Dear Editor,

We wish to submit our manuscript entitled, "Sex differences or similarities? Testing the ‘greater male variability’ hypothesis across the animal kingdom" by Lauren Harrison, Daniel Noble and Michael Jennions for consideration as a *Science Advances* research article. We test the robustness of oft-cited biological explanations for the ‘greater male variability’ hypothesis in humans. To do so we present a meta-analysis of animal personality behaviour that uses a massive dataset of 2,000+ effect sizes, covering 226 different species of mammals, birds, fish, reptiles/amphibians and invertebrates collected from over 200 studies.

Studies of differences in trait variability between men and women often draw parallels with the animal kingdom to provide an evolutionary explanation for greater variability in men. There is, however, limited evidence that morphological traits show greater male variability in animals, and almost no evidence for behaviours that are shared by both sexes. We compared the personality behaviours of males and females in 226 animal species, to test the applicability of the ‘greater male variability’ hypothesis. There was no evidence for widespread, consistent male-female differences in variability in personality. There is therefore no evidence to support the greater male variability hypothesis for behaviours expressed by both sexes.

Our findings suggest that invoking evolutionary explanations as the chief reason for greater variability in men than women for personality and allied behaviours (e.g. creativity) is premature. This is important as such explanations can be socially influential. The most high-profile case was when Harvard President Larry Summers speculated that biology might explain why fewer women are in STEM careers, an evolutionary argument given further prominence by the leading public intellectual Steven Pinker. Our study undermines this speculation.

Sex differences in variability for men and women is a topic that frequently attracts attention in psychology and the social sciences, but researchers often cite single-species studies to infer a biological basis for sex differences in humans. We think that the unexpected findings of our large meta-analysis will therefore interest both a general audience and specialists interested in human sex differences or animal behaviour. We believe our work is an excellent fit for *Science Advances*. We note that a very recent research article/meta-analysis, published in *Science Advances*, challenges preconceived ideas surrounding women’s roles in ancient human societies (Haas *et al.* 2020. ﻿Female hunters of the early Americas. *Science Advances*). Given the extremely high levels of interest in this paper (Altmetric 2643), we expect a similar response for the current paper, especially given the interest in human social behaviour.

Each of the authors have contributed significantly to the present submission, and all confirm that this manuscript is not under consideration by another journal. Our meta-analysis was also pre-registered with the Open Science Foundation (OSF), as is good practice for systematic and meta-analytic studies. All the authors have approved the contents of this manuscript and agree to *Science Advances’* submission policies.

We would like to suggest Prof. Shahid Naeem and Prof. Michael Hochberg as Deputy and Associate editors, respectively.

We would also like to suggest the following five people as potential reviewers:

Dr Stuart Ritchie, King’s College London [email: [stuart.j.ritchie@kcl.ac.uk](mailto:stuart.j.ritchie@kcl.ac.uk)] He has published many papers on behavioural sex differences in humans, including variation in brain structure. He is also well acquainted with meta-analysis (see his 2020 book *Science Fictions*).

Dr Wiebke Schuett, University of Sussex [email: [w.schuett@sussex.ac.uk](mailto:w.schuett@sussex.ac.uk)] She is an academic expert in the study of animal personalities, and is lead author of the highly cited review of *Sexual selection and animal personalities* (2010).

Prof Denis Réale, Université du Québec a Montréal [email: [reale.denis@uqam.ca](mailto:reale.denis@uqam.ca)] He is an academic expert in the field of animal personality and has experience publishing meta-analyses in the evolution and ecology field.

Prof Cordelia Fine, University of Melbourne [email: [cfine@unimelb.edu.au](mailto:cfine@unimelb.edu.au)] She is an academic expert in the study of human sex differences. She is also aware of the social dimensions of such research, as shown by her Royal Society Prize winning 2017 book, *Testosterone Rex*.

Dr Tim Janicke, French National Centre for Scientific Research (CNRS) [email: [janicke.tim@gmail.com](mailto:janicke.tim@gmail.com)] He has published several high-impact meta-analyses on sexual selection and sex differences in animals, including a well-cited meta-analysis on sex roles published in *Science Advances* (2016).

We look forward to your editorial decision. Please do not hesitate to contact us should you have any questions.

Sincerely,

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