Authors' responses to "Statistical heartburn: An attempt to digest four pizza publications from the Cornell Food and Brand Lab"

A recent critique by van der Zee, Anaya and Brown (2017) alleges several inconsistencies in the analysis of four articles based on a two-month field study of paying diners at a pizza buffet (Just, Sigrici, and Wansink 2014; 2015; Kniffin, Sigirci, and Wansink 2015; Sigirci and Wansink 2015). We appreciate their intention of strengthening research through peer review. We take replication of our research results very seriously. In order to arrive at their list of 150 inconsistencies, they have simultaneously compared numbers appearing in the tables and text across all of the articles. Often times this required the authors of the criticism to make assumptions about the data generating process that were in conflict with the reality of collecting and reporting field study data.

Survey data was used to analyze these four papers. Field study surveys are notoriously incomplete because people skip questions. This is especially true when people are eating – some do not want to write down their weight and others do not want to write down what they ate. These missing values for different variables shift the number of observations for each survey question. Missing values explains 59 of the 151 inconsistencies. In other places, these critics assumed a different arithmetic process (such as converting a rounded mean in lbs to kg and then converting individual observations from lbs to kg, taking the mean and then rounding). This accounted for another 10 inconsistencies.

Alternatively, our own self-reanalysis agrees that there were some errors of oversight in the original articles. Some of these were due to under-reporting of the number of observations, and to not reporting that two observations had not been included in the analyses in each of two columns in one of the tables. However, the authors of the critique count each of these mistakes multiple times by applying redundant diagnostics to the same reported numbers. Taking this in to account, the number of unique errors between the four papers is reduced to 24. Furthermore, when we scrutinize the unique inconsistencies, many are due to rounding error (accounting for 8 of the inconsistencies within 0.01 of the correct statistic), transcription (accounting for 6, most within 0.02), under-reporting the number of participants in a cell (accounting for 5). The remaining five inconsistencies were due to: one error in the original coding of the data that was caught subsequent to publication, and four instances of not reporting the non-inclusion of data in the fourth article. A reanalysis of the data for all four papers enabled us to correct these errors of oversight in the new erratum for the papers, and the general conclusions remain. These errors have led us to initiate new standard operating procedures (SOPs) to double-check the final analyses, reporting, and archiving of analysis scripts prior to publication. They are available at FoodPsychology.Cornell.edu/ResearchSOPs.

References

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