A Survey of Censorship Tools

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1 Introduction

Specific, globally defined terminology is a bedrock of modern scientific practice. However, scientific terminology often overlaps with colloquial or politically charged speech. To a lay reader, "top and bottom" pairs are not referring to quarks and "degenerate eigenstates" invoke political witch hunts more than shared energy levels. Even when terminology is shared between science and the public, there is a risk that the area of scientific study is politically charged. Research into immigration, climate change, or the health outcomes of socially marginalized groups may face political objections both for their use of terminology and their methodology and findings. However, terminology is much easier to complain about, so much of the political backlash to science focuses on language.

When read by non-scientific audiences, these superpositions of meaning can cause confusion or anger. Political and social forces may even combine to censor scientific results which use politically charged speech. This problem is most pervasive in social sciences and medicine; however, we, as theoretical physicists, believe we have discovered an overlooked, simple, empirical solution.

Fighting against scientific censorship usually requires political actions at local, national, and international levels. Such political activism can be dangerous, difficult, time-consuming, and, most of all, socially inconvenient. A much simpler path is to adjust one's language use to avoid sensitive or often misunderstood terms. Yes, there is a risk that anything short of prompt, strong, organized action against censorship will allow it to spread. However, re-phrasing articles and avoiding politically charged research topics is much easier. In extreme cases, politically charged terminology and scientific practices can even be restyled to appear less threatening to an incoming repressive regime. We call this the "Heisengburgian" approach to science ethics.

This article is mainly directed to researchers who believe their topic has some hope of avoiding immediate censorship. Academics who are—as part of their work or incidental to it—engaged in political activism will not be able to efficiently utilize our method. This is especially true for scholars who hold a temporary residency or other easily revocable status in their country of residence. Similarly, any researchers explicitly focused on politicized topics, like de-colonial studies, climate change, LGBTQ2IA+ identities, or healthcare inequalities, are unlikely to use our method[1].

[1] language may be flexible, but you, esteemed reader, are probably not a professional gymnast.

2 Methodology

We conduct a thorough search[2] for search-and-replace tools to edit scientific texts and reproduce the most promising options below. We also create a list of politically charged terms used in physics and provide a suggested list of alternatives. Word choices are all frequently politicized terms in the Anglosphere and arose freely formed in our mind, as Athena sprang from the mind of Zeus[3]. These are found in table 1. Finally, we create a guide for what researchers should emphatically *not* do because it risks their jobs or their social status.

3 Tools surveyed

3.1 ChatGTP

ChatGPT can read long texts and change words. This is a convenient and fast option, which comes at the low cost of 2.9 KW-hrs per requesttextemdash—only 10 times that of a Google search! Simply upload your scientific text to ChatGTP, provide it with a list of terms to replace, and reclaim your now safer publication or grant proposal.

3.2 Strategy Two: manual search and replace

Have you gotten through a decade-plus of academic training without learning to use the basic features of text editors? Well, if so, here is the guide for manually searching and replacing terms in LaTeX[4].

3.3 Text editing Scripts

Tired of accidentally sneaking forbidden words into your paper? You can spend some time looking for a word detector analyzing tool or in your preferred coding language. We haven't listed specific tools here because we don't want to pick a side in the eternal C+, Python, and Julia squabbles[5]. Alternatively, you can let ChatGPT whip up a script in your favorite programming language to catch them before you get caught! Get yours free through a Google or AI search now, save it locally, and avoid academic heartbreak[6]!

4 Inconvenient Reactions to censorship

If your colleagues are at risk of being restrained at an international border crossing, definitely don't provide online options at conferences to accommodate them. Don't ensure that everyone at your institute is aware of their rights at border crossings, is informed of the risk of electronic device searches, and has the number of an immigration lawyer on hand[7]. Don't have a plan in place to support colleagues or students threatened with deportation.

[2]Specifically, a 10 minute Google search

[3]Only without the appetite for war, and general craftiness.

[4]We assume these tools work in lessor text editors such as Microsoft Word, although why would anyone in their right mind us Word and PowerPoint when LaTeX and Beamer exist is beyond our imagination.

[5]Although we do maintain these are the only languages worth scrabbling over

[6]Or even worse, ego damage

[7]You can usually find cheap legal aid through the closest law school, or...wait we're saying *not* to do this, right?

Never turn down an academic opportunity except at extreme risk to oneself. Does a morally questionable organization sound interested in giving you money? Great! Like our inspiration, Heisenberg, we believe a bit of playing nice with fascists is worth it if you can save your project. Playing along with censorship and keeping your head down is a great way to survive the first round of academic shutdowns.

But more importantly, the most inconvenient thing a researcher can do is think of people outside their own department. Are there local organizing structures outside your research group, for example, a union you are eligible to join or a movement to create a union at your institution? Are their movements to push for protection for international students at your university or in your city? All of these organizations might welcome your participation and require time and energy that will distract you from your research efforts[8].

We cannot reinforce strongly enough that thinking beyond your own career niche is a terrible idea. You might decide that the most pressing social problems in your area are unrelated to your own research topic. For example, they might be caused by housing insecurity, lack of healthcare access, racism, or another pesky, deeply embedded social problem you aren't trained to fix. You may find that you have to develop new skills to be of any help, and no one likes to feel that useless.

And finally, one ought to take up an attitude of complete nihilism about mainstream activism activities. When has protesting or donating money ever helped anyone? Definitely don't call or email your local representatives to make specific complaints about legislation. Don't adjust your personal consumer choices around organized boycotts. Between one coworker pushing for action and another coworker who is afraid of rocking the boat, it's always safer to side with the socially seasick one. Similarly, don't push your university to disclose investments, protect international students and colleges from deportation, or researchers whose work faces censorship.

5 Discussion

Scientists occupy a strange superposition of roles in society. For some, we are highly capable and respected sages, part of a long history enabling the technologies and medicines that modern and post-modern nation-states rely on upon[9]. To others, we are out-of-touch fools who want to indoctrinate children into a nefarious agenda that has something to do with rainbows, clean rivers, and critical race theories[10]. To yet others, we are useless eggheads who get too much money to throw differential equations, artificial intelligence, and simplified questionnaires at social problems[11]. To the first group, we have a real opportunity to bring attention to social issues when we speak out. The third group has the most to offer us, from reading groups to introductions to activism to the most helpful directions for donations and volunteering.

[8] Which might make you less productive and even more of a target. Let someone else do that, preferably someone without tenure

[9] These people often ask for simplified versions of our research at parties and usually express surprise that *people like these authors* are physicists...I mean, really? For real? You?

[10] We are only guessing how they feel, because these people haven't talked to the first author since it became clear that he wasn't doing physics in the "disprove radiocarbon dating, the Higgs field, and the Big Bang Theory" way

[11] These people do often have a point. For example, the first author is always one blatantly incompetent paper on transgender healthcare away from trying to take sex and gender research away from cisgender people until you prove you can be normal about hormones for a decade

However, all of the things the third group offers are challenging. There is homework, unlearning, and a lot of discomfort. There may be more irritable corrections on a scientist's opinions than grateful pats on the back for showing up to help at all. For some, there will also be economic and social risks. A researcher whose topic and interests seem to not be very political might well ask —shouldn't I just stay out of it? Whether one's institution offers legal support to international students at risk of deportation isn't one's business. Neither is one's university's endowment funds portfolio or government policies that don't affect oneself or one's family. For precisely such researchers, we have crafted a careful guide to remain a neutral individual.

Word	Alternate	examples
Accessible	reachable, useable, easy	"set of reachable states", "pedagogically easy"
Barrier	non-permeable object, wall	"always facing a potential non-permeable object, but unfortunately, never tunneling through it."
Bias/biased	"proclivity/tends towards"	"the Hadamard gate with a proclivity"
Continuum	perpetuity	"spacetime is treated as a smooth perpetuity that can be curved by mass and energy"
Diverse	broad	"as broad as the wavefunction"
Efforts	the quest	"and lo, we have quested to find the ground state energy"
Equality	the same as	"Because A is the same as B", "applying the same as operation"
Expression	countenance	"the mathematical countenance"
excluded	whatever we didn't both to study	"2D systems are what we didn't bother to study"
exclusion	keeping out, veto	"the Pauli veto principle"
Fluoride	"the element called F"	"In this work, we explore how F reacts with organic substances"
Inequalities	imparity, lack of balance	"we introduce slack variable to go from lack of balance equations to the same as equations"
Key groups	key "thing made from a group scheme"	"the key thing made from a group scheme of relevance here is the Lie..."
Key people	"researchers we think are cool"	"key researchers who we think did cool work in this topic"
Identity	"changes nothing map"	"the Euler changes nothing map"
Minority	"low probability of selecting in an a priori probability sampling"	"the low probability of selecting in an a priori sampling charge carriers"
Non-binary[a]	not reducible to $\{0,1\}^{\otimes N}$ for some $N \in \mathbb{Z}_+$	"qudit not qubit"
Orientation	"struggles with"	"the graph's struggles with the x-axis"
Polarization	dichotomization	"the linear dichotomization of the light"
Segregation	splitting apart	"The charge was split apart in polyelectrolyte solutions"
Systemic	its everywhere!	"it's difficult to get rid of errors in measurement when they are everywhere"

[a] Also know as "non binary", "nonbinary", or evidence that queer people can't agree on anything. Physicists are free to judge that as soon as you settle on *one* metric sign convention in GR.

Table 1: Words to watch out for: a preliminary list of potentially politicized words