

Science not silence - a positive spin on negative results

Silence. That was the response when the Danish Diabetes Academy (DDA) invited early career researchers to share their negative results, either through an article or a webinar. The initiative was a follow-up from an earlier workshop, going from words to action. While one can only speculate about the reason for the compact silence, it is apparent that the sharing of negative results is problematic.

This was not the first time an organization had the idea to create a forum for sharing negative results. Other attempts have resulted in few speakers signed up for events, and the [Journal of Negative Results in BioMedicine](#) was discontinued after a year because there were too few submissions.

The subject of failure and negative data came up again during a series of workshops held by the [National Junior Faculty in Sweden \(NJF\)](#), in collaboration with the Danish Diabetes Academy ([DDA, 2020](#)). The conclusion was that we as the science community need to adopt a more positive view on 'negative' results.

First of all, there are no such thing as 'negative' results in science.

Science is about discovery, and pursuing research means taking risks and, sometimes, finding out that the hypothesis we were testing was not true. These so-called 'negative' results are part of the scientific process, and we can still learn from them. We need to stop the polarisation of results into good and bad, supporting and non-supporting the hypothesis, into valuable and negative results. Provided that the study is well designed and follows the scientific method, all of these results are quite simply called 'results', without requiring an accompanying adjective.

Nobel Laureates often talk about their struggles and failures in their early career. In that stage the research environment was often a crucial factor to being able to continue their research and making ground-breaking discoveries. One such example is the Nobel laureate, [Emmanuelle Charpentier](#), who speaks warmly of a supportive environment at Umeå university, where she could investigate the bacterial defense system that nowadays is well known as the genetic scissor CRISPR/Cas9. Researchers need a supportive environment where they have trust, time, and resources to develop brilliant ideas - an environment where curiosity-driven research and its accompanying risks are possible. The research environment and culture seem to be the key.

How do we create such a culture?

All participants at the NJF workshop agreed that to be able to change the view of 'negative' results in science, multiple stakeholders need to be involved and take action to make this shift of perception happen. For instance, funding agencies could re-evaluate the strict metrics requirements and thereby create possibilities to fund riskier, curiosity-driven projects. A method-based review process before starting a study could be another piece of the puzzle. Some journals (such as PLoS) have already adopted the use of pre-registered studies and their accompanying publications. In a two-step process, journals commit to publish results if the methods were approved by review. This can also improve the quality of the science by being assessed and receiving feedback before conducting studies. Open access publishing platforms such as [eLife](#) and [F1000 Research](#) request pre-prints, which undergo 'post-publication' peer review, empowering researchers to decide what they want to publish, including 'negative' results. These initiatives will increase the need for reviewers, and we would need to re-consider the current peer reviewing process to make this sustainable.

Another solution is that scientific journals create space in their issues dedicated to 'negative' results. Some already offer this, including special issues or 'research notes', such as in the journal BMC. This would be a short-term solution to aid with the publishing and normalising of 'negative' findings, with the overarching goal to abolish this polarisation of positive and negative findings.

An honest conversation about negative findings and why we hide them away is an important black box that we try to open. That box contains a lot of research ethics - waste of resources, manpower, lack of transparency, and a break of traditions. This is not an easy task, and everyone in the science community needs to participate to make this change of perception. This includes researchers, teachers, funders, journals, and university executives. All stakeholders need to work together to create the infrastructure and the support system to be able to conduct curiosity-driven science that advances scientific knowledge.

For Science. Not Silence.

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