Title: Further discussion on findings appendix for "Alternative science against the corrupt elites? The effects of pseudoscience and censorship accusations in health misinformation"
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Note: The material contained herein is supplementary to the article named in the title and published in the Harvard Kennedy School (HKS) Misinformation Review.

Appendix G: Further discussion on findings

Part 1: Asymmetric patterns observed in the GMO and vaccination context

We observed that pseudoscientific content increased GMO risk perceptions and reduced behavioral intentions for GMO consumption, but not for vaccination. This asymmetry likely stems from several interrelated factors.

First, prior experience and entrenched beliefs. Data collection occurred in January 2024, by which point the vast majority of Singaporeans had already received multiple doses of COVID-19 vaccines (Deutsche Welle, 2021), supported by sustained government vaccination campaigns (VacciNationSG, 2021). Vaccination is thus a behavior with which most participants had direct, repeated personal experience (the individual use of preventive medical technology on one's body), making existing attitudes more resistant to change from a single exposure to a message. GMO consumption, by contrast, involves less direct experiential grounding, leaving related attitudes comparatively malleable to informational influence.

Second, social norm dynamics. Studies have shown that perceived injunctive norms strongly correlate with vaccination intention in Singapore (Geber et al., 2023). In a context pronounced for its collectivist culture, expressing vaccine hesitancy may carry a social cost that expressing caution about GMO foods does not. This normative asymmetry may have buffered vaccination intentions against pseudoscientific framing even among participants who found the content credible.

Third, the structure of our behavioral measures. The vaccine intention item asked participants how likely they were to get a booster if health authorities recommended it for their age group, which may invite deference to institutional authority. This specific wording was carefully crafted in the context of the COVID-19 public health emergency and ethical considerations. We note that the question wording ("if health authorities recommend it for your age group?") was carefully designed, given the relatively rapidly evolving booster vaccination recommendations for different age groups at that point during the pandemic, and the question wording reflects the decision-making considerations of individuals more realistically. The GMO intention item carried no equivalent dynamic, leaving it more sensitive to attitudinal shifts. We are nonetheless reasonably confident in the overall validity of our vaccine measure, given Singapore's high-trust institutional context and the measure's alignment with established approaches in the literature (Jolley & Douglas, 2014; Kwok et al., 2021; Wong et al., 2021). Future research may incorporate more diversified behavioral measures to capture the multidimensional nature of vaccination intentions better.

These factors collectively underscore the topic-contingent nature of pseudoscientific persuasion. GMO findings may also be more internationally generalizable, as GMO attitudes are less anchored by strong institutional messaging and may reflect a more neutral attitudinal baseline across a wider range of countries.

Part 2: Science populism's discrete effects between the COVID-19 vaccines and the GMOs

Main points: Among individuals high in scientific populism, exposure to pseudoscientific content alone was associated with higher vaccination intentions but lower GMO consumption intentions. This divergent pattern likely reflects the same interrelated factors discussed above: vaccination in Singapore carries

strong normative salience and personal experiential grounding, such that even science-skeptical individuals may not translate institutional distrust into vaccine refusal in this context. GMO consumption, being comparatively neutral and less normatively anchored, remains more susceptible to pseudoscientific framing. This suggests that the behavioral relevance of scientific populism is influenced not only by message framing but also by the extent to which a given issue is institutionally and culturally anchored in the target population.

More detailed discussion: In the Singapore context, vaccination was driven by extensive government campaigns, high institutional trust, repeated personal experience with vaccination, and strong social norms favoring vaccine uptake. As a result, even individuals skeptical toward mainstream science (higher science populism) may not translate this attitude to vaccine refusal in the same way observed in lower-trust or more polarized contexts. Furthermore, communications on vaccine uptake were spearheaded by the Ministry of Health. In contrast, attitudes towards science (science populism) involve other actors, such as vaccine-developing scientists, mostly in other countries (scientists in Singapore were not directly involved in COVID-19 vaccine development). Relatedly, several studies have shown that the country of origin of vaccine development can shape attitudes towards vaccines (e.g., Atkinson et al., 2023). Hence, in hindsight, we interpret it as not entirely implausible that individuals might have divergent attitudes towards scientists and vaccination intentions in a high-trust context where the government spearheads robust norm-based vaccine promotion. This stands in stark contrast to early vaccination efforts and inconsistent messaging from political leaders in the USA (a country where scientists were directly involved in COVID-19 vaccine development). GMO consumption, by contrast, carries weaker normative and experiential anchoring, given that it does not involve tangible action on one's own body and lacks the urgency of the pandemic. These might make GMO-related attitudes more susceptible to pseudoscientific framing. It is also more acceptable to avoid GMOs as a consumption pattern, given the natural/organic food and wellness movements worldwide and, specifically, the widely accepted alternative/complementary health culture in Singapore's public health and medical services repertoire (e.g., Traditional Chinese Medicine) (Lim et al., 2005; Wu & Kuru, 2025).