



Peer Review Comments on *Seeds of Science* articles (2021-2022)

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1. On Scaling Academia ([article](#))

- Author: Jan Hendrik Kirchner
- Date: April, 2022

I found this an interesting discussion/proposal and an important topic. Undoubtedly an idealized version of the scientific method is our best tool for gaining knowledge, but in practice the scientific method itself is not without its limitations - in particular at the level of hypothesis generation and a potential lack of importance placed on observations that lie outside the main research programme or paradigm (Castillo, 2013).

Perhaps a mention of this would be a relevant inclusion in the paper? A vivid contemporary example of how this problem (of an unwillingness to pursue/support

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alternative hypotheses) can have potentially disastrous effects on knowledge is the mRNA research, actually mentioned in the paper, of Katalin Karikó, which was for over 10 years seen as a dead end by other more senior researchers, to the extent that she had to accept demotion and a pay cut to even stay within the research community.

It's not clear to me that scaling academia is a necessary condition toward improving scientific research, even less that it is a sufficient condition. Scaling the current academic structure, which as this paper points out is highly hierarchical, seems to run the unwelcome risk of scaling the problems by potentially prioritising quantity and increased outputs of enlarged research teams over quality and meaningful research that genuinely expands knowledge. If the only metric used is journal publication there is a risk of 'Zombie Science' (Berenbaum 2021) This paper seems to accept an academic hierarchical structure without question, but could alternative models better encourage teamwork/research? I'm thinking here specifically of an Authority Gradient analysis of teams that has proved very effective in other sectors such as Medicine and Air Safety.

The other candidate mentioned (for scaling academia) is prediction markets, which I found to be a welcome and unexpected surprise in a paper that I thought was going to be mainly about improving efficiencies and scale in a traditional hierarchical system.

What was not made clear was whether the use of academic/scientific predictions markets should be open to all or just to those already involved in academic research. If not open to all, why not? Also, whilst prediction markets are appealing for many of the reasons stated in the paper, their flaws should be pointed out, especially their susceptibility to 'gaming' (Y Chen, 2009)

2. Building a Brain: An Introduction to Narrative Complexity, a language & internal dialogue-based theory of human consciousness ([article](#))

- Author: R. Salvador Reyes
- Date: April, 2022

An ambitious paper that read more as a poetic speculation for me (though it lacked poetic brevity). Whilst the paper offered some citations, these did not convince me that it was accurately set in context, still less that those citations that were mentioned reflected the huge amount of contemporary research in this area. As a result, for me, a persuasive and coherent argument was not developed. The obvious self-promotion in the paper was also not helpful or good practice and I feel should have been omitted.

3. Market Failures in Science ([article](#))

- Author: Milan Cvitkovic
- Date: April, 2022



This is an excellent summary and analysis of what has been seen as a creeping marketisation of science (Meagan Day- 'Capitalism is Ruining Science' 2022), that has potentially negative effects on the way science is conducted. The analysis here is persuasive, making a compelling case for failures of a market-place approach to science by highlighting specific examples. However there was one statement that I feel could possibly benefit from some revision before publication– the notion that the first publication of an idea in science guarantees credit (or even fame!). In fact the issue is far more nuanced than this – as shown by Stigler's 'Law of Eponymy' (Stigler 1980), There have been a great many instances where even some of the most famous discoveries in science have not been attributed to the original proposer. It seems that the crucial factor in attribution relies far more on sociological factors- that it is the scientist who convincingly presents the idea to the scientific community who gets the credit.

Whilst the paper does not go far in suggesting remedies to address 'marketisation' problems, it does act as an interesting discussion piece for further work. Splitting the topic down into individual sections made the whole paper clear, easy to read and quite 'punchy', though I felt that a broader introduction and the addition of a conclusion would have been beneficial.

What was not 'teased' out of the argument in the paper and perhaps could be mentioned in a recommended conclusion, was the idea that the problems identified are not necessarily solvable by better methods and more stringent procedures (although these would surely help), rather that they are best addressed by a closer adherence to good values and ethics, moreover that it is above all the attitude of the scientist that builds integrity in any scientific community, as so eloquently expressed by Lee McIntyre in 'The Scientific Attitude'

4. What does it mean to represent? Mental representations as falsifiable memory patterns ([article](#))

- Authors: Eloy Parra-Barrero, Yulia Sandamirskaya
- Date: May, 2022

A compelling and superb co-ordination of accurate philosophical notions concerning mental representation and the possibilities of translating these into practical strategies for building computational structures. Consequently, though fairly brief and concise, this paper is an exemplar of Applied Philosophy and one that has potentially important implications for AI research. I found the arguments were developed convincingly and clearly, with good explanatory graphics and the whole paper to be well-researched. I have no hesitation in recommending this paper for publication as, at the very least, it is clearly a good discussion point/seed for future cognitive science.



5. Moral Weights of Animals, Considering Viewpoint Uncertainty ([article](#))

- Authors: Richard Bruns, Jim Davies
- Date: July, 2022

This is an attempt to quantify suffering in a few selected animals using a statistical analysis based on different moral conceptions. Though the authors freely admit to adopting a utilitarian approach, it seems to me that fundamental to their whole project is the moral status of animals, a question they themselves pose in the introduction. What the authors do not point out is that we have no good reason to assume this moral status can be understood solely within a utilitarian framework and indeed it is clearly open to interpretation in other ways, for example with deontological animal ethics - 'The Case for Animal Rights' Tom Regan 1983. (Though deontological animal ethics itself can have severe practical problems, even absurdities in terms of absolutist tendencies).

So for me this 'meta' level of deciding the moral status of animals is crucial, for if we concentrate or promote a biased interpretation, subsequent efforts may be futile. I appreciate of course that this might have led to a much lengthier and different kind of paper though.

The authors deftly avoid the paper becoming a dry accounting exercise by the inclusion of a broad and fascinating list of variables, some of which are claimed as unique to this paper, for example the inspired 'Tinker Bell Theory' (which is so good it deserves to be true!)

Overall I feel there is a danger in using statistics that are based on some fairly generalised assumptions about how to classify animal suffering, and to draw the conclusion that such surveys are 'better than nothing'. The danger here being that poor welfare standards or even inflicted harm can conceivably be legitimised or gain credence by a purported metric of suffering.

Despite these misgivings I felt it was a fascinating paper with complex statistical analysis presented in a very understandable way and consequently have no hesitation in recommending publication.

6. The Rise and Fall of the Dot-Probe Task: Opportunities for Metascientific Learning Authors ([article](#))

- Benjamin T. Sharpe, Monika Halls, Thomas E. Gladwin
- Date: November, 2022



This paper is a cogent examination of the dot-probe paradigm and sustains a consistently high level of engagement throughout. What especially recommends this paper is its coordination of the perceived successes and weaknesses of the dot-probe construct, within a broader epistemological context that raises questions about what constitutes evidence not just for Psychology but for Science as a whole.

This added philosophical dimension makes this paper relevant for researchers of any discipline who may be faced with a similar conundrum as detailed in the paper - that as part of the research process, logically coherent constructs, or the selection of experimental setups and the resulting statistical analysis employed, cannot avoid generalising or simplifying heuristically, and in doing so will always run the risk of biased or false models.

Revision comments:

In an otherwise comprehensive account, this paper could potentially benefit from greater attention to a specific and often neglected problem in psychology – heterogeneity (Linden & Hönekopp 2021). Whilst the problem of individual variance is acknowledged in the paper, I feel a more explicit account of heterogeneity could conceivably form part of the authors discussion concerning a critical analysis of research practices that they highlight as a possible way forward to address some identified problematic psychometric findings of the dot-probe task.

As the authors explain, the essential practicality of the dot-probe construct is its ability to measure attentional bias as a proxy for potential underlying mechanisms or disorders. However, heterogeneity suggests such measurements and their purported behavioural association, should be qualified, especially if the effect sizes are small, because to do otherwise would be to make an assumption that the dot-probe task applies equally well to a large portion, if not all, of the population. In contrast, and to minimise the problem of heterogeneity, would better specified and smaller subsections or target populations produce better measurement and predictive success?

Clearly, as the paper explains, in any meta-analysis, measuring individual variance is an important factor in determining the theoretical scope of a psychometric assessment and the dot-probe paradigm is no exception to this.

But there is another sense in which a consideration of heterogeneity is important as part of a methodological principle, that is not mentioned in the paper, and that is to avoid the so-called ‘paradox of convergence’ where there is a disconnect between an accumulation or convergence of evidence in favour of a particular theory and yet at the



same time an inability to be sure that such theory can accurately be applied to any individual (Davis-Stober C, Regenwetter M.,2019).

Recommendation:

The interaction of heterogeneity with an accumulation of evidence, means it's not hard to foresee a crisis of confidence questioning the theoretical rationale for any psychometric construct, in particular the dot-probe paradigm, the precise subject of the paper under review and the reason why I suggest a greater emphasis on heterogeneity would only be of benefit to an already fascinating and well-researched paper that is highly recommended for publication.

7. Will general antiviral protocols always be science fiction? ([article](#))

- Author: Rick Sheridan
- Date: December, 2022

This paper is written in an accessible opinion-piece style that presents a compelling case for the potentially highly beneficial use of flavonoids, a class of plant-derived compounds able to treat viral infections. The writing style is confident, assured and obviously written by an expert or experts in the field.

The paper makes a convincing case for the therapeutic advantages of flavonoids and the need for further research. After the experience of the COVID pandemic, it would seem an obvious matter of urgency that all possible means to inhibit viral replication are explored, especially if some candidate compounds are readily accessible from the plant kingdom.

However, this is where the reason for the paper's advocating style becomes apparent - the problems of patenting natural products and the financial risks involved in clinical trials with long lead times.

These problems of financing research and trials lead the author/s to conclude that it will take a philanthropic intervention to bring about the potential and very desirable outcome of well-tolerated plant-derived compounds able to treat a range of viral infections. If true, this is a serious indictment of the 'free' market capacity to supply the public good of health and an unfortunate demonstration of how knowledge production can be negatively determined by economics.

Coincidentally whilst reviewing this paper, I also came across some articles on the challenges of introducing psychedelic drugs as potential treatments for some mental health conditions. There are parallels between flavonoids and psychedelics – both



originally plant-derived and both 'hard sells' to conventional pharmaceutical companies or investors, so it strikes me there are possible synergies between the two areas.

The development of psychedelic drug treatments has benefited enormously from visionary investors like Christian Angermayer, who, with his company Atai Life Sciences, has vigorously pursued a policy of patenting psychedelics and has the view that - "Pharma is just a very boring distribution machine, they're never willing to take any risks. We took the risk early and they all want to partner with us now'. Hopefully, for the sake of a healthier future for all of us, a similar visionary can be found for flavonoids.

This paper is an important one that deserves widespread dissemination, so I have no hesitation in recommending it for publication.

8. Why Proposal Review Should Be More Like Meteorology ([article](#))

- Author: Stuart Buck
- Date: January, 2023

This article is written in the style of an opinion piece or blog post and whilst lacking the rigour of a more traditionally formatted academic paper, is no less engaging and thought-provoking.

Metaresearch – the scientific study of how science is conducted - is an area where new ideas to solve perceived problems are urgently required. This article focuses on proposal review, a vital first step to secure funding for many research enquiries.

Unfortunately, as the article explains, proposal review has a high error rate in predicting research success, one far less reliable than the comparator the paper chooses - a meteorological forecast. This article suggests one possible solution - reviewers should assign probabilities to a proposal in much the same way as weather forecasting.

This idea has a distinct 'Bayesian' feel, and whilst a Bayesian approach to assigning probabilities is not mentioned or developed by the author/s, it is a measure of how well the paper succeeds in presenting a generalised discussion that invites further reflection from the reader.

My specific Bayesian reflection on reading the paper (that could add to the argument in favour of assigning probabilities) is to break proposals down into incremental stages and stage payments (already common practice), with each successive stage updating the priors for any project. Assigning probability scores on a stage-by-stage basis is arguably more realistic/practical than the difficulty for a reviewer of estimating a



probability score for the whole project. After the successful completion of the first stage of a proposal, probabilities for following stages could be updated by reviewers with far more confidence.

This article is a helpful contribution to an area that needs original thinking to address problems that have proved intractable to the traditional ways in which science has been conducted, consequently I would definitely recommend this paper for publication.

8. How to Escape From the Simulation ([article](#))

- Author: Roman Yampolskiy
- Date: March, 2023

This is a lengthy paper with an impressive number of citations (210) that deals with a highly speculative area – whether or not we live in a simulation, and specifically, can we, or should we, try to escape such a simulation? That contemporary science discourse can accommodate such speculative lines of reasoning provides a vivid response to those who may claim that modern science is closed to new or even extraordinary ideas.

In terms of new ideas, it's not clear to me that this paper is the first to address possible simulation escape methods. The author states, somewhat ambiguously - '...this being a first research paper dedicated to this topic'. I feel this statement should be clarified. Does the author mean 'one of the first' or 'the first'?

Helpfully the author makes the important distinction that there are in fact, two ways in which we can understand 'simulation'. The first is an idea with a long pedigree in philosophy - the Cartesian question of 'how can we know we do not live in a dream?' (with dream now replaced by the more techy-sounding 'simulation'). The second way to understand living in a simulation is that we participate in some monstrously elaborate Virtual Reality (VR). However, I feel the author needs to address this distinction in greater depth because it seems to me that the consequences of each interpretation have a greater bearing on his project than he allows for the following reasons:

If we live in what the author calls a 'partial simulation' - a VR, yet our bodies are in some sense 'real' or 'non-simulated agents', this raises what might be called the boundary problem. Like any other living system, humans are energy metabolisers, with a major byproduct of the process being CO₂ exhaled through the lungs (dieters lose 80% of their weight loss this way). The CO₂ we produce metabolises from our 'real' cells, so at what point or boundary does the gas become part of a virtual world? As it enters our lungs from the bloodstream? On exhalation? I suggest that because of this boundary problem alone, the idea that we have real bodies interacting with a VR is not a coherent position (I will leave others to imagine the not-insignificant problems of, say, ingesting food from a virtual world).



The idea that we live embedded within a dream/simulation or, as the paper says, a 'full simulation', is much harder to refute, but it's the only option left if we discount a VR interpretation.

My view is that if we were to be an intrinsic part of a dream/simulation, in other words, our thoughts, experience of ourselves and any supposed external reality were, in fact simulated, then we would only exist as figments of a dream, and it makes no sense that we could have a reality outside of such a dream, therefore little motivation or capacity to attempt any escape.

Whilst this paper allows that certain factions of some overriding intelligence capable of running a simulation may be sympathetic to requests to either abandon or alter the simulation, I feel more should have been said about the need to avoid the monoculture fallacy. Clearly, any agent capable of devising a simulation on the scale that we are purportedly experiencing is from a vastly more advanced technological civilisation, whether alien or our own far descendants. The monoculture fallacy reminds us that, almost by definition, advanced civilisations have a great diversity of viewpoints and running such a simulation would be a significant ethical consideration.

I enjoyed reading this paper and its free-ranging excursion through current Simulation theoretical work. Despite my skeptical position on the validity of the Simulation Hypothesis, I would definitely recommend this paper for publication as I feel it adds a considered and rigorous academic voice to the debate.