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High agreement on family affluence between children’s and parents’ reports: international study of 11-year-old children

A Andersen,1 R Krølner,1 C Currie,2 L Dallago,3 P Due,1 M Richter,4 Á Örkényi,5 B E Holstein1

ABSTRACT

Objective: To examine the agreement between parents’ and children’s reports on four items of family affluence: number of cars, own bedroom, number of family holidays and number of computers, and to analyse predictors of disagreement.

Design: Cross-sectional child–parent validation study of selected items from an internationally standardised questionnaire.

Setting: Survey conducted in schools in Denmark, Germany, Hungary, Italy, Poland and Scotland.

Participants: 972 11-year-old children and their parents responded to the questionnaires.

Results: The child item response rates were high (above 93%). The per cent agreement was low for holidays spent with family (52.5%), but high for the other three items of family affluence (76.2–88.1%). The kappa coefficients were good or excellent for all items (between 0.41 and 0.74) and the gamma coefficients were strong for all items (between 0.56 and 0.96). Children from single-parent families were more likely to over-report family affluence (OR 2.67; CI 1.83 to 3.89).

Conclusions: Young adolescents’ self-reports of family affluence are fairly valid across the six countries. This finding suggests that the variables measured can be used in epidemiological studies that aim at ranking children according to socioeconomic position.

Valid measures of socioeconomic position are important in school surveys as health is often socially patterned.1 2 Children are unable to report their parent’s educational background correctly.3 The evidence is conflicting for child reports of parental occupation.3–5 Children-reported socioeconomic information suffers from high proportions of missing information.6–11 Currie et al12 and Wardle et al13 developed new indicators that are easy for children to report. Wardle et al’s home affluence scale includes items on housing tenure, car ownership, ownership of computer and the option of free school meals. Currie et al’s family affluence scale (FAS) includes three items: car ownership, child having own bedroom, and number of family holidays in the past year.12 A second version of FAS also included an item on the number of family computers.12 13 The three-item FAS was uniformly associated with self-rated health across countries, which suggests the robustness of the FAS and its predictive validity.14 The mean FAS was highly correlated with a country’s gross domestic product14 and the standard deviation of FAS in national samples of adolescents was strongly associated with the national income inequality measured by the Gini coefficient.15

Agreement between the children’s and the parents’ answers to affluence scales is yet another way to assess the validity of children’s reports. This study aimed to (1) examine the child–parent agreement on answers to the four FAS items in six European countries and (2) identify predictors of disagreement between children and parents.

METHODS

The International Health Behaviour in School-aged Children (HBSC) Child–Parent Validation Study 2005 was designed to validate items from the HBSC international research project.12 We compared reports from parents and 11-year-old children. The 11-year age group in the HBSC study had the most pronounced difficulties in reporting the occupation of their parents.

Six countries participated: Denmark, Germany, Hungary, Italy, Poland and Scotland. In each country, the sample included schools in very diverse areas: metropolitan, urban and rural, and districts with high and low average income; in total 35 schools with 1810 11-year-old pupils enrolled; 1478 pupils (81.7%) and 982 parents (representing 65.3% of the pupils) completed the questionnaires. The final data file included 972 matched child–parent pairs.

The pupils completed a questionnaire in the classroom after a standardised instruction and the parents completed a similar questionnaire at home. The study included four items on family affluence: (1) “Does your family own a car, van or truck?” (no/yes one/yes two or more), (2) “Do you have your own bedroom for yourself?” (no/yes), (3) “During the past 12 months, how many times did you travel away on holiday (vacation) with your family?” (not at all/once/twice/more than twice), and (4) “How many computers does your family own?” (none/one/two/more than two). The item response rates for pupils and parents were 93–98% and 98–99%, respectively. FAS was constructed as a 0–7 point scale, which counted 1 point each for having one car, one holiday, one computer, own room and one extra point each for having more than one car, holiday or computer.

The predictor analyses included three pupil-reported items: (1) gender, (2) primary language spoken at home? (national vs other) and (5) family composition: single parent, reconstructed and traditional family.
The statistical analyses included three steps. (1) Comparison of children with and without a matching parent questionnaire, testing for homogeneity using the $\chi^2$ test. (2) Child–parent agreement measured by per cent agreement, kappa and gamma statistics. In contrast to the per cent agreement, the kappa coefficient takes into account the agreement expected by chance and the weighted kappa takes into account the amount of disagreement. We interpreted kappa coefficients in the interval 0.75–1.00 as excellent, 0.40–0.74 good, and below 0.40 moderate or poor.\textsuperscript{16} The gamma coefficient measures the association between two ordered categorical variables. Associations above 0.30 are strong, 0.15–0.30 moderate, below 0.15 weak.\textsuperscript{15} (3) Child over-reporting of family assets was the most common problem observed and we conducted logistic regression analyses of child over-reporting by gender, family composition and language.

RESULTS
The comparison of children with (n = 972) and without (n = 497) matching parent questionnaires showed that children with a matching parent questionnaire more often reported two or more family cars (p value <0.001), two or more computers (p = 0.040) and speaking the national language at home (p = 0.002).

For all countries together, the per cent agreement was high for car ownership (78.9%), own bedroom (88.1%) and computers (76.2%), but low for holidays (52.5%) and the full FAS (44.6%) (table 1). When disagreement was defined as more than one FAS point difference between child and parent, the per cent agreement for the full scale was 82.7%. These results did not vary much across countries. The kappa and gamma coefficients were good or excellent in most of the comparisons and lowest for the family holiday item.

The prediction analysis showed that over-reporting was not associated with gender (OR 1.20; 95% CI 0.88 to 1.65) and speaking the national language (OR 0.99; 95% CI 0.51 to 1.91) but was significantly higher among children from single parent families (OR 2.67; 95% CI 1.83 to 3.89), even when controlled for country and school.

DISCUSSION
We observed high item response rates on four items about family affluence among 11-year-old children and high agreement between the children’s and the parents’ answers to three of the four items. These findings were robust across six countries. Similar rates of agreement on parental occupation were found in other studies.\textsuperscript{3–5,7}

Most cases of disagreement reflected over-reporting of material assets by children. Children from single-parent families had a higher risk of over-reporting, maybe because they reported assets of both their parents, whereas the corresponding single parent only reported their own assets. Over-reporting of family affluence could be interpreted as a social desirability bias, that is some children want to give desirable answers.\textsuperscript{18} The children whose parents did answer the questionnaire had a higher prevalence of material goods than children whose parents did not, that is the four-item FAS may be a more valid socio-economic status indicator among more affluent children.

FAS needs further development, for example replacement of the family holiday item and updating of items as the general level of affluence increases. The results suggest that the current version of the FAS can be used in cross-national studies among adolescents with caution.

Table 1 Per cent agreement, kappa coefficients and gamma coefficients for the agreement between parents’ and children’s responses to family affluence scale (FAS) single items and the full FAS

<table>
<thead>
<tr>
<th>Matched pupil–parent pairs</th>
<th>All countries</th>
<th>Denmark (n = 972)</th>
<th>Germany (n = 118)</th>
<th>Hungary (n = 228)</th>
<th>Italy (n = 208)</th>
<th>Poland (n = 82)</th>
<th>Scotland (n = 107)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per cent agreement for:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car ownership</td>
<td>78.9</td>
<td>86.5</td>
<td>89.9</td>
<td>75.3</td>
<td>68.1</td>
<td>78.3</td>
<td>83.1</td>
</tr>
<tr>
<td>Own bedroom</td>
<td>88.1</td>
<td>93.5</td>
<td>94.1</td>
<td>86.7</td>
<td>78.0</td>
<td>84.5</td>
<td>94.9</td>
</tr>
<tr>
<td>Family holidays</td>
<td>52.5</td>
<td>50.5</td>
<td>56.8</td>
<td>52.8</td>
<td>48.6</td>
<td>50.6</td>
<td>59.6</td>
</tr>
<tr>
<td>Family computers</td>
<td>76.2</td>
<td>71.4</td>
<td>76.5</td>
<td>78.2</td>
<td>78.6</td>
<td>75.0</td>
<td>75.9</td>
</tr>
<tr>
<td>Full FAS</td>
<td>44.6</td>
<td>52.0</td>
<td>50.8</td>
<td>39.9</td>
<td>36.5</td>
<td>45.1</td>
<td>49.5</td>
</tr>
<tr>
<td>Kappa coefficients (95% CI) for:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car ownership*</td>
<td>0.66 (0.61 to 0.70)</td>
<td>0.80 (0.72 to 0.87)</td>
<td>0.82 (0.71 to 0.92)</td>
<td>0.60 (0.51 to 0.69)</td>
<td>0.37 (0.26 to 0.48)</td>
<td>0.66 (0.52 to 0.80)</td>
<td>0.75 (0.65 to 0.86)</td>
</tr>
<tr>
<td>Own bedroom†</td>
<td>0.74 (0.70 to 0.79)</td>
<td>0.69 (0.53 to 0.85)</td>
<td>0.83 (0.72 to 0.95)</td>
<td>0.70 (0.61 to 0.80)</td>
<td>0.51 (0.39 to 0.64)</td>
<td>0.69 (0.53 to 0.84)</td>
<td>0.87 (0.76 to 0.97)</td>
</tr>
<tr>
<td>Family holidays*</td>
<td>0.41 (0.37 to 0.46)</td>
<td>0.38 (0.28 to 0.48)</td>
<td>0.46 (0.34 to 0.59)</td>
<td>0.44 (0.36 0.53)</td>
<td>0.34 (0.24 to 0.44)</td>
<td>0.29 (0.13 to 0.45)</td>
<td>0.46 (0.32 to 0.60)</td>
</tr>
<tr>
<td>Family computers*</td>
<td>0.68 (0.64 to 0.72)</td>
<td>0.63 (0.54 to 0.72)</td>
<td>0.68 (0.56 to 0.79)</td>
<td>0.73 (0.66 to 0.80)</td>
<td>0.61 (0.51 to 0.72)</td>
<td>0.48 (0.30 to 0.65)</td>
<td>0.64 (0.52 to 0.77)</td>
</tr>
<tr>
<td>Full FAS*</td>
<td>0.53 (0.50 to 0.57)</td>
<td>0.56 (0.47 to 0.65)</td>
<td>0.61 (0.51 to 0.70)</td>
<td>0.53 (0.46 to 0.60)</td>
<td>0.34 (0.25 to 0.43)</td>
<td>0.49 (0.37 to 0.62)</td>
<td>0.63 (0.53 to 0.72)</td>
</tr>
<tr>
<td>Gamma coefficients (ASE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car ownership</td>
<td>0.84 (0.02)</td>
<td>0.97 (0.02)</td>
<td>0.95 (0.04)</td>
<td>0.77 (0.06)</td>
<td>0.57 (0.09)</td>
<td>0.95 (0.05)</td>
<td>0.97 (0.02)</td>
</tr>
<tr>
<td>Own bedroom</td>
<td>0.96 (0.01)</td>
<td>0.97 (0.02)</td>
<td>0.99 (0.01)</td>
<td>0.86 (0.02)</td>
<td>0.86 (0.05)</td>
<td>0.94 (0.04)</td>
<td>1.00 (0.00)</td>
</tr>
<tr>
<td>Family holidays</td>
<td>0.56 (0.03)</td>
<td>0.61 (0.07)</td>
<td>0.64 (0.09)</td>
<td>0.69 (0.05)</td>
<td>0.48 (0.08)</td>
<td>0.58 (0.13)</td>
<td>0.55 (0.10)</td>
</tr>
<tr>
<td>Family computers</td>
<td>0.86 (0.02)</td>
<td>0.83 (0.05)</td>
<td>0.83 (0.07)</td>
<td>0.94 (0.03)</td>
<td>0.85 (0.05)</td>
<td>0.72 (0.14)</td>
<td>0.81 (0.07)</td>
</tr>
<tr>
<td>Full FAS</td>
<td>0.70 (0.02)</td>
<td>0.73 (0.05)</td>
<td>0.78 (0.05)</td>
<td>0.72 (0.04)</td>
<td>0.53 (0.06)</td>
<td>0.68 (0.07)</td>
<td>0.80 (0.05)</td>
</tr>
</tbody>
</table>

*Weighted kappa coefficients, which takes into account the degree of disagreement.
†Simple kappa coefficients.
ASE, asymptotic standard error.
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Competing interests: none.

Ethics approval: The participating countries have different requirements for ethical approval of school surveys. Each research team met their own national requirements. In most of the participating countries the procedures for ethical approval of school surveys are less restrictive than the procedures for getting ethical approval for randomised controlled trials of new medicines.

REFERENCES