Reviewer's report

Title: Controlled Testing of Novel Portion control Plate Produces Smaller Self-selected Portion Sizes Compared to Regular Dinner Plate

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Reviewer: Andrew James Williams

Reviewer's report:
Thank you for the opportunity to review the statistical elements of this interesting study of the impact of a portion control plate on portion sizes. The paper contains two studies with slightly different information being given to participants; absolute vs. relative portions. In both studies the participants experience both the intervention (portion control plate) and control (regular plate) conditions with randomisation of the order in which the plates were presented. There was a 'wash out' period between experiencing each condition. It was found that the portion control plate did result in smaller portions, however, the portion of vegetables appears to have reduced to more compared with the protein and carbohydrate potions. There were also some interactions with gender and order of plate presentation. I believe that the authors have correctly interpreted the results presented, however, I need more information about the nature of the analysis in order to establish if the statistical methods are appropriate.

If I have understood correctly the authors describe undertaking 2x2x2 (gender x condition x plate order) ANOVA. ANOVA is an appropriate method for comparing means in this factorial design. However, here are the concerns I have with what is presented:

1. It was not clear whether the analyses assumed that each measurement was independent or took account of the fact that the data are paired.
2. If I have understood correctly, the analyses for each of the food stuffs (vegetable, carbohydrate and protein) would have involved the calculation of at least 3 test statistics and p-values. Which results in at least 21 p-values which may mean that some adjustment for multiple testing is necessary.
3. I would like more information in order to determine if the degrees of freedom listed are appropriate. In study 1 there were 70 participants each appearing in the dataset twice (balanced design), and the degrees of freedom mentioned are 66. When only looking at half the sample in the analysis the degrees of freedom are 33. In study 2 with 40 participants the degrees of freedom listed is 36. I don't have enough information to tell if these are correct. In each of the complete studies you appear to lose 4 degrees of freedom, but in the 8 possible combinations of gender, condition and plate order, I would expect you to only lose 3 degrees of freedom. Although, I suspect I have missed something.

4. I don't feel the authors have completely reported the results of the study. In most cases individual effects or interactions are presented in the text with two bar charts presented. Therefore, I don't feel all the results estimated have been presented. The bar charts encourage you to compare between the types of food stuff, but these were not actually directly compared, and it would be difficult to do this as I guess if you take up more space on the plate with protein the other portion sizes reduce (i.e. they are not independent). You also seem to compare the two types of information (relative vs. absolute) given to the participants, but the participants in each study are completely independent and therefore any differences could be the result of differences in the sample. I would have thought there is space in a BMC Obesity paper for complete reporting or providing some results as supplemental material. Furthermore, in lines 327 to 330 there are new results added about the calorie count which was not a pre-specified analysis as far as I can tell.

This is not a statistical matter, but I couldn't help spotting it. Those references to websites (15, 19, 20, 22 and 23) appear to contain residual data from the referencing software used (editor^editors[]. City|: Publisher|.). Also reference 34 includes '&percnt;' instead of I guess the '% symbol.

Overall this is a small and interesting study, I just need more information.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.
No
Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.
Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.
Yes

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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.
I am able to assess the statistics

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