Author's response to reviews

Title: More distinct food intake patterns among women than men in northern Sweden: a population-based survey

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Author's response to reviews: see over
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Dear Dr Gabriel,

Thank you for the feedback on our manuscript (Ms 121415961228277 “More distinct food intake patterns among women than men in northern Sweden”). We found the comments most useful and have mostly revised the manuscript accordingly. We here submit a revised version of the manuscript as well as the extra tables (not changed since first submission). Below, please find a point-by-point response to the concerns of the referees.

We look forward to hearing from you soon,

Anna Winkvist

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Responses to Referee 1, Fernanda Scaglìusi:

2) **Background, page 2:** I think that the paper would be more appealing if the authors also stated that it is important to know dietary patterns, and not only intake, because dietary patterns more closely resembles the way people actually eat and it is the main measure of the present study.

Response: We agree with the reviewer and have added patterns of intake to this sentence. It now reads (p 2): *A prerequisite for planning and evaluating interventions on dietary intake is the existence of valid information on long-term average dietary intake as well as patterns of intake in a population.*

3) **Methods, page 3:** Please describe more clearly how portion sizes were quantified for foods other than staple food, meat, and vegetables.

Response: We have clarified that natural sizes refer to single food items such as a fruit and that other portion sizes were determined in a national survey for each sex and age group. We believe this should be sufficient for the readers. The sentence now reads (p 4): *Portion sizes used were those indicated on the photographs, natural sizes such as an orange, or average portion sizes for the sex and age as determined in a national survey.*

4) **Methods, page 7:** Please include a table in order to show which foods composed the food groups utilized in the cluster analysis.

Response: This has now been included as a new Table 1.

5) **Results, page 9:** I have some questions about the names of the patterns.

Response: We agree and now follow the tradition of naming the patterns based on typical food characteristics of the groups. Hence, new names for the four groups of the women are: “Fruit and vegetables”, “High-fat”, “Coffee and sandwich” and “Tea and ice cream”. New names for the three groups of the men are: “Fruit and vegetables”, “High-fat”, and “Tea, soda and cookies”.

6) **Results, page 11:** The authors cite some characteristics of the subjects belonging to each pattern (as BMI, age and low energy reporting), but I would really like to see these numbers in a table.

Response: In a forthcoming manuscript, we explore the identified food pattern groups in depth with respect to current characteristics and associations with different health outcomes. Hence, we don’t want to emphasize these characteristics too much in this paper, where the focus more is on presenting food groups and dietary intake data. Thus, we believe that the current level of details (information presented in running text) is the suitable one for this paper.

7) **Discussion, page 13:** The authors correctly stated that “A typical characteristic of “Prudent” women and men was a higher proportion of underreporting, which may reflect more knowledge about healthy diet and a desire to report only what is healthy”. I think you should explore more this issue.
Response: We agree with the reviewer that the pattern of underreporting as well as high BMI in these groups provides a complex picture that deserves further exploration. In our forthcoming manuscript we do look at these issues in more detail. However, also in this manuscript it is important to highlight these issues and we have added thoughts in this in the Discussion. New sentences read (pp 13-14): Thus, it is possible that the profile of healthy eating in these groups partly reflects a desire to eat healthy and partly what is actually being consumed. Similarly, the higher BMI values in these groups may reflect this desire to eat healthy or it may reflect a pre-existing condition that has encouraged these women and men to change to a healthier diet.

8) Discussion, page 13: I recommend being a bit more cautious in your statement that “Traditional” women and men typically were smokers and had a lower educational level, which may indicate less knowledge and less interest in healthy lifestyles”.
Response: We agree and have deleted the sentence (p 14)”…which may indicate less knowledge and less interest in healthy lifestyles”.

9) Discussion, page 12: The authors did a good job describing the limitations of the FFQ. I would like to know if you repeated the cluster analysis after the exclusion of the low energy reporters, as Bailey did (cited in reference 18).
Response: We had previously not carried out these analyses but now did so. Groups with mostly similar characteristics to those reported for the entire sample appeared and this is now reported in the Methods (pp 7-8): The cluster analyses also were repeated after removing all Low Energy Reporters. Groups with similar unique dietary intake characteristics to those reported for the whole sample were found among both women and men; only exception was lower coffee intake among women in the group labeled “Coffee and sandwich” and lower tea intake among men in the group labeled “Tea, soda and cookies”.

10) Conclusions, page 14: The authors affirmed that “However, the results on food intake patterns should be valid and useful as a basis for targeting information on healthy diet to groups most in need”. I agree that the results should be valid, but I am not so sure that what people need is more information, since even your results suggest that information may lead to underreporting but not an improve of food intake. I think we need more creative and cultural approaches. I am aware that this is not the focus of the current paper, but I think that this sentence is important, since it is the last one in the article and also the conclusion of the abstract.
Response: We actually had in mind any kinds of interventions, not solely those based on providing information. Thus, we thank the referee for pointing this out. The revised sentence in Abstract, Discussion and Conclusion now reads: However, the results on food intake patterns should be valid and useful as a basis for targeting interventions to groups most in need.
Responses to Referee 2, Hélène Delisle:

1) Research question: [...] However, how they intend to use their findings for the promotion of healthy eating is not addressed, nor discussed. Is the “prudent” pattern to be advocated? How and to whom? It would be useful if not essential to provide the profile of people in the various clusters, based on age, sex, physical activity, smoking, education, etc., in order to identify the population segments at higher risk of unhealthy diet, for instance. It would also appear essential to appraise the quality of the various eating patterns, for instance, by computing their nutrient density.

Response: The aim of this manuscript is to present dietary patterns, so that these can be the basis for discussions on what kinds of interventions that may be most useful overall or to certain risk groups. We do not see it as within the frame of this manuscript to also address what kinds of interventions that may be most useful. Also, in a forthcoming manuscript we explore the identified food pattern groups in depth with respect to current characteristics, nutrient intake and associations with different health outcomes. Hence, we don’t want to emphasize these characteristics too much in this paper, where the focus more is on presenting food groups and dietary intake data. Thus, we believe that the current level of details (information presented in running text) is the suitable one for this paper.

2. Methods: Methods for sample selection are not described.

Response: Information on sample selection can be found under the heading Study population. We have now added that the invitation is by a mailed letter. The paragraph now reads (p 3):

Since 1985, inhabitants in Västerbotten county in northern Sweden (population of 255,000) have been invited by a mailed invitation letter to their local health center for a medical examination when turning 40, 50, and 60 years of age. Initially, also 30-year olds were invited. Participants fill in an extensive diet and lifestyle questionnaire. During 1992-1993, 57 percent of eligible inhabitants participated and there were no systematic differences between participants and non-participants [6]. Participation rates have since been 58-66 percent.

Our data base thus consists of information on all those about 60% who have responded to the invitation and filled in the questionnaire. Drop outs in our sample are described in the remaining sections in Methods.

3. Results: The sampling process might be better presented in a table. It is of concern that close to 7% of subjects were excluded because of a too low or too high FIL level, and that in the final sample, more that half were considered as under-reporters.

Response: We believe that the number of tables in the manuscript is sufficient (a new Table 1 has been added in response to referee no 1) and that the sampling process is sufficiently clearly described in the running text. We agree that the high proportion of low-energy reporters is of concern and discuss this in the manuscript.

4) Results: We suggest reporting intakes in kcal and not only in MJ.
Response: We disagree and prefer the SI-unit MJ.

5) Results: We would suggest further data analysis, including:
- Identifying socio-demographic and lifestyle features of the various clusters, as suggested above, with related tables or figures
- Comparing the nutrient density of the various dietary patterns as a means of verifying the quality of these patterns
- Since the sample is large, applying the cluster analysis among men and women after excluding the under-reporters, in order to check whether the results are the same as when including all subjects.

Response: With respect to the first two issues, please see response to query No 1 above. With respect to the stratified cluster analysis, we had previously not carried out these analyses but now did so. Groups with mostly similar characteristics to those reported for the entire sample appeared and this is now reported in the Methods (pp 7-8): The cluster analyses also were repeated after removing all Low Energy Reporters. Groups with similar unique dietary intake characteristics to those reported for the whole sample were found among both women and men; only exception was lower coffee intake among women in the group labeled “Coffee and sandwich” and lower tea intake among men in the group labeled “Tea, soda and cookies”.

6) Discussion and conclusion: We would have liked to see some points further discussed, beyond the well-known under-reporting by high-BMI subjects and higher consumption of fruit and vegetables by women. For instance:
- Statistical method: is the cluster analysis more relevant than other data-driven methods of studying eating patterns?

Response: We do have plans to apply also factor analysis to investigate food patterns in this population. However, a discussion of the relevance of one method vs. another would belong in such a paper that can compare the results of both.

- What if intake data were not corrected for energy intake (at least among the non-under-reporters?)

Response: This is an important question and we now address this in the Discussion as follows (p 13): To improve robustness and account for differences in reported energy intake, our analyses were based on reported frequency of intake/1000 kcalories. Groups with high levels of underreporting, such as the “Fruit and vegetables” groups, may thus be represented by higher frequencies/1000 kcalories than other groups with lower levels of underreporting. This may falsely enhance differences among groups in the cluster analyses process. However, reported differences in frequency of intake among cluster groups were indeed large even without energy adjustment, as seen in Tables 3 and 4.

- How “prudent” is the prudent dietary pattern cluster, and what are the implications for nutrition communication?

Response: in the Discussion of the diet among women and men in the Prudent/Fruit and vegetables clusters, we have now added the following (p 13): Thus, it is possible that the profile of healthy eating in these groups partly reflects a desire to eat healthy and partly what is actually being consumed. Similarly, the higher BMI values in these groups may reflect this...
desire to eat healthy or it may reflect a pre-existing condition that has encouraged these women and men to change to a healthier diet.

In this paper, we do not address the issue of what kinds of interventions that would be most suitable.

- How appropriate are the names given to the clusters? For instance, the "tea and cookies" subjects do not appear to eat more cookies…
  Response: We agree and now follow the tradition of naming the patterns based on typical food characteristics of the groups. Hence, new names for the four groups of the women are: “Fruit and vegetables”, “High-fat”, “Coffee and sandwich” and “Tea and ice cream”. New names for the three groups of the men are: “Fruit and vegetables”, “High-fat”, and "Tea, soda and cookies". In the “Tea, soda and cookies”-group, these men have a frequency of cookie intake corresponding to the mean of all men, whereas the other two groups have intakes below the mean of all men. Hence, this group does have the highest intake of cookies among the men.

- The data were collected between 1992 and 2005: major dietary shifts may have occurred over this time span, and this is not mentioned anywhere.
  Response: This is an important point. It is outside the scope of this manuscript to evaluate such changes but we agree that this should be pointed out in the manuscript. In the last paragraph of Discussion we have added the following (p 15): Finally, it was not within the scope of this analysis to evaluate changes in intake that may have occurred during the data collection period. However, this would be valuable to further investigate in the future.

The conclusion of a larger variation of intake among women than men is not too exciting… And how the data will be useful to target information on healthy diet to “those most in need” is not at all explained.
  Response: The aim of this paper is to reveal dietary patterns and it does not also cover the suitability of different interventions. We agree that the focus on providing information as an intervention was too narrow. This sentence has been changed to the following in all relevant places: However, the results on food intake patterns should be valid and useful as a basis for targeting interventions to groups most in need.

7). Title and abstract: The title, much like the conclusion, does not mean much, and even “more distinct patterns” (in the title) does not mean the same as “larger variation” (in the conclusion).
  Response: We believe that this general title and statements in the conclusion are suitable summaries of the major characteristics of the results, namely that more clear patterns were found among women and that larger variations in food frequencies were found among women. We agree with the referee that “larger variation” does not mean the same as “more distinct”. Hence, we have adjusted the text in the Conclusion as follows (p15): In conclusion, more distinct food patterns, including larger variation in frequency of daily intake, was found among women than among men for most food groups.