Author's response to reviews

Title: Popcorn is more satiating than potato chips in normal-weight adults

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Version: 2 Date: 22 June 2012

Author's response to reviews: see over
June 22, 2012

Nehme Gabriel, Editor-in-Chief
Chief of Gastroenterology
Leesburg Regional Medical Center and The Villages
Regional Health System, Florida

Dear Dr. Gabriel:

Thank you for the review of our manuscript *Popcorn is more satiating than potato chips in normal-weight adults* submitted to Nutrition Journal on April 9, 2012. We sincerely wish to thank the reviewers for their valuable time and expertise to assess this manuscript and feel that the requested revisions have added to the quality of the paper.

Below are the reviewer comments, followed by our responses. Changes to the manuscript are highlighted.

Thank you again for the prompt review of this article and we look forward to hearing from you.

Sincerely,

Kristin Reimers, PhD
Manager, Nutrition
ConAgra Foods
Omaha, NE

**Reviewer's report**
**Title:** Popcorn is more satiating than potato chips in normal-weight adults
**Version:** 1 **Date:** 2 May 2012
**Reviewer:** Susan Barr

Reviewer’s report:
This manuscript describes the effects of 1 cup popcorn, 6 cups popcorn, and 1 cup potato chips on satiety and ad-libitum intake at a subsequent meal consumed 30 minutes later. The methods are clearly described and overall, the manuscript is well-written. Issues that require attention include the rationale for providing the test snack in very close proximity to the ad-libitum meal, the absence of data on palatability, the need to address the potential impact of increased thirst with the snacks, and the need to differentiate the effects of one cup versus six cups of popcorn (in many instances, the word “popcorn” is used without clarification).

Major Compulsory Revisions
1. Page 5, Design: What was the rationale for providing the test foods 30 minutes before an ad-libitum meal (which could commence as shortly as 15 minutes after participants finished the test food)? To my knowledge, snacks are not generally consumed in such close proximity to a meal. It almost seems that you were testing
the effect of an “appetizer” rather than a snack. Do you have data to indicate that this is a normal time for a snack? If so, it should be provided. In any case, this needs to be addressed in the discussion section.

In this study, meal intake was a measure of short-term satiety, and the timing was not designed to model a typical snack-meal pattern. The rationale for timing the test food commencement 30 minutes before the meal was to capture the potential satiety effects of the relatively small calorie load (15 – 150 kcal). Designing a satiety study that models typical snack-meal patterns would be of interest for a future study. A statement addressing this was added to the discussion section on future studies.

2. Page 8, para 2. Data on the extent of caloric compensation should be added to Table 3, along with measures of variability (i.e., mean +/- SD) and the significance of comparisons among the three test food conditions.

The actual (± sd) and percent (± sd) energy compensation values among conditions are shown in Table 3, abstract and results section. There was not statistical significance due to the variability, which is not surprising given the relatively small calorie differences being examined.

3. Page 8, results. The results section does not include information on the palatability ratings, so these should be added. Also, it should be explicitly stated that all 3 test foods increased thirst.

Added palatability rating to Table 2. Added statement that all three test foods increased thirst on page 8.

4. Discussion is needed regarding the potential implications of the increased thirst with all 3 test foods on your findings. Did you obtain data on water consumption at the ad libitum test meal? If so these data should be presented in the results section. If you can demonstrate that water intake at the ad-libitum meal did not differ among the test foods and the water control, your findings would be strengthened. However, if it did differ, then how the findings might be altered in the context of a meal with a caloric beverage needs to be discussed: If a caloric beverage had been available instead of water, and if the higher thirst rating translated to increased beverage consumption, the caloric compensation results might differ from what you observed with water. If data on water consumption at the ad-libitum meal were not collected, the issue should still be addressed.

Added water intake data to Table 3. No differences (p>0.05) among water intakes were observed.

Minor Essential Revisions

5. Title – I appreciate the challenge of providing a concise yet informative title. Your title refers to “satiety” and this might be interpreted as referring to the VAS ratings. While it is true that 6 cups of popcorn was more ‘satiating’ than 1 cup of potato chips, there were no differences in VAS satiety ratings between 1 cup of popcorn and 1 cup of potato chips. The title should reflect this if possible. Also,
because of the unusual interval between the snack and the ad-libitum meal, it would be appropriate if the title indicated “when consumed within 30 minutes of a meal”.

We believe the results can be generalized to popcorn. The outcome measures for satiety were VAS, combined energy intake, and energy compensation. Six cups popcorn exhibited greater satiety outcomes than potato chips on all three measures. One cup popcorn (15 kcal) did not elicit stronger VAS responses than potato chips (150 kcal), but did elicit the same response (not statistically different) despite the 10-fold energy difference. If popcorn was not more satiating, the VAS scores from one tenth the energy load would be reduced significantly, thus, a finding of no difference was interpreted as a positive finding. Additionally, the combined energy intake from one cup popcorn plus meal was significantly less than the combined energy intake from potato chips plus meal, further described by the finding that mean energy compensation of one cup popcorn was complete, whereas mean energy compensation of potato chips was incomplete. Taken in total, we feel the results support the stronger satiety response of popcorn vs. potato chips.

Likewise, we believe that the title is accurate without adding the timing of the test food before the meal. Others have measured meal intake 30 minutes after the test food without description in the title [1-4]. Timing of subsequent intake is described in the abstract and methodology.

We suggest the title remain unchanged, but for increased clarity, have revised the discussion to provide clearer rationale for the conclusion being generalized to popcorn, and not just 6 cups of popcorn, and have added a rationale for the timing of the test food before the meal.

6. Abstract: In the results section, there is a typographical error in “satisfaction”. Please provide measures of variability for energy compensation (220% +/- XX%, etc.). In the conclusion section, it’s not strictly true that “popcorn exerted a stronger effect on short-term satiety than did potato chips as measured by subjective ratings...”. Six cups of popcorn exerted a stronger effect on subjective ratings than potato chips; one cup of popcorn did not.

Typo corrected, thank you. Variability of energy compensation at meal time has been added. See comments in item 5 above regarding generalizability to popcorn, not limited to 6 cups popcorn.

7. Page 4, Introduction, para 2, line 3: Reference 14 appears twice. Also, in your statement of purpose you indicate that popcorn and potato chips are “two commonly consumed snacks”. It would be useful to readers if you provided data on the frequency of consumption of these two snack foods – particularly among the age group you studied.

Duplicate reference 14 has been removed, thank you. Have added frequency of consumption of popcorn and potato chips on page 4.
8. Page 5, line 2-3: Please provide a brief statement about what the newspaper advertisement told potential participants about the study (i.e., because they provided informed consent, presumably they were aware that the study’s purpose was to compare the effect of popcorn and potato chips on satiety ratings and on intake at a meal – but it is useful to readers to know what they were told as cognitions have the potential to impact behavior, even on a subconscious level).

   The newspaper advertisement and the informed consent described the study as: “a research study that will provide data on the effects on satiety (appetite) after consuming popcorn and potato chips in varying amounts.” Added this description in methods.

9. Page 5, line 6-8: Scores for dietary restraint, disinhibition and perceived hunger occur on continuous scales, and there are not well-established cut-points for exclusion. What criteria did you use when screening participants?

   The cut point for exclusion was >10 on the dietary restraint sub scale. Added to methods.

10. Page 7, paragraph 1, middle – Please change “after the first bite of the test meal” to “after the first bite of the test food”. Otherwise, it’s easy to confuse this with the ad-libitum meal.

   Changed meal to food.

11. Discussion. As indicated earlier, I think it’s important to be very precise with your terminology. There are differences in findings between 6 cups of popcorn and 1 cup of popcorn; accordingly, “popcorn” should not be used generically. Similarly, there are also differences in findings for “satiety” between the VAS ratings and as interpreted from energy intake at the subsequent meal. For this reason, it would be helpful to readers if you clearly made these distinctions. So (for example) – 6 cups of popcorn resulted in greater subjective satiety ratings than 1 cup of potato chips; 1 cup of popcorn did not. And although both 6 cups of popcorn and 1 cup of popcorn were associated with lower combined energy intakes than 1 cup of potato chips, none of the snacks actually reduced combined energy intake relative to the water control.

   Added rationale for generalizing to popcorn, and made specific references to the conditions to improve clarity.

12. Page 12 – I assume that “JM” should be “JR” in the description of the authors’ contributions.

   Changed JM to JR

13. References – these appear to be complete and correctly formatted, except that lower case should be used for the title of the article by Zizza and Xu. This reference also needs a complete citation.

   Corrected Zizza reference
14. Table 2: So that table can “stand alone”, footnotes should be used to describe the VAS scale (i.e., that it was 100 mm, and that ratings were anchored by....). This table could also be modified to include the data on palatability.

Added Palatability ratings. Added explanation to Table 2.

Discretionary Revisions

15. The discussion does a good job of addressing many of the potential issues and limitations. In addition, other issues include:

- Although the manuscript does not overstate its findings, inferences about potential impact on body weight should recognize that the data collected don't actually allow any conclusions could be drawn (it's not known whether the observed 1-day findings would persist chronically, and the effect on total energy balance was not assessed).

- A small additional consideration is that further research should consider assessing the impact of popcorn that is not 94% fat free, particularly if 94% fat free popcorn does not dominate the marketplace.

Added idea to conduct future study on regular popcorn.

References


Reviewer's report

*Title:* Popcorn is more satiating than potato chips in normal-weight adults

*Version:* 1  *Date:* 14 May 2012

*Reviewer:* Dan Benardot

*Reviewer's report:*

Thank you for submitting a carefully reported and well-researched article. You have presented the data in a way that is both illuminating and clear.

No revisions requested.

Reviewer's report

*Title:* Popcorn is more satiating than potato chips in normal-weight adults

*Version:* 1  *Date:* 23 May 2012
Reviewer: Ann Grandjean  
Reviewer's report:  
1. Minor Essential Revisions:  
a. Abstract - was all popcorn low-fat or no-fat? If so, specify so in the abstract.  

   Have added low fat description to abstract.

b. Introduction - 2nd paragraph, end of first sentence - reference "14" entered twice.  
   Corrected typo

2. Discretionary Revisions:  
a. "Test foods and Ad Libitum Meal" section. The first sentence is long and for reader not familiar with this area of research clarity may be compromised. Suggest ending the first sentence following "....200 mL of water" and have the sentence describing the test conditions be a separate sentence.  
b. Consider inserting a subtitle before the last paragraph of the Discussion Section; i.e. the paragraph that begins with "This study has several limitations..." The last three sentences of that paragraph address future studies. Also, consider expanding on ideas for future potential studies.

   Modified sentence, inserted subtitle and added ideas for future research.

This concludes our responses. Thank you again to the reviewers for their time and expert reviews.