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International Variation in Child Subjective Well-Being

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Abstract Does the subjective well-being of children vary between countries? How does it vary? What explains that variation? In the past the subjective well-being of children has been compared at country level using published data derived from comparable international surveys, most commonly the Health Behaviour of School-aged Children survey. The league tables of child well-being produced in this way are fairly consistent. Thus for example the Netherlands consistently comes top of the rankings of OECD countries. Why is this? How does the Netherlands achieve this? In seeking to explain these national rankings we tend to explore associations with other national league tables. Thus in the UNICEF Report Card 11 (RC11), country ranking on subjective well-being were compared with country rankings on more objective domains of well-being—material, health, education, housing and so on, all at a country level. In this paper we explore international variations in subjective well-being using individual level data from the HBSC 2009–10 survey. We use similar indicators of subjective well-being as were used in RC11. We establish that the components form a reliable index. The ranking of countries is very similar to that obtained at a country level. We also explore the distribution of subjective well-being. We then control for a number of factors associated with variations in subjective well-being at an individual level and, using linear regression with a country fixed effects model, establish whether national differences in subjective well-being are still sustained having taken into account these independent factors. There are some changes in the ranking of countries having taken account of, particularly, behavioural indicators such as bullying. A multilevel model, taking into account country and school level effects, shows that that the effects of child characteristics on subjective well-being vary across countries.

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1 Background

International comparisons of child well-being have tended to include subjective well-being (UNICEF 2007, 2013; Bradshaw and Richardson 2009). Innocenti Report Card 11 (UNICEF 2013) decided for the first time to separate subjective well-being from the more objective domains of material, health, education, behaviours and housing well-being. In research that contributed to RC 11 Bradshaw et al (2013) found that there was an association between subjective well-being and all the other domains at a country level. Thus countries with children with higher material well-being, better child health, higher levels of educational participation and attainment, better risk behaviour and housing and environmental conditions tended to have higher levels of subjective well-being. This observation that subjective well-being is associated with the objective circumstances of children has not been observed so clearly in the few individual sample surveys of children that have been undertaken. Thus for example the Children's Society (2012) in repeated surveys of subjective well-being of children in England found it difficult to explain more than 5 % of variation in subjective well-being using a range of common socio-demographic characteristics of the child and their family. Similar findings have emerged from Casas (2011) in Spain. This finding has resulted in a variety of hypotheses—that subjective well-being is more a function of personality (Goswami 2013), nature rather than nurture; that it is subject to genetically determined homeostatic adaptation (Cummins 2010); that is subject to false expectations or adaptive preferences; that scales used to measure it are neither reliable nor valid; and that happiness is a cultural trait. The conclusion of this would be that league tables of countries' subjective well-being are meaningless.

In order to assess these arguments further what is required is comparative individual-level analysis of subjective well-being. This is what this paper presents.

2 Methods

The paper is based on the secondary analysis of the 2009/10 Health Behaviour in School -Aged Children survey (http://www.hbsc.org/). This survey is undertaken every 4 years of a sample of 11, 13 and 15 year olds in 43 countries across Europe and North America using self-completed questionnaires administered in schools. The analysis here is restricted to 28 OECD countries.

2.1 Subjective Well-Being at Country Level

Bradshaw et al (2013) derived the UNICEF RC11 measure of subjective well-being from data in the published report of the HBSC 2009/10 (Currie et al 2012) at country level. They took eight indicators and combined them into four components to represent subjective well-being. These were life satisfaction, relationships, subjective education and subjective health. The indicators that contributed to this are summarised in Table 1.

Table 1 UNICEF index of subjective well-being

Component	Indicator	Definition
Life satisfaction	Life satisfaction	Young people with scores above the middle of (Cantril's ladder) life satisfaction scale, aged 11, 13 and 15
Relationships	Easy to talk to mothers	% 11,13,15 year olds who find it easy to talk to mothers
	Easy to talk to fathers	% 11,13,15 year olds who find it easy to talk to fathers
	Classmate are kind and helpful	% 11,13,15 finding their classmate are kind and helpful
Subjective education	Pressured by school work	% 11, 13 15 who feel pressured by school work
	Young people liking school a lot	Young people liking school a lot aged 11, 13, 15
Subjective health	Health fair or poor	Percentage of young people age 11, 13 and 15 who rate their health as fair or poor.
	Health complaints	Prevalence of self-reported health complaints

The score was the average of the standardized (z) scores for the indicators and the overall well-being score was the average of the standardized component (z) scores.

The theoretical rationale for the index was that subjective well-being consisted of an overall evaluative element (life satisfaction) and satisfaction with different components of life including relationships with family and friends, school and health. There are of course other components of subjective well-being that are not included in the UNICEF index which have been included in other indices (see The Children's Society 2012)—for example subjective views about appearance, money/possessions, time-use, local area, safety, choice, the future. Although some of these components are represented by questions asked in the HBSC they were not reported in the published report (Currie et al 2012). Stiglitz et al. (2009) suggested that subjective well-being should also include an experiential element–positive affect (joy/pride) and negative affect (pain/worry), also Eudemonic well-being—worthwhileness, or achieving rewards in life independent of pleasure but these could not be represented by HBSC data.

Table 2 shows the associations at a country level between these components and the overall subjective domain. The subjective education component is least associated

Table 2 Correlation matrix of subjective well-being indicators in HBSC at the country level, components and domains (z scores spearman rank)

	Life satisfaction	Relationships	Subjective education	Subjective health	Subjective domain
Life satisfaction	1.000	0.350	−0.228	0.487**	0.646**
Relationships		1.000	0.111	0.283	0.669**
Subjective education			1.000	−0.275	0.228
Subjective health				1.000	0.692**
Subjective domain					1.000

**Correlation is significant at the 0.01 level (2-tailed)

with the other components and the overall subjective well-being domain. None of the components are so closely associated as to suggest redundancy, for example subjective health only explains 24 % of the variation in life satisfaction.

However at a country level we are not really able to test the scalability of the index and/or explore its interactions.

2.2 Creating the Scale at an Individual Level

So the first thing to do was to re-create the scale at an individual level.

Life Satisfaction The measure of life satisfaction is Cantril's Ladder. It might have been better to have used a multi-dimensional psychometric scale like the Huebner scale but no such scale exists in the HBSC except the psychosomatic health complaints that we have used in the subjective health dimension (see below).

At the country level the life satisfaction score was the % of children in a country with scores above the mean of the scale. At an individual level we were able to use the individual young person's score on the 0–10 scale. Figure 1 shows the distribution of mean scores with 95 % confidence intervals. The Netherlands, Israel, Iceland and Spain have the highest mean life satisfaction. Canada, Poland, and Turkey have the lowest level of life satisfaction. This league table is very similar to the UNICEF distribution of countries based on the proportion scoring above the mean.

Relationships At a country level the relationship component was derived by combining the z scores of the proportion of young people finding it easy to talk to father, mother and who found their friends kind and helpful. The response codes for these questions are five point Likert scales. In the case of talking to mother and father 1 = very easy, 2 = easy, 3 = difficult, 4 = very difficult 5 = don't have or see. In the case of friends kind and helpful 1 = strongly agree and 5 = strongly disagree. For the individual level analysis it was decided to treat these as ordinal scales and don't have don't see was coded with very difficult. The z scores were combined and transposed

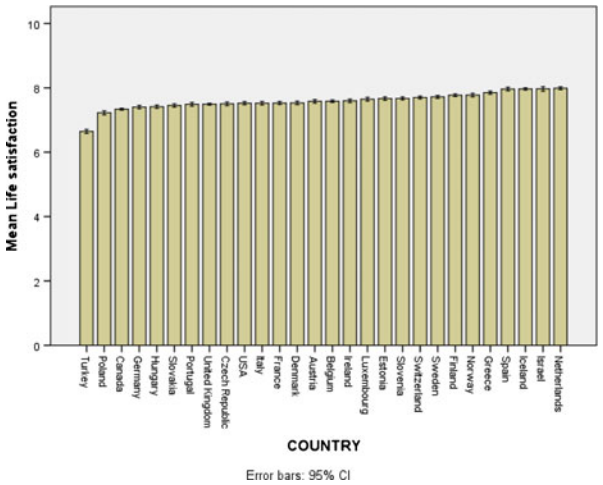

Fig. 1 Mean life satisfaction

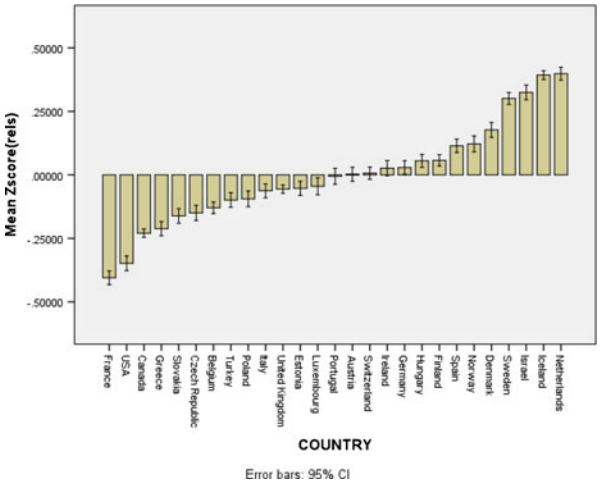

Fig. 2 Relationships mean z scores

and the mean relationship score is shown in Fig. 2. Young people in the Netherlands, Iceland, Israel and Sweden have the best relationships and young people in France and the USA the worst relationships. Relationship data is missing for Slovenia.

Subjective Education Was made up of two indicators. Liking school and feeling pressured by school work. Liking school is a four item Likert scale 1 = a lot, 2 = a bit, 3 = not very much, 4 = not at all. Pressured by school work is also a four item Likert scale 1 = not at all, 2 = a little, 3 = some, 4 = a lot. Figure 3 gives the distribution of z scores of the combination of these variables. The Netherlands is again a positive outlier on subjective education with Spain and Italy having the lowest scores.

Subjective Health The UNICEF indicator at the country level was a combination of subjective health 1 = excellent to 4 = poor and the proportion of children in each

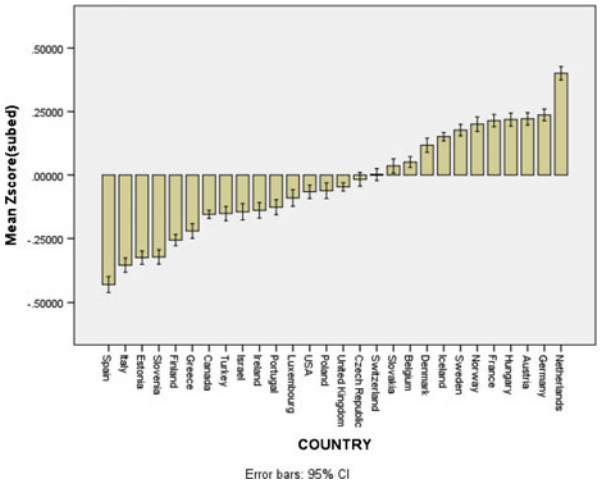

Fig. 3 Subjective education

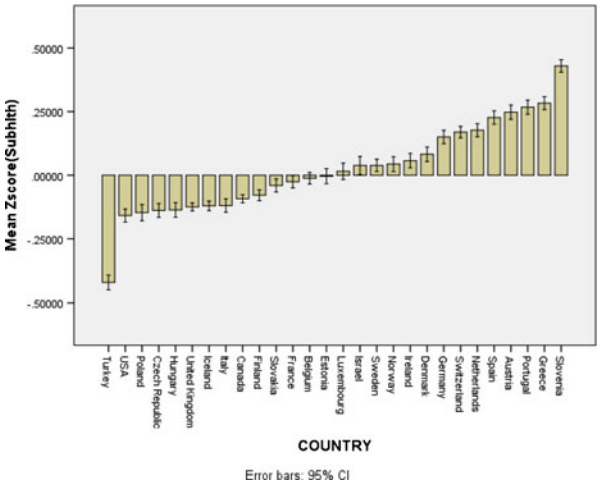

Fig. 4 Subjective health

country reporting two or more of eight psychosomatic health complaints. Using individual data it is possible to produce a health complaints score based on the response options for each symptom ranged on a five point scale from "about every day" to "rarely or never". The subjective health component was a combination of the z scores of subjective health transposed and health complaints. Figure 4 shows the resultant distribution of scores. The highest level of subjective health is found in Slovenia, Greece and Portugal and the lowest in Turkey, the USA and Poland.

The overall subjective well-being variable is a standardized combination of the z scores of these four components: life satisfaction, relationships, subjective education and subjective health. For Slovenia we took the mean values for the relationships variable. Figure 5 gives the distribution of overall subjective well-being with the Netherlands at the top of the league table by some margin and Turkey, the USA,

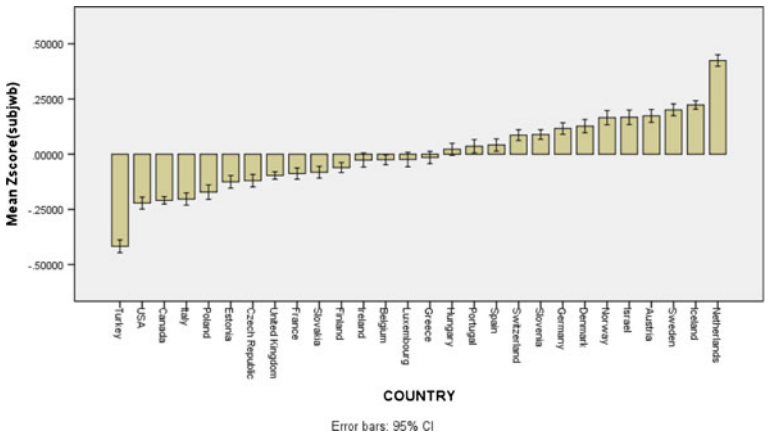

Fig. 5 Overall subjective well-being

Canada, Italy and Poland at the bottom. This league table using individual scores is similar, but not identical, to that using country scores. The Netherlands and Iceland are at the top on both and the USA is at the bottom on both (discounting Turkey not included in RC11). But some other countries change their ranking—the biggest changes are Norway, five places higher at the individual level and Finland, five places lower at the individual level.

Table 3 gives the correlation matrix of components and overall subjective well-being at the individual level. These can be contrasted with the country level correlations in Table 2. On the whole the associations are stronger at an individual level. The strongest association is between life satisfaction and subjective health but all the components are positively correlated. Life satisfaction explains most of the variation (56 %) of overall well-being but all the components are strongly correlated with overall subjective well-being

The scalability of the index was assessed using Cronbach's alpha. The alpha coefficient was 0.680 which is close enough to 0.7 to be respectable and it can be seen in Table 4 that the coefficient would not have been improved by dropping any component.

We found that the scale worked better (had higher Cronbach's alphas) in the Nordic and richer countries than in the Southern and Eastern European countries (see Fig. 6). The Slovenia result is influenced by the fact that relationships component was imputed as country average because it was missing.

We also tried a factor analysis with all the components. Only one factor could be extracted with a variance explained of 51.3 % and factor loadings of 0.77 on life satisfaction; 0.69 on relationships; 0.64 on education well-being; and 0.75 on subjective health. This confirms the viability of the scale.

As well as exploring the mean of the subjective well-being index we are also interested in the dispersion. A measure of dispersion commonly used in studies of income inequality is the gini coefficient based on the analysis of Lorenz curves. The larger the gini, the more unequal the distribution.

Figure 7 gives the league table of the gini coefficients calculated using FASTGINI in Stata (Sajaia 2007) with the Netherlands, Israel and Sweden having the most equal distributions and Italy and Turkey the least equal distributions.

Table 3 Correlation coefficients between components of subjective well-being at the individual level

	Life satisfaction	Relationships	Subjective education	Subjective health	Overall subjective well-being
Life satisfaction	1	0.374**	0.305**	0.467**	0.750**
Relationships		1	0.285**	0.330**	0.699**
Subjective education			1	0.317**	0.670**
Subjective health				1	0.739**
Overall subjective well-being					1

**Correlation is significant at the 0.01 level (2-tailed)

Table 4 Scalability of the subjective well-being index

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
Subjective health	−0.0523106	4.874	0.502	0.270	0.589
Subjective education	−0.0201085	5.242	0.394	0.156	0.658
Relationships	−0.0371028	5.071	0.436	0.194	0.632
Life satisfaction	−0.0475704	4.822	0.521	0.288	0.576

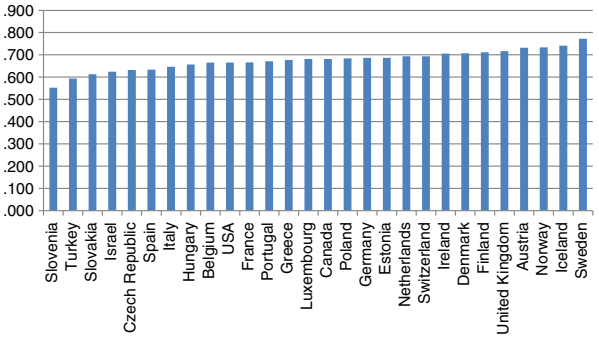

Fig. 6 Country level Cronbach's alpha

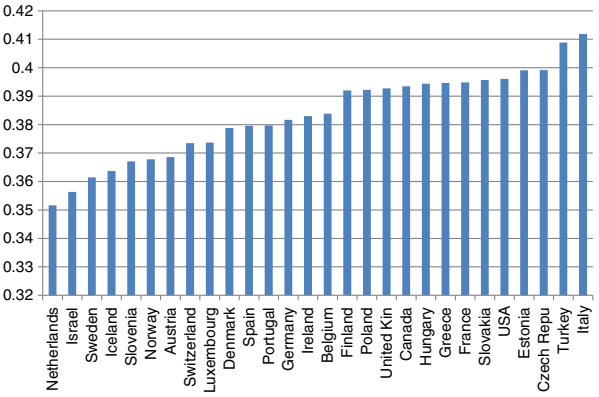

Fig. 7 Gini coefficients of subjective well-being

It can be seen in Fig. 8 that there is a close association between the mean and the distribution of subjective well-being (r=0.89), though there are some interesting rerankings of countries—Canada, USA and Poland show a lower country rank than the gini value would suggest. Hungary, Greece and Germany on the other hand are doing better on overall subjective well-being rank than you might expect from the unequal distribution.

3 Explaining Variation in Subjective Well-Being

How can these variations in subjective well-being be explained? First we run a multiple regression with clustered standard errors. A range of individual level variables which have previously been associated with child subjective well-being are included. Three country level variables which give information about the country level environment in which the children are living are also included. Missing data means that all countries cannot be included in all analyses. Canadian children did not answer questions in the survey about the employment status of parents, children in Turkey did not answer questions about risk behaviours and bullying, and public spending data is missing for Switzerland.

Table 5 gives the results. In the first model, which includes age and gender, girls have lower subjective well-being than boys and subjective well-being is lower at age 13 and 15 than it is at age 11. Gender and age explain 8 % of the variation in subjective well-being. Model 2 adds indicators of family structure, parental employment and family affluence. If the father is not in the main home subjective well-being is lower, as it is if the mother is not in the home. Subjective well-being is also lower if the father does not have a job and slightly lower if the mother does not have a job. Subjective well-being is positively associated with higher family affluence (indicated by the total of the number of cars, bedroom for self, number of holidays and number of computers in the household). This simple model increases the percentage of subjective well-being explained to 12.4 %.

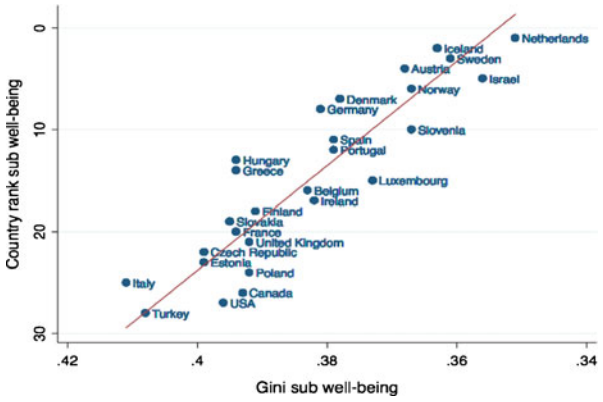

Fig. 8 Mean subjective well-being by inequality in the distribution of subjective well-being

Table 5 Multiple regressions of subjective well-being with clustered standard errors

	Model 1		Model 2	
	B	S.E.	B	S.E.
Constant	0.462***	0.036	0.560***	0.030
Gender (female)	−0.185***	0.013	−0.172***	0.014
Age – 11 (Ref)				
Age – 13	−0.413***	0.016	−0.412***	0.018
Age – 15	−0.653***	0.031	−0.647***	0.037
Father in home (no)			−0.221***	.014
Mother in home (no)			−0.198***	0.022
Father in work (no)			−0.207***	0.016
Mother in work (no)			−0.062**	0.021
Family affluence scale			0.124***	0.016
Model stats	F(3, 27)=243.72, $p<.001$, $R^2=.079$		F(8, 26)=218.46, $p<.001$, $R^2=.124$	
Number of countries included in model	28		27[a]	

Regression models conducted using Stata12

* $p<.05$, ** $p<.01$, *** $p<.001$

[a] Missing data for Canada

Then in Table 6 model 3 adds some behavioural indicators which are all associated with subjective well-being and their introduction means that whether the mother is in work is no longer significant. The frequency of bullying has a big and linear impact reducing subjective well-being. Currently smoking and ever been drunk also reduces subjective well-being and taking exercise more than once a week increases subjective well-being. Adding these factors nearly doubles the proportion of variation in subjective well-being explained to 23 %. Model 4 then adds some country characteristics taken from the OECD SocX database (for 2009): GDP per capita (a measure of national wealth), youth unemployment (an indicator of the prospects that young people are facing) and public spending on families as % of GDP (an indicator of welfare state effort on behalf of families with children). None of these country characteristics are significantly associated with variation in subjective well-being

Table 7 reruns the first three of these models with country included as a dummy variable and with the UK as the reference case. These models provide fixed effects estimates of the effect of country on child subjective well-being. The results for the individual level variables mimic those for the previous regression analyses, with all individual level variables being significant with the exception of mother's employment status in the final model. All of the countries included in the model are found to have significantly different levels of subjective well-being to the UK.

Table 8 focuses on these country effects. It gives the original ranking from Fig. 5 and then after controlling for the factors in each of the regression models.

Having controlled for age and gender in model 1 the rankings are very similar to the original ranks in Fig. 5 but they change more when family factors are added in model 2—for example Norway moves down the ranking and Hungary moves up. There are

Table 6 Multiple regression of subjective well-being with clustered standard errors

	Model 3		Model 4	
	B	S.E.	B	S.E.
Constant	0.558***	0.029	0.765***	0.121
Gender (female)	−0.178***	0.012	−0.177***	0.013
Age – 11 (Ref)				
Age – 13	−0.365***	0.017	−0.361***	0.018
Age – 15	−0.486***	0.031	−0.490***	0.032
Father in home (no)	−0.172***	0.011	−0.175***	0.010
Mother in home (no)	−0.154***	0.020	−0.147***	0.018
Father in work (no)	−0.172***	0.016	−0.167***	0.014
Mother in work (no)	−0.015	0.012	−0.009	0.012
Family Affluence Scale	0.092***	0.008	0.087***	0.007
Victim of bullying (never) (Ref)				
Victim of bullying (once or twice)	−0.359***	0.020	−0.366***	0.019
Victim of bullying (2–3 times per month)	−0.614***	.033	−0.623***	0.033
Victim of bullying (once a week)	−0.703***	0.037	−0.711***	0.039
Victim of bullying (several times a week)	−0.956***	0.038	−0.962***	0.040
Currently smoke (yes)	−0.362***	.021	−0.356***	0.020
Been drunk (yes)	−0.286***	0.028	−0.287***	0.027
Exercise (more than once per week)	0.222***	0.016	0.220***	0.016
GDP PPP (in $1,000 s)			−0.004	0.002
Youth unemployment rate			−0.009	0.005
Public spending on children and families (% of GDP)			0.030	0.026
Model stats	F(15, 25)=520.02, $p<.001$, $R^2=.231$		F(18, 24)=1343.87, $p<.001$, $R^2=.235$	
Number of countries included in model	26[a]		25[b]	

* $p<.05$, ** $p<.01$, *** $p<.001$

[a] Missing data for Canada, and Turkey

[b] Missing data for Canada, Turkey and Switzerland

further changes in ranking when the behavioural variables are controlled for. For example Portugal, Switzerland and Belgium move up the league table. Norway, Sweden and Iceland move down the league table. All the countries that move up the league table have comparatively high bullying rates and this perhaps indicates how much better their child subjective well-being would be if they tackled their bullying more effectively.

The results show that the Netherlands still perform very well in terms of children's subjective well-being, however it is outperformed by Austria which is perhaps surprising given that Austria ranked 15th in life satisfaction in Fig. 1. But it is the controls for behavioural effects that make this difference.

Having investigated the differences in subjective well-being between countries using regression models, further analysis is conducted using multilevel modelling to provide some understanding of what affects country level variation. Multilevel modelling is an

Table 7 Linear regression model with country fixed effects and clustered standard errors

	Model 1		Model 2		Model 3	
	B	S.E.	B	S.E.	B	S.E.
Constant	0.379***	0.020	0.484***	0.024	0.474***	0.024
Gender (female)	−0.184***	0.013	−0.174***	0.014	−0.181***	0.012
Age – 11 (Ref)						
Age – 13	−0.408***	0.017	−0.410***	0.019	−0.359***	0.017
Age – 15	−0.652***	0.032	−0.648***	0.036	−0.485***	0.031
Father in home (no)			−0.220***	0.010	−0.164***	0.008
Mother in home (no)			−0.194***	0.020	−0.142***	0.017
Father in work (no)			−0.208***	0.012	−0.168***	0.011
Mother in work (no)			−0.033*	0.013	−0.008	0.011
Family Affluence Scale			0.095***	0.007	0.083***	0.006
Victim of bullying (never) (Ref)						
Victim of bullying (once or twice)					−0.375***	0.016
Victim of bullying (2–3 times per month)					−0.631***	0.030
Victim of bullying (once a week)					−0.724***	0.034
Victim of bullying (several times a week)					−0.977***	0.038
Currently smoke (yes)					−0.371***	0.017
Been drunk (yes)					−0.278***	0.019
Exercise (more than once per week)					0.217***	0.015
UK (Ref)						
Austria	0.284***	0.001	0.249***	0.002	0.365***	0.004
Belgium	0.048***	0.001	0.015***	0.002	0.097***	0.004
Canada	−0.094***	0.001	–	–	–	–
Czech Republic	−0.021***	0.000	−0.016***	0.003	−0.026***	0.003
Denmark	0.203***	0.001	0.175***	0.003	0.156***	0.004
Estonia	−0.038***	0.000	−0.026***	0.002	0.119***	0.005
Finland	0.011***	0.001	−0.018***	0.002	0.020*	0.007
France	−0.013***	0.001	−0.052***	0.002	0.020***	0.004
Germany	0.201***	0.000	0.157***	0.002	0.151***	0.004
Greece	0.071***	0.000	0.026***	0.004	0.024***	0.004
Hungary	0.130***	0.001	0.160***	0.004	0.189***	0.003
Iceland	0.310***	0.000	0.228***	0.005	0.125***	0.008
Ireland	0.098***	0.002	0.096***	0.003	0.049***	0.004
Israel	0.247***	0.001	0.195***	0.003	0.185***	0.005
Italy	−0.118***	0.001	−0.146***	0.003	−0.213***	0.005
Luxembourg	0.098***	0.001	0.040***	0.002	0.054***	0.004
Netherlands	0.501***	0.001	0.423***	0.003	0.355***	0.007
Norway	0.224***	0.002	0.137***	0.006	0.094***	0.007
Poland	−0.082***	0.000	−0.076***	0.004	−0.034***	0.004
Portugal	0.158***	0.001	0.126***	0.002	0.186***	0.004
Slovakia	0.039***	0.001	0.072***	0.005	0.090***	0.004

Table 7 (continued)

	Model 1		Model 2		Model 3	
	B	S.E.	B	S.E.	B	S.E.
Slovenia	0.170***	0.001	0.105***	0.003	0.121***	0.003
Spain	0.176***	0.002	0.134***	0.002	0.116***	0.003
Sweden	0.284***	0.001	0.217***	0.003	0.126***	0.006
Switzerland	0.196***	0.001	0.131***	0.003	0.190***	0.004
Turkey	−0.330***	0.001	−0.200***	0.016	–	–
USA	−0.124***	0.001	−0.104***	0.002	−0.155***	0.005
	R^2=.107		R^2=.140		R^2=.245	

* $p<.05$, ** $p<.01$, *** $p<.001$

extension of linear regression which allows intercepts and slopes for individual countries and schools to vary. This allows the dependence in the data caused by the sampling design to be corrected for and also treated as a subject of interest in itself, permitting the investigation of variation between, as well as within, countries and schools. A 3-level model will be used, with children grouped into their school and country in order to replicate the sampling design of the data. The sampling design of HBSC is 4-level, with children also grouped within their classes. However a 4-level model was not used due to the very small number of classes grouped in schools in some countries. The removal of countries with small group sizes at this level was not conducted because of the already small sample size at the highest (country) level. Countries had between 4,036 and 15,919 children in them grouped into 5,953 schools (with between 44 and 515 schools in each country). All schools were included in the models as only very few had small sample sizes (for example only 4.1 % of schools had five or fewer children in them) which was unlikely to affect the interpretation of results as the primary interest is in fixed and between country effects (Rasbash 2008; Paterson and Goldstein 1991). As with the regression models some countries were lost from the analyses due to missing data.

The unstandardized versions of the subjective well-being variable (standardized components, not standardized overall) as well as the family affluence scale were used because of the issues with using standardized variables in multilevel models (Hox 2010). This outcome variable had a standard deviation of 2.835, minimum of −14.044 and a maximum of 5.980. All binary and continuous predictor variables were grand mean centred in order to improve the stability of the model as well as aid with the interpretation of the random coefficients (Hox 2010).

Initially a null, or empty model, was run. Then two random coefficient models are run replicating the approach taken in the regression analyses. The second model included the demographic information, emulating the second models in the regression analysis. Finally a model potentially including all variables was run. Variables were added to the fixed part of the random coefficient models and then to the random part. Variables were added to the random part of the model one at a time to each level, and at each stage checked to see whether the addition of variable improved the model fit using a likelihood ratio test. Once all significant variables had been added to the model, they were then checked again, by removing them from the random part of the model one at a time, to check that none had

Table 8 Rank order of countries after controlling for factors in the regression models

	Original rank	Model 1 rank	Model 2 rank	Model 3 rank
Austria	4	4	2	1
Belgium	16	17	18	14
Canada	26	25	–	–
Czech Republic	22	22	20	23
Denmark	7	7	6	7
Estonia	23	23	22	12
Finland	18	19	21	20
France	20	21	23	21
Germany	8	8	8	8
Greece	14	16	17	19
Hungary	13	13	7	4
Iceland	2	2	3	10
Ireland	17	14	14	18
Israel	5	5	5	6
Italy	25	26	26	26
Luxembourg	15	15	16	17
Netherlands	1	1	1	2
Norway	6	6	9	15
Poland	24	24	24	24
Portugal	12	12	12	5
Slovakia	19	18	15	16
Slovenia	10	11	13	11
Spain	11	10	10	13
Sweden	3	3	4	9
Switzerland	10	9	11	3
Turkey	28	28	27	–
UK	21	20	19	22
USA	27	27	25	25

become irrelevant with the addition of further variables. As such all random coefficients reported in the model significantly improve the model ($p<.001$, $p<.05$ for father job, mother in main home and father in the main home at country level). Wald tests are inappropriate for reporting significance for random effects (Hox 2010) and are therefore not reported. As such asterisks are not used to report the significance of the random effects. The variables were added to the model in this way as it is plausible for all of the individual level variables to vary at the different levels. The normality of residuals at each level was checked using qnorm plots and found to be satisfactory. Estimation was conducted using restricted maximum likelihood estimation due to the small number of groups at the highest level (Snijders and Bosker 2012). Use of restricted maximum likelihood prohibited the use of weighting or robust standards errors (Stata Corp 2009). Analysis was conducted using Stata12 and random effects are reported as variances.

Table 9 Multilevel analysis

	Model 1 (null)		Model 2 (mid)		Model 3 (full)	
	B	S.E.	B	S.E.	B	S.E.
Fixed						
Constant	0.031	0.098	1.002***	0.079	1.224***	0.077
Gender (female)			−0.475***	0.041	−0.499***	0.037
Age – 11 (Ref)						
Age – 13			−1.130***	0.055	−0.989***	0.053
Age – 15			−1.775***	0.085	−1.325***	0.083
Father in home (no)			−0.595***	0.033	−0.442***	0.028
Mother in home (no)			−0.541***	0.060	−0.394***	0.052
Father in work (no)			−0.580***	0.038	−0.464***	0.034
Mother in work (no)			−0.101**	0.034	−0.033	0.029
Family Affluence Scale			0.148***	0.009	0.128***	0.008
Victim of bullying (never) (Ref)						
Victim of bullying (once or twice)					−1.077***	0.045
Victim of bullying (2–3 times per month)					−1.776***	0.078
Victim of bullying (once a week)					−2.056***	0.092
Victim of bullying (several times a week)					−2.728***	0.109
Currently smoke (yes)					−1.063***	0.050
Been drunk (yes)					−0.789***	0.036
Exercise (more than once per week)					0.594***	0.039
GDP PPP ($1,000)					0.005	0.008
Youth unemployment					−0.008	0.012
Random						
Country						
Constant	0.264 (0.153–0.455)	0.073	0.161 (0.091–0.285)	0.047	0.144 (0.078–0.263)	0.044

Table 9 (continued)

	Model 1 (null)		Model 2 (mid)		Model 3 (full)	
	B	S.E.	B	S.E.	B	S.E.
Gender (female)			0.037 (0.019–0.071)	0.012	0.029 (0.014–0.057)	0.010
Age – 11 (Ref)						
Age – 13			0.067 (0.035–0.131)	0.023	0.060 (0.031–0.118)	0.021
Age – 15			0.181 (0.101–0.323)	0.053	0.166 (0.091–0.301)	0.050
Father in home (no)			0.018 (0.008–0.045)	0.008	0.011 (0.004–0.033)	0.006
Mother in home (no)			0.058 (0.022–0.152)	0.029	0.035 (0.011–0.112)	0.021
Father in work (no)			0.021 (0.008–0.058)	0.011	0.013 (0.004–0.044)	0.008
Mother in work (no)			0.020 (0.009–0.046)	0.009	0.012 (0.005–0.032)	0.006
Family affluence scale			0.002 (0.001–0.003)	0.001	0.001 (0.0005–0.002)	0.0004
Victim of bullying (never) (Ref)						
Victim of bullying (once or twice)					0.041 (0.020–0.083)	0.015
Victim of bullying (2–3 times per month)					0.112 (0.050–0.250)	0.046
Victim of bullying (once a week)					0.140 (0.058–0.339)	0.063
Victim of bullying (several times a week)					0.218 (0.095–0.500)	0.092
Currently smoke (yes)					0.043 (0.019–0.100)	0.018
Been drunk (yes)					0.021 (0.009–0.048)	0.009
Exercise (more than once per week)					0.034 (0.017–0.066)	0.012
School						
Constant	0.743 (0.702–0.786)	0.022	0.171 (0.149–0.196)	0.012	0.123 (0.105–0.145)	0.010
Gender (female)			0.199 (0.156–0.254)	0.025	0.160 (0.123–0.208)	0.021
Age – 11 (Ref)						
Age – 13			0.139 (0.104–0.185)	0.020	0.082 (0.055–0.121)	0.016
Age – 15			0.096 (0.065–0.141)	0.019	0.064 (0.039–0.104)	0.016
Father in home (no)			0.046 (0.015–0.136)	0.025		

Table 9 (continued)

	Model 1 (null)		Model 2 (mid)		Model 3 (full)	
	B	S.E.	B	S.E.	B	S.E.
Mother in home (no)			0.538 (0.385–0.751)	0.092	0.387 (0.258–0.579)	0.080
Father in work (no)			0.221 (0.149–0.327)	0.044	0.175 (0.113–0.273)	0.040
Mother in work (no)			0.102 (0.061–0.171)	0.027	0.053 (0.023–0.120)	0.022
Victim of bullying (never) (Ref)						
Victim of bullying (once or twice)					0.053 (0.021–0.136)	0.025
Victim of bullying (2–3 times per month)					0.673 (0.500–0.904)	0.101
Victim of bullying (once a week)					1.048 (0.781–1.407)	0.157
Victim of bullying (several times a week)					2.488 (2.131–2.904)	0.196
Currently smoke (yes)					0.372 (0.283–0.489)	0.052
Been drunk (yes)					0.113 (0.071–0.182)	0.027
Individual						
Constant	7.215 (7.164–7.266)	0.026	6.415 (6.363–6.467)	0.012	5.419 (5.371–5.467)	0.024
Model statistics						
	Log likelihood=−389158.45 χ^2=10263.26, p<.001 $\rho_{Country}$=.032 (.019–.054), $\rho_{School\|Country}$=.122 (.107–.139) Country n=28, School n=5947, child n=160216		Log likelihood=−322364.42 χ_7^2=4957.54, p<.001 $\rho_{Country}$=.024 (.014–.041),: $\rho_{School\|Country}$=.049 (.037–.064) Country n=27, School n=5506, child n=135939		Log likelihood=−286723.80 χ_{19}^2=5129.89 p<.001 $\rho_{Country}$=.025 (.014–.045), $\rho_{School\|Country}$=.047 (.034–.064) Country n=26, School n=5171, Child n=124758	

* p<.05, ** p<.01, *** p<.001

Table 9 shows the results of the multilevel models. All the models are significantly multilevel, and investigation of two level models suggests that country level and school level variance are both significant (null country model χ^2=4429.44, p<.001; null school model χ^2=9197.19, p<.001). The residual intraclass correlation is reported for model 1 (equivalent to the variance partition coefficient), while conditional intraclass correlations are reported for models 2 and 3 (Stata Corp 2009). The intraclass correlation (ρ) is a measure of the similarity between two units (in this case children) who are in the same higher-level group (in this case country or school) (Snijders and Bosker 2012). The inclusion of variables in the country (and school) level random part of the model reduces the intercept variance which is to be expected. This reduces the intraclass correlations, which are small, suggesting in the final model a small correlation between children in the same country (ρ=.025), with a slightly greater similarity between children in the same school.

As in the regression analyses all variables are significant in the fixed part of the model which includes demographic variables (model 2) and with the addition of behavioural variables in model 3 mother in work is no longer significant. The country level variables, GDP, public spending and youth unemployment, are not significant at any level of model 3. GDP and youth unemployment are reported in the fixed part of the model for information while public spending on children and families is not reported as its inclusion would mean removing Switzerland from the model. However it is the random effects that are of most interest.

In the second model all of the possible variables were significant at the country level. The same was true in the third model, with the exception of the country level variables as discussed above. Significant random effects suggest that countries vary significantly from the fixed effect average where the fixed effect is itself significant. This suggests that, for example, the effect of being a girl on subjective well-being is less dramatic in some countries than in others. Similarly the effect of not having both parents in the home is less dramatic in some countries and so on.

Fewer variables were significant at the school level. The family affluence scale was not significant at this level in either of the models while father in the home and exercise are not significant in the final model. As with the country level the influence of individual characteristics on subjective well-being varies across schools. Children in the same school have an intra-class correlation of 0.047.

The significant random coefficients at the country level show that while the individual level characteristics, such as gender and age, affect subjective well-being, the effect that they have is dependent on the country in which the child lives. These results suggest that individual level characteristics are of most importance to the subjective well-being of children. However, other aspects of a child's ecology including the school that they attend and the country in which they live are also influential.

4 Discussion

Previous comparative analysis of subjective well-being has tended to be undertaken at country level. This analysis at individual level has a number of advantages. It enables us to adapt the measures to use individual scores rather than average scores

and to test the reliability and validity of the scale of subjective well-being that was created. We are also able to analyse the dispersion of scores across the distribution and relate average scores to a measure of dispersion. The league table of countries on overall subjective well-being is similar but not identical at country and individual level. Individual level analysis permits the building of explanatory models for variations in subjective well-being. We have confirmed previous national surveys that subjective well-being varies by age and gender and by family type, parental employment and family affluence. But not much of the variation is explained by these factors. Behavioural factors such as bullying contribute more to explaining variation in subjective well-being. The overall ranking of countries changes very little after age and gender are controlled for. There are some bigger changes in rank when family factors are controlled for and poorer countries like Hungary move up the league table. There are even larger changes when the behavioural variables are controlled for indicating that for example Norway and Sweden are high ranked because of their children's good behaviour and Estonia and Portugal could be much better ranked if they were able to change behaviour (probably in particular bullying).

The regression analyses find that the country in which a child lives significantly contributes to the level of subjective well-being that they report. Multilevel analysis confirms variation in the effects of individual characteristics on subjective well-being at the country level. No such effect was found for the country level variables included such as GDP and youth unemployment. This is a remarkable result. It indicates that it is not the economy (GDP) or spending on family policies which can foster child-well-being. Rather it is the cultural context and the school climate that influences the way that individual characteristics influence child subjective well-being. So referring to the Bronfenbrenner conception, child well-being looks to be more a result of the micro (family) and meso (school) level rather than the macro (society) level.

As all the individual level random effects in the model at country level were found to be significant, the model does not identify a specific cause for the variation in international subjective well-being. This is perhaps due to the limited number of variables included in the model. Future research should aim to elaborate on this further investigating why, for example, girls are more disadvantaged in terms of their subjective well-being compared to boys in some countries than in others. Some of the variance identified in the model is more likely to be policy salient than others. For example it is plausible that the variation in the effects of bullying on children's subjective well-being across nations is policy salient, through the adoption of anti-bullying strategies or support groups. However variation in the effects of drinking on children's subjective well-being may instead reflect cultural attitudes towards drinking at a young age.

5 Limitations

There are a number of limitations with these analyses. The focus of the research on the effect of countries means that the cluster size for the regression analyses is small, as is the sample size for the multilevel modelling. The inclusion of the subjective education component in overall subjective well-being means that it is possible that the school-level effect is emphasised, although this remains an important component of subjective well-being. Similarly, the necessary exclusion of the class level in the

model means that it is likely that the school level includes variance better explained at the class level. There is also quite a lot of missing data, however multiple imputation is impractical on such a large dataset.

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