translatE
Transcending language barriers to environmental sciences

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April 2023 update on the progress of translatE project

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Tatsuya Amano and Violeta Berdejo-Espinola (University of Queensland)

We are glad to send around our first project update of the year packed with new papers and other good news.

The first phase of the translatE project has come to an end last month. Thanks to all your enormous contribution, we have had four exciting years since the official launch of this project in April 2019. Please see Section 6 of this update for the summary of our achievements during this period.

However, it is not the end of our project! We are now about to start the next phase of the translatE project, funded by the Australian Research Councile Discovery Project grant, in which we will focus on devising and implementing solutions (including the use of Artificial Intelligence – see Section 1 below) to overcoming language barriers.

We look forward to continuing existing, and developing new collaboration with you all to tackle this important issue in science!

1. New letter: Berdejo-Espinola, V. and Amano, T. (2023) AI tools can improve equity in science. *Science*.

The journey to overcome language barriers in science has taken a new turn with the launch of ChatGPT and other generative Artificial Intelligence (AI) tools. We have been following the evolution of this new technology and its impacts on the scientific community. Importantly, we believe the appropriate use of generative AIs can help improve equity in science.

For example, after the journal *Science* updated its editorial policy to ban the use of text generated by AI tools in scientific papers, we wrote a letter to the Editor raising our concern about the decision made (see below). Since AI tools like ChatGPT and DeepL can proofread English text with high accuracy, we suggest that this is a unique opportunity for non-native English speakers to get their research edited/proofread for free (or at affordable rates). This is especially beneficial for researchers in low-income countries, who often cannot afford to use human English editing services. We thus believe that the appropriate use of such AI tools could help alleviate current linguistic disparities in academia and improve equity in science. We are also pleased to see that, in response to our letter, *Science* now recognises potentially acceptable uses of AI tools for writing papers and may consider adjusting its policies in future.

If you have not tried ChatGPT yet, please do and discover the huge opportunities it offers to overcome language barriers in scientific writing.
Read the published letter here.

Accepted version of the letter

AI tools can improve equity in science

Violeta Berdejo-Espinola and Tatsuya Amano

Science has updated its Editorial Policy for ethically using artificial intelligence (AI) in scientific papers. It essentially bans the use of text generated from AI, machine learning or similar algorithmic tools in articles. However, prohibiting the use of AI tools when writing scientific articles could cause us to miss out on a huge opportunity to achieve equity in science by alleviating current linguistic disparities.

Research has shown that non-native English speakers need to spend much more effort than native English speakers when writing papers in English (Amano et al. 2022). Papers written by non-native English speakers are also more likely to be rejected and requested by journals to revise, simply due to their English writing. Human English translation or editing services exist but they are costly and time-consuming, creating a profound disadvantage for the career development and fair participation of non-native English speakers in science.

Emerging AI tools, such as ChatGPT and DeepL, can proof-read English text with high accuracy since they are trained on massive amounts of English text. Text generated/proof-read by AI tools may not be perfect and authors should be responsible for their final products. But we see AI tools' huge potential to immediately provide free (or at least affordable) and decent English editing for texts written by non-native English speakers. This poses a real opportunity for all non-native English speakers but especially those in low-income countries, as they often cannot afford to use human English editing services (Amano et al. 2022). AI tools could thus reduce the technical and financial burden for non-native English speakers, making a real difference to achieving equity in science.

A free tool that can distinguish between AI- or human-written text is now available, though it certainly has some limitations (Hendrik Kirchner et al. 2023). This enables more transparent and legitimate use of AI for English proof-reading. If AI is used for English proof-reading, journals can also request authors to declare its use (as *Nature*'s new policy does (Nature Editorial 2023)) and submit the original, pre-AI-edited version as well as the AI-edited version of the manuscript.

Our relationship with AI should not be a competition, but a partnership. AI tools like ChatGPT are exciting technologies that can revolutionise our efforts to overcome linguistic disparities for disadvantaged communities, and unlock the untapped potential of currently under-represented non-native English speakers in science.

References and Notes

T. Amano, V. Ramírez-Castañeda, V. Berdejo-Espinola1, I. Borokini , S. Chowdhury, M. Golivets , J. González-Trujillo , F. Montaño-Centellas, K. Paudel, R. White, D. Veríssimo, The cost of being a non-native English speaker in science. EcoEvoRxiv [Preprint] (2022). https://doi.org/10.32942/X29G6H

J. Hendrik Kirchner, L. Ahmad, S. Aaronson, J. Leike, New AI classifier for indicating AI-written text. (2023). https://openai.com/blog/new-ai-classifier-for-indicating-ai-written-text/

Tools such as ChatGPT threaten transparent science; here are our ground rules for their use. [Editorial] *Nature* **613**, 612 (2023).

2. **New paper: Amano, T., Berdejo-Espinola, V., Akasaka, M., Andrade Junior, M.A.U., Blaise, N., Checco, J., Çilingir, G.F., Citegetse, G., Corella Tor, M., Drobniak, S.M., Giakoumi, S., Golivets, M., Ion, M.C., Jara-Diaz, J., Katayose, R., Lasmana, F., Hsien-Yung, L., Lopez, E., Mikula, P., Morales-Barquero, L., Mupelele, A.C., Narváez-Gómez, J.P., Nguyen, H.T., Nogueira Lisboa, S., Nuñez, M.A., Pavón-Jordán, D., Pottier, P., Prescott., G.W., Samad, F., Šćiban, M., Seo, H.M., Shinoda, Y., Vanja, F., Vozykova, S., Walsh, J.C., Wee, A.K.S., Xiao, H., Zamora-Gutierres, V. (2023) The role of non-English-language science in informing national biodiversity assessments. *Nature Sustainability*.**

We are pleased to announce yet another publication based on global collaboration!

This research, led by Tatsuya Amano, investigated the contribution of scientific literature that is available in different languages to informing national-level policy reports on the state of biodiversity in 37 countries/territories where English is not an official language. We also delivered a survey to the report editor(s) asking to identify the barriers and enablers affecting the use of references in English- and non-English languages.

On average, non-English-language literature constituted 65% of the references cited in reports (Figure on the next page). Non-English-language literature represented over half of the references cited in reports for 28 (76%) countries/territories and over 75% for 15 (41%) countries/territories. Such non-English language literature was recognized as a relevant knowledge source by 75% of the report authors. But non-English-language literature represents just 3.4% of the references cited in the IPBES reports.

This means that international assessments like those by the IPBES may be overlooking important, locally and regionally relevant scientific information on biodiversity conservation, as we also uncovered in this paper.

A quarter of report authors also said they struggled with understanding English-language literature, which shows that English-language barriers seem to impede the uptake of scientific evidence in decision making in those countries where English is not widely spoken.

Luckily we have also found a solution to this; half of the report authors said having non-English titles/abstracts can help them search and understand English papers.

Our findings point to the importance of overcoming language barriers for making the best available evidence accessible to anyone regardless of the publication language, for example by providing non-English-language abstracts, and/or promoting the use of AI tools.

Read the paper here.

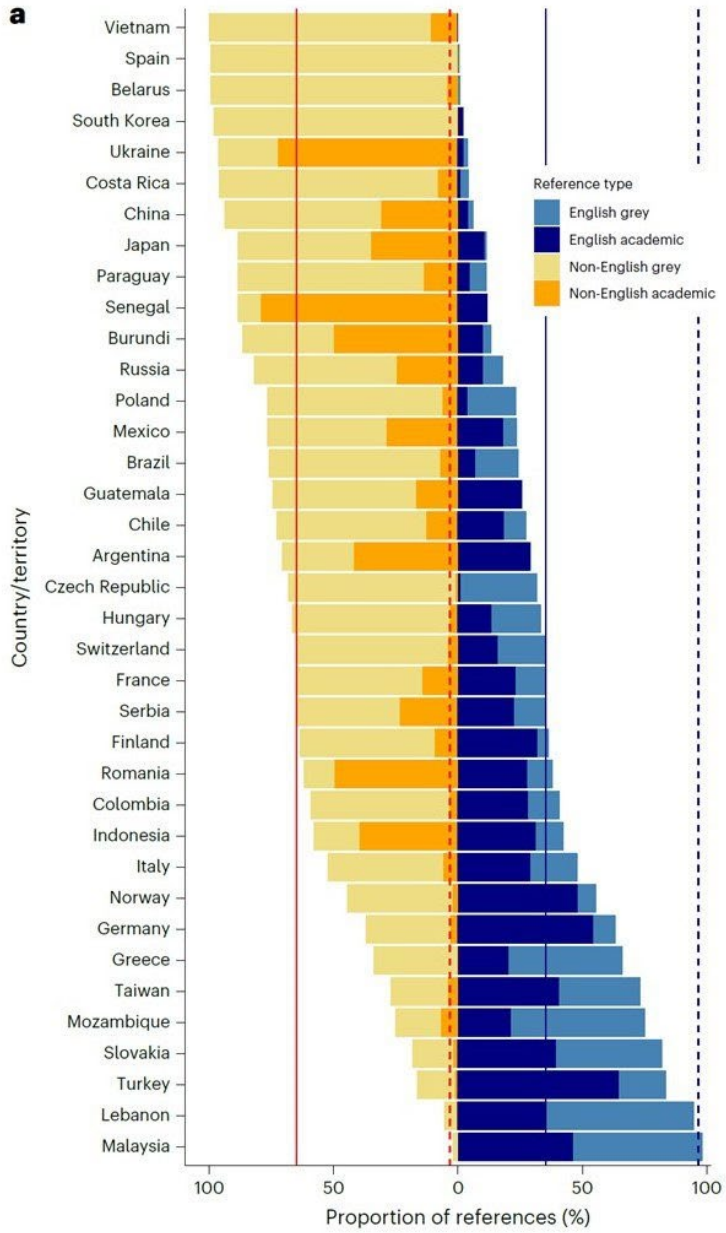

Figure. References cited in national biodiversity assessments in 37 countries/territories where English is not an official language by language and literature type. Solid lines represent the mean proportions across 37 countries/territories, and dotted lines represent the mean proportions in eight IPBES assessments based on this paper.

3. Interview on ABC radio Tasmania

It's great to see some media coverage of our new publication: "The role of non-English-language science in informing national biodiversity assessments", this time in Tasmania!

Tatsuya talked about the new publicaiton at ABC radio Tasmania Afternoons with Joel Rheinberger (link expired and not available anymore unfortunately).

4. Tatsuya's plenary at ESA-SCBO2022 is now available online

Tatsuya's plenary on why language barriers matter in conservation and how we can tackle the issue, delivered back in December 2022 at the joint conference of the Ecological Society of Australia and the Society for Conservation Biology Oceania 2022, is now available at this link (from 48:48).

5. Call for contribution to special issue "Emotional burdens of imposed monolingualism in education and science".

Our close collaborator Valeria Ramírez-Castañeda at UC Berkeley is calling for contribution to a special issue "Emotional burdens of imposed monolingualism in education and science" for journal Forum for *Linguistic Studies*. Suitable topics include (but are not limited to):

- Mental health issues for foreign or second-language students.
- Pressure to conduct science in dominant languages in the global south.
- Institutional demands on international graduate instructors to erase accents and teach exclusively in a dominant language.
- Notions of professional success and failure related to language proficiency.
- Feelings of limitation to pursue higher education programs due to linguistic barriers.
- Institutional barriers or diminished options to diversify language in science.
- Differential participation and leadership of foreign-language students in monolingual.

The submission deadline is 30th September 2023. See here for more details.

6. Four years of the translatE project – phase 1

The translatE project was officially launched in April 2019, when Tatsuya started his Australian Research Council Future Fellowship at the University of Queensland. The fellowship has come to an end in April 2023, meaning that the phase 1 of this project has

also ended. Thanks to all the enormous contribution from our collaborators, we have made significant progress over the past four years including:

- Have grown into a group of **seven (past and present) core members** here at UQ;
- Collaborated with **155 people around the world** who collectively speak at least 20 languages;
- Published a total of **13 peer-reviewed papers** on the topic;
- Delivered **15 presentations (including six keynote and eight invited presentations)** domestically (e.g., Ecological Society of Australia) and internationally (e.g., British Ecological Society, Ecological Society of America, iDiv, The Biodiversity Conservation Society of the Philippines, and The Taiwan Endemic Species Research Institute);
- Organised **two workshops**;
- Been featured in at least **23 media outlets** including The Guardian, Times Higher Education, and Australian Broadcasting Corporation;
- Compiled and released **ten simple tips** for overcoming language barriers in science;
- Released **two interactive products** (Bird language diversity shiny app, and a database of non-English-language articles on the effectiveness of conservation actions, to be ready soon!)

Coincidentally we have seen a number of positive movements in journals, societies, conferences, and institutions over the past four years. They include:

- Journals and authors have increasingly provided translations of the abstracts/main texts of English-language papers (e.g., this paper and this paper, just to name a few);
- Some journals have further published blog posts of their articles in multiple languages (e.g., The Applied Ecologist);
- Some journals have started providing translations of (a part of) their author guidelines (e.g., *Journal of Applied Ecology* and *Ecological Solutions and Evidence*);
- Journal *Evolution* started the EELS (Evolution English Language Support) programme for potential authors;
- Some influential journals have featured the issue of language barreirs in science (e.g., *Nature* and *Science*);
- A preprint server *EcoEvoRxiv* has started accepting preprints and post-prints in Spanish and Portuguese;
- *Japanese Journal of Conservation Ecology* has started a partnership with *Conservation Evidence* to share information on Japanese-language articles on the effectiveness of conservation actions;
- Some conferences have started to move towards multilingualism (e.g., Animal Behaviour Society 2022 and Evolution 2023);
- *Conservation Evidence* has incorporated a database of non-English-language articles;

- The Guidelines and Standards for Evidence Synthesis in Environmental Management version 5.1 (by the *Collaboration for Environmental Evidence*) now has a section on the use of multiple languages in evidence synthesis and also explains the risk of language bias in evidence sysnthesis by citing one of our articles;
- Important conservation documents have been published in multiple languages (e.g., Coastal high-tide shorebird habitat management guidelines);
- The Kunming-Montreal Global biodiversity framework adopted in December 2022 clearly mentions the importance of overcoming language barriers in communication.

We are modest enough not to claim that our project is the only driving force behind all these movements! However, we sincerely hope that our initiative had made some contribution to these global efforts to overcome language barriers in science.

We will continue our journey to make the best available science, produced by anyone around the world, accessible to anyone across the globe, irrespective of one's linguistic or socioeconomic background.

That is another summary of the project's update. See you in a couple of months with more good news!