Ad hominem attacks on scientists are just as likely to undermine public faith in research as legitimate empirical critiques

Media coverage attacking the character and trustworthiness of a scientist can diminish public faith in the research findings of that scientist. ***Ralph M. Barnes****,* ***Heather M. Johnston****,* ***Noah MacKenzie****,* ***Stephanie J. Tobin*** *and* ***Chelsea M. Taglang*** *have investigated the degree to which such attacks do undermine trust in that scientist's research, and the relative impact of various types of ad hominem attacks. Perhaps surprisingly, purely ad hominem attacks, such as accusations of a financial conflict of interest, for example, prove just as effective in undermining public faith in research findings as direct criticism of the empirical foundations of a science claim.*

Most people consider science to be an institution that produces trustworthy facts about the world. However, for certain topics (e.g. evolution, global warming, vaccines, genetically modified organisms, etc.) many members of the general public deviate from scientific consensus. It is likely that there are many reasons for the disconnect between the scientific mainstream and the public, but in a recent paper in *PLoS ONE*, we focused our attention on the degree to which attacks on scientists may undermine claims made by those scientists.

Newspaper, magazine, and internet articles present the public with negative information about scientists. Articles in the mainstream media have attacked the integrity of Andrew Wakefield, Hwang Woo-suk, Anil Potti, Diederik Stapel, and many others. In addition to direct allegations of research fraud, it is also common for the mainstream media to point out conflicts of interest in science. For instance, those attacking GMOs claim that much of the research on GMO safety comes from researchers with financial ties to Monsanto, and those attacking vaccines claim that many of the scientists in the Centers for Disease Control and Prevention have financial ties to vaccine manufacturers. Attacks on the character and trustworthiness of a scientist may impact the faith that laypersons place in the research findings of that scientist. We know that the public is exposed to a number of different types of *ad hominem* attacks on scientists. What we wanted to find out is the degree to which attacks on a scientist undermine faith in that scientist's research, and the relative impact of various types of *ad hominem* attacks.

In order to answer our questions about the impact of *ad hominem* attacks, we asked our participants to read a series of science claims, and indicate their attitudes towards each of those claims. In some cases, the claim was presented in isolation, and in others it was followed by either an attack on the research upon which the claim was based, or an attack on the scientist who conducted the research. In both conditions, participants were asked to indicate their attitude towards the science claim using a six-point scale, running from "strongly favour" to "strongly oppose". From the initial scores we could calculate a difference score that would provide us with information about how much (if at all) the various kinds of attacks undermined faith in the original science claim. In an earlier paper, we found that the results obtained using this type of difference score were consistent with the results of another task that relied on choice as a dependent measure.

The two studies in our current paper employed six different kinds of attacks:

1. *Sloppy* – an accusation that the researcher had a reputation for conducting sloppy research.
2. *Education* – an accusation that the researcher earned her/his degree from an institution with a poor reputation.
3. *Conflict of interest* – an accusation that the researcher had a financial conflict of interest related to her/his research.
4. *Relevant misconduct* – an accusation that the researcher committed research fraud (e.g. faking data) while conducting the study that the science claim was based on.
5. *Past misconduct* – an accusation that the researcher had committed research fraud at some earlier time in her/his career. This fraudulent research was unrelated to the study upon which the science claim of interest was based on.
6. *Empirical* – this was not an *ad hominem* attack, but served as a comparison for the effectiveness of the five *ad hominem* attacks. In the empirical condition the research was directly attacked by noting things such as use of the wrong dependent measure, failure to use a control group, improperly labelling the data, improper statistical analysis, etc.

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So what did we find in the current study? In both studies (the second was a replication of the first) we found the same pattern of results:

- Attacks on the educational background or competence of a researcher do not undermine faith in the claims made by that researcher.
- Accusations of conflicts of interest and accusations of both types of research misconduct undermine faith in the claims made by the accused researcher.
- Attacks on the empirical foundation of a science claim (our control condition) undermined faith in that science claim.
- Accusations of deliberate misconduct, accusations of conflict of interest, and attacks on the empirical foundation of a claim were all equally effective. That is, we found no statistical differences between the past misconduct, relevant misconduct, conflict of interest, and empirical conditions in either Experiment 1 or 2.

The effects were moderate in size, Experiment 2 nearly perfectly replicated the results of Experiment 1, and the pattern of results did not vary as a function of gender, age, socioeconomic status, or education level of participants.

It is not surprising that accusations of research fraud are just as influential as attacks on the empirical foundation of a claim: an allegation of research fraud contains both an *ad hominem* attack and an attack on the empirical foundation of the data. What is more surprising is that purely *ad hominem* attacks (i.e. conflict of interest attacks) were just as effective as direct attacks on the empirical foundation of a claim.

Of particular interest is that our findings indicate that if members of the general public are aware of a conflict of interest connected to a scientific finding, then this may seriously undermine their faith in that finding. Such a finding might be interesting to a number of parties:

- *Journal editors* – who have to make decisions about conflict of interest disclosure policies.
- *Science journalists* – who decide whether to include conflict of interest information in their articles.
- *Decision-makers in private corporations* – who have to decide whether to rely on neutral or in-house research. If they choose in-house research, they have to consider whether the conflict of interest inherent in the research will become general knowledge, and the possible consequences.
- *Policymakers* – who have to decide policy on conflicts of interest.

We must note that our results are the result of two studies (n = 439 and 199 respectively). While some may find the current findings interesting or provocative, we would like to see future studies (preferably using different stimuli/methods/procedures) demonstrate the same effect we have shown.

This blog post is based on the authors' article, "The effect of ad hominem attacks on the evaluation of claims promoted by scientists", published in PLoS ONE (DOI: 10.1371/journal.pone. 0192025).

Note: This article gives the views of the authors, and not the position of the LSE Impact Blog, nor of the London School of Economics. Please review our comments policy if you have any concerns on posting a comment below.

About the authors

***Ralph M. Barnes** is a member of the Psychology Department at Montana State University, and his research interests include science communication, rhetoric, and judgement and decision-making. His ORCID iD is 0000-0002-6141-5491.*

***Heather M. Johnston** is a Professor of Psychology at Columbus State Community College and her primary research interests are myths in psychology and the teaching of psychology.*

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Noah MacKenzie *is an Associate Professor of Psychology at The Clermont College of the University of Cincinnati. His primary research interests include music cognition and the teaching of psychology.*

Stephanie J. Tobin *is a senior lecturer at Australian Catholic University, and her primary research interest is the psychology of social media use. Her ORCID iD is 0000-0002-3056-7767.*

Chelsea M. Taglang *is currently employed in the private sector, but was affiliated with Hood College during her involvement in this research.*

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