Final Report

17-109-R "Public Understanding of Science in a Post-Truth World"

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Executive Summary

This project addressed a fundamental challenge for science and society: to understand how destructive "misbeliefs" about empirical reality persist and proliferate in the face of contrary scientific evidence. Strong scientific consensus on issues such as the medical benefits of vaccines and the economic benefits of immigration is not mirrored by public opinion, which is itself increasingly polarised and politically partisan on key issues. Intense division over the facts of the matter may have catastrophic ramifications for public life – potentially inducing and exacerbating public health emergencies, sectarian violence, financial crises and environmental disasters.

Across three broad, interdisciplinary work-packages employing novel methodologies, our project investigated fundamental cognitive and sociocultural factors sustaining these divisions. Our general framework integrated a range of factors that facilitate the acquisition and transmission of false beliefs. These factors can be loosely classified as features of the message, the messengee or the messenger:

Message: Just as a fizzy drink may become culturally successful because it satisfies evolved cravings for sugar, some ideas (e.g., that vaccines cause autism, that atheists are immoral) spread and endure, in part, because their content resonates with our biologically endowed or culturally entrenched intuitions and preferences.

Messengee: Trait factors that render individuals vulnerable to misinformation include cognitive ability and various learning biases. For instance, individuals tend to restrict the amount of information they collect when forming beliefs, "jumping to conclusions" on limited evidence. In terms of cognitive ability, evidence indicates that the most educated and cognitively sophisticated opposing partisans display the most extreme political polarization in their reported factual beliefs.

Messenger: Features of the social context in which a belief is encountered may strongly influence its adoption. For example, people are more likely to adopt beliefs that are commonly held, or that are espoused by sources they trust.

Our findings reveal that these various mechanisms may interact with ominous consequences. For instance, in WP 1 we demonstrated that people can socially acquire a disregard for evidence – when they see other people collecting minimal evidence before making a decision, they too are more inclined to collect minimal evidence – and more likely to be wrong. In shifting the focus from the diffusion of false beliefs to the diffusion of suboptimal belief-formation strategies, we identified a novel mechanism whereby misbeliefs arise and spread.

WP2 focussed on beliefs in the political sphere and explored the causes and concomitants of identity-based polarisation. We found that people's evaluations of scientific evidence become more partisan in the presence of a peer observer, indicating that biased assimilation of evidence is at least partly socially strategic (functioning to signal commitment to identity groups upon which individuals depend). Other studies revealed that more analytic individuals are overall less biased in their belief updating after receipt of new political information, whether or not it aligns with their political identity; and that "party cues" (cues of what prominent party members think, or of what most partisans think) function in part as heuristics, stand-ins for a lack of substantive policy information.

WP3 explored further interactions between messenger, message and messengee. For instance, using nationally representative data from the general adult populations of Ireland and the United Kingdom, we identified psychological predictors of vaccine hesitancy/resistance, e.g., in both populations, those resistant to a COVID-19 vaccine showed higher levels of mistrust in traditional and authoritative information sources. A further cross-cultural study indicated a robust global source credibility effect for scientific authorities, which we dub 'the Einstein effect': across 24 countries and all levels of religiosity, nonsense from a scientist was considered more credible than nonsense attributed to a spiritual guru. Happily, these findings suggest that irrespective of religious worldview, science is a powerful and universal heuristic that signals the reliability of information.

Dissemination: Summary

So far our project has produced:

- **Ten** peer-reviewed manuscripts published or accepted for publication, in outstanding outlets such as *Nature Communications, Journal of Experimental Psychology: General* (two manuscripts), *Developmental Science, Behavioral and Brain Sciences* and *Cognitive Psychology.* Full citations are as follows:
    - Sulik, J., Efferson, C. & McKay, R. (2021). Collectively jumping to conclusions: social information amplifies the tendency to gather insufficient data. *JEP: General.* doi: 10.1037/xge0001044.
    - Murphy, J., Vallières, F., Bentall, R. P., Shevlin, M., McBride, O., Hartman, T. K., McKay, R., *et al.* (2021). Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. *Nature Communications, 12*(29).
    - McKay, R. T. & Ross, R. M. (2021). Religion and delusion. *Current Opinion in Psychology,* 40, 160-166. doi:10.1016/j.copsyc.2020.10.002
    - Efferson, C., McKay, R. & Fehr, E. (2020). The evolution of distorted beliefs versus mistaken choices under asymmetric error costs. *Evolutionary Human Sciences*, 2, e27.
    - Tappin, B. M., Pennycook, G. & Rand, D. G. (2020). Rethinking the link between cognitive sophistication and politically motivated reasoning. *Journal of Experimental Psychology: General.* https://doi.org/10.1037/xge0000974
    - Lloyd, A., McKay, R., Sebastian, C. & Balsters, J. (2020). Are adolescents more optimal decision-makers in novel environments?

Examining the benefits of heightened exploration in a patch foraging paradigm. *Developmental Science,* e13075.

- Furl, N., Averbeck, B. & McKay, R. (2019). Looking for Mr(s) Right: Decision bias can prevent us from finding the most attractive face. *Cognitive Psychology, 111,* 1-14.
- Miyazono, K. & McKay, R. (2019). Explaining delusional beliefs: A hybrid model. *Cognitive Neuropsychiatry, 24*(5), 335-346. doi: 10.1080/13546805.2019.1664443
- McKay, R., Jong, J. & O'Lone, K. (2019). Idolizing the indexical. *Religion, Brain & Behavior, 9*(3),260-2.
- Tappin, B. M., Ross, R. & McKay, R. T. (2018). Do the folk actually hold folk-economic beliefs? *Behavioral and Brain Sciences, 41*, e190*.* doi:10.1017/S0140525X18000560

- **Seven** further completed manuscripts, including a manuscript under re-review at *Nature Human Behaviour,* and a manuscript provisionally accepted (as a registered report) at *British Journal of Psychology.*
- Several further manuscripts in preparation, including an invited article (due Oct 2021) for the prestigious international journal *Current Directions in Psychological Science*. Altogether the project is likely to yield more than 20 published peer-reviewed articles acknowledging our grant (compared to the three articles we originally promised to produce).
- Blog posts on our work in outlets such as *Imperfect Cognitions* and *The Conversation*, with around 100,000 readers and hundreds of reader comments.
- More than **30** presentations to international audiences, including in Australia, Belgium, Estonia*,* France, Germany, Greece, Hungary, the Netherlands, Switzerland, the UK and the USA.