PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Overall and COVID-19-specific citation impact of highly visible COVID-19 media experts: bibliometric analysis
AUTHORS	Ioannidis, John; Tezel, Alangoya; Jagsi, Reshma

VERSION 1 – REVIEW

REVIEWER	Godskesen, Tove Uppsala Universitet
REVIEW RETURNED	17-Jul-2021

GENERAL COMMENTS	The authors present a study of overall and COVID-19 specific citation impact of the most highly visible COVID-19 experts in USA, Denmark, Greece, and Switzwerland. The paper is in need of some important revisions and clarifications, however; mostly related to the method. I hope the comments below will be helpful. Background: The background is short and some issues need further clarifications: Page 4: "knowledgeable scholars" or "experts". The paper assumes that there is a link between citations and knowledge/competence, but there are many knowledgeable experts visible in media who are not primarily researchers in the field, but still would have excellent knowledge of research on Covid-19 or are experts in other subjects, such as economy, ethics, work environment etc. They might nevertheless not be ranked high in science and thus unjustly be considered less knowledgeable according to your method. Two examples from your Danish dataset: Søren Brostrøm is at first place among the 50 most visible experts in Danish media and Anders Tegnell from Sweden is fourth. Both are directors, Brostrøm for the Danish Health Authority and Tegnell for the Swedish Health Authority. These two have almost no Covid-19 publications or citations. Nevertheless, they have extensive knowledge about Covid-19, are together with others responsible for the National corona strategies and are engaged experts in media. So, what is an expert? Bruce Weinstein (What is an expert, 1993) argue that there are two kinds of experts, the first is out of a function of what they know (epistemic expertise), the other is related to what they do (performative expertise). He separates knowledge in or about a particular field. Weinstein claims that an "epistemic expert is a person who is capable of providing strong justifications for a range of claims in a domain" and that "performative expertise is a person who is able to perform a skill well according to the rules and virtues of a practice". I wonder if you talk about experts with specialized knowledge in a sense too

narrow. Brostrøm for example is an expert that have authoritative knowledge based on a bigger research field. I understand that citations is one way to objectively assess research performance, but it is not clearly stated why this link is important for the study and why researchers with high citation impact are better suited to assist in media reporting.

Method:
Some parts of the method are weak, and information is missing or not clear:
- What is the rationale for studying US, Switzerland, Greece, and Denmark?

- Information about data collection and selection is missing: As the method is now presented, it gives the impression that the selection of scientists who appear in media is not systematic and not the same for all countries. For USA, you found these highly scientists who appear at Fox News Network, CNN and MSNBC. Did all you authors do the search? Were you in agreement about the selection? How did you do it?

- For Denmark, Greece, and Switzerland, did you use google as search engine? How did you find "a news article" (page 6, line 3) and "find information from a news article" (page 6, line 13). This "find" gives the picture of you having searched randomly for articles about Covid-experts being in the media. Why did you not use the same data collection in each country?

- What was the search terms for Denmark, Greece, and Switzerland? Since most information to the public is given in their own language, did you search in their language (German, French, Italian and Romansh for Switzerland, Danish, and Greek) or in English? This information is important for reproducibility but not least related to your second aim, "we also paid particular attention to probing the representation of women" (page 4, lines 31-36). If you search only in English, there is a risk that you missed information about these highly visible experts. In addition, the data collection needs to be same for all included countries.

- In the Danish sample of 50 top media experts, only 43 were experts in Covid-19. Why did you not exclude expert not related to Covid? However, you excluded two experts that were foreigners: "Among the 48 visible experts who were Danes …" (page 8, line 38). Why did you exclude these two experts? Was it important to live in the country they were experts? I cannot find any information about exclusion criteria. Please clarify both inclusion- and exclusion criteria.

- In the Swiss dataset, you found only the two most commonly appearing names of experts in media. It gives an impression that the data collection was not systematically performed but, in some way, random. In Switzerland, the population is ~8.4 million people, in Denmark ~5.8. This indicate that there should be a lot more experts than the only two you found, compared to 50 in Denmark. In Switzerland, they speak four languages, and you found only two experts?

- It is most probable that you missed some experts because you did not search in their language or didn´t do it systematically. This mistake makes it impossible to answer research question 2, if

2

women are underrepresented among COVID-19 experts, since you base your analysis on only two among maybe numerous more experts. Also, it is not stated in what kind of media these experts appeared (television, social media, radio?). I suggest you remove the small Swiss sample, because of the above reasons.

- You choose experts in the top 2% of their main scientific discipline in terms of their citation impact. Why 2%? That means that scientists who are in the top 3-5% do not count as knowledgeable experts. Surely they would be so considered by most. 2% seem to be a blunt instrument for judging top experts.

Results:
At page 6 under the heading "Experts in Denmark", line 24 it is said "Only 6 of the 50 were women" Delete this information as the same text is stated in the beginning of the paragraph.
On page 8, information about Marcel Salathé is very specific: "an associate professor at the École Polytechnique Fédérale de Lausanne". Such information is not specified for the experts in the other countries, except for Christian Althaus.

Discussion:
Page 11: "We could not assess the racial background of media experts, but we suspect that minorities would also be underrepresented, as they are under-represented in many aspects of both academics and societal power structures". This is speculative, as you did not assess this, and there is no reference to other scientific work that has found minorities to be underrepresented. I suggest you remove this or add a reference.
Page 12: "Women and minorities may feel even more disincentivized in this environment". Why should women feel more disincentivized? This deserves more discussion. I actually suggest that you remove the part on minorities since it is not clear what you mean by minorities and you did not study this.
Page 12, lines 16-17: "The vast majority is produced and disseminated by people without any scientific training and with little or no self-reflection on their inadequacy to judge complex and rapidly evolving scientific concepts." I wonder if these studies you refer to say anything at all about this relationship, while this statement creates an implicit assumption that this is what your study has found (or points to).

Page 12, lines 20-32: " Of note, several of the highly visible media COVID-19 experts were probably invited in some capacity other than their research scholarship, e.g. some scientists had political or administrative roles and others were front line clinicians rather than academics. These aspects of non-research expertise are also very useful, and it could well be that all experts analyzed here should be applauded for their willingness to engage and inform the wider public". This conclusion is interesting, and what I emphasised at the beginning of this review. Consequently, you actually seem to discard your own study.

Also, what are the strengths and limitations of this study?

References:
The reference list is not up to date and too limited in scope. Of the eight references used in the discussion, one is preprint and five are twenty years old and some are published thirty to forty years ago. I recommend the authors to update the reference list.

	My conclusion is that I am uncertain what this study adds to the scientific knowledge. Do we learn anything about experts in media that we did not already know? The basic request to the authors is therefore to make clearer their contribution to the body of knowledge.

REVIEWER	Nair, Pradeep Central University of Himachal Pradesh, New Media
REVIEW RETURNED	02-Aug-2021

GENERAL COMMENTS	The subject of the study is quite interesting and the results of the study is significant. The study methodologically assessed the Covid-19 experts highly visible on broadcast media and their citation impact among scientists in the same discipline worldwide. The rationality of the result needs more evidential support in terms of expertise and scholarship.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Tove Godskesen, Uppsala Universitet

Comments to the Author:

The authors present a study of overall and COVID-19 specific citation impact of the most highly visible COVID-19 experts in USA, Denmark, Greece, and Switzwerland. The paper is in need of some important revisions and clarifications, however; mostly related to the method. I hope the comments below will be helpful.

Reply: thank you for the extremely useful comments.

Background:

The background is short and some issues need further clarifications:

Page 4: "knowledgeable scholars" or "experts". The paper assumes that there is a link between citations and knowledge/competence, but there are many knowledgeable experts visible in media who are not primarily researchers in the field, but still would have excellent knowledge of research on Covid-19 or are experts in other subjects, such as economy, ethics, work environment etc. They might nevertheless not be ranked high in science and thus unjustly be considered less knowledgeable according to your method. Two examples from your Danish dataset: Søren Brostrøm is at first place among the 50 most visible experts in Danish media and Anders Tegnell from Sweden is fourth. Both are directors, Brostrøm for the Danish Health Authority and Tegnell for the Swedish Health Authority. These two have almost no Covid-19 publications or citations. Nevertheless, they have extensive knowledge about Covid-19, are together with others responsible for the National corona strategies and are engaged experts in media.

So, what is an expert? Bruce Weinstein (What is an expert, 1993) argue that there are two kinds of experts, the first is out of a function of what they know (epistemic expertise), the other is related to what they do (performative expertise). He separates knowledge in or about a particular field. Weinstein claims that an "epistemic expert is a person who is capable of providing strong justifications for a range of claims in a domain" and that "performative expertise is a person who is able to perform

a skill well according to the rules and virtues of a practice". I wonder if you talk about experts with specialized knowledge in a sense too narrow. Brostrøm for example is an expert that have authoritative knowledge based on a bigger research field. I understand that citations is one way to objectively assess research performance, but it is not clearly stated why this link is important for the study and why researchers with high citation impact are better suited to assist in media reporting.

Reply: This is a very insightful comment. We have revised and expanded the background in the introduction to add: "Knowledge and expertise is difficult to appraise with full objectivity. Bruce Weinstein (ref) argued that there are two kinds of experts, those who are recognized as experts based on what they know (epistemic expertise) and those who are worthy of being called experts based on what they do (performative expertise). According to this classification, an epistemic expert is a person who is capable of providing strong justification for a range of claims in a domain, while performative expertise characterizes a person who is able to perform a skill well according to the rules and virtues of a practice (ref). Performative experts may not necessarily be contributors to the scientific literature themselves, but may still know their job well and have extensive practical experience. It is very difficult, however, to appraise in a standardized manner and with consistency and quantitative metrics such performative expertise. Conversely, epistemic experts are likely to be contributors to the scientific literature and their level of contribution and impact in the science of their field is a key hallmark of their expertise. What can be readily appraised in a non-subjective fashion is the publication and citation track record of scientists who appear in news media as experts. One can use objective data to quantify the citation impact of the published work of these scientists across science throughout their career, as well as the specific impact that they are having with their scientific publications about COVID-19. While publications and citations do have limitations (as all bibliometric metrics), they are objective, readily quantifiable and offer useful information about scientific impact."

Method:

Some parts of the method are weak, and information is missing or not clear:

- What is the rationale for studying US, Switzerland, Greece, and Denmark?

Reply: We have added "We examined bibliometric indicators of top media experts in USA, Switzerland, Greece, and Denmark. These are countries for which we could identify pre-existing lists of experts who had prominent visibility in media. These lists are typically not published in the peer-reviewed scientific literature (with the exception of the USA list that was previously generated and published by members of our team (ref)), but in media news items in different countries, thus defying the possibility for efficient systematic searches. We therefore asked our colleagues at the Meta-Research Innovation Center at Stanford (METRICS) and affiliated colleagues who come from different countries if they were aware of any such publicized lists."

- Information about data collection and selection is missing: As the method is now presented, it gives the impression that the selection of scientists who appear in media is not systematic and not the same for all countries. For USA, you found these highly scientists who appear at Fox News Network, CNN and MSNBC. Did all you authors do the search? Were you in agreement about the selection? How did you do it?

Reply: We have clarified: "We accepted these lists regardless of how visibility had been defined in these surveys." For the USA survey, we have added "Details on the data collection and selection for the USA list and features of the sample have been previously described (ref)."

- For Denmark, Greece, and Switzerland, did you use google as search engine? How did you find "a news article" (page 6, line 3) and "find information from a news article" (page 6, line 13). This "find" gives the picture of you having searched randomly for articles about Covid-experts being in the media. Why did you not use the same data collection in each country?

Reply: Please see explanation above. We have added in the Discussion "Our examined lists of media visible experts were pre-compiled independently of the current analysis. The pre-compilation had happened either by our team (in the case of USA experts) or by news and media organizations in different countries and these compilations may use different criteria for identifying and ranking experts for visibility. It is possible that some different names might have entered these lists, if different visibility criteria had been used. Nevertheless, all of the experts analyzed here had prominent media exposure and all analyzed experts in European countries had massive media exposure in order to be able to reach such high ranks of visibility (even if variously defined)."

-        What was the search terms for Denmark, Greece, and Switzerland? Since most information to the public is given in their own language, did you search in their language (German, French, Italian and Romansh for Switzerland, Danish, and Greek) or in English? This information is important for reproducibility but not least related to your second aim, "we also paid particular attention to probing the representation of women" (page 4, lines 31-36). If you search only in English, there is a risk that you missed information about these highly visible experts. In addition, the data collection needs to be same for all included countries.

Reply: please see replies above. As we clarify "Searches for visible experts were made by local organizations in each country and they pertain to national media visibility", so there is no language issue.

-        In the Danish sample of 50 top media experts, only 43 were experts in Covid-19. Why did you not exclude expert not related to Covid? However, you excluded two experts that were foreigners: "Among the 48 visible experts who were Danes …" (page 8, line 38). Why did you exclude these two experts? Was it important to live in the country they were experts? I cannot find any information about exclusion criteria. Please clarify both inclusion- and exclusion criteria.

Reply: We did not exclude anyone and we clarify, we used the pre-existing lists as they were. For Denmark, as we had clarified "43/50 had commented on COVID-19, but it was not stated who are the 7 who only commented only on other, non-COVID-19-related topics", so it is not possible to give data on 43 experts only. We did not exclude the two foreigners, but simply focus on the 48 Danes specifically for the citation impact for a fair comparison (as in other countries citation rank is judged against other scientists from the same country).

-        In the Swiss dataset, you found only the two most commonly appearing names of experts in media. It gives an impression that the data collection was not systematically performed but, in some way, random. In Switzerland, the population is ~8.4 million people, in Denmark ~5.8. This indicate that there should be a lot more experts than the only two you found, compared to 50 in Denmark. In Switzerland, they speak four languages, and you found only two experts?

Reply: the clarifications above should make it clear why. For Switzerland, only the top two names were mentioned explicitly in the news article. We make no comparison on the number of available experts across different countries, since it would make absolutely no sense, given the variability of sources and data availability.

-        It is most probable that you missed some experts because you did not search in their language or didn´t do it systematically. This mistake makes it impossible to answer research question 2, if women are underrepresented among COVID-19 experts, since you base your analysis on only two among maybe numerous more experts. Also, it is not stated in what kind of media these experts appeared (television, social media, radio?). I suggest you remove the small Swiss sample, because of the above reasons.

Reply: the search within each country is systematic, as we describe above, and it was done in the native language. We believe that the Swiss data are still useful to include, it would be arbitrary to drop

them, since they are available. We do state in the Methods the sources of visibility assessment/media for each country.

-    You choose experts in the top 2% of their main scientific discipline in terms of their citation impact. Why 2%? That means that scientists who are in the top 3-5% do not count as knowledgeable experts. Surely they would be so considered by most. 2% seem to be a blunt instrument for judging top experts.

Reply: The databases of top-cited 2% experts per discipline are already available and published and they focus on the top-2%, data below the 2% are not available. We have added in the Discussion "We should acknowledge that citation metrics are far from being perfect measures of epistemic expertise. Moreover, we focused on using already existing data on the 2% top-cited scientists across each scientific discipline, and we could not examine whether scientists who were not in the top 2% of these pre-existing lists might be in the top-3% or in the bottom 5% of citation impact. Obviously, many scientists may still have considerable epistemic expertise even if they are not strictly in the top 2% of citation indicators."

At page 6 under the heading "Experts in Denmark", line 24 it is said "Only 6 of the 50 were women" Delete this information as the same text is stated in the beginning of the paragraph.

Reply: thank you for noticing this. We have deleted the duplication.

On page 8, information about Marcel Salathé is very specific: "an associate professor at the École Polytechnique Fédérale de Lausanne". Such information is not specified for the experts in the other countries, except for Christian Althaus.

Reply: We have revised to include only the affiliation information, as we have done for other countries.

Discussion:

Page 11: "We could not assess the racial background of media experts, but we suspect that minorities would also be underrepresented, as they are under-represented in many aspects of both academics and societal power structures". This is speculative, as you did not assess this, and there is no reference to other scientific work that has found minorities to be underrepresented. I suggest you remove this or add a reference.

Reply: We have added references to support this statement:

Windsor LC, Crawford KF. Women and minorities encouraged to apply (not to stay). Trends Genet. 2021 Jun;37(6):491-493.

Hinton AO Jr, Vue Z, Termini CM, Taylor BL, Shuler HD, McReynolds MR. Mentoring minority trainees: Minorities in academia face specific challenges that mentors should address to instill confidence. EMBO Rep. 2020 Oct 5;21(10):e51269.

Page 12: "Women and minorities may feel even more disincentivized in this environment". Why should women feel more disincentivized? This deserves more discussion. I actually suggest that you remove the part on minorities since it is not clear what you mean by minorities and you did not study this.

Reply: as above, we have added two references that demonstrate amply these issues.

Page 12, lines 16-17: "The vast majority is produced and disseminated by people without any scientific training and with little or no self-reflection on their inadequacy to judge complex and rapidly evolving scientific concepts." I wonder if these studies you refer to say anything at all about this

relationship, while this statement creates an implicit assumption that this is what your study has found (or points to).

Reply: This is an important point and we have expanded on it along with adding suitable references: "Empirical studies show that non-experts are very poor at making predictions about COVID-19, and they are worse than experts – even though even experts do not account sufficiently for uncertainty in their estimates and are therefore often also wrong (ref). both models and empirical data suggest that media can have an impact on the course of the pandemic (ref) and it can also affect mental health during its course (ref). While there can be questions and concerns even about the media appearances of the best and most knowledgeable experts, media without involvement of scientific expertise is likely to be far worse." References added are the following: Recchia G, Freeman ALJ, Spiegelhalter D. How well did experts and laypeople forecast the size of the COVID-19 pandemic? PLoS One. 2021 May 5;16(5):e0250935. / Lavazza A, Farina M. The role of experts in the Covid-19 pandemic and the limits of their epistemic authority in democracy. Front Public Health. 2020 Jul 14;8:356. / Goh S. Who will guard the guards? Covid-19 research may be incomplete, but experts are vital during this pandemic. BMJ. 2020 Jul 3;370:m2658. / Yan Q, Tang Y, Yan D, Wang J, Yang L, Yang X, Tang S. Impact of media reports on the early spread of COVID-19 epidemic. J Theor Biol. 2020 Oct 7;502:110385. / Chao M, Xue D, Liu T, Yang H, Hall BJ. Media use and acute psychological outcomes during COVID-19 outbreak in China. J Anxiety Disord. 2020 Aug;74:102248.

Page 12, lines 20-32: " Of note, several of the highly visible media COVID-19 experts were probably invited in some capacity other than their research scholarship, e.g. some scientists had political or administrative roles and others were front line clinicians rather than academics. These aspects of non-research expertise are also very useful, and it could well be that all experts analyzed here should be applauded for their willingness to engage and inform the wider public". This conclusion is interesting, and what I emphasised at the beginning of this review. Consequently, you actually seem to discard your own study.

Reply: We want to be civil and thank everyone for what they try to do in this major crisis. This does not mean though that epistemic expertise should not be important in media communications.

Also, what are the strengths and limitations of this study?

Reply: We have added in the Discussion "The current study has used diverse data from several countries for experts who are highly visible in media and has linked their profiles to objective data from bibliometric analyses. While methods for selecting experts are different in each country, the observed patterns seem to be consistent across countries. However, there are several limitations that need to be discussed>" – and then we discuss the limitations that are listed in the responses to the previous comments above.

References:

The reference list is not up to date and too limited in scope. Of the eight references used in the discussion, one is preprint and five are twenty years old and some are published thirty to forty years ago. I recommend the authors to update the reference list.

Reply: As suggested, we have added several new references to the reference lists and we discuss these references in the current Discussion. As per our replies above, we have added the following references: Windsor LC, Crawford KF. Women and minorities encouraged to apply (not to stay). Trends Genet. 2021 Jun;37(6):491-493. / Hinton AO Jr, Vue Z, Termini CM, Taylor BL, Shuler HD, McReynolds MR. Mentoring minority trainees: Minorities in academia face specific challenges that mentors should address to instill confidence. EMBO Rep. 2020 Oct 5;21(10):e51269. / Recchia G, Freeman ALJ, Spiegelhalter D. How well did experts and laypeople forecast the size of the COVID-19 pandemic? PLoS One. 2021 May 5;16(5):e0250935. / Lavazza A, Farina M. The role of experts in the

8

Covid-19 pandemic and the limits of their epistemic authority in democracy. Front Public Health. 2020 Jul 14;8:356. / Goh S. Who will guard the guards? Covid-19 research may be incomplete, but experts are vital during this pandemic. BMJ. 2020 Jul 3;370:m2658. / Yan Q, Tang Y, Yan D, Wang J, Yang L, Yang X, Tang S. Impact of media reports on the early spread of COVID-19 epidemic. J Theor Biol. 2020 Oct 7;502:110385. / Chao M, Xue D, Liu T, Yang H, Hall BJ. Media use and acute psychological outcomes during COVID-19 outbreak in China. J Anxiety Disord. 2020 Aug;74:102248. Moreover, we discuss two more recent references that have appeared: Fletcher S, Joe MB, Hernandez S, Toman I, Harrison TG, Ruzycki SM. The Gender of COVID-19 Experts in Newspaper Articles: a Descriptive Cross-Sectional Study. J Gen Intern Med. 2021 Apr;36(4):1011-1016. / Murayama A, Ozaki A, Saito H, Sawano T, Sah R, Tanimoto T. Coronavirus disease 2019 experts appearing on Japanese television: their characteristics and financial conflicts of interest with pharmaceutical companies. Clin Microbiol Infect. 2021;27:805-7. Specifically, we have added that "The under-representation of women in our examined samples was more prominent than what Fletcher et al. found by analyzing articles in 10 US newspapers in April 2020 where 34% of the authors were women (ref)" and "One other recent study has examined the scientific productivity of COVID-19 experts (ref). Murayama et al. assessed the 11 most frequently appearing medical experts in Japanese television during the first 6 months of 2020, 10 of which were men. They found that only one of the 11 experts had published a single scientific paper on COVID-19 indexed in PubMed as of August 14, 2020. The very low rate of publishing experts in this Japanese sample may be due to the fact that the search date for publications was too early. It is possible that some experts may publish COVID-19-related papers later and the same applies also to experts without COVID-19-related publications in our evaluation. Indeed, on August 30, 2021 we re-examined the publication record of the 11 Japanese experts and found that 5 (45%) had published at least one Scopus-indexed COVID-19-related paper until that time. By analyzing data on payments from the pharmaceutical industry made in 2017, Murayama et al. also found that 7 of the 11 experts had received payments from the pharmaceutical industry amounting to $317,324 for that single year. We did not assess potential financial conflicts in our study. However, certainly this is an important issue for all countries and it may often be difficult to ascertain in the absence of comprehensive payment databases that cover all potential financial conflicts for all scientists, not just clinicians." Please note also that we updated our searches to see if we could find any more of the experts that we analyzed who might have published any Scopus-indexed COVID-19 papers after March 1, 2021 and until August 30, 2021; very few others did publish anything.

My conclusion is that I am uncertain what this study adds to the scientific knowledge. Do we learn anything about experts in media that we did not already know? The basic request to the authors is therefore to make clearer their contribution to the body of knowledge.

Reply: thank you for your extremely useful comments. We trust that with the revisions and clarifications, there is no doubt that the study contributes to the body of knowledge.

Reviewer: 2

Dr. Pradeep Nair, Central University of Himachal Pradesh

Comments to the Author:

The subject of the study is quite interesting and the results of the study is significant. The study methodologically assessed the Covid-19 experts highly visible on broadcast media and their citation impact among scientists in the same discipline worldwide. The rationality of the result needs more evidential support in terms of expertise and scholarship.

Reply: thank you for the kind appreciation of our work. As suggested also by the other reviewer, we have added more clarifications on how expertise is defined, the evidence for being classified as an expert being visible in media, and what the employed citation indicators mean.

VERSION 2 – REVIEW

REVIEWER	Godskesen, Tove Uppsala Universitet
REVIEW RETURNED	05-Sep-2021

GENERAL COMMENTS	The authors sufficiently addressed my comments.