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. Some articles will have been accepted based in part or entirely on reviews undertaken for other BMJ Group journals. These will be reproduced where possible.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Representations of the Health Value of Vitamin D Supplementation in Newspapers: media content analysis
AUTHORS	Clark, Marianne; Caulfield, Timothy; McCormack, James; Rachul, Christen; Field, Catherine

VERSION 1 - REVIEW

REVIEWER	Davi Thornton Southwestern University, USA
REVIEW RETURNED	15-Sep-2014

GENERAL COMMENTS	The paper clearly shows that media misrepresent the scientific data regarding Vitamin D supplements. As a rhetorical scholar, my concern is that this isn't entirely news: there are few if any issues--especially related to health, medicine and/or science--that are not misrepresented. What is particularly significant or interesting about this case? Moreover, I believe the article would be more powerful if it at least addressed or contextualized better the question of causality. While media do influence public perceptions of health-related issues, it is also true that public ideologies fuel media coverage. In a contemporary culture marked by "healthism," in which people avidly seek out and consume an enormous range of health-related products, how do media play a role? While the article seems to acknowledge this complexity in somewhat cursory fashion, I believe it would be helpful to engage this more in the introduction and conclusion and consider how this is a part of a much broader pattern of hyper-health consciousness and consumption of a variety of products.

REVIEWER	Bernice L. Hausman Virginia Tech and the Virginia Tech Carilion School of Medicine
REVIEW RETURNED	06-Sep-2014

GENERAL COMMENTS	I indicated that the statistics used in the paper are not appropriate or described fully. I have two minor statistical concerns. Please be aware that I am an English professor. However, the statistics used in this article are simple descriptive statistics, so they are fully within my capacity to understand. The authors write that "Health providers rarely recommend their use," referring to supplements, and they reference a 2013 article in JAMA Internal Medicine. I believe that this statement misstates the reference's support. The source cited suggests that almost 1/4 of supplements (23%) were used by recommendation of a health care provider. Calcium, which is

often fortified with Vitamin D, is the 2nd most recommended supplement. The authors appear to use their assertion to bolster the notion that folks are making their own decisions about supplementation. I recommend that their assertion be revised to be more in line with the source that they are referencing.

The second statistical problem--a problem in representation--is the use of the word cloud to indicate the prevalence of various conditions mentioned in relation to Vitamin D. This is actually an area about which I have specific expertise, as I was a co-PI on a data mining project and have worked with computer scientists to create word clouds as representations of statistical frequencies of word association. The authors should not simply present the word cloud as evidence without indicating the algorithmic parameters that created the word cloud. For example, what is the proximity of words that is being indicated--are these words that came within 2-3 sentences of the mention of Vitamin D? Ten sentences? The authors should also indicate whether the color differentiation between words means anything. Usually in a word cloud, the size of the word indicates frequency in relation to the target words (in this case, Vitamin D) but the computer scientists can often manipulate other factors. In addition, were all sources digitized or did the text mining occur with original print text that had to be scanned? That process affects the overall accuracy of the data mining operation.

I find this paper to be interesting and straightforward. My only comments are related to the statistics, as indicated above, and those are very specific recommendations for clarification and more accurate use of references. I do believe that the authors try to downplay the role of health care providers in recommending supplementation and they should do a better job of representing the ambiguity in this area. In particular, the source that they reference suggests a higher percentage of supplementers are doing so on the basis of health care provider recommendation.

The authors should also not assume that readers will understand what the word cloud means. Word clouds are created through algorithmic manipulation that needs to be clearly spelled out in order to understand what the rendering of the data means. Word clouds are not like graphs, which usually make their parameters explicit.

I miss a table in the article that indicates the magazines used for analysis. Since magazine coverage is compared to newspaper coverage, this oversight seems significant.

Otherwise, I find the article strong. It might be strengthened even more by some reference to research in the rhetoric of science that looks precisely at what happens to news reporting on scientific findings through the cycle of discovery and dissemination. J. Fahnestock comes to mind here.

REVIEWER	Sarah Gollust
	University of Minnesota, USA
REVIEW RETURNED	09-Sep-2014

GENERAL COMMENTS	1. Authors need to more clearly identify the research questions and their expectations, especially differences by media type. 4. No reliability statistics are presented for inter-rater reliability nor is there enough information about the coding instrument so it is impossible to replicate this study. Perhaps the coding instrument could be included as an appendix. 7. If authors want to describe differences between media modes they should test whether these differences are significant and report p-values. 8. There are no references to framing theory and/or content analysis methods or similar content analysis studies on which this paper was modeled. 10. The results -- particularly the figures -- were challenging to interpret.
	In this article, the authors have conducted a content analysis of popular magazine and print news coverage of Vitamin D to find out whether journalists are representing the science of Vitamin D accurately. This is an interesting question (although could be better motivated) but the methods, results, and discussion fall a bit short.
	I have identified the following issues with the manuscript that I hope that authors can address:
	1. Abstract. The "so what" of the project is not well described in the abstract. Why is this important? The abstract should, as the intro does well, point out that there is no conclusive evidence of the value of Vitamin D but that supplementing is a prevalent behavior and explain that understanding media covg might shed light into the influences upon the public.
	2. The introduction as a whole is well-written and motivates the study nicely. It would be nice to see specific research questions laid out up front. Why do the authors compare newspapers and magazines? If this is important to the authors, it should be identified as a key research question.
	3. It would be nice to see the authors go a bit further in their discussion in the intro about why it is important to understand media messaging around this issue: what are the consequences of inaccurate or hyperbolic news coverage upon the public? Authors might look at the work of Rebekah Nagler on nutrition messages in general, as this paper could be packaged in a more theoretically interesting way by referencing other similar health communication work. See: Nagler, Rebekah H. "Adverse outcomes associated with media exposure to contradictory nutrition messages." Journal of health communication 19.1 (2014): 24-40.
	4. The methods are weak. Authors do not cite or refer to any methodology so it is not clear what type of content analysis approach they are using. They also use many terms without definition and in an inconsistent manner – for instance, "framing" "coding frame" "framework". This is confusing. It is not clear if they are using "frame" in the manner of Gamson and Modigliani, Chong and Druckman, Dietram Scheufele or other authors. These are important concepts in communication research but the authors gloss over them and the result is confusing to the reader. I suggest that the authors read the above work on framing to better situate their paper within this discourse.

5. Relatedly, from the results section, it's not clear at all that they are really analyzing how articles are "framed" (which I view as "interpretive packages" in the language of Gamson and Modigiliani). Instead, it seems they are simply quantifying discrete "messages" or "arguments" (as described in examples on p. 7). Is this right?

6. I also have concerns about the coding process. The more standard word for the coding procedures is to use the term "coding instrument" not "coding frame." More detail is needed on the components of the coding instrument and how coding proceeded. Did the two coders code all content separately? Was there overlap? Importantly, what were the inter-rater reliability metrics (kappa, alpha, what?) How are readers to be assured that this approach is reliable and valid?

7. If differences between magazines and print are of interest, this must be noted on the introduction and described in the methods, and should be conducted as t-tests or chi-squared tests. The results section is heavy with comparisons between print and magazines but the reader has no way of knowing whether these differences are actually statistically meaningful.

8. Results. I do not recommend a word cloud approach to presenting data. There are other textual analytic approaches that are more scientifically appropriate that I suggest authors look into. Relatedly, Figure 1 was confusing because there were words in the word cloud that did not seem to be health conditions ("vegans", "newborns")

9. I found the figures difficult to interpret without legends. They all compare newspapers vs. magazines but the authors have not made it clear to me why that difference is important to assess. Is it because they have different readership? What is meaningful about comparing the media types like this? The figure on p. 19 is particularly confusing because it says it shows the % of articles in each year, but how can this add up to above 100% in a given year?

10. The discussion is nicely written but devotes much attention to the differences between magazine and newspaper coverage. Repeating myself: I still am not sure why these differences matter – and the authors do not take a stand either, saying only that "the definitive tone of the magazine articles may have relevance to how the public views the value…". Can authors be more assertive about what are the implications or consequences of their findings? Authors could go further to answer the "so what" question underlying their study.

REVIEWER	Amy Koerber Texas Tech University USA
REVIEW RETURNED	06-Sep-2014

| GENERAL COMMENTS | Here are some comments to support my rationale for the questions on which I answered "no" in the above list:

Intro paragraph—it's always hard to describe the cause-effect relationship when we're dealing with media representations of science. In this opening paragraph the authors ask, "What is driving public attitudes towards an interest in vitamin supplementation?" They rightly suspect that media reports might be part of what is driving these attitudes, but here is where I think the cause-effect relationship might be more complex than the authors are suggesting here. It's probably not a one-way delivery of information, from the media to consumers. Rather, it's more of an interactive, recursive |

process, with media outlets publishing the kinds of reports and information that consumers want to read. I'd suggest that the authors explore some of the literature that communication scholars have written about the rhetorical mechanisms of popular science writing. Here are a couple of links to articles that come to mind:

http://wcx.sagepub.com/content/15/3/330.short
http://wcx.sagepub.com/content/22/3/275.short
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2897184/

p. 9: In the "Deciphering Science" section, I think that BMJ readers might expect a more sophisticated statistical analysis. Reporting the straight percentages is not all that helpful because we don't know probabilities. I'd encourage the authors to work with a statistician on these numeric results.

p. 10: I wonder about this statement, "The definitive tone of the magazine articles may have relevance to how the public views the value of supplementation." What do the authors mean by this exactly? And what do we know about readership of the magazine articles in contrast to the newspaper articles? Do the authors mean to suggest that more people are reading the magazine articles than the newspaper articles?

After reading the article all the way through, I'm not sure the authors have adequately addressed the question that they stated at the beginning: "What is driving public attitudes towards an interest in vitamin supplementation?" As far as I can tell, the authors' main finding seems to be that newspaper and magazine articles encourage Vitamin D supplementation and obscure the uncertainty that exists in the scientific literature on this subject. Based on this conclusion, I suppose we might surmise, as the authors suggest, that the newspaper and magazine articles play some part in encouraging consumers to be enthusiastic about Vitamin D supplementation. But it seems like in a content analysis of this nature that the study should go beyond this rather obvious conclusion. Previous literature (including the studies I've mentioned above) already provides a lot of evidence to show that media coverage tends to oversimplify scientific information, so why do we need another study to prove this? I'd much rather see the authors take this as a starting assumption and then do something in their study that helps us better understand this phenomenon. Maybe they could look more closely at the articles in their sample and see if there are some trends that could be revealed through close analysis of the language. Then, looking back at some of the previous literature (such as the studies I list above), they might be able to offer some more nuanced analysis of the precise manner in which the language in their articles compares and contrasts to what other scholars have observed when they have paid close attention to the language that is used in popular media reports on scientific topics.

In the manner they are currently reported (as straight percentages), the statistics in this study have little value to readers. I think that if the authors want to use quantitative analysis and reporting, they should work with a statistician to achieve a more sophisticated analysis of their numeric results.

I also think, though, that another choice the authors might make is to emphasize the qualitative aspect of their study more than the quantitative. If they take this approach (i.e., engaging in a close

	reading of the language that's used in these articles as a way to contribute something more specific to the literature in communication and rhetorical studies), then the statistical reporting and analysis might come to have less importance in the article.

VERSION 1 – AUTHOR RESPONSE

Responses to Reviewers – Responses in italics and indented

Reviewer: 1

Reviewer Name   Amy Koerber

Institution and Country Texas Tech University, USA

Here are some comments to support my rationale for the questions on which I answered "no" in the above list:

Intro paragraph—it's always hard to describe the cause-effect relationship when we're dealing with media representations of science. In this opening paragraph the authors ask, "What is driving public attitudes towards an interest in vitamin supplementation?" They rightly suspect that media reports might be part of what is driving these attitudes, but here is where I think the cause-effect relationship might be more complex than the authors are suggesting here. It's probably not a one-way delivery of information, from the media to consumers. Rather, it's more of an interactive, recursive process, with media outlets publishing the kinds of reports and information that consumers want to read. I'd suggest that the authors explore some of the literature that communication scholars have written about the rhetorical mechanisms of popular science writing. Here are a couple of links to articles that come to mind:

http://wcx.sagepub.com/content/15/3/330.short

http://wcx.sagepub.com/content/22/3/275.short

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2897184/

> *We are aware, and were not intending to suggest, that scientific communication is a linear process from news media to consumers. We have tried to clarify this by including additional information and references in our introduction and have revised the question "What is driving public attitudes towards an interest in vitamin supplementation?" so as to avoid the suggestion that we think media is solely responsible for people's decisions to take supplements.*

p. 9: In the "Deciphering Science" section, I think that BMJ readers might expect a more sophisticated statistical analysis. Reporting the straight percentages is not all that helpful because we don't know probabilities. I'd encourage the authors to work with a statistician on these numeric results.

We have removed the magazine articles from our data set because our research questions and purpose do not include the differences between media types, but include a focus on how media discussed Vitamin D supplementation, thus statistical analyses of these differences are no longer required. In addition, our study is essentially a qualitative, descriptive study, despite findings being coded into numerical values. Our purposes do not include making generalizations or inferences to a greater sample of articles, and so do not require statistical testing of significance or inferential statistical tests. We intend to do further work on magazines for a possible future publication.

p. 10: I wonder about this statement, "The definitive tone of the magazine articles may have relevance to how the public views the value of supplementation." What do the authors mean by this exactly? And what do we know about readership of the magazine articles in contrast to the newspaper articles? Do the authors mean to suggest that more people are reading the magazine articles than the newspaper articles?

As mentioned above, we have removed the magazine articles from our data set, in order to focus the manuscript on understanding how media portrays Vitamin D supplementation and not how this differs between different media.

After reading the article all the way through, I'm not sure the authors have adequately addressed the question that they stated at the beginning: "What is driving public attitudes towards an interest in vitamin supplementation?" As far as I can tell, the authors' main finding seems to be that newspaper and magazine articles encourage Vitamin D supplementation and obscure the uncertainty that exists in the scientific literature on this subject. Based on this conclusion, I suppose we might surmise, as the authors suggest, that the newspaper and magazine articles play some part in encouraging consumers to be enthusiastic about Vitamin D supplementation. But it seems like in a content analysis of this nature that the study should go beyond this rather obvious conclusion. Previous literature (including the studies I've mentioned above) already provides a lot of evidence to show that media coverage tends to oversimplify scientific information, so why do we need another study to prove this? I'd much rather see the authors take this as a starting assumption and then do something in their study that helps us better understand this phenomenon. Maybe they could look more closely at the articles in their sample and see if there are some trends that could be revealed through close analysis of the language. Then, looking back at some of the previous literature (such as the studies I list above), they might be able to offer some more nuanced analysis of the precise manner in which the language in their articles compares and contrasts to what other scholars have observed when they have paid close attention to the language that is used in popular media reports on scientific topics.

We have attempted to clarify our research questions/purpose, as well as the relationship between media and consumer actions, including the implications for news media framing in this specific issue.

In the manner they are currently reported (as straight percentages), the statistics in this study have little value to readers. I think that if the authors want to use quantitative analysis and reporting, they should work with a statistician to achieve a more sophisticated analysis of their numeric results.

> *As mentioned previously, our study is essentially a qualitative, descriptive study, despite findings being coded into numerical values. Our purposes do not include making generalizations or inferences to a greater sample of articles, and so do not require statistical testing of significance or inferential statistical tests.*

I also think, though, that another choice the authors might make is to emphasize the qualitative aspect of their study more than the quantitative. If they take this approach (i.e., engaging in a close reading of the language that's used in these articles as a way to contribute something more specific to the literature in communication and rhetorical studies), then the statistical reporting and analysis might come to have less importance in the article.

> *We agree that a closer reading of the language using rhetorical and discourse analysis methods would be interesting, but that is a very different study from the one we have conducted. There is much precedent for the approach we have taken, and we have tried to include references to other studies we have modeled this study after.*

Reviewer: 2

Reviewer Name   Bernice L. Hausman

Institution and Country Virginia Tech and the Virginia Tech Carilion School of Medicine

I indicated that the statistics used in the paper are not appropriate or described fully. I have two minor statistical concerns. Please be aware that I am an English professor. However, the statistics used in this article are simple descriptive statistics, so they are fully within my capacity to understand.

> *We have removed the magazine articles from our data set because our research questions and purpose do not include the differences between media types, but include a focus on how media discussed Vitamin D supplementation, thus statistical analyses of these differences are no longer required. In addition, our study is essentially a qualitative, descriptive study, despite findings being coded into numerical values. Our purposes do not include making generalizations or inferences to a greater sample of articles, and so do not require statistical testing of significance or inferential statistical tests.*

The authors write that "Health providers rarely recommend their use," referring to supplements, and they reference a 2013 article in JAMA Internal Medicine. I believe that this statement misstates the reference's support. The source cited suggests that almost 1/4 of supplements (23%) were used by

recommendation of a health care provider. Calcium, which is often fortified with Vitamin D, is the 2nd most recommended supplement. The authors appear to use their assertion to bolster the notion that folks are making their own decisions about supplementation. I recommend that their assertion be revised to be more in line with the source that they are referencing.

We have amended this wording.

The second statistical problem--a problem in representation--is the use of the word cloud to indicate the prevalence of various conditions mentioned in relation to Vitamin D. This is actually an area about which I have specific expertise, as I was a co-PI on a data mining project and have worked with computer scientists to create word clouds as representations of statistical frequencies of word association. The authors should not simply present the word cloud as evidence without indicating the algorithmic parameters that created the word cloud. For example, what is the proximity of words that is being indicated--are these words that came within 2-3 sentences of the mention of Vitamin D? Ten sentences? The authors should also indicate whether the color differentiation between words means anything. Usually in a word cloud, the size of the word indicates frequency in relation to the target words (in this case, Vitamin D) but the computer scientists can often manipulate other factors. In addition, were all sources digitized or did the text mining occur with original print text that had to be scanned? That process affects the overall accuracy of the data mining operation.

We appreciate the reviewers' very valuable insight into word clouds. We have removed the word clouds to avoid confusion and misrepresentation of our data.

I find this paper to be interesting and straightforward. My only comments are related to the statistics, as indicated above, and those are very specific recommendations for clarification and more accurate use of references. I do believe that the authors try to downplay the role of health care providers in recommending supplementation and they should do a better job of representing the ambiguity in this area. In particular, the source that they reference suggests a higher percentage of supplementers are doing so on the basis of health care provider recommendation

The authors should also not assume that readers will understand what the word cloud means. Word clouds are created through algorithmic manipulation that needs to be clearly spelled out in order to understand what the rendering of the data means. Word clouds are not like graphs, which usually make their parameters explicit.

As mentioned above, we appreciate the reviewer's insight and suggestions regarding the word cloud and have removed these to avoid confusion and misrepresentation of our data.

I miss a table in the article that indicates the magazines used for analysis. Since magazine coverage is compared to newspaper coverage, this oversight seems significant.

> *This was an oversight, but given that we have removed the magazine articles from our data set, it is no longer relevant.*

Otherwise, I find the article strong. It might be strengthened even more by some reference to research in the rhetoric of science that looks precisely at what happens to news reporting on scientific findings through the cycle of discovery and dissemination. J. Fahnestock comes to mind here.

> *We have included a more discussion and references to describe our theoretical approach to the research and manuscript.*

The authors are particularly good at indicating the limitations of the study and the need for further research. The authors should correct the statistical issues above--and I would suggest NOT using the word cloud to denote frequency of conditions associated with inadequate Vitamin D intake but some other more quantifiable form of representation--and also include the table of magazines analyzed for the study.

We have removed the magazines from analysis.

Reviewer: 3

Reviewer Name   Sarah Gollust

Institution and Country University of Minnesota, USA

 Please state any competing interests or state 'None declared': None declared

1. Authors need to more clearly identify the research questions and their expectations, especially differences by media type.

> *We have tried to focus and clarify our research purposes in the introduction. We have also chosen to remove the magazine articles from the data set since our intention was to describe media portrayals and not the differences between media types.*

4. No reliability statistics are presented for inter-rater reliability nor is there enough information about the coding instrument so it is impossible to replicate this study. Perhaps the coding instrument could be included as an appendix.

We have revised our methods section to clarify the coding process, and have included inter-rater reliability statistics using Cohen's Kappa.

7. If authors want to describe differences between media modes they should test whether these differences are significant and report p-values.

As mentioned above, we have removed the magazine articles from our data set so as not to distract from our purpose in describing media portrayals rather than differences between media types.

8. There are no references to framing theory and/or content analysis methods or similar content analysis studies on which this paper was modeled.

We have included further discussion and references in the introduction and methods sections to clarify our theoretical and methodological approaches.

10. The results -- particularly the figures -- were challenging to interpret.

We have removed 2 of the original figures and edited existing ones so that they are hopefully easier to interpret.

In this article, the authors have conducted a content analysis of popular magazine and print news coverage of Vitamin D to find out whether journalists are representing the science of Vitamin D accurately. This is an interesting question (although could be better motivated) but the methods, results, and discussion fall a bit short.

I have identified the following issues with the manuscript that I hope that authors can address:

1. Abstract. The "so what" of the project is not well described in the abstract. Why is this important? The abstract should, as the intro does well, point out that there is no conclusive evidence of the value of Vitamin D but that supplementing is a prevalent behavior and explain that understanding media covg might shed light into the influences upon the public.

We have amended the abstract accordingly.

2.   The introduction as a whole is well-written and motivates the study nicely. It would be nice to see specific research questions laid out up front. Why do the authors compare newspapers and magazines? If this is important to the authors, it should be identified as a key research question.

We have removed the magazine articles in order to focus the article and clarify our research questions/purposes.

3.   It would be nice to see the authors go a bit further in their discussion in the intro about why it is important to understand media messaging around this issue: what are the consequences of inaccurate or hyperbolic news coverage upon the public? Authors might look at the work of Rebekah Nagler on nutrition messages in general, as this paper could be packaged in a more theoretically interesting way by referencing other similar health communication work. See: Nagler, Rebekah H. "Adverse outcomes associated with media exposure to contradictory nutrition messages." Journal of health communication 19.1 (2014): 24-40.

We have tried to revise the introduction in order to highlight the importance of understanding news media portrayals of this topic.

4.   The methods are weak. Authors do not cite or refer to any methodology so it is not clear what type of content analysis approach they are using. They also use many terms without definition and in an inconsistent manner – for instance, "framing" "coding frame" "framework". This is confusing. It is not clear if they are using "frame" in the manner of Gamson and Modigliani, Chong and Druckman, Dietram Scheufele or other authors. These are important concepts in communication research but the authors gloss over them and the result is confusing to the reader. I suggest that the authors read the above work on framing to better situate their paper within this discourse.

We have revised the methods section to include further information regarding our approach and studies we have modeled this one on. We have also revised the whole manuscript so that terminology is consistent.

5.   Relatedly, from the results section, it's not clear at all that they are really analyzing how articles are "framed" (which I view as "interpretive packages" in the language of Gamson and Modigiliani). Instead, it seems they are simply quantifying discrete "messages" or "arguments" (as described in examples on p. 7). Is this right?

We have included more explicit discussion of what we mean by "framing," which we describe as "central organizing ideas," in the introduction section that we hope will clarify the results.

6.   I also have concerns about the coding process. The more standard word for the coding procedures is to use the term "coding instrument" not "coding frame." More detail is needed on the components of the coding instrument and how coding proceeded. Did the two coders code all content separately? Was there overlap? Importantly, what were the inter-rater reliability metrics (kappa, alpha, what?) How are readers to be assured that this approach is reliable and valid?

We have included more detail about the coding process and have added inter-rater reliability scores using Cohen's Kappa.

7.   If differences between magazines and print are of interest, this must be noted on the introduction and described in the methods, and should be conducted as t-tests or chi-squared tests. The results section is heavy with comparisons between print and magazines but the reader has no way of knowing whether these differences are actually statistically meaningful.

We have removed the magazine articles from our data set because our research questions and purpose do not include the differences between media types, but include a focus on how media discussed Vitamin D supplementation, thus statistical analyses of these differences are no longer required. In addition, our study is essentially a qualitative, descriptive study, despite findings being coded into numerical values. Our purposes do not include making generalizations or inferences to a greater sample of articles, and so do not require statistical testing of significance or inferential statistical tests.

8.   Results. I do not recommend a word cloud approach to presenting data. There are other textual analytic approaches that are more scientifically appropriate that I suggest authors look into. Relatedly, Figure 1 was confusing because there were words in the word cloud that did not seem to be health conditions ("vegans", "newborns")

Based on multiple reviewer comments regarding word clouds, we have removed these in order to avoid confusion and misrepresenting our results.

9.   I found the figures difficult to interpret without legends. They all compare newspapers vs. magazines but the authors have not made it clear to me why that difference is important to assess. Is it because they have different readership? What is meaningful about comparing the media types like this? The figure on p. 19 is particularly confusing because it says it shows the % of articles in each year, but how can this add up to above 100% in a given year?

We have eliminated magazines from our analysis, consequently these figures should be more clear

10.   The discussion is nicely written but devotes much attention to the differences between magazine and newspaper coverage. Repeating myself: I still am not sure why these differences matter – and the authors do not take a stand either, saying only that "the definitive tone of the magazine articles may have relevance to how the public views the value…". Can authors be more assertive about what are the implications or consequences of their findings? Authors could go further to answer the "so what" question underlying their study.

As mentioned above, after much discussion, the authors have chosen to remove the magazines from our data set as the differences between the media types were not as important as the portrayals themselves. We hope that this has resulted in a more focused paper.

Reviewer: 4

Reviewer Name   Davi Thornton

Institution and Country Southwestern University, USA

 Please state any competing interests or state 'None declared': None declared

The paper clearly shows that media misrepresent the scientific data regarding Vitamin D supplements. As a rhetorical scholar, my concern is that this isn't entirely news: there are few if any issues--especially related to health, medicine and/or science--that are not misrepresented. What is particularly significant or interesting about this case?

We included more discussion in the introduction to emphasize the importance and implications of our study.

Moreover, I believe the article would be more powerful if it at least addressed or contextualized better the question of causality. While media do influence public perceptions of health-related issues, it is also true that public ideologies fuel media coverage. In a contemporary culture marked by "healthism," in which people avidly seek out and consume an enormous range of health-related products, how do media play a role?

We have included more discussion in the introduction to clarify our theoretical perspective on the role of media in consumers' decision-making.

While the article seems to acknowledge this complexity in somewhat cursory fashion, I believe it would be helpful to engage this more in the introduction and conclusion and consider how this is a part of a much broader pattern of hyper-health consciousness and consumption of a variety of products.

VERSION 2 – REVIEW

REVIEWER	Bernice L. Hausman Virginia Tech, USA
REVIEW RETURNED	18-Nov-2014

GENERAL COMMENTS	The authors addressed my concerns with the first article and have, as far as I can see, addressed the other reviewers comments. I do think that Professor Koerber's comments are still germane. She was trying to suggest that the very modest goals of this article--that news articles misrepresent the equivocal facts of vitamin supplementation--have really been demonstrated, and that what would be more innovative would be a full-fledged analysis of the language. I realize that this project is not that, but her point is appropriate--why conduct a study that is so modest that its conclusions are relatively self-fulfilling from its initial questions? I recommend publication of this article, but I recommend that the authors think more ambitiously in future projects.

REVIEWER	Amy Koerber Texas Tech University USA
REVIEW RETURNED	24-Nov-2014

GENERAL COMMENTS	Excellent revisions. My concerns have been addressed through revisions to the manuscript and/or in the response that the authors provided.

REVIEWER	Davi Thornton Southwestern University USA
REVIEW RETURNED	04-Dec-2014

GENERAL COMMENTS	This is an excellent revision and I believe this should be published. I do have one suggestion for a minor revision: the last paragraph that starts on p. 3 should be given another look. The content of the paragraph is fine, but it reads awkwardly. I simply recommend that one of the authors take another pass at this paragraph. While I continue to have some general concerns about the significance of the implications of this study (are we really surprised that media contribute to "healthism," or that media contain scientific inaccuracies?), these are the result of my own methodological biases and are no fault of this paper which I believe makes a clear

	contribution to studies of media and health.

REVIEWER	Sarah Gollust University of Minnesota, USA
REVIEW RETURNED	10-Dec-2014

GENERAL COMMENTS	The authors have done a thorough job responding to my, and the other thoughtful reviewers', critiques. I think the paper is much improved and they have ameliorated the methodological and conceptual concerns I voiced in the earlier iteration.

VERSION 2 – AUTHOR RESPONSE

Response to reviewers

We would like to express our appreciation to the reviewers for their thoughtful comments and constructive suggestions. We have revised the manuscript in response and feel it is significantly stronger and more focused as a result. Below we have endeavored to provide a concise but thorough response to the major concerns. We would, of course, be happy to address any remaining questions or editorial suggestions.

1. In response to reviewers' comments and suggestions for additional theoretical context for the study, we have added a brief explanation in the introduction about the particular perspective of the contemporary context for health and news media framing that guided the study. This theoretical perspective was also revisited in the discussion section to enhance the importance of our results. Our hope is that this additional theoretical explanation will also clarify the "so what" of the article, as mentioned by some of the reviewers. In this regard, we have also noted that few studies have tackled this issue and that we hope our study will inform policy and provide and patient discussions about the use of supplements.

2. We also expand on our discussion of health communication in the introduction as suggested by reviewers 1 and 3, and have included several more references in this section.

3. To help with this enhanced framing of the paper and to assist with statistical analysis, a fifth author (Christen Rachul – a frequent member of our research team) who has extensive knowledge of communication theory and strong statistical skills was invited onto the paper.

4. We agree with reviewers' comments that the importance of the differences between the newspaper and magazine articles is not explicitly articulated. The inclusion of magazines also appears to have prompted many of the concerns regarding our lack of statistical analysis is in relation to this issue. Therefore, we have chosen to exclude the magazines from our analysis and the manuscript now only addresses the newspaper articles. We hope that this eliminates both the concerns over the unexplained focus on this difference as well as the statistical concerns. We plan to expand our analysis of magazines for a possible future article.

5. We have eliminated the word cloud in response to reviewer suggestion. The manuscript text adequately conveys the idea that vitamin D is associated with numerous and diverse health conditions in newspaper articles.

6. We have conducted inter-rater reliability scores, which are described thoroughly in the methods section.

7. In addition, we have included references to previous studies on which this study was modeled in the methods section and have tried to clarify how our chosen methodological approach relates to our theoretical perspective on news framing.

8. In order to clarify the methods and the terminology throughout the manuscript, we have replaced "coding framework" with the term "coding instrument," and where appropriate refer to our "content analysis" instead of the coding framework or instrument. This will clarify our theoretical use of the term "framing" from our methods.