(6) Are we too quick to assume that the most recent evidence is inevitably the strongest? Discuss with reference to the natural sciences and one other area of knowledge.

Word count: 1592

Personal code: jtk047

Knowledge in the areas of knowledge of natural and human sciences constantly evolves as new evidence is found. "We" (experts, media, policymakers and the general public) are often *too* quick to assume that the most recent evidence is the strongest, overlooking flaws of the evidence. This essay explores the reasons for and the implications of this improper response to new evidence in the natural and human sciences.

The most recent evidence in the natural sciences is sometimes assumed too quickly to be the strongest evidence by the general public. An example of this is evidence of excess heat production and the detection of neutrons by Pons and Fleischmann inside a cell where deuterium was being forced together at room temperature. Pons and Fleischmann interpreted this as evidence supporting cold fusion (lighter elements combining into heavier ones at low temperatures) and immediately announced this result to the general public in a press conference (Gilet 8). The general public was quick to consider this as strong evidence towards cold fusion, with the news becoming a media sensation and being accepted by most people. However, later, it turned out that this evidence was flawed as scientists had been unable to replicate this evidence, and the excess detection of heat and neutrons had been due to calibration inaccuracies and palladium electrode contamination (Gilet 10). The general public had swiftly believed the validity of this evidence likely because of how it was conveyed in the press conference and media. The press conference did not focus on the evidence itself and its shortcomings such as lack of replication. The press conference emphasized

how cold fusion would solve critical environmental and energy problems (StevenKrivit 15:55). This led people to believe this evidence too quickly because of an appeal to emotions and an appeal to consequences (wishful thinking*)* used when conveying the evidence. The economic disaster following the 1973 oil crisis may have also exacerbated the emotional impact of this evidence on people, clouding their rational judgment. Had this communication focussed more on the objective strength of the evidence instead (which was dubious at best), the general public may not have been too quick to assume it to be strong. The quick acceptance of this evidence by the general public led to a loss of trust in the scientific community and media and damaged scientific credibility from the general public's perspective.

While the general public had been too quick to assume that cold fusion was possible, the experts hadn't. This was because of two reasons. Firstly, scientists understood that cold fusion contradicted well-established theories and principles in physics. Hence, scientists were hesitant to believe this new evidence unless a new theory could explain it. Secondly, scientists believed firmly in the scientific method and the importance of peer review and replication than the general public. Since this evidence was extremely new and hadn't been replicated, most scientists decided to wait before considering this evidence as strong (Gilet 12).

Conversely, experts are sometimes too quick to assume that the most recent evidence is strong. An example of this is from studies in the 1970s that found a correlation between the deposition of cholesterol in arteries and the risk of heart disease. Experts considered this evidence as strong support of the theory that a cholesterol-rich diet increases the risk of heart disease. However, later evidence showed that cholesterol in the bloodstream remained largely controlled despite changes

in the cholesterol levels in the diet (Berger, Samantha, et al.). Therefore, experts were too quick to assume that this new evidence was strong in the context of supporting a theory. Unlike the evidence from cold fusion, this evidence did not contradict existing evidence or theories, which is likely why it was accepted with less resistance. The swift acceptance of this evidence resulted in the American Heart Association publishing recommendations to restrict the consumption of nutritious food such as eggs due to their high cholesterol content (Soliman). This may have had adverse effects on public health by disincentivizing eating nutritional food that, in reality, posed no increased risk of heart disease. The scientific community may have been too hasty in accepting this theory and acting upon it. However, this may have been the best bet given the circumstances as this was a low-risk, high-reward situation; heart attacks cause one in four deaths in the USA (Soliman), and rationing egg consumption did not have a major impact on nutrition. Therefore, hastily assuming this evidence to be strong may have been the pragmatic thing to do in this scenario to prevent as many deaths as possible.

New evidence from the AOK of human sciences is often assumed to be the strongest too quickly. An example of this is evidence in the field of nutritional psychology by Brian Wansink claiming that giving healthy vegetables exciting names such as “Silly Dilly Green Beans” or “X-Ray Vision Carrots” increases the consumption of healthy vegetables among children from 32 to 66 percent (Newcomb). This surprising evidence circulated everywhere in popular media outlets such as the *Time Magazine* and *ABC News*. After independent audits by sceptical researchers, it turned out that this evidence as well as evidence from 17 other papers by Brian Wansink was flawed. Wansink used problematic statistical techniques to conclude that the data supported the hypothesis (Resnick, Brian, and Julia Belluz). The general public had been too quick to assume that this recent evidence

was credible, with parents and schools implementing Wansink's unhelpful recommendations instead of encouraging kids to follow a healthier lifestyle and diet. Wansink even influenced public policy regarding mid-day meals in America by convincing policymakers that his flawed evidence was strong (Wansink). The media, the general public and policymakers were quick to assume that this evidence was strong because of Authority bias. People believed Wansink's research to be credible since he was faculty at the reputable Cornell University and his research was published in reputable journals. Furthermore, the general public also believed this evidence because of their blind trust in statistics and ignorance of how statistical data can be manipulated.

On the other hand, we are sometimes too slow in assuming that the most recent evidence is the strongest. An example of this is new evidence from the field of study of behavioural economics in the 1970s. Kahnmen and Tversky presented evidence that people are not always rational when making risky choices, and may be too risk-seeking when they perceive themselves to be at a "loss" (Kahneman and Tversky 268). For instance, gamblers might take more risks when they have had a particularly bad day. This evidence was not considered *strong* enough by economists until the 21st century. While economists didn't question the validity of the evidence, they questioned its relevance to the discipline of economics. Hence, the experts were too slow to accept this new evidence as strong with regard to its relevance and utility. In fact, this and other evidence from behavioural economics were only recently added to the IBDP Economics syllabus in 2019. The slow acceptance of this evidence resulted in negative consequences for society, justifying why this new evidence was too slow to be considered strong. One negative consequence was the devastating 2008 financial crisis, which may have been identified and mitigated quicker had this latest evidence been taken into account. The 2008 crisis was driven by investors investing heavily in

risky mortgage-backed securities, which lenders ended up defaulting on. An explanation for seemingly irrational behaviour can be given by Kahnmen and Tversky's evidence suggesting that investors were too risk-seeking because of the low market returns leading up to 2008 (Colander, David, et al.). One reason for the slow integration of this evidence into economic models was the paradigm shift it brought about in economics as it conflicted with existing models which were based entirely on rational behaviour (Maialeh). Hence, there was inertia in economic experts to integrate this evidence into their models and theories.

All the examples explored in this essay explore how the general public, media and experts have responded to new evidence. In the natural and human sciences, evidence is never perfect and always has limitations in terms of its accuracy and relevance, especially new and unreplicated evidence. We often ignore these limitations and believe new evidence quickly because of biases and fallacies such as authority bias, appeal to emotions and appeal to consequences. The negative consequences of quickly accepting the latest evidence as the strongest were discussed in the examples of cold fusion, cardiovascular disease and behavioural nutrition. Therefore, educating the general public to be aware of these biases and question the limitations of evidence would result in a more appropriate response to new evidence. Moreover, a greater understanding of the scientific method and statistics would increase awareness of the limitations of new evidence among the general public and media. This would reduce the likelihood of the general public accepting new evidence too quickly.

While it is important to be sceptical, there are also problems with being too slow to accept new evidence. This was shown in the example of behavioural economics, wherein dogma and

contradiction with existing theories caused new evidence to be considered weak by experts, despite its relevance in addressing modern economic issues. Evidence that contradicts existing ideas and theories should be looked at more carefully, but never ignored. Experts responded thoughtfully to the new evidence of cold fusion, recognizing its potential importance while maintaining a level of caution given its divergence from established theories. They neither rushed to fully embrace evidence supporting cold fusion nor dismissed it outright. For any area of knowledge to thrive and to reduce the negative implications of accepting evidence too quickly or too slowly, it is crucial that both the general public and experts strike a balance between scepticism and open-mindedness.

Bibliography

Aarts, Alexander A., et al. "Estimating the Reproducibility of Psychological Science." *Science*, vol. 349, no. 6251, Aug. 2015, https://doi.org/10.1126/science.aac4716. Accessed 20 December 2023.

Berger, Samantha, et al. "Dietary Cholesterol and Cardiovascular Disease: A Systematic Review and Meta-analysis." *The American Journal of Clinical Nutrition*, vol. 102, no. 2, Aug. 2015, pp. 276–94. https://doi.org/10.3945/ajcn.114.100305. Accessed 25 November 2023.

Colander, David, et al. "The Financial Crisis and the Systemic Failure of Academic Economics." *Social Science Research Network*, Jan. 2009, https://doi.org/10.2139/ssrn.1355882. Accessed 22 December 2023.

Curtis, Gary. "Logical Fallacy: Appeal to Consequences." *Copyright 2001-2008, FallacyFiles*, fallacyfiles.org/adconseq.html. Accessed 25 January 2024.

Gilet, Candace. "Cold Fusion." *Understanding Science*, 12 Aug. 2022, undsci.berkeley.edu/cold-fusion-a-case-study-for-scientific-behavior. Accessed 5 November 2023.

Hansen, Kristian Bondo, and Thomas Presskorn-Thygesen. "On Some Antecedents of Behavioural Economics." *History of the Human Sciences*, vol. 35, no. 3–4, Apr. 2021, pp. 58–83. https://doi.org/10.1177/09526951211000950. Accessed 8 January 2024.

Head, Megan L., et al. "The Extent and Consequences of P-Hacking in Science." *PLOS Biology*, vol. 13, no. 3, Mar. 2015, p. e1002106. https://doi.org/10.1371/journal.pbio.1002106. Accessed 20 December 2023.

Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica*, vol. 47, no. 2, Mar. 1979, p. 263. https://doi.org/10.2307/1914185. Accessed 8 January 2024.

Leonhardt, David. "5 Tips From 'Mindless Eating.'" *The New York Times*, 2 May 2007, www.nytimes.com/2007/05/02/business/02davidside.html?action=click&module=RelatedCoverage&pgtype=Article®ion=Footer. Accessed 24 December 2023.

Maialeh, Robin. "Generalization of Results and Neoclassical Rationality: Unresolved Controversies of Behavioural Economics Methodology." *Quality & Quantity*, vol. 53, no. 4, Jan. 2019, pp. 1743–61. https://doi.org/10.1007/s11135-019-00837-1. Accessed 8 January 2024.

Newcomb, Tim. "Your Kid Won't Eat His Vegetables? Give Them a Spiffy New Name | TIME.com." *TIME.com*, 22 Sept. 2012, newsfeed.time.com/2012/09/22/your-kid-wont-eat-his-vegetables-give-them-a-spiffy-new-name. Accessed 24 December 2023.

"Pros and Cons of Restricting SNAP Purchases", 115th Cong (2017) (testimony of Brian Wansink). Accessed 1 November 2023.

Resnick, Brian, and Julia Belluz. "A Top Cornell Food Researcher Has Had 15 Studies Retracted. That's a Lot." *Vox*, 24 Oct. 2018, www.vox.com/science-and-health/2018/9/19/17879102/brian-wansink-cornell-food-brand-lab-retractions-jama. Accessed 1 November 2023.

Soliman, Ghada A. "Dietary Cholesterol and the Lack of Evidence in Cardiovascular Disease." *Nutrients*, vol. 10, no. 6, June 2018, p. 780. https://doi.org/10.3390/nu10060780. Accessed 25 November 2023.

StevenKrivit. "1989 - Cold Fusion Press Conference at University of Utah." *YouTube*, 29 Apr. 2023, www.youtube.com/watch?v=itQ_VKnkd4U. Accessed 25 January 2024.