collection of a Swiss physician named Lauffenberger since the 1930s, and he had acquired it from a Greek art dealer named Roussos. There were also numerous pieces of correspondence between Lauffenberger and others regarding the statue: a letter from the eminent scholar of archaic sculpture, Ernst Langlotz, to Lauffenberger in 1952 linked the statue stylistically to the Anavyssos kouros; a further letter from a Herman Rosenberg to Lauffenberger confirmed that Langlotz had told him that he believed the kouros was "a masterpiece of Greek archaic sculpture of the greatest rarity"²; and another letter from 1955 indicated that Lauffenberger had contacted a Basel artisan named A. E. Bigenwald about repairs to the kouros.

Scientifically, the evidence was also coming together. A geologist from the

University of California, Stanley Margolis, concluded that the statue was made of dolomite marble from the ancient Cape Vathy quarry on the island of Thasos. Importantly, these tests also established that the kouros had a thin outer layer of calcite as a result of de-dolomitisation, where magnesium leaches out of the dolomite (leaving calcite), a process that can take hundreds of years. This finding became one of the crucial pieces of evidence that clinched the deal for the Getty: it confirmed that the statue was not a modern fake. Satisfied, the museum purchased it for US\$9M and it went on display in 1986.

Uncomfortable questions, however, began to surface about its authenticity. Prior to sealing the deal with Becchina, one of the world's foremost experts on Greek sculpture, Evelyn Harrison, was shown the statue by Arthur Houghton, the museum's curator. Houghton dramatically pulled a cloth off the statue and said, "Well, it isn't ours yet, but it will be in a couple of weeks". Harrison simply replied, "I'm sorry to hear that"¹. For her, something was amiss with the statue, a sentiment that had been previously expressed by Federico Zeri, a member of

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the Getty's board of trustees. For him, it was the statue's fingernails – they just didn't seem right. Later, Thomas Hoving, former director of the Metropolitan Museum of Art in New York, was taken to see the statue. He asked Houghton, "Have you paid for this?" Houghton was stunned. Then Hoving added, "If you have, try and get your money back. If you haven't, don't". To Hoving the statue also looked wrong: it looked 'fresh', not over 2000 years old. For him, statues simply didn't come out of the ground in this condition – he said it looked "like it had been dipped in the very best coffee latte from Starbucks"¹.

And things were about to get worse, the Getty packaged up the statue and sent it to Athens where it was reviewed by other

experts. There was disagreement: some viewed it as genuine, but many agreed with Harrison, Zeri, and Hoving – the statue was a fake. For a start, it was a strange mismatch of styles. While it had initially appeared similar to the Anavyssos kouros, closer examination showed this might not be the case: the Getty kouros was actually a mishmash of several different styles, making it difficult to assign to a specific time or place.

(In fact, it was later found that the kouros it most resembled was a fragmented statue discovered by a British art historian in Switzerland in 1990. Not only were they similar stylistically, but both kouros were sculpted in similar marble. So, did the presence of both these kouros suggest a previously undiscovered style? Perhaps not, the comparison was a deeply concerning one: the Swiss kouros was a known fake, originating from a forger in Rome in the early 1980s.)

The robustness of the statue's provenance had also started to unravel. The letters used to trace the kouros to Lauffenberger were faked – a letter dated 1952 used a postcode that didn't exist until the 1970s, and a letter dated 1955 referenced a bank account that was not opened until 1963. However, while the letters may have been faked, this did not necessarily mean that the Getty's statue was a fake. After all, geology had confirmed, through the presence of calcite formation, that the statue was hundreds of years old. But here, too, there was an issue. A marine chemist from the Scripps Oceanographic Institute in La Jolla, California showed how the de-dolomitisation process could be faked in a laboratory over a period of months using potato mould. The geologist, Margolis, has since confirmed those results².

So, the 14-month investigation conducted by the Getty, utilising various forms of evidence, failed to raise serious questions about the statue's authenticity – and this evidence would start to unravel as the years went on. How then, asks Malcolm Gladwell, did the art experts, in seconds, take one look at the statue and know it was a fake?

To attempt to answer this question, we have to examine how experts think and use their expertise, a journey that will take us into the world of psychology.

Figure 1
Getty kouros



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Expertise

While many conceptualisations of expertise exist, we will explore the model detailed by Dane³. Dane explains the nature of expertise by comparing a novice's expertise with that of an expert. A novice's expertise comprises schema, attributes and linkages (or interrelationships) (Figure 2a). Think of schema as individual clumps of knowledge, attributes as pieces of knowledge within schema, with linkages or interrelationships connecting these attributes and schema.

The expert's expertise is similar, but different. As you'd expect, the expert's expertise contains more knowledge than the novice's; that is, it has more attributes. Just as importantly, however, the expert's expertise also has more linkages and interrelationships between these attributes (Figure 2b). It is these linkages that give the expert their pattern recognition ability.

Take the hypothetical situation of a number of novices attempting to solve a problem. They are stumped, so they ask an expert for their view. The expert suggests a solution, which turns out to be correct. Now, if the novices question the expert as to how they arrived at their view, the expert will probably shrug their shoulders and say, "I just had a feeling..." Similarly, if the novices were to push further and ask the expert to point out the specific pieces of information (attributes) they relied upon to reach their view, the expert will probably struggle to identify specific pieces, and suggest something along the lines of "it wasn't one thing in particular..." While this sounds like 'intuition,' it is more likely the expert's pattern recognition at work. The expert is not relying on specific pieces of information, but instead is recognising the pattern of information before them.

This aspect of expertise was demonstrated by de Groot in 1965 with chess players⁴. He got together some chess novices and chess experts and, using positions from actual chess games, allowed each player to view the chessboard for five seconds. Then, from memory, the players were asked to reposition the pieces on the board. Who performed better? Unsurprisingly, the grandmasters significantly outperformed the novices. While it may appear obvious to attribute the expert's success to superior memory ability – after all, chess experts continuously calculate and recalculate chess positions in their head – the reason is more complex.

De Groot repeated the experiment, but this time, rather than using chess positions from actual games, the pieces were placed randomly on the board. Did the experts outperform the novices in this scenario? No, they were only marginally better – their advantage had essentially evaporated. The reason? In the first experiment, the positions of the pieces on the chess boards were consistent with established patterns in the expert's expertise (i.e. similar to positions they would have encountered in the past). So, rather than the expert having to remember the location of each individual piece – as the novices did – they recognised and remembered the pattern of the pieces, which is a considerably easier task. However, in the second experiment, once these familiar patterns were removed, the experts – just like the novices – were forced to rely on remembering the location of each individual piece, with a similar success rate.

(Taking a day-to-day example, try to memorise these words in order: "the brown cow safely crossed the busy road". This is considerably easier to remember than: "crossed cow the safely the road brown busy". Both contain identical words, but because the order of the

words in the first case is consistent with a pattern in our (language) expertise, we remember the pattern, and use this to reassemble the order of the words. There is no helpful pattern in the second case.)

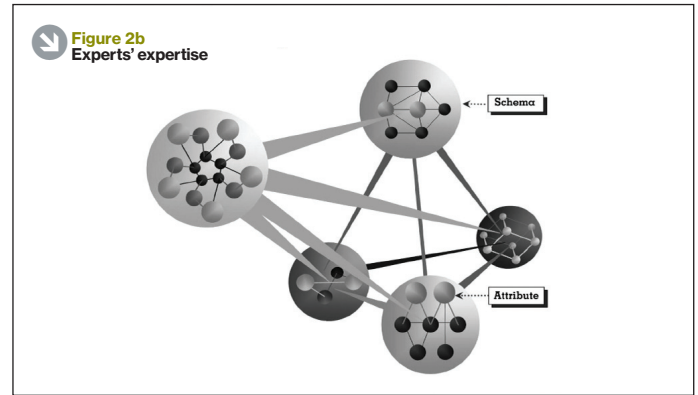
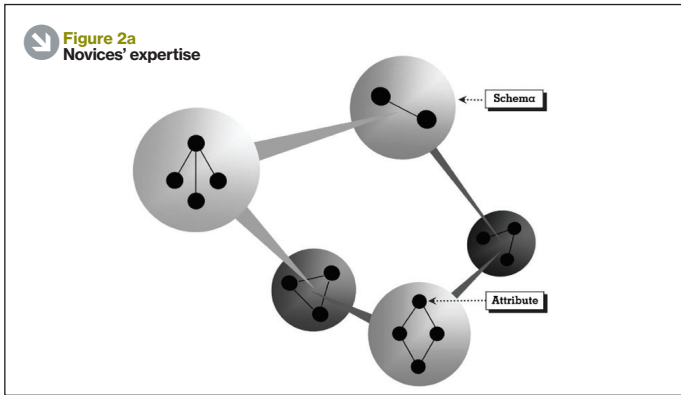
So, one of the key aspects of an expert's expertise is their ability to see and recognise patterns because these patterns are consistent with a pattern of attributes and linkages within their expertise. This is exactly what Evelyn Harrison, Federico Zeri and Thomas Hoving, along with many other art experts, were relying upon when they made their snap judgement that the Getty kouros was a fake – it simply didn't fit within any of their existing patterns – and rather than being able to point to one or more specific issues that troubled them, the experts were left with a 'feeling' that the kouros just wasn't right.

Disadvantages of expertise

Clearly, possessing such expertise has many advantages. Indeed, many professions – including structural engineering – demand high levels of expertise to get the job done. But does possessing such expertise also have a downside?

The literature cites numerous examples where this is the case, especially when the expert is working on novel problems^{3,5}. The disadvantage is the flipside of one of expertise's advantages – its stability. When an expert gains expertise, their schema, attributes and linkages become stable, but this very stability also results in inflexibility and what is known as cognitive entrenchment.

This disadvantage comes to the fore when experts are faced with situations that are similar, but slightly different to the norm, as was the case for the chess experts: it's still chess, but without the familiar patterns. In such circumstances, the expert can apply what is known



as 'strong but wrong' rules⁶. 'Strong' because they are embedded in their expertise, 'wrong' because of the inappropriate application of their expertise. The issue is compounded because the expert is usually totally unaware of this inappropriate application. The expert is essentially applying the Law of the Instrument: "When all you have is a hammer, everything looks like a nail"⁷.

In essence, the application of the expertise runs into difficulty because it is based on assumptions which, while usually correct, are incorrect for this application. These assumptions are usually made automatically – the expertise is simply applied subconsciously – and are by definition 'implicit'. Because they are implicit, and therefore non-explicit, they can escape critical examination. They are, as Donald Rumsfeld says, an 'unknown unknown': things we don't know, but don't know we don't know.

Implicit assumptions in structural engineering

Indeed, in many cases of catastrophic failure, the role of implicit assumption is evident. The collapse in 2007 of the I-35W Bridge in Minneapolis, Minnesota, was due to increases in dead and live loads and the presence of a design error: some gusset plates were undersized⁸. However, the bridge operated for 40 years without the design error being identified, despite the original design being subject to multiple reviews and load ratings. Why did the design error remain unidentified? Primarily because the reviews and load ratings did not consider the capacity of the gusset plates. One overarching reason for this omission was the implicit assumption held by some bridge engineers that gusset plates are designed more conservatively than the members they connect. Once this implicit assumption was made, the capacity of the gusset plates simply went unchecked.

Similarly, with the Citicorp Center Tower in New York, which also contained a design error, implicit assumption played a role, although in this case it was identified and the tower rectified, thus averting failure⁹. The tower's designer, William LeMessurier (along with his detailed design team) would (implicitly) assume that the effects of quartering wind were less severe on the structure than wind acting perpendicularly on its sides. While this assumption may be correct in most cases, it would prove inappropriate for the Citicorp Tower due to LeMessurier's choice to utilise a novel bracing system – the classic issue of the application of existing expertise to a novel situation. This assumption would prove incorrect: quartering winds actually resulted in some structural members being significantly overstressed, with retrofitting being required. As the assumption was implicit, it went unexamined until a year after the structure was completed.

Conclusions

So, as with any profession that requires its individuals to possess

expertise, the challenge we face is to retain the advantages of this expertise, while being aware of and managing its downside. Such expertise is underpinned by many assumptions, many of them implicit, and the non-explicit nature of these assumptions often results in a failure to subject them to rigorous analysis. Methods of making these implicit assumptions explicit are the key.

And what of the Getty kouros? Was it real or a fake? Were the art experts correct or was this a case where the experts were genuinely faced with a new, previously undiscovered style of kouros – one that did not fit their patterns, but was nonetheless genuine? Intriguingly, we may never know. If you visit the J. Paul Getty Museum in Los Angeles, you'll find the kouros exhibited bearing the plaque "Greek, about 530 B.C., or modern forgery".

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