LOSING MY RELIGION
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Reflection. How I lost my religion.
Losing My Religion is not only in homage to the song that takes me back to our wonderful farewell party. Julia Voss bouncing. Daniel Schönpflug rocking out. Eva von Kügelgen dancing. But now it also reminds me of the journey that I took as a College for Life Sciences Fellow. It was at the Wiko that it dawned on me that science is my religion. The faith that scientists have in science is nothing short of religious. But we see ourselves as so

much more rational, evidence-based and thorough than the somewhat limited view many of us have of religion. We believe because there is evidence, we see so we believe. In hindsight, the arrogance is astounding.

It is quite funny that this hadn't dawned on me before. My Wiko project and my day job are precisely about challenging the status quo in biomedical research. I spend my days trying to understand what it is about the way in which we do science – design our experiments, conduct them and report them – that has led to so many scientific studies to be irreproducible, and not to have translated to the human health benefits they seek. I know that, in biomedical research, science is not quite working as it should be. My approach to this has been focused on methods. I look at the methods researchers use to reach their conclusions, and by studying large numbers of studies have identified behaviours that limit the validity of much biomedical research. This evidence is part of my armamentarium to improve the validity of biomedical research. I came to the Wiko to try to understand why some scientists do not adopt what I consider simple measures to improve the validity of their research. There have been some research domains in which the evidence that my colleagues and I have produced has led to substantial changes in their approach to experimental design. There are other research domains (hat tip to Luca Giuliani for explaining why my use of "culture" in my abstract was not appropriate) that are believers in the way they do their science and do not wish to change (improve) their methods. They do not believe in the veracity of *my scientific evidence*. I am a scientist; my research is empirical and I believe it. But this is precisely the problem. Our success in our respective fields is in part due to our ability to think critically – and we do this within our fields. I can read a paper on testing drug X in an animal model of disease Y and provide an in-depth critical review of its pros and cons. I cannot read such a paper without doing this. However, there are clearly other domains in science not concerned with finding treatments for human diseases. These are the scientific papers I generally believe, although I do not know how to critique them thoroughly. Or more precisely, I did not feel the need to critique them thoroughly, because they are scientific. The further a scientific study is from my area of expertise the more likely I am to believe it. Strange.

Despite all the experience and evidence. I was a believer.

And then a few things happened. Firstly, Michael Jennions gave his colloquium. The reaction of many Fellows shocked me. At first, I thought that my fellow Fellows were prudes. Yes, he talked about penis size. It's a bit strange but not taboo. I argued that it was science. He had performed an experiment. I said, "But he didn't say that." And then I

started to listen. The major issue that I understood was two-fold: (i) the question itself and (ii) the relevance of digital naked avatars to attraction. Fascinating. Many men were quiet and many women outraged. There appeared to be a science divide, too. We do not walk into a bar and assess the size of a man's penis before we let him buy us a drink. We cannot. Even if we could, what does that have to do with silver avatars? Could I, a female scientist, have conducted this study? Would the response have differed? A lot, I suspect. I certainly would not undertake such an endeavour. Nevertheless, I still believe that Michael asked a specific question of the participants of his study. They responded, having interpreted that question. The result was significant. The silver avatars with larger penises (if we can call them that) were favoured. In the same way that I critique studies in my own field, I started to think about the construct validity of Michael's research – what are the constructs of attraction and were they encapsulated in his study? I thought of the external validity; how reproducible is this study beyond the undergraduate white female Australians who were his cohort? But interestingly, I also thought of the social implications of performing such research and our responsibility regarding the inferences that are drawn from the research that we undertake.

Secondly, suddenly I started to understand the non-science talks. I won't lie, it took a few weeks. I was used to listening in one way – IMRAD. *I*ntroduction (what's the problem and what question am I answering to address it, *M*ethods (what I am going to do), *R*esults (what was the answer) *A*nd *D*iscussion (what does this mean). This is how I was trained. I spent the first few Tuesdays leaving the seminar room asking myself, "But what did they do?" I have already explained that I have a preoccupation with methods. I also often wondered, "But what does this mean?" My science colleagues were asking rather intelligent-sounding questions. How did they understand while I didn't? I resigned myself to clearly not being smart enough to be a Wiko Fellow, and then something changed. Maybe my scientific arrogance waned. I'm not sure. But it dawned on me that not everything is a problem we are trying to solve. Sometimes we are just interested in why things happened or how things happened. This phenomenon is not just a non-science one. There are probably more scientists whose interests are in trying to understand for the sake of understanding, rather than trying to solve a problem. Truth is determined not only by conducting a randomised controlled experiment. Not everything is experimental. There are different approaches to gaining knowledge, to understanding our environment and to history. Similarly to the different approaches to science, there are different approaches to the arts, to social science, to history, to law. Of course, you can argue a hierarchy of

evidence, but it is still evidence. It's rather embarrassing to lay bare the level of my ignorance. But it is what it is.

Thirdly, during my own colloquium, Thomas Ackermann asked me a question about my research on publication bias. FYI – publication bias is the phenomenon that studies that do not show significant results are not published and therefore do not contribute to our distillation of knowledge. I presented data on the presence and impact of publication bias, both substantial, and argue that all sound experiments should be published irrespective of their findings. My argument is that knowing what does not work is as important as knowing what does work. The annoyingly smart man that Thomas is asked: "What data have you produced that doesn't fit your narrative, which you have not presented today." I remember being a little dumbfounded. I replied that all my data fits this narrative. Or something of this ilk. I cannot quite bring myself to listen to the recording. *Narrative*. The most used word at the Wiko. A word that in the past I had never paid enough respect to. But the ultimate reason that I briefly lost my religion … the story that I told. A narrative. I don't independently present single experiments, irrespective of whether they contradict each other, but rather tell a story backed up by a whole bunch of experiments. I had data that fit my narrative. That made it scientific. The data that didn't fit this narrative … there, of course, was a reason for this. Often a scientific one. Maybe there was not sufficient power to test an assertion. Oh dear. "Narrative", I realised, persisted through all the colloquia. Whether you were talking about abstraction, penis size or the history of science, it was my ability to focus on the narrative that made me understand the talks. And once I understood the narrative I could begin to critique the methods or sometimes even the narrative.

There were those who reinforced this science-is-a-religion rhetoric. I thought they were right. But they could draw. Learn Swedish. Write books. Take photographs. Advocate. Perform. Still had faith in their fields. I was a scientist, who had only just learnt the concept of following the bloody narrative.

I soon realised that I was being overly dramatic. Hyperbolic. My crisis gained some perspective. It was not science that I loved, it was the scientific method. I fell back in love harder than makes sense. It was in fact because of these discussions that I realised how much I love the scientific method. The time I had to experience my teenage-like crisis. The comfort of IMRAD; I understand it and appreciate it. Without the time afforded to me by the College for Life Sciences Fellowship, I think I very much would still be an arrogant scientist who at the same time thought she was too stupid to understand non-science academics.

The most fulfilling thing about my time at the Wiko is that I learnt so much about my approach to science in general, to my research and to non-science topics. However, it probably wasn't until my re-entry to "normality", where I was presenting fresh and novel concepts (to me at least) to colleagues and friends, that the true impact of my Wiko experience registered. As is normal for many early-career scientists, I was focused on the numbers – getting the peer-reviewed papers out and writing the grant applications. It's a competitive business; these numbers, unfortunately, matter more than they probably should. But what Wiko did was give me time do the other things that are equally important. I read! A lot. I read papers because they interested me, not just because I needed to finish that paper or grant application. The idea of just stopping and reflecting was alien. Yet I reflected. The sense of pressure and looming deadlines that normally occupy my brain was relieved. And this meant I had time to learn. To innovate. To lose my religion. To recharge and fall in love with science again. I feel that this report has turned into a somewhat lame coming-of-age story. But I feel more like a grown-up now. This, I think, is in keeping with my Wiko experience. Things certainly did not turn out as I expected. My original plan did not quite come to fruition. But I got so much more out of my time than I ever could have expected.

With respect to IMRAD, here is my science paper on my Wiko experience.

Introduction: Early-career life scientists lack sufficient exposure to other disciplines. They often work in silos within science, and interdisciplinary interactions are seldom. This has the potential to limit their ability to think critically and to limit their appreciation of other disciplines. A College for Life Sciences Fellowship will give them time to complete a project, reflect on their career and develop new scientific interactions. I hypothesise that a College for Life Science Fellowship will be an invaluable contribution to my research career.

Methods: Gather Fellows from a range of disciplines to join the Wissenschaftskolleg for an academic year. Instil a routine of daily lunches, Thursday dinners and Tuesday colloquia. Convene an adult sex ratio working group with no women. Fellows with limited German skills may be taught by Ursula Kohler. Those who are more proficient may be taught by Eva von Kügelgen. Pilates classes will be available on a Friday morning. Other organised events are available for Fellows to join. Provide a group of outstanding support staff to facilitate and ensure this experience is wonderful.

Results: A total of 45 Fellows (30 male, 15 female) were admitted in the 2016/17 academic year. Five were College for Life Sciences Fellows. Fellows came from America (n=16), Germany (n=8), Great Britain (n=3), Israel (n=2), Canada (n=2), Switzerland (n=2) and one from each of Argentina, Australia, Brazil, France, Hungary, India, Italy, Japan, Lebanon, Senegal, South Africa and Spain. Disciplines ranged from law to architecture, from Arabic literature to economics and musicology to biology, to name but a few. I spent a total of six months at the Wiko. Many Fellows came with partners and children, all of whom were a joy to spend time with. The female Fellows were a particular inspiration. I was often among the subset of Fellows up late on a Thursday drinking gin and tonics. With music supplied by Michael Jennions, there was dancing with Helena Jambor, Vivek Nityananda and Yoav Zeevi. I learnt many new words, most notable were "global south" and "hegemony" – thank you Sa'diyya Shaikh. I believe *genau* was the most useful German word I learnt. I thoroughly enjoyed German lessons and probably learnt as much French, thanks to Frédéric Brenner and Lena Lavinas. I also taught some English phrases to Julia Voss and Philipp Deines – "bingo wings" and "panda eyes". I was invited to present a total of seven seminars around Germany, I believe this is directly related to the esteem associated with the Wiko. I introduced Peter Kappeler's colloquium, he's an impressive academic. I learnt about Habilitation; I'm glad I will not have to experience it. I delivered one colloquium. Had a substantial crisis of scientific confidence. Recovered. Fell in love with the scientific method again. I designed my new kitchen from afar with input from Thomas Ackermann. Wrote papers. Fostered new collaborations with German academics. Was offered a job. Became editor-in-chief of *BMJ Open Science*. Explored Berlin. Established myself as the resident bar and restaurant critic – I ate and drank a lot. I learnt to think differently and to appreciate different approaches to research. I made some amazing friends. I have new skills and confidence that underscore my new research agenda.

Discussion: These data suggest that a College for Life Sciences Fellowship is an invaluable asset to the career of an early-career scientist. The protected time to step back and reflect should not be underestimated. The opportunity to have access to and be surrounded by intellectuals of such calibre is unique. My ability to listen to the narrative, in addition to the method, has totally changed my approach to my research and how I communicate my research to others. My new challenge is to harness these new skills to result in a second term as a Wiko Fellow.