

Perspectives on Scientific Error: Comparing history and parsing viewpoints

16 – 19 August 2021, Lorentz Center@Oort (hybrid format)

Description and aims

Recent studies reveal a high prevalence of errors in published research. Theoretical arguments suggest that many published findings are false, and reports across fields show that many experiments do not replicate. These errors raise important issues. From a practitioner's perspective, errors mislead and slow down research projects. From a philosophical perspective, scientific error raises questions about the right forms of scientific inference, scientific progress and the reliability of science as a source of knowledge. From the perspective of the public, scientific error undermines the epistemic authority of science and the degree to which policy-makers trust scientific experts.

During the last decade, countless meta-scientific studies (i.e., research on science and scientists) have been conducted to investigate the extent of these problems, statistical tools have been developed to identify them, and many solutions have been proposed and implemented to combat them. In addition, we are seeing the first results of meta-scientific studies on the effectiveness of these interventions. In short, we considered the time ripe for those working on these problems to reflect on these investigations, evaluate their results, and provide guidance in plotting the future of methodological development and error prevention.

This workshop was a first step in that direction. During each of the four days, one invited senior and junior researcher presented their perspectives on one of four themes: methodological reforms, statistical reforms, publishing reforms, and institutional reforms, followed by group discussion on gaps and opportunities in the afternoon. Our focus was on three main goals:

- Obtaining an up-to-date overview of the research on each kind of reform from senior expert researchers.
- Create a collaborative space for junior and senior researchers to identify gaps in knowledge and opportunities for improvement for each kind of reform.
- Lay the foundations for future discussions on research plans to address the gaps.

Tangible outcomes

With the help of designated note-takers, we have generated an extensive set of notes on the state of the field of metascience. The group discussions in particular have yielded a long list of potential gaps and opportunities in the four focus areas of the workshop: methodological reforms, statistical reforms, publishing reforms, and institutional reforms. We are currently working on turning this material into a position paper. The identified gaps and opportunities in particular will be useful to those that participated in the workshop and perhaps to metascientists more generally as a jumping-off point for future research in this area.

Organization

It was a lively and well-received workshop. We had about nineteen on-site participants, almost all of whom attended all four days of the workshop, and between twenty and thirty online participants at any given time, many of whom attended all four days but several others dropped in and out. The hybrid format worked about as seamlessly as might be expected. In particular, on-site and online participants were generally able to interact on an equal footing during the formal parts of the workshop. The chat function was used extensively during the workshop and many people used the various emoji reactions to engage, creating a lively online platform. There was more of a distinction during the informal parts, as on-site participants had a few social events while the socializing opportunities for the online participants (in particular the Wonder coffee room) were barely used.

For most of the on-site participants (as well as the Lorentz Center employees, seemingly), it was the first in-person conference or workshop they had participated in since the start of the COVID-19 pandemic about seventeen months earlier. Several participants expressed above-normal levels of excitement to discuss metascientific and other matters with each other in person.

For the organizers, it has been a bit of a rollercoaster as we initially formulated our ideas in terms of a fully in-person workshop during January-March 2020. Subsequently we adjusted our plans several times as we faced uncertainty over whether a hybrid or even fully in-person workshop would be possible or whether an online-only format would be necessary. In some ways it feels like we organized three workshops, but the actual event made our efforts worth it.

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