

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	The influence of political and medical leaders on parental perception of vaccination: a cross-sectional survey in Australia
AUTHORS	Zhang, Elissa; Chughtai, Abrar; Heywood, Anita; MacIntyre, Raina

VERSION 1 – REVIEW

REVIEWER	Edgar K. Marcuse Department of Pediatrics University of Washington School of Medicine USA
REVIEW RETURNED	05-Oct-2018

GENERAL COMMENTS	<p>This paper reports the results of a web based, cross sectional survey of Australian parents with at least one child under age 5 years to assess their attitudes towards vaccination and their response to vaccine-related media messages from 2 political and 1 medical leader. Study subjects are said to be a representative sample of the 400,000 “registered panel members” stratified by gender and residence. Of 1727 potential participants, 411 were eligible made up the study sample. Based on “a range of qualitative and quantitative data...on parental attitudes toward childhood vaccinations” the sample was divided into those with “fixed” and “susceptible” views. Both groups were exposed to videos of 2 politicians expressing negative views about vaccines and one physician expressing a positive view and the change, either positive or negative, and the parent’s baseline view assessed. Parents in the susceptible group were more likely to change their views than were those in the fixed group. Susceptible parents were more likely to report increased hesitancy after viewing negative messages, but some subjects in both the fixed and susceptible groups reported increased hesitancy hearing positive messages.</p> <p>The text is clearly written, includes all items required for a report of a cross- sectional study, the figures and tables present the relevant data.</p> <p>Concerns:</p> <p>Introduction: The authors seem to suggest here that their construct of susceptible versus fixed vaccine views expands upon the WHO definition of vaccine hesitancy. This is puzzling since the WHO definition and accompanying diagrams clearly depicts a continuum which includes uncertain acceptors and refusers and in the Analysis section the authors refer to a spectrum of views.</p> <p>Analysis: The statement “baseline influences on parental vaccination attitude were reported from the population survey” is opaque: what influences?</p>
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	<p>The authors present no information on how what questions they used to categorize parents' views as fixed. Only 2.2% were classified as having fixed anti vaccine views but 21.7% had fixed provaccine views. Because this relatively large fixed provaccine group was judged not susceptible some insight into the basis of this classification would be of interest.</p> <p>Results: The authors combination positive and negative change into a single variable is of real interest and warrants exploration in the Discussion section specifically commenting on the apparent paradox that positive messages increased hesitancy for some and negative messages decreased hesitancy for others.</p> <p>The number classified as having fixed antivaccine view while representative of the proportion of Australian vaccine refusers is nonetheless too small to draw any conclusions on the effects of media on this subgroup's view Consider noting this in the Limitations section of the Discussion.</p> <p>Qualitative analysis: The authors describe the views of parents with fixed provaccine views about the credibility and trustworthiness of the public figures, refer to the views of those with negative views but not describe them. The views of credibility and trustworthiness of the susceptible parent group would be of interest but are not described.</p> <p>Discussion: It is not self-evident why the views of politicians are more difficult to address than those of other celebrities. The authors basis for concluding that current public health vaccine messaging focuses on those with fixed antivaccine views is not clear.</p>
REVIEWER	<p>Katie attwell university of western Australia</p> <p>Katie Attwell has previously been employed by the Immunisation Alliance of Western Australia to conduct social research using an unrestricted grant from Sanofi Pasteur. She has received travel, accommodation and conference registration support from GSK, and travel, accommodation and speakers fees from Merck.</p>
REVIEW RETURNED	15-Oct-2018
GENERAL COMMENTS	<p>The influence of political and medical leaders on parental perception of vaccination: a cross-sectional survey in Australia</p> <p>This article explores how a representative sample of Australian parents with young children respond to vaccine messaging by two populist politicians and a medical expert. It is a well-written manuscript that would be suitable for publication with a few enhancements as noted below. I note that my expertise pertains to qualitative research and hence my discussion of the quantitative research does not reflect on statistical analyses undertaken but more to the reporting of the results and of the survey details.</p> <p>Reference 13 on Page 1 should be contextualised based on which country the Pediatrics researchers were looking at, as parents' trust in messaging from celebrities re vax may vary from country to country.</p> <p>On page 4, it may help the framing of the article to conclude the section by stating that despite the interest in studying compliant parents, the study looks at ALL types of parents.</p> <p>Also on that page and in discussing the compliant but vulnerable parents ('susceptible') and their vulnerability to scares / stories /</p>

	<p>misinformation, the authors may find useful the conceptualisation and discussion of ‘hesitant compliers’ in this Australian article: Enkel, S. L., Attwell, K., Snelling, T. L., and Christian, H. E. 2018. ‘Hesitant compliers’: Qualitative analysis of concerned fully-vaccinating parents. <i>Vaccine</i> 36 (44). doi: 10.1016/j.vaccine.2017.09.088.</p> <p>The description on p.6 of how parents were classified as ‘fixed’ or ‘susceptible’ – I wanted to know more about the kinds of questions that were used to determine this – qual and quant. This information could be illustrative rather than exhaustive. I think this is important to provide if the authors are seeking to make their new framework useful to others. It’s also relevant for things later like when the authors report on p.13 parents’ information sources. (So that question should be explained up front.) Authors could consider putting all the questions from the survey in an appendix. The more I engage with the article, the more I find I want to know. Had the survey questions been used anywhere else? Who designed the survey? Why were these questions / this survey instrument chosen? Page 7 – ‘parents were also asked if media messaging increased their safety concerns.’ How was this asked? What kind of media messaging – general or specific? Asked open or closed? Also on that page – it seems that you also (in your results) noted changes in either direction (eg. someone views Trump and becomes MORE likely to vaccinate). It is worth stating this because it currently reads in this section like you’re only interested in change, not in which direction.</p> <p>And finally, the analysis section needs more information on how the qualitative analysis was undertaken. Although it seems that this was predominantly done to check the quantitative data provided by participant, you also report the themes that occurred. What kinds of questions were asked? How were answers analysed? Was software used or manual methods? Even if the qual analysis was fairly cursory, the methods need some elaboration.</p> <p>On p.9 , line 3 onwards – is it worth clarifying at this point that ‘change’ means ‘in either direction’, highlighting that in some cases the anti-vax views expressed by the politicians provoked parents TO favour vaccination? (I will return to the significance of this in a moment.)</p> <p>p.9 Line 27 onwards – when reporting actual numbers from whole study, it would be helpful to state in the text after each number how many of these parents were in your ‘susceptible’ basket.</p> <p>p.10 – the report of the qual section seems like a wasted opportunity to make more of some of these findings. The qual section could benefit from an introduction that names and pulls out the key themes that emerged: safety concerns; credibility; delivery style; ‘moderation’ (I’m using that as a term for Trump’s seemingly [but not] sensible idea that the schedule could be made less intensive); rights; and standpoint (Hanson’s gender, parenthood). I’ve extracted each of these from the paragraphs. The whole section could be a bit more systematic. I thought the findings here were intriguing and interesting. The authors could consider removing the qual analysis from this paper (except as a validator of the qual material) and publishing it in a separate paper qual with more elaborate methods. This is a suggestion only to enable a further, more detailed publication of the interesting qual data, and is not required.</p> <p>Page 12 lines early 40s. Now that Aus no longer has Conscientious Objections, you should qualify this comment by saying something like “when these were still collected in 20XX prior to their abolition in 2016.”</p>
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	<p>Page 13 reports parents' self-reported info sources. See above for need for questions asked.</p> <p>Final point – returning to point made about people's views changing in both directions. This article actually shows something interesting about political polarisation that is currently not being mentioned. This is demonstrated in the fact that some 'susceptible' respondents are feeling more positive about vaccination when they've heard the anti-vax views from Hanson and Trump. The stats on this could be pulled out clearly in a paragraph in the results, if the authors wanted to go with this. Then, in the discussion, they could reflect on political polarisation as analysed by Kahan (2014) in the US context and consider what it means that some Australians are responding more positively about vaccination presumably (only) because they reject the messaging of Trump and Hanson.</p>
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VERSION 1 – AUTHOR RESPONSE

REVIEWER: 1

- *Introduction*

The authors seem to suggest here that their construct of susceptible versus fixed vaccine views expands upon the WHO definition of vaccine hesitancy. This is puzzling since the WHO definition and accompanying diagrams clearly depicts a continuum which includes uncertain acceptors and refusers and in the Analysis section the authors refer to a spectrum of views.

Authors' reply:

We agree with the reviewer regarding the ambiguous description of the differences between two classifications and have amended wording in the introduction to better describe the spectrum of parental vaccine opinions covered by the existing definition of vaccine hesitancy and its limitations in not accounting for parents with vaccine accepting behaviours but with doubts susceptible to future vaccine delay or refusal. The key point of our analysis is to shift the focus into the middle segment of parents, as currently we tend to focus on parents at the tail end of the distribution of views. Whilst we acknowledge the WHO definition, we are introducing a different perspective, that of the "silent majority" of parents who are usually not the focus or our attention nor target of health promotion interventions, because they tend to accept immunisation. The study shows that this group may be susceptible to anti-vaccination messaging from public figures.

We modified paragraph 5 of the introduction to describe how the current definition of vaccine hesitancy

"encompasses parents with a spectrum of vaccine hesitant opinions, including those with fixed anti-vaccination views, who generally do not change their opinions, and uncertain parents that are not fully compliant with vaccine schedules but could be persuaded to change (20). Whilst the WHO SAGE definition(21) refers to parents who are fully or mostly compliant with vaccine schedules but experience caution or uncertainty in doing so, the emphasis of research and health intervention is rather focused on those who refuse some or all vaccines. These vaccinating parents nevertheless may be influenced to doubt childhood vaccination and delay or refuse vaccinations in the future and may still be susceptible to negative vaccine messages (22) . Whilst health promotion and intervention tend to focus on parents at the hesitant end of the spectrum, it is currently unknown how easily influenced the silent majority of vaccinating parents are, whose continued compliance is necessary for upholding effective vaccination coverage rates. Hesitant but compliant parents in Australia are influenced by vaccine-related events and news coverage, contributing to complex unresolved

concerns regarding the safety of vaccines, and could potentially reduce their future compliance accordingly”

- *Analysis:*

The statement “baseline influences on parental vaccination attitude were reported

- *from the population survey” is opaque: what influences?*

Authors’ reply:

We modified the statement in paragraph 1 of the Analysis section to include the influences outlined in the online questionnaire as “doctors, health professionals, personal experiences, familial/friend advice, media/internet”. Furthermore we clarified that this information was obtained pre-exposure to political media messages from the political and medical leaders related to this analysis.

We also referenced the added Appendix 2, which contains the questionnaire, as suggested by Reviewer 2.

- *The authors present no information on how what questions they used to categorize parents’ views as fixed. Only 2.2% were classified as having fixed anti vaccine views but 21.7% had fixed provaccine views. Because this relatively large fixed provaccine group was judged not susceptible some insight into the basis of this classification would be of interest.*

Authors’ reply:

We agree with the comment and have amended paragraph 2 of the Analysis section to include further detail to clarify the categorisation of the “fixed population”.

The following sentence was added:

“Parents were categorised as fixed pro- or anti- vaccine based on their views of childhood vaccination as “very important for children” or “not important for children/risky for children” respectively, and these views not changing during the survey”

- *Results:*

The authors combination positive and negative change into a single variable is of real interest and warrants exploration in the Discussion section specifically commenting on the apparent paradox that positive messages increased hesitancy for some and negative messages decreased hesitancy for others.

Authors’ reply:

We have added additional information addressing the combination of positive and negative change into a single variable as well further discussing the “backfire” effect in more depth of detail in paragraph 6 of the Discussion.

The new section reads:

In our analysis we analysed change in parental vaccine attitude irrespective of direction of change, to confirm that parental vaccination attitudes are suspect to influence from media messaging from public figures. Observation of the absolute numbers of parents who increased or decreased in willingness to vaccinate in response to specific media messages (Figure 3) also reveals an apparent paradoxical response of some parents whereby they increased willingness to vaccinate in response to an anti-vaccinating message and vice versa. This apparent ‘backfire’ response possibly indicates a discord between what public figures communicate and what the public actually perceives. In this study, it appeared there were strong political opinions existing alongside or potentially causing variable vaccination opinions, and some Australian parents may have rejected the messages of Trump or Hanson based on their pre-existing political biases. Parental rejection of pro- or anti-vaccine

messages could be motivated by ‘cultural cognition’ (35) whereby individuals attempt to selectively value perspectives that conform their pre-existing perceptions of vaccine risk. Future research could explore more deeply the factors that impact direction and magnitude of change resulting from media messaging in a variety of contexts.

- *The number classified as having fixed antivaccine view while representative of the proportion of Australian vaccine refusers is nonetheless too small to draw any conclusions on the effects of media on this subgroup’s view Consider noting this in the Limitations section of the Discussion.*

Authors’ reply:

We have now added a statement at the end of paragraph 2 of the Discussion section that reads:

“This population of fixed-antivaccine parents is too small to draw any conclusions on the effects of media messaging on their vaccine opinions and behaviours, a limitation that could be addressed in future research.”

We have also added a fourth bullet point in the Strengths and Limitations of this study section of the manuscript regarding this:

- Proportion of fixed anti-vaccine parents was too small to determine conclusions about the impact of media messages
- *Qualitative analysis:*

The authors describe the views of parents with fixed provaccine views about the credibility and trustworthiness of the public figures, refer to the views of those with negative views but not describe them. The views of credibility and trustworthiness of the susceptible parent group would be of interest but are not described.

Authors’ reply:

We agree with the reviewer and have amended Paragraph 2 of the Qualitative analysis section to include additional information on the views of “fixed” anti-vaccination parents and “susceptible” parents:

“In contrast, “fixed” anti-vaccination parents identified more strongly with themes of vaccine hesitancy, with one parent stating “[Hanson] seems to be the only one telling people to think and research instead of blindly following the masses”. Parents defined as “susceptible” commonly expressed varied and less polarised reactions, with some expressing that they “can’t decide really”. While several “susceptible” parents had trust in the medical qualifications and professional background of Dr Gannon, some found arguments by Hannon and Trump persuasive because “[Gannon] speaks with views of parents in mind” and “smaller doses over a period of time sounds like a good idea” respectively.”

- *Discussion:*

It is not self-evident why the views of politicians are more difficult to address than those of other celebrities.

Authors’ reply:

We have amended the statement in paragraph 1 of the Discussion to clarify that the views of politicians may be more difficult to address because they have authority and power within their capacities as elected officials who can influence health legislation.

- *The authors basis for concluding that current public health vaccine messaging focuses on those with fixed antivaccine views is not clear.*

Authors' reply:

We have revised the statement to reduce ambiguity regarding the methods mentioned:

“Recent public health interventions like the No Jab No Pay Policy in Australia(35), and the elimination of personal belief vaccine exemptions in US states like California(36) attempt to alter the behaviour of fixed non-vaccinating parents at one end of the spectrum rather than the majority of parents who vaccinate but hold uncertain views which are susceptible to change.”

REVIEWER 2

- *Reference 13 on Page 1 should be contextualised based on which country the Pediatrics researchers were looking at, as parents' trust in messaging from celebrities re vax may vary from country to country.*

Authors' reply

We have amended paragraph 2 of the Background section to clarify the study was based in the US.

- *On page 4, it may help the framing of the article to conclude the section by stating that despite the interest in studying compliant parents, the study looks at ALL types of parents.*

Authors' reply

We agree with the reviewer and have amended the concluding statement of the Background section (page 4) for greater clarification.

The aim now reads: “The aim of this survey was to investigate parental vaccination attitudes and responses to vaccine-related media messages from political and medical leaders of all types of parents through an alternate model of classifying parental vaccine opinions by susceptibility to change rather than their behaviour of vaccine refusal.”

- *Also on that page and in discussing the compliant but vulnerable parents ('susceptible') and their vulnerability to scares / stories / misinformation, the authors may find useful the conceptualisation and discussion of 'hesitant compliers' in this Australian article:
Enkel, S. L., Attwell, K., Snelling, T. L., and Christian, H. E. 2018. 'Hesitant compliers': Qualitative analysis of concerned fully-vaccinating parents. *Vaccine* 36 (44). doi: 10.1016/j.vaccine.2017.09.088.*

Authors' reply

We thanks the reviewer for altering us to this paper that was published after our paper was submitted for review. We have incorporated the reviewer's suggested reference to enhance the contextualisation of our paper in the Background section. We have added a statement in Paragraph 5 of this section that reads:

“Hesitant but compliant parents in Australia are influenced by vaccine-related events and news coverage, contributing to complex unresolved concerns regarding the safety of vaccines, and could potentially reduce their future compliance accordingly(22)”

We have also referenced this article in the Qualitative section, in regards to consistent themes of parental vaccine hesitancy.

- *The description on p.6 of how parents were classified as ‘fixed’ or ‘susceptible’ – I wanted to know more about the kinds of questions that were used to determine this – qual and quant. This information could be illustrative rather than exhaustive. I think this is important to provide if the authors are seeking to make their new framework useful to others. It’s also relevant for things later like when the authors report on p.13 parents’ information sources. (So that question should be explained up front.) Authors could consider putting all the questions from the survey in an appendix. The more I engage with the article, the more I find I want to know. Had the survey questions been used anywhere else? Who designed the survey? Why were these questions / this survey instrument chosen?*

Authors’ reply

Paragraph 2 of the Analysis section has been modified also in response to the suggestions of Reviewer 1, to clarify the data used to categorise “susceptible” and “fixed” populations. Additional information has also been added in Paragraph 3 of the Analysis section to clarify the qualitative validation of the “fixed” and “susceptible” classification.

Paragraph 3 of the Analysis section has also been amended add details of the qualitative validation so it now reads:

The data from the quantitative survey were then internally validated by checking against qualitative comments, in particular the use of strong language like “never” or “always”, and ensuring these were consistent with the categorisation of fixed or susceptible by the agreement two study authors (EZ and AAC).

We have added Appendix 2 that comprises a compilation of questions from the online survey that provided the data analysed in this paper as per Reviewer 2 suggestion.

We have added additional information in the Methods section to clarify the uncertainties regarding the survey questions and design. Additional information in Paragraph 1 of this section reads:

“The questions used in the online survey were formulated by the authors of this paper to answer the research questions of this paper and to obtain a range of qualitative and quantitative data on parental attitudes towards childhood vaccinations, and socio-demographic information.”

- *Page 7 – ‘parents were also asked if media messaging increased their safety concerns.’ How was this asked? What kind of media messaging – general or specific? Asked open or closed?*

Authors’ reply

We have amended the statement to clarify the questions raised by the reviewer:

“Closed ended questions were asked if the media messages presented in this survey increased vaccine safety concerns, with optional open-ended elaboration.”

- *Also on that page – it seems that you also (in your results) noted changes in either direction (eg. someone views Trump and becomes MORE likely to vaccinate). It is worth stating this because it currently reads in this section like you’re only interested in change, not in which direction.*

Authors’ reply

We have revised the statement to include the following clarifications:

“The analysis firstly noted positive and negative change in willingness to vaccinate . Subsequently change in either direction was combined into one single variable “change” and unchanged positive or negative pre-existing attitudes into a “no change” variable for further analysis.”

- *And finally, the analysis section needs more information on how the qualitative analysis was undertaken. Although it seems that this was predominantly done to check the quantitative data provided by participant, you also report the themes that occurred. What kinds of questions were*

asked? How were answers analysed? Was software used or manual methods? Even if the qual analysis was fairly cursory, the methods need some elaboration.

Authors' reply

Additional information was added in the fourth paragraph of the Analysis section regarding the qualitative analysis to clarify the methods used:

“Qualitative analysis was also performed by manually collating optional open-ended responses regarding the persuasiveness of the public figures.”

- *On p.9 , line 3 onwards – is it worth clarifying at this point that ‘change’ means ‘in either direction’, highlighting that in some cases the anti-vax views expressed by the politicians provoked parents TO favour vaccination? (I will return to the significance of this in a moment.)*

Authors' reply

We have amended the statement (now page 9 line 2) to include “in either direction” for clarification.

- *p.9 Line 27 onwards – when reporting actual numbers from whole study, it would be helpful to state in the text after each number how many of these parents were in your ‘susceptible’ basket.*

Authors' reply

We have added the number of participants in the “susceptible” subgroup into the text of the Results section paragraph 5.

- *p.10 – the report of the qual section seems like a wasted opportunity to make more of some of these findings. The qual section could benefit from an introduction that names and pulls out the key themes that emerged: safety concerns; credibility; delivery style; ‘moderation’ (I’m using that as a term for Trump’s seemingly [but not] sensible idea that the schedule could be made less intensive); rights; and standpoint (Hanson’s gender, parenthood). I’ve extracted each of these from the paragraphs. The whole section could be a bit more systematic. I thought the findings here were intriguing and interesting. The authors could consider removing the qual analysis from this paper (except as a validator of the qual material) and publishing it in a separate paper qual with more elaborate methods. This is a suggestion only to enable a further, more detailed publication of the interesting qual data, and is not required.*

Authors' reply

We have modified the opening statement of the Qualitative Analysis section to more succinctly capture the key themes identified in the qualitative section:

“Qualitative analysis of open-ended survey questions identified several key themes that emerged regarding the media figures in terms of their credibility, delivery style, and standpoint; vaccine safety concerns and ‘moderation’ of vaccine schedules; as well as parental rights.”

We have also altered some of the structure of this section to align with the themes of the amended introductory statement.

We retained the Qualitative Analysis section in order to keep the qualitative context of the parental responses.

- *Page 12 lines early 40s. Now that Aus no longer has Conscientious Objections, you should qualify this comment by saying something like “when these were still collected in 20XX prior to their abolition in 2016.”*

Authors' reply

We have amended paragraph 2 of the Discussion (now page 13) with the added qualifier so it now read:

“Moreover, the proportion of parents with fixed anti-vaccination views was very low (2.2%, n=9/411), consistent with the documented rate of Australia children with registered conscientious objections in 2016 prior to its abolishment later that year”

- *Page 13 reports parents’ self-reported info sources. See above for need for questions asked.*

Authors’ reply

We have added the Appendix A with a compilation of the survey questions. We have also rephrased the section to clarify the questions asked:

“When asked what parent’s considered to be strong influences on their vaccine decisions, we found that 20.2% of parents are strongly influenced by the media and Internet websites”

- *Final point – returning to point made about people’s views changing in both directions. This article actually shows something interesting about political polarisation that is currently not being mentioned. This is demonstrated in the fact that some ‘susceptible’ respondents are feeling more positive about vaccination when they’ve heard the anti-vax views from Hanson and Trump. The stats on this could be pulled out clearly in a paragraph in the results, if the authors wanted to go with this. Then, in the discussion, they could reflect on political polarisation as analysed by Kahan (2014) in the US context and consider what it means that some Australians are responding more positively about vaccination presumably (only) because they reject the messaging of Trump and Hanson.*

Authors’ reply

We have added further information in the Discussion section paragraph 6 that further explores the political polarisation and apparent “backfire” effect. We have added a reference to Kahan’s article “A risky science communication environment for vaccines” (2013) in this section.

The body of the Discussion section was altered to allow for a more cohesive structure with the additional information.

VERSION 2 – REVIEW

REVIEWER	Katie attwell University of Western Australia
	As per last review
REVIEW RETURNED	08-Feb-2019
GENERAL COMMENTS	I am happy with the revisions that the authors have made to this paper in response to my previous review. Although I've signed off on the written English being OK, the authors need to carefully read their revisions as there are several spelling and grammar issues that ought to be corrected.