

## Short Communication

# Test–retest reliability and agreement between children’s and parents’ reports of a computerized food preferences tool

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### Abstract

*Objective:* To investigate test–retest reliability of primary-school children’s reports of food preferences and to investigate agreement with parental reports.

*Design:* Children completed an online test and retest, one to two weeks later, during school hours; parents completed a paper-and-pencil or an online questionnaire at home. The children’s preferences questionnaire contained 148 food items, reduced to twelve scales; the parental questionnaire contained seventy-eight items reduced to nine scales.

*Setting:* Children of fourteen primary schools in Belgium-Flanders.

*Subjects:* In total 572 children participated; test–retest data were available for 354 children, children’s tests could be matched to 362 parental reports.

*Results:* Test–retest intraclass correlations were on average 0.73, ranging between 0.62 and 0.86; correlations between children’s and parents’ reports were on average 0.50, ranging between 0.32 and 0.62. Retest preferences were significantly higher for more than half of the scales. Children reported higher preferences than their parents for milk & milk products, fruit and soft drinks, while parents reported higher preferences for bread & breakfast cereals, meat, snacks and sauces.

*Conclusions:* The results indicate that the test–retest stability was good; however, agreement between parents and children was rather low to moderate.

**Keywords**  
Food preferences  
Primary-school children  
Reliability  
Parents  
Online

In 2008, a biennial longitudinal study on dietary habits and influencing factors was started in Belgium-Flanders in young children 3 years of age<sup>(1,2)</sup>. At this age, children are still developing the basic cognitive skills for verbal exchange<sup>(3)</sup>. Hence, parents were asked to complete the study’s questionnaire including a fruit and vegetables preferences questionnaire.

Considering most parents provide a large proportion of the food consumed by their offspring, it has been assumed that parents can report on their child’s food preferences and intake<sup>(4)</sup>. However, once children start school, the accuracy of parents’ report of their child’s food intake and preferences can be compromised by the foods consumed outside the home and by the environment in which the food is consumed<sup>(4)</sup>. Therefore, gradually more and more questions will be assigned to the children instead of the parents.

A first tool developed for young children was a computer-based animated fruit and vegetables preferences

questionnaire<sup>(5)</sup>. In brief, this tool showed different fruits and vegetables and children were asked to indicate for each item their preference rating on an audiovisual analogue scale (smiley faces) representing different preferences (‘hmm, yummy’; ‘not yummy, not yucky but okay’; ‘bah, yucky’; ‘I never ate that food item’). Test–retest reliability and agreement between parents’ and children’s reports were investigated in pre-school children (4–6 years of age). Test–retest intraclass correlations (ICC) were good (fruit: 0.74; vegetables: 0.75) and agreement between parents’ and children’s reports was moderate (fruit: 0.48; vegetables: 0.41). We further elaborated this tool for primary-school children (6–12 years old): the number of food items was expanded to represent all food groups, response options were added (from four to six) and the layout and pictures were changed to be more age appropriate.

Few studies have reported child–parent comparisons of food preferences<sup>(5,6)</sup>. Nevertheless, agreement between parents’ and children’s reports is important in a longitudinal

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context, where surveys are first completed by a parent and later on follow-up surveys are self-completed by the children. The main aim of the present study was to investigate test–retest reliability of this instrument and to investigate agreement between children’s and parents’ reports of their children’s preferences. Differences in test–retest reliability were investigated by grade and gender. Additionally, differences in response format of the parental preferences questionnaire were explored, as in the longitudinal study parents were provided with a paper-and-pencil textual grid format representing all items simultaneously, while the tool for children is computer-based and includes food images sequentially presented.

## Methods

### Participants and procedure

A convenience sample of fourteen primary schools in the neighbourhood of the researchers’ living environment participated in the study. One thousand and twenty-nine children in the second, fourth and sixth grades and their parents were invited, by letter, to participate in the study. Children completed the test during school hours. Half of the second and fourth graders and all sixth graders were asked to complete the retest one to two weeks later; a subsample was asked to complete an evaluation questionnaire.

After the children’s retest, parents received a link to the parental questionnaire by email or a paper-and-pencil format via their child, depending on their choice indicated in the consent form. Parents were asked to return the completed questionnaire within a week. Parents who did not complete the online questionnaire within 7 d were sent a reminder by email.

Data collection took place in February–March 2011. Ethical approval for the study was obtained from the ethical board of the Ghent University Hospital.

### Material

The children’s preferences assessment tool started with a selection option with two gender-specific faces. Next, five gender-specific faces expressing different preferences, ranging from ‘–2 = does not like it at all’ to ‘2 = like it a lot’, guided the child in identifying his/her preference for each of 148 individual food items, visually represented by a label and a food image (Fig. 1). A sixth response option was provided for children who never ate a certain food, coded as –2 considering foods that are tried less often, tend to be less liked<sup>(7)</sup>. Food items were selected based on the literature<sup>(7–9)</sup> and data collected with a web-based 24 h dietary tool<sup>(10)</sup>. The items were presented in a ready-to-eat form (e.g. carrots were presented on a plate and cut in slices; Fig. 1). To make the tool attractive, ten photographs were decorated (e.g. a rabbit carried the picture of carrots). A progress bar indicated how much of the questionnaire was completed.

For the assessment of parents’ perceptions of children’s preferences three formats were used: (i) a paper-based grid format for parents opting for the paper-and-pencil format; (ii) a computer-based grid format for one-third of the parents opting for the online version (randomly selected); and (iii) the same format as the children for the remaining parents. Identical response options were provided in all formats, but no images were included in the grid formats. Additionally the grid formats contained only seventy-eight food items, as we expected that too long a list would deter many parents. Mainly less familiar items were excluded.

The evaluation tool asked if the questionnaire was clear, interesting, nice, difficult, suitable for children, too long, and if the food images were clear. Response options ranged from ‘1 = completely agree’ to ‘4 = completely disagree’.

The children’s preferences tool was developed with PHP 4.3.10-22 (open source software) and the data were stored in a MySQL database (open source software) on an

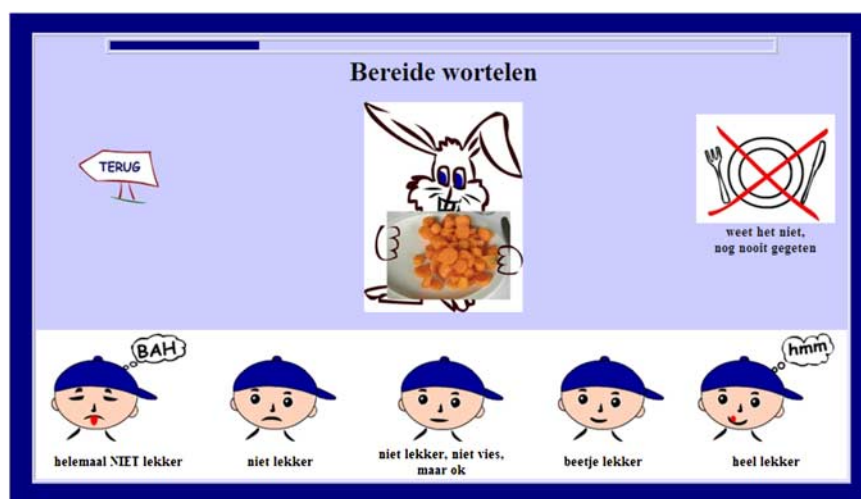


Fig. 1 (Color online) Screenshot of the preferences tool: version for boys

Apache 1.3.33 web server (2004; Apache Software Foundation, Delaware, USA). The online parental grid format was developed in Limesurvey 1.87 (open source software; <http://www.limesurvey.org/>). The parental paper pencil format was developed in Teleform version 10.1 (2006; Cardiff, Vista, CA, USA).

### Analysis

The 148 food items were grouped into twelve food categories. Six abbreviated scales were computed in order to be able to compare with all parental reports. Internal consistencies (Cronbach's  $\alpha$ ) were computed for each category; average category-based preference scores were computed for each respondent. Spearman's correlations were used to assess agreement on a group level (data aggregated by food item). The ICC was used to investigate agreement between test and retest of the scales. ICC by grade and gender were computed and compared by repeated-measures ANOVA (grade and gender as within-subject factors). Repeated-measures ANOVA with measure (T1 *v.* T2) as the within-subject factor were executed to investigate systematic differences between scale preferences at time 1 (T1) and time 2 (T2). The main effect of measure shows whether there are significant differences between T1 and T2. Interactions with grade and gender were entered to investigate whether differences in preferences between T1 and T2 depended on age and gender. The same set of analyses was repeated to investigate agreement between children's reports at T1 and parents' reports. ANOVA was used to investigate drop out and children's completion time.

Data were analysed using the SPSS statistical software package version 15.0.1.1 (2007; SPSS Inc., Chicago, IL, USA). *P* values < 0.05 were considered statistically significant. Interactions were considered significant at *P* < 0.01.

### Results and discussion

Five hundred and seventy-two children (grade 2: 33%, mean age 7.8 (SD 0.5) years, 45% boys; grade 4: 35%, mean age 9.7 (SD 0.7) years, 47% boys; grade 6: 32%, mean age 11.7 (SD 0.7) years, 40% boys) completed the first measurement; 396 children completed the tool a second time, of whom 354 could be matched to T1; 178 (grade 2: *n* 41; grade 4: *n* 56 and grade 6: *n* 81) completed a short online evaluation tool. Four hundred and forty-nine parents completed the questionnaire (89% mothers; 54% had at least a bachelor's degree; 32% computer picture format, 20% computer grid format; 48% paper-and-pencil grid format). After exclusion of those with incomplete questionnaires (more than one preferences missing), 362 questionnaires could be matched to children's first measurement.

Before further describing and interpreting the results, some limitations should be noted. Representativeness

cannot be assumed as the response rate was relatively low: of the 1029 parents approached, 596 parents (58%) returned informed consent. In addition, only 449 (44%) parents completed the preferences tool and after exclusion of those with missing data (*n* 41), only 362 (35%) could be matched to children's measurements. Nevertheless, comparison of children's preferences between parents who dropped out and those who participated resulted in no significant differences. A second limitation is that a gold standard to assess children's preferences does not exist. As parents provide most of the food to children, it is reasonable to assume that parents know what their children like; nevertheless, it must be realized that children and their parents do not constantly share the same environment, which might affect the adequacy of parents' reports<sup>(11)</sup>. A third limitation is that the questionnaire contained only a selection of the range of foods children in Flanders consume; a selection of other food items may result in different findings.

Children had tried on average 91% of the foods according to the children and 93% according to the parents. Children liked on average 66% of the food items (according to the parents: 65%) and disliked 17% (according to the parents: 19%). More details about the percentage likes can be obtained from the authors on request. Correlations on the aggregated food-level data indicated that foods reported as being most liked by the children were also reported as being most liked by the parents ( $r=0.93$ ), the same was true for the items disliked ( $r=0.92$ ) and the items never tried ( $r=0.85$ ). Correlations between percentage tried and average liking score, excluding children who indicated to have never tried a food item, confirmed that foods that were tried more were more liked ( $r=0.76$  for children's reports and  $r=0.78$  for parents' reports). The internal consistency of the scales was acceptable, on average 0.70 for the children (0.67 for the abbreviated scales) and 0.65 for the parental scales (Table 1).

Test-retest correlations of the preferences scales were in general good (on average 0.73). Two other studies<sup>(5,12)</sup> have investigated the validity of computerized food preferences instruments; however, both were limited to fruit and vegetable preferences, targeted younger children and used less response options. In the study of Vereecken *et al.*<sup>(5)</sup> in Flemish pre-school children, test-retest correlations were respectively 0.74 and 0.75 for fruit and vegetables. In the study of Jaramillo *et al.*<sup>(12)</sup>, in African-American and Hispanic-American pre-school children, the test-retest correlations were 0.49 for fruit, 0.73 for vegetables and 0.37 for fruit juice. The correlations for fruit and vegetables in the present study were higher for the total sample, but in the same range for the youngest age group. Repeated-measures ANOVA, with correlations of the full scales by grade and gender as input variables, indicated significantly lower correlations for children of grade 2 (average correlation grade 2: 0.60 (SE 0.03);

**Table 1** Number of items of the scales, Cronbach's  $\alpha$  of children's and parents' reports, comparison of children's reports at time 1 (T1) v. time 2 (T2): means with their standard errors, significance of the difference between both measurements ( $P$  (measurement); repeated-measures ANOVA), and test-retest correlations for the total sample and by grade

	No. of items	Cronbach's $\alpha$		T1		T2		$P$ (measure)	Test-retest correlations			
		T1	Parent	Mean	SE	Mean	SE		Total	Grade 2 ( $n$ 96)	Grade 4 ( $n$ 97)	Grade 6 ( $n$ 161)
Food preferences scales												
Potatoes & grains	7	0.45		1.18	0.03	1.23	0.03	0.047	0.72	0.54	0.82	0.80
Bread & breakfast cereals	12	0.70		0.71	0.04	0.75	0.04	0.168	0.68	0.54	0.71	0.74
Bread & breakfast cereals <sup>abr</sup>	7	0.57	0.63	0.57	0.04	0.59	0.04	0.561	0.68	0.55	0.69	0.75
Milk & milk products	18	0.87		0.20	0.05	0.33	0.05	<0.001	0.78	0.64	0.89	0.81
Milk & milk products <sup>abr</sup>	7	0.71	0.72	0.86	0.05	0.92	0.05	0.070	0.76	0.56	0.91	0.82
Meat, fish & vegetarian	26	0.89		0.47	0.04	0.59	0.04	<0.001	0.78	0.71	0.83	0.82
Meat, fish & vegetarian <sup>abr</sup>	9	0.69	0.61	0.69	0.04	0.80	0.04	0.001	0.74	0.60	0.85	0.79
Fruit	14	0.84	0.85	1.27	0.04	1.28	0.04	0.852	0.86	0.78	0.91	0.89
Vegetables	16	0.88	0.84	0.51	0.05	0.57	0.05	0.062	0.82	0.67	0.85	0.91
Soup	3	0.54		0.81	0.05	0.86	0.06	0.302	0.62	0.55	0.72	0.60
Fast food	11	0.73		0.89	0.04	0.96	0.04	0.012	0.75	0.68	0.77	0.80
Fast food <sup>abr</sup>	4	0.61	0.56	1.00	0.05	1.08	0.05	0.022	0.72	0.59	0.75	0.81
Sweet & savoury snacks	25	0.84		1.11	0.03	1.17	0.03	0.003	0.76	0.66	0.85	0.77
Sweet & savoury snacks <sup>abr</sup>	6	0.62	0.63	1.44	0.03	1.48	0.03	0.138	0.69	0.55	0.81	0.72
Sweet filling	4	0.51		0.48	0.05	0.69	0.05	<0.001	0.64	0.46	0.70	0.76
Soft drinks	3	0.81		1.12	0.06	1.22	0.06	0.031	0.71	0.51	0.89	0.76
Soft drinks <sup>abr</sup>	2	0.78	0.58	1.03	0.06	1.15	0.07	0.022	0.71	0.47	0.88	0.78
Sauces	3	0.31	0.42	0.45	0.05	0.57	0.05	0.003	0.67	0.51	0.70	0.74
Response categories												
Never consumed				0.09	0.01	0.10	0.01	0.168	0.76	0.69	0.84	0.80
Like a bit/a lot				0.66	0.01	0.68	0.01	<0.001	0.82	0.71	0.90	0.84
Rather/completely dislike				0.17	0.01	0.14	0.01	<0.001	0.65	0.44	0.75	0.81
Midpoint				0.08	0.00	0.08	0.00	0.112	0.74	0.59	0.81	0.73

<sup>abr</sup>, abbreviated scale, including only the items which were included in both children's and parents' questionnaires.

**Table 2** Comparison of children's reports at time 1 (T1) *v.* parents' reports (P) by gender and grade: means with their standard errors, significance (*P*, repeated-measures ANOVA) of the difference between both measurements (measurement), significance of the interactions with gender and grade and of the main effects of gender and grade, and correlations between children's and parents' reports for the total sample and by grade

		Boy		Girl		Grade 2		Grade 4		Grade 6		<i>P</i> (measure)	<i>P</i> (measure × gender)	<i>P</i> (measure × grade)	<i>P</i> (gender)	<i>P</i> (grade)	Correlations between children's and parents' reports			
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE						Total	Grade 2	Grade 4	Grade 6
Bread & breakfast cereals	T1	0.61	0.06	0.52	0.05	0.45	0.07	0.59	0.07	0.65	0.07	0.001	0.252	0.463	0.497	0.073	0.38	0.43	0.29	0.43
	P	0.70	0.05	0.71	0.05	0.65	0.06	0.66	0.06	0.80	0.07									
Milk & milk products	T1	0.97	0.07	0.85	0.06	1.05	0.08	0.89	0.08	0.78	0.09	<0.001	0.553	0.823	0.233	0.052	0.56	0.41	0.72	0.53
	P	0.79	0.06	0.72	0.06	0.86	0.07	0.75	0.07	0.65	0.08									
Meat, fish & vegetarian	T1	0.76	0.07	0.59	0.06	0.58	0.08	0.67	0.08	0.78	0.08	<0.001	<0.001	0.483	0.690	0.181	0.47	0.32	0.57	0.54
	P	0.89	0.05	1.01	0.04	0.92	0.06	0.90	0.06	1.02	0.06									
Fruit	T1	1.21	0.06	1.29	0.05	1.20	0.06	1.23	0.06	1.32	0.07	0.003	0.898	0.254	0.186	0.730	0.61	0.57	0.70	0.52
	P	1.11	0.05	1.20	0.05	1.15	0.06	1.17	0.06	1.15	0.06									
Vegetables	T1	0.42	0.07	0.48	0.06	0.40	0.08	0.38	0.08	0.58	0.09	0.085	0.186	0.976	0.157	0.059	0.62	0.45	0.71	0.66
	P	0.44	0.06	0.60	0.05	0.47	0.07	0.44	0.06	0.66	0.07									
Fast food	T1	1.02	0.08	0.87	0.07	0.78	0.09	0.80	0.09	1.26	0.10	0.413	0.031	0.377	0.534	<0.001	0.54	0.45	0.60	0.54
	P	0.96	0.06	1.01	0.06	0.75	0.07	0.93	0.07	1.27	0.08									
Sweet & savoury snacks	T1	1.49	0.05	1.39	0.05	1.43	0.06	1.44	0.06	1.45	0.06	0.002	0.035	0.898	0.689	0.836	0.32	0.36	0.34	0.19
	P	1.53	0.04	1.58	0.04	1.54	0.05	1.54	0.05	1.59	0.05									
Soft drinks	T1	1.20	0.09	1.13	0.08	1.41	0.11	1.12	0.11	0.96	0.11	0.010	0.863	0.190	0.639	0.044	0.50	0.33	0.59	0.59
	P	1.02	0.09	0.98	0.08	1.12	0.10	0.94	0.10	0.95	0.11									
Sauces	T1	0.54	0.08	0.30	0.07	0.59	0.09	0.24	0.08	0.43	0.09	<0.001	<0.001	0.418	0.476	0.011	0.51	0.35	0.58	0.56
	P	0.88	0.07	0.99	0.06	1.02	0.08	0.77	0.08	1.01	0.09									
Percentage selecting the response categories																				
Never consumed	T1	7.6	0.7	6.2	0.6	8.8	0.8	6.4	0.8	5.4	0.9	<0.001	0.075	0.098	0.358	0.003	0.18	0.13	0.11	0.36
	P	4.1	0.4	4.4	0.3	4.7	0.4	4.7	0.4	3.3	0.4									
Like a bit/a lot	T1	69.5	1.3	67.7	1.1	68.5	1.4	67.1	1.4	70.3	1.5	0.383	0.017	0.699	0.965	0.109	0.51	0.39	0.64	0.47
	P	68.3	1.0	70.2	0.9	68.3	1.2	68.1	1.1	71.5	1.2									
Rather/completely dislike	T1	15.0	1.0	17.6	0.9	17.6	1.1	17.6	1.1	13.6	1.2	0.232	<0.001	0.197	0.810	0.069	0.39	0.38	0.41	0.38
	P	18.2	0.9	16.1	0.8	17.6	1.1	17.6	1.1	16.2	1.1									
Midpoint	T1	7.9	0.5	8.5	0.5	5.1	0.6	8.9	0.6	10.7	0.6	0.013	0.447	<0.001	0.675	<0.001	0.07	-0.02	0.15	0.12
	P	9.4	0.5	9.3	0.4	9.4	0.5	9.6	0.5	9.0	0.6									

grade 4: 0.80 (SE 0.02); grade 6: 0.78 (SE 0.02);  $P < 0.001$ ), but no gender differences. Findings were similar for the abbreviated scales.

Repeated-measures ANOVA with children's preference scales at T1 and T2 as within-subject factor indicated significantly higher preferences in the retest for eight of the twelve full and three of the six abbreviated scales, mainly due to a higher number of likings and a lower number of dislikes (Table 1). No significant interactions with grade or gender were found (data not shown). It might be that completing the list of food preferences has some influence on how the instrument was completed at the second measurement occasion. It is however also possible that the long list of items might have caused some boredom in some children; in particular, when this list has to be completed a second time, children may be less motivated and use a more 'satisficing' approach resulting in the selection of less accurate responses<sup>(3,13)</sup>.

Correlations between children's and parents' reports (Table 2) were on average 0.50, ranging between 0.32 and 0.62. In the study of Vereecken *et al.*<sup>(5)</sup> in pre-school children, correlations between parents' and their children's reports were 0.48 and 0.41 respectively for fruit and vegetables. Comparison of the correlations by grade and gender in the present study indicated significant differences by grade, but not by gender (average correlation grade 2: 0.41 (SE 0.05); grade 4: 0.57 (SE 0.05); grade 6: 0.51 (SE 0.05);  $P < 0.009$ ), with a significant difference only between grade 2 and grade 4 ( $P = 0.013$ ) in pair-wise comparison. Repeated-measures ANOVA, with children's preferences at T1 and parents' reports of children's preferences as within-subject factor, indicated that children reported higher preferences than their parents for milk & milk products, fruit and soft drinks, while parents reported higher preferences for bread & breakfast cereals, meat, snacks and sauces, and no significant difference was found for vegetables and fast food. In the absence of an objective criterion for subjective information such as preferences, no conclusions can be drawn as to whether children's or parents' reporting is more valid. Nevertheless, the lower test–retest stability in grade 2 children and their lower agreement with parents' reports in comparison with grade 4 children indicate an improvement with age, which favours parents' reports in the youngest age group. However, agreement between children and parents was not significantly different between grade 2 and grade 6 children.

For meat and sauces, interactions with gender were significant at  $P < 0.01$  indicating that girls reported lower preferences than boys, while parents' reports of children's meat preferences were higher for girls than boys and similar for sauces. A comparable trend was noticed for fast food and snacks. No significant interactions were found with grade.

On average over all items, children reported more often to have never consumed an item and selected less often the middle category, in particular in the youngest age group.

Comparison of the ICC between parents' and children's reports by parental questionnaire format resulted in no significant difference (average correlation picture format: 0.50 (SE 0.03); computer grid format: 0.55 (SE 0.05); paper grid format: 0.48 (SE 0.05);  $P = 0.302$ ).

The preferences tool was in general well received by the children: the food images were clear (98% agree/completely agree) and liked (92%), the questionnaire was clear (89%), suitable for children (94%), interesting (94%) and fun (93%); however, 51% of the children, mainly the second graders (grade 2: 66%; grade 4: 44%; grade 6: 49%;  $P = 0.004$ ), did find the questionnaire too long. It might be too demanding in particular for the youngest age group, although it took on average not more than 8 min 55 s to complete the preferences questionnaire at T1 (grade 2: 9 min 40 s, grade 4: 8 min 47 s, grade 6: 8 min 20 s;  $P < 0.001$ ). For future studies, it might be advocated to shorten the questionnaire or to split the questionnaire and alternate with other questions or tasks.

## Conclusion

The test–retest correlations were good. However, the systematic differences between parents' and children's reports for seven of the nine scales, and the moderate to low correlations between children and their parents, indicate that caution is necessary in longitudinal analyses when the respondent is changed from one survey to the next.

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## References

1. Vereecken C, Rovner A & Maes L (2010) Associations of parenting styles, parental feeding practices and child characteristics with young children's fruit and vegetable consumption. *Appetite* **55**, 589–596.
2. Vereecken C & Maes L (2010) Young children's dietary habits and associations with the mothers' nutritional knowledge and attitudes. *Appetite* **54**, 44–51.
3. Borgers N, DE Leeuw E & Hox J (2000) Children as respondents in survey research: cognitive development and response quality. *Bull Methodol Sociol* **66**, 60–75.
4. Mata J, Scheibehenne B & Todd PM (2008) Predicting children's meal preferences: how much do parents know? *Appetite* **50**, 367–375.



5. Vereecken CA, Vandervorst S, Nicklas T *et al.* (2010) Test–retest reliability and comparison of children’s reports with parents’ reports of young children’s fruit and vegetable preferences. *Appetite* **55**, 574–581.
6. Skinner JD, Carruth BR, Wendy B *et al.* (2002) Children’s food preferences: a longitudinal analysis. *J Am Diet Assoc* **102**, 1638–1647.
7. Cooke LJ & Wardle J (2005) Age and gender differences in children’s food preferences. *Br J Nutr* **93**, 741–746.
8. Caine-Bish NL & Scheule B (2009) Gender differences in food preferences of school-aged children and adolescents. *J Sch Health* **79**, 532–540.
9. Diehl JM (1999) Food preferences of 10- to 14-year-old boys and girls. *Schweiz Med Wochenschr* **129**, 151–161.
10. Vereecken C, Covents M & Maes L (2010) Comparison of a food frequency questionnaire with an online dietary assessment tool for assessing preschool children’s dietary intake. *J Hum Nutr Diet* **23**, 502–510.
11. Tak NI, Te Velde SJ, de Vries JHM *et al.* (2006) Parent and child reports of fruit and vegetable intakes and related family environmental factors show low levels of agreement. *J Hum Nutr Diet* **19**, 275–285.
12. Jaramillo SJ, Yang SJ, Hughes SO *et al.* (2006) Interactive computerized fruit and vegetable preference measure for African-American and Hispanic preschoolers. *J Nutr Educ Behav* **38**, 352–359.
13. Read J & Fine K (2005) Using survey methods for design and evaluation in child computer interaction. [http://www.chici.org/references/using\\_survey\\_methods.pdf](http://www.chici.org/references/using_survey_methods.pdf) (accessed August 2009).