

EDITORIAL

Science must begin with myths, and with the criticism of myths

The quotation that serves as the title for this editorial was offered by Karl Popper as a way of acknowledging that science is fraught with error, but makes progress through deliberate and systematic efforts at correction.¹ Myths, in our lay usage, are 'incorrect' understandings of the world that somehow persist, whereas science is commonly treated as a means through which to eliminate such misunderstandings. When myths and science are placed in direct opposition like this, it is easy to romanticise science (or 'evidence-based anything' for that matter) without recognising that it has much in common with mythology. Both provide explanations for phenomena in the world. Both give us insights that go beyond the surface of what is visible. And, significantly, both science and mythology are based on compelling stories that inspire and motivate human behaviour.

In many ways, science can be a source of 'myth'. It generates lore around how discoveries such as gravity (Newton's apple) and electricity (Franklin's kite) were made. Further, the scientific process itself is arguably mythologised when it is treated as an objective means through which truth can be separated from mythology. The direct focus of this issue, however, is how scientific reasoning generates beliefs that become widely held, but may be misunderstood, incomplete or inaccurate. Theories of learning styles provide a very strong example.² The strategic maximising of understanding by aligning instruction with individuals' preferred means of learning is a powerful and intuitive idea.³ The idea is so self-evident that it is readily believed and so easy to implement that it is readily adopted. Unfortunately, it is also utter bunk.⁴⁻⁷ As one of many authoritative reviews has concluded: '...there is no solid evidence that ... there is any benefit to adapting and designing education and instruction to these so-called styles.'⁸ Even more unfortunate is that the idea has been hard to remove from our collective understanding of education practice. A simple search of Google Scholar for 'learning styles' and 'medical education' yields over 1300 results from the first 9 months of 2019. Once a concept gains the guise of scientific credibility, it tends to proliferate.

How can that be so? Analysis of how education innovations diffuse and become popularly accepted reveals a few telling insights.^{9,10} The success and diffusion of educational ideas depend on their appeal and credibility, as well as their compatibility with previous understandings.⁹ Appeal is the visual and rhetorical format and presentation of the idea; credibility includes the recommending source, and compatibility is represented by the idea's alignment with previous intuitions and beliefs. Noteworthy from this work is the minimal influence that evidence and quality of evidence have played in the diffusion of educational ideas. Health professional education may be in a particularly difficult situation when it comes to eradicating ideas



with intuitive appeal. In such a diverse field of study, no individual can be expert in all sources of insight that may be relevant to any given problem and, as a result, evidence that could help to determine if and how lessons from other disciplines should be utilised is easily overlooked.

Regardless of the mechanism by which myths become 'sticky', it seems clear that a myth – a good story well told – can trump science. If we want to make progress, our science must tell equally good stories. To this end, many have made efforts to scrutinise the myths in our midst.¹¹⁻¹³ To construct this year's State of the Science issue of this journal, we have taken such initiatives to the next level by putting out a broad call for papers that offer a sceptical look at a commonly accepted belief with the goal of providing nuance, counterpoint and, in some cases, clear refutation. To be clear, this is not meant simply to be an effort at 'myth busting', although we were quite content for that to happen. Rather, we align with Popper's stance¹ that myths are an important starting point for science and that what is crucial for progress is a deliberate appraisal of whether or not something deserves to be labelled as myth. Martimianakis et al., in this issue, take the suggestion a step further, providing compelling argument regarding the social implications and impacts of 'myths'.¹⁴ In their view, the 'truth' of the myth is secondary to the ways by which individuals act on their beliefs. In that spirit, we strove to curate a 'Mythology in Medical Education' issue to stimulate critical examinations (or re-examinations in Masters' case¹⁵) of issues that we risk taking for granted and consideration of what impacts, positive or negative, that might have.

The call for papers indicated that we sought 'attempts to clarify the extent to which commonly held perspectives stand up to scientific scrutiny'. The submissions received clearly answer this call. Some hark back to enduring misconceptions about generalisable skills¹⁶ and generational learning 'styles'.¹⁷ These are classic myths that continually emerge in new forms in health professional education. Others debunk, or at the very least provide nuance and context to, commonly held beliefs on multiple phenomena, including medical error,¹⁸ stress,¹⁹ and empathy attrition.²⁰ Papers in this vein reframe common truisms and clichés such as those pertaining to the value of the feedback sandwich²¹ or the notion that assessment (necessarily) drives learning.²² This issue also allows us to read critiques of common beliefs that, on close inspection, seem best described as simply unexamined – and perhaps untenable – mythology.²³ In reading these articles we would encourage you to consider the advice of Martimianakis et al.¹⁴ and to ask why myths persist and what function they serve in our community. Yes, even ongoing belief in learning styles may serve some function.

George Orwell is credited to have said: 'Myths which are believed in tend to become true.' This State of the Science issue is an opportunity to ask which myths we want to believe as a community and what truths we are prepared to accept. As the authors in this issue have demonstrated, examining myths can allow us to advance science and practice. In fact, the wide array of excellent contributions that required adjudication leads us to believe this to be a series worth continuing. As such, we hope this issue strikes your inner muse and inspires you to take a similar look at myths that you think warrant more attention. The author guidelines at www.mededuc.com have been updated to provide details of how to submit when you are prepared to do so.

Reaching this point was possible only with the help of 27 individuals who helped us to review the 70-plus proposals and articles we received in response to this call: Anna Ryan, Chris Roberts, Clarence Kreiter, David Brewster, Doug Larsen, Edward Krupat, Gabrielle Finn, Georges Bordage, Gerry Gormley, Glenn Regehr, Jan Illing, Jenny Johnston, Karen Smith, Kent Hecker, Lars Konge, Lawrence Grierson, Liz Wolvaardt, Meghan McConnell, Patricia O'Sullivan, Paula Rowland, Rakesh Patel, Renee Stalmeijer, Rob Paul, Saad Chahine, Stefan Schaubert, Susan Wearne and Wolf Hautz. Thank you all for your contributions.

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