Accuracy of 11-year-olds self-reported school lunch consumption

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Background
This thesis is embedded in the emerging scientific discipline of public health nutrition and explores the methodological aspect of measuring children’s ability to report their school lunch consumption accurately. Children’s dietary intake does not concur with nutritional recommendations or food-based dietary guidelines which constitutes a public health concern for several reasons. In Denmark children’s food consumption during school hours constitutes more than a third of children’s daily energy intake. Assessment of school lunch consumption among children in their natural settings holds a range of methodological challenges when a population-based approach is applied.

Children’s lunch on weekdays is predominantly prepared by others and consequently children cannot be expected to provide detailed self-reported information beyond the food level. Parents, care-givers and kitchen staff may have accurate knowledge of what children are served but children are often asked what they have consumed. When self-reported methods are applied the remaining research questions relate to how accurately children’s actual consumption is reported. The majority of existing food level validation studies among children has addressed accuracy in relation to school meals. However, in several countries including Denmark packed lunch is the prevalent lunch format and the lack of packed lunch reporting accuracy studies needs to be addressed to increase the knowledge about school hour reporting accuracy in general.

Objectives
The aim of the present thesis was to assess food level reporting accuracy in Danish 11-year-old children’s self-reported school lunch consumption, and the aim was operationalized in following objectives.

1- To identify food items clustering by lunch format (Preliminary analyses)
2- To assess gendering accuracy in relation to gender and self-reported methods (Paper I)
3- To address aspects of reporting inaccuracy from intrusions by food group, against different objective measures, and classification of intrusions in stretches and confabulations (Paper II)
4- To assess how reporting accuracy differ by the lunch format consumed (Paper III)

Material and methods
The study was conducted as a cross-sectional dietary reporting study. The population consisted of 11-year-old children from three public schools in Copenhagen. The study was conducted on two consecutive days and assessed reporting accuracy of packed lunch and school meals. Digital pre- and post-meal images constituted the objective reference against which accuracy of self-reported consumption was assessed. Self-reports were obtained by a non-quantitative food level Lunch Recall Questionnaire (LRQ) which consisted of an open-ended random ordered report (OE-Q) and a precoded food-group prompted report (PC-Q). Individual multi-pass recall interviews were conducted and anthropometrics were measured objectively.

Food items reported and obtained from the images were characterized according to pre-defined food groups. Self-reported food items were categorized as matches (food items reported and verified by the images), omissions (food items not reported but verified by the images) and intrusions (food items reported but not verified by the images). Intrusions were further categorized as stretches which expressed food items served on the plate, not consumed as determined by the images but reported consumed by the child and confabulations which expressed food items that were neither served nor consumed according to the images but reported consumed. Accuracy were expressed as match rates (% correctly reported food items), omission rates (% food items omitted), and intrusions rates (% phantom food items reported).

Two sample t-tests were conducted to assess differences in background variables gender and BMI and differences in mean accuracy and inaccuracy rates were tested with paired t-test statistics. In the assessment of which objective measure reflected self-reports better a one-sided match t-test was applied.

Results
No significant difference was found in anthropometric characteristics by gender. Girls consumed more varied packed lunch i.e. girls consumed a higher number of food items compared with boys. Further, girls reported more food items than boys with all self-reported methods although the difference in mean number reported was only significant in the open-ended part of the questionnaire (OE-Q) (p = 0.005). Proportions of correctly reported food items consumed expressed as match rates ranged between 65 and 90%. Intrusion rates ranged between 12 and 36%.

40% of the children had at least one intrusion in self-reports obtained with OE-Q and the corresponding proportion was 77% with the PC-Q. Stratification by food groups showed that bread and fruits including nuts were most accurately reported. Intrusions and particularly omissions from fat spreads were high in OE-Q self-reports. Intrusions from snacks were substantial with the PC-Q reports. The majority of intrusions were confabulations (84% in OE-Q and 73% in PC-Q self-reports). Correspondingly stretches constituted 16% of the intrusions in OE-Q self-reports and 27% of the intrusions in PC-Q self-reports.

Omission rates and intrusion rates were significantly higher for school meals compared with packed lunch consumption. Packed lunch consumption contributed to a higher diversity i.e. variation across food groups compared with school meal consumption.

Conclusions and perspectives
Accuracy among 11-year-olds self-reported school lunch consumption differed by gender, self-reported method and lunch format. Gender differences were identified in relation to consumption, reporting and accuracy of self-reports. Accuracy of self-reported packed lunch obtained by interviews was higher compared with the open-ended (OE-Q) and the precoded (PC-Q) parts of the Lunch Recall Questionnaire. Food level reporting accuracy was higher for packed lunch compared with school meals, and actual consumption of packed lunch was more diverse than school meals even though diversity in food served did not differ significantly.

In the context of the public health nutrition research population-based methods to measure dietary intake are crucial and the need for a high level of details may be less prominent compared with nutrition research. In order to ensure construct
validity of moderated recalls or records selection of food items needs further investigation - and may differ depending on the objective and research outcome of the particular study.

An emergent but still undefined research question regards of what constitutes an acceptable level of accuracy at the food level, in relation to portion size estimations and consequently at nutrient level.

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