

# Implausible Results from the Use of Invalid Methods

Dear Editor:

With interest, we began our perusal of the article by Mendez et al. (1), “Shifts in the Recent Distribution of Energy Intake among U.S. Children Aged 2–18 Years Reflect Potential Abatement of Earlier Declining Trends.” Unfortunately, that interest was short-lived given that the methods used to collect the energy intake data were invalid.

The primary flaw was the use of an invalid estimate of energy intake. These authors used self-reported energy intake (SREI), which is not an accurate measure of true energy intake due to widespread reporting errors in children and adults (2–4). They compounded this fatal flaw by inappropriately applying a method published by Huang et al. (5) to filter the SREI data that were never intended for use in measuring energy intake. In fact, the article by Huang et al. demonstrated the method to be invalid for measuring true energy intake. Specifically, the Huang et al. method was developed to reject implausible dietary reports for analysis of nutrient intake other than energy by reducing the percentage of SREI records from the database that were severely under (or over)-reported with respect to foods consumed. When applied to energy, it was demonstrated that the use of the  $\pm 1.5$ -SD cutoff for exclusion of SREI data actually resulted in a 15% underestimate, and thus an inaccurate measure, of habitual energy intake (5).

The second flaw was to assume that the subset of SREI values after application of the exclusion method proposed by Huang et al. could be used to compare estimates across ethnic and racial groups. Huang et al. reported that the inaccuracy between the filtered SREI and the criterion measure varied by sex, age, and race/ethnicity. Thus, the bias between SREI and true habitual energy intake varies between subgroups, and thus no inference regarding true differences in energy intake between these subgroups can be made.

Taken together, these demonstrate that SREI methods as used by Mendez et al. are flawed. SREI data were not measurements of energy intake but simply numeric values assigned by the researcher to the respondent’s retrospective perceptions (i.e., memories) of eating behavior. In the case of young children, it is parental memory of the child’s food consumption. In other words, nutrition researchers are not measuring energy intake. They are merely assigning numeric caloric values from invalid and incomplete data that the participants were willing and able to report in relation to what they think (or want the researchers to think) (6) they consumed during the reporting period.

Finally, Mendez et al. do readers a disservice by not questioning their own implausible findings. They report differences of 90–240 kcal/d between 2003–2004 to 2007–2008 and 2009–2010 at the median without any consideration of the physiologic magnitude of such a difference. A recent energy balance equation by Hall et al. (7) indicates that changes of this magnitude for the number of years indicated should have led to major shifts on pediatric weight at the population level, and this has not been observed (8).

In the body of their article, Mendez et al. do state “despite efforts to maximize the validity of the data used, it is not possible to

ascertain to what extent error or bias in reported intakes may have influenced the trends observed.” The addition of this statement does not excuse the numerous flaws in methodology, nor does it allow for the conclusions featured in the abstract and final paragraph that are in direct contradiction to this statement. It is unfortunate that scientists still lack valid methods for accurately measuring energy intake in free-living populations. That deficiency, however, does not excuse the use of invalid methods simply because they are available and expedient. SREI methods are profoundly dissonant with basic scientific principles and have been clearly demonstrated to be both invalid and imprecise (9). The continued use of these methods misleads the scientific and policy communities and leads to both the waste of research funds and inappropriate policy.

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