



Fake news concerning research data. Scientific evaluation and scientific communication in the age of social media

“Don’t listen to me. Listen to science.” – Greta Thunberg

1. Abstract

Western countries are currently facing a serious crisis, notably the rise in fake news and the belief of their citizens in such news. These fake news often stem from unverified data in scientific fields and bring science and academic institutions into disrepute. Researchers from the Humanities and the Natural Sciences are exposed to the dangers and negative consequences of these practices without having the instruments to prevent and contrast them.

Our project aims to analyze scientific practices and find possible causes as well as propose potential solutions to prevent such issues. We will bring together key players in the Science and Humanities spheres to brainstorm together about issues that damage the reputation of our work and institutions.

The final outputs of our project will be practical tools such as “rules of conduct” to prevent fake news, and workshops on communicative skills for young researchers (e.g. “science in the twitterverse and on facebook”, “How to give an interview on science issues”, “How to recognize reliable science data in media”).

2. Description of the project

In recent times, the dissemination of misleading scientific data has been one of the topics at the forefront of the fake news discussions. The following subject matters fall under the realm of these conversations: ‘anti-vaxxers’, ‘climate deniers’, ‘holocaust negation’, ‘racist theories’. The most palpable observation from this short list indicates that the fake news do not spare any research fields. The root of fake news is many-fold and stems from misconstrued scientific facts as well as cultural and philosophical beliefs and biases and therefore impacts the Natural Sciences as well as the Humanities.

Often the blame is passed on to the journalistic medium for the miscommunication of science. However, we believe that science should interrogate itself and its practices to prevent such issues. Paradoxically, institutions like academia, who can prevent fake news are sometimes protagonists in their creation. What is the role of academia in the rise of fake news and what solutions can it offer to this toxic problem? To try to answer this question, the Humboldt Alumni Award will bring together a diverse team of international researchers, science evaluators, journalists, editors, and politicians to discuss practices within the Science and the Humanities which could, inadvertently, contribute to the spread of fake news. Due to the interdisciplinarity and to the international importance of this topic, the two applicants of this Humboldt Alumni Award come from diverse disciplines and cultural backgrounds (Italy - Humanities & USA – Natural Sciences).

Some examples: The anti-vaccination movement was spurred by a now many times over debunked article from Dr. Andrew Wakefield in the Lancet. The advent of social media and the internet caused this article, published in a reputable journal, to be the core argument for a loud minority to encourage parents not to vaccinate their children. This in turn led to a public health disaster where measles is now resurging as a threat. In Biomedicine, where the results of a study are pertinent for

human health, there is a lack of urge to tackle the issue. Similarly to Wakefield's article, several other publications have led to adverse outcomes and the recent media coverage of these issues has contributed to the public's rejection of scientific findings. One pertinent case is the publication of an article in the "New England Journal of Medicine" shifting the blame of obesity and heart disease on dietary fats rather than sugar. The collision of these publications with the media's search for explosive stories can lead to calamities such as the Lancet publication. Other prominent examples could be the cases of Stanley Fish and Martin Fleishmann about "cold fusion" and Jacques Benveniste who published an article on the memory of water in 1988 in Nature with the support of the editor John Maddox, which is the basis of homeopathic remedies nowadays.

Similar issues can be observed and are becoming more prominent in the Humanities. Very recently (2013), an article published in the journal "Science" described the results of a series of psychological studies that claimed to show a causal link between reading high-brow literary fiction and "theory of mind," or empathy. The results were much discussed in the news and elicited a triumphalist vibe in many literary theorists and educators. Unfortunately, subsequent experiments failed to replicate the results of the experiment. The social sciences and psychology have faced up to this problem with organizations such as the "reproducibility project: psychology" and "the "social sciences replication project" where they find that 38% of the studies in the scientific journals Nature and Science are irreproducible and all of the reproducible studies had a much smaller effect than originally found¹. The spread of fake news or even openly wrong data can have even worse outcomes: no later than in 2018, the American Society of Human Genetics (ASHG) denounced the attempt to link genetics and racist theories².

Another alarming case in the Humanities is the so-called Leuchter report by Fred A. Leuchter, a paper stating that no traces of cyanide were found when he examined samples taken from one of the Auschwitz gas chambers in 1988. This fake study corroborated negationist theories of the Holocaust.

3. Potential Causes:

Our hypothesis is that the following scientific and academic practices could have directly or indirectly contributed to the creation of fake news:

3.1 Pressure of publications (Publish or perish)

One could argue that the examples cited above are isolated events but as scientists within academic institutions, we put forward that the problem lies more deeply within the operations in academia. The variety of available scientific journals combined with the pressure on researchers to publish has led to an infinite flow of publications in the Natural Sciences as well as in the Humanities. Very often the pressure to publish leads to immature and not well-thought-out publications. This has led to the above-mentioned replication or reproducibility crisis.

3.2 Lack of interdisciplinary sensitivity:

Traditionally, research in the Humanities has been more qualitative and based on self-reflection. Indeed, the major problem lies in the lack of familiarity with empirical evidence and very often researchers in the Humanities and Social sciences lack the expertise for the analysis of quantitative data. In fact, novel quantitative approaches to hypotheses in the Humanities such as the Digital Humanities and Empirical Aesthetics for example are confronted with much skepticism from traditional Humanities researchers. Furthermore, several sociological studies demonstrate a gap between quantitative and non-quantitative sciences (where most of the Humanities publications would lie).

Similarly, quantitative research, which is common in the Natural sciences, lacks in sensitivity for cultural and religious values which can lead to reductionism. Sometimes scientific research can accidentally give birth to fake news when it only cares to produce and publish data, without being aware of its cultural impact.

3.3 Commercial reasons

¹ <https://www.nature.com/articles/s41562-018-0399-z>

² [https://www.cell.com/ajhg/fulltext/S0002-9297\(18\)30363-X](https://www.cell.com/ajhg/fulltext/S0002-9297(18)30363-X)

Publishing houses have the interest to publish as many books as possible, whereas journals and editors have to care about the continuity of their journals by guaranteeing a constant flow of publications. Thus publication volume is more valuable in this business than the detection of quality works separating the good science from the bad. In addition, the wish to publish “sexy” data for the editors and the desire of authors for groundbreaking research to enhance their CV forms a perfect storm for the publication of erroneous and misleading results.

3.4 The fatigue of reviewing

Linked to the previously described problem is the question of the flow of the review process. The scientific method at face value should prevent the publication of questionable results. However, the outsourcing of scientific publishing to journals has slowly eroded the core of evaluation. Nowadays, reviewing of scientific articles, partially due to the proliferation of scientific journals, is a time-consuming activity for the researchers but is neither sufficiently appreciated in the CV nor brings monetary benefit. The necessity for researchers to perform this crucial activity on a free-will basis negatively impacts the quality of the review process.

3.5 Science and social media

More and more publications in the Humanities and in the Natural Sciences are announced on twitter, facebook, websites and other social media platforms. Very often this happens on a spontaneous basis without any control and filter. This information produced by experts but reposted and rephrased by laymen flows to the general audience sometimes generating social alarms or phobias. The quick dissemination of publications on social media without any checks can lead to social alarms, discrimination, and the scientific miseducation of society. Moreover, discussions of important political issues (i.e. climate change, migration) are not corroborated by scientific data leading to several problems in society.

It is very clear from the information above that important issues are at stake in our discussions touching diverse disciplines and fields. Though we do not have ready-made solutions, we find it necessary to use the Humboldt Alumni Award to develop a network with the relevant stake-holders and experts from different fields and offer suggestions for bold reforms including but not limited to:

- Publication of “failed experiments” and pre-publication as a form of open-access dialogue with the whole scientific community
- Obligatory payment of reviewers of papers, projects, CVs
- Validation of research through big data (see Checchi & al 2019)
- The development of soft skills required for communication of science (e.g. narratives and storytelling to communicate with nonexperts Dahlstrom M.F., 2014; Olson R. 2015). Researchers are not trained to deal with journalists and communication is therefore untactful and clumsy.
- A significant increase in scientific education for the public. As a result, this will put pressure on politicians to act on the prescription of scientific data.

From the situation depicted, it follows that this important issue for society as well as for science cannot be tackled only by scientists and researchers. We will use the Humboldt Alumni Award to invite the following stakeholders to these crucial discussions: researchers, science evaluators (DFG, ERC, Alexander von Humboldt-Stiftung, Horizon 2020), editors, publishers, public relations managers, social media specialists, journalists, as well as politicians.

4. Program

The project follows a funnel model. In the first year, the key figures and main stakeholders are targeted and involved in the project. In the second year, two workshops are planned to bring together people from science, funding institutions and

science communication. The third year will be devoted to the writing of “manuals of good practices” for young researchers and scientific institutions.³

³Prof. Massimo Salgaro and Dr. Jean-Yves Tano

⁴European Research Council, Horizon 2020, Alexander von Humboldt Stiftung, DFG, DAAD

⁵Nature, Science, ORION Open Science, Steven Novella, BMBF