

**Title**

Inequality, material well-being, and subjective well-being: Exploring associations for children across 15 diverse countries

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**Abstract**

Children's material well-being, and the levels of wealth and inequality in societies within which children live, are important factors in determining outcomes. However, less is known about the extent to which these factors have an impact children's subjective well-being, especially in an internationally comparative context. This study draws on data from the Children's Worlds survey, an international study of child subjective well-being, to explore links between national level indicators of wealth and inequality (GDP and Gini coefficients), individual indicators of material well-being (the material resources children report having access to), and subjective well-being. The survey covers 15 diverse countries covering the continents of Europe, Asia, Africa and South America, with samples of at least 3,000 per country, ages 8, 10 and 12. Analysis takes the form of a multilevel, varying intercepts and slopes model, examining the association between financial and material resources and inequality and subjective well-being across and between countries. Findings suggest that material resources that children report are significantly associated with subjective well-being, while indicators of financial resources and inequality at the national level are not. While a significant association between material resources and subjective well-being is found across the whole sample, the magnitude of this association, and the association between school- and country-level material resources, varies markedly. Within different countries, the strongest material resources-related predictor of overall subjective well-being may be either at the individual, school or country level.

**Key words**

Material well-being; subjective well-being; children; inequality; multilevel modelling

## Highlights

- The Children's Worlds survey provides valuable self-reported data on children's lives which can be used to understand links between children's material living standards and their subjective well-being.
- Across all of the 15 diverse countries included in this analysis, significant associations were found between children's access to child-specific material resources and their subjective well-being.
- Country-level measures of resources (e.g. GDP per capita and the national average of access to material resources) were not significantly associated with children's subjective well-being.
- Inequalities in access to resources (e.g. Gini coefficients and inequalities in access to material resources), measured at the school and country level, were not significantly associated with children's subjective well-being.
- Within participating countries, differences were found in both the scale of the association between material resources and subjective well-being, and the level (individual, school or country) at which the effect was strongest. This suggests that while significant associations are universal, the nature and meaning of these associations varies and more research is needed to understand this topic.
- Measuring children's access to material resources in a diverse international sample of children is a complex task and much refinement is needed to develop measures and understand the meanings of associations with subjective well-being.

## Funding

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### **Inequality, material well-being, and subjective well-being: Exploring associations for children across 15 diverse countries**

Gill Main<sup>1</sup>, Carme Montserrat<sup>2</sup>, Sabine Andresen<sup>3</sup>, Jonathan Bradshaw<sup>4</sup>, and Bong Joo Lee<sup>5</sup>

## Abstract

Children's material well-being, and the levels of wealth and inequality in societies within which children live, are important factors in determining outcomes. However, less is known about the extent to which these factors have an impact children's subjective well-being, especially in an internationally comparative context. This study draws on data from the Children's Worlds survey, an international study of child subjective well-being, to explore links between national level indicators of wealth and inequality (GDP and Gini coefficients), individual indicators of material well-being (the material resources children report having access to), and subjective well-being. The survey covers 15 diverse countries covering the continents of Europe, Asia, Africa and South America, with samples of at least 3,000 per country, ages 8, 10 and 12.

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Analysis takes the form of a multilevel, varying intercepts and slopes model, examining the association between financial and material resources and inequality and subjective well-being across and between countries. Findings suggest that material resources that children report are significantly associated with subjective well-being, while indicators of financial resources and inequality at the national level are not. While a significant association between material resources and subjective well-being is found across the whole sample, the magnitude of this association, and the association between school- and country-level material resources, varies markedly. Within different countries, the strongest material resources-related predictor of overall subjective well-being may be either at the individual, school or country level.

## 1. Background

There is no doubt that for adults national wealth is associated with country variations in subjective well-being. The World Happiness Report 2015 (Helliwell, Layard and Sachs, 2015) used a combination of six factors to explain 74% of the cross-national variation in life satisfaction. The six factors were: GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity of giving and perceptions of corruption. Social support and freedom to make life choices explained two-thirds of the variance in life satisfaction explained by the model. However the log of GDP per capita made a significant contribution to explaining life satisfaction.

Previous research on child subjective well-being has found strong associations between subjective well-being at country level and objective factors including the rate income poverty and material deprivation in a country (Bradshaw, Martorano, Natali and de Neubourg, 2013, Bradshaw, 2015). However a comparative micro level study based on the Health Behaviour of School Aged Children (Klocke, Clair and Bradshaw, 2014) found only a weak association between variations in subjective well-being and the level of family affluence of the child, and the GDP per capita of the country was not associated with variations in subjective well-being. Similarly micro studies at national level have found at best only very weak associations between child subjective well-being and family income. For example analysis of the youth panel of the UK Understanding Society Survey (The Children's Society, 2014) found that family income poverty had only a very weak association with subjective well-being.

However, conceptualising poverty only in terms of income poverty provides a narrow view of the disadvantage and material deprivation faced by many children across the world. Material deprivation provides a more direct measure of poverty, allowing for analysis of experiences at the level of the individual rather than the household. This can facilitate an understanding of what constitutes poverty which draws on the actual living standards (outputs of income and other resources), rather than on income as one potential input into living standards (Main and Besemer, 2014). Main and Besemer (2014) highlighted that specific indicators of material living conditions have usually drawn on an adult perspective, using the household as the unit of analysis. Such an approach does not provide an optimal understanding of the living conditions of children as individuals. The material living conditions of children may vary depending on how household resources are distributed between different household members, and on whether children actually have access to services that meet their needs. By studying children's material living standards, children who are materially deprived can be identified thus providing a measure of child poverty which does not rely on household income. Main and Bradshaw (2012), Main (2013) and Gross-Manos (2015) have developed indices of material resources derived from children themselves. These developments are in line with the recommendation of Casas, González, Navarro and Aligué (2013) and Andresen et al. (2015) that there is a need to start doing research where children generate knowledge with regard to child well-being.

In the present study, material well-being refers to the material resources children report having access to; subjective well-being (SWB) refers to children's assessments of the quality of their lives, including positive and negative components (Diener, 1984) and life satisfaction. UNICEF's Report Card 7 (UNICEF, 2007) took an important step towards articulating objective and subjective indicators for understanding children's well-being in different countries, comprising material well-being, health and safety, educational well-being, interpersonal relationships, behaviour, risks, and subjective well-being. More recently, UNICEF Innocenti Report Card 12 (2014) on child well-being in rich countries during the recession stated that beyond income and employment levels, the recession affected a number of other dimensions of people's lives. In 29 of the 41 countries: (i) the percentage of respondents who reported not having enough money to buy food for themselves and their family had increased, and (ii) the stress indicator increased.

Also in almost half of the countries, overall life satisfaction decreased. And in 21 of the 41 countries, fewer respondents agreed with the statement that children have the opportunity to learn and grow. On the other hand, some relatively wealthy countries have seen only small increases in child poverty and yet rank in the bottom third of the Gallup league table (as cited in UNICEF, 2014), suggesting that monetary poverty alone is not enough to reflect the well-being of families during this period (2007-13).

### ***1.1 Contextual factors and children's subjective well-being***

The identification of which contextual factors influence subjective well-being among children has important implications for policy, research and practice. Montserrat, Casas and Moura (2015) explored the differences in subjective well-being (SWB) between young adolescents living in disadvantaged situations and the general population aged 12 years old in Spain. The authors calculated the dimensions of poverty (material conditions, education, satisfaction with home and subjective poverty) and the satisfaction with life domains. All of the analysed dimensions are negative predictors for the Domains Satisfaction General Index.

Rees et al. (2012) showed that some subgroups of the population such as children from ethnic minorities (also in Bradshaw, Keung, Rees and Goswami, 2011), those in the public care, or those who live in a jobless households had lower subjective well-being than children in the general population. In some domains, girls had lower subjective well-being than boys. This is also the case in young age groups in Germany (Andresen et al., 2015). The third World Vision Survey (2013) used the 5-point class index to analyse social origins. It assigned children to a social class of origin on two dimensions: first, the parents' educational background (education dimension); and, second, the material state of the household (material participation dimension). This taps the children's central home-related and material starting and framing conditions. It focuses on the family's level of education within the context of a sufficient availability of the necessary financial resources. Children from 6 to 11 years who were from the lower classes reported lower subjective well-being.

Along similar lines, Llosada, Montserrat and Casas (2015) studied the subjective well-being of adolescents aged 12 in residential care, comparing them to those in the general population, and found lower subjective well-being among children in care. Another factor negatively influencing SWB is related to recent changes in children's family and school life (Dinisman, Montserrat and Casas, 2012). In this vein a study conducted in 8 countries (Montserrat, Dinisman, Baltatescu, Grigoras and Casas, 2015) aimed to explore adolescents' subjective well-being (SWB) in relation to critical changes in their lives during the last year; findings indicated a negative effect of critical changes (moved house, changed local area, changed school, living in another country for over a month and change in the parents or carers they live with) on adolescents' SWB in 7 out of 8 countries.

In addition, Abdallah, Main, Pople and Rees (2014) showed that some of the activities that were most strongly associated with children's subjective well-being were: noticing and enjoying one's surroundings; teaching oneself new things; talking to family about important matters and reading for fun.

In the light of previous research on the association between material resources and subjective well-being drawing on data from the Children's Worlds survey (detailed below), our research questions comprise:

- Which (if any) indicators of children's financial and material living conditions are associated with their subjective well-being?
- How do such associations vary between different countries?

## **2. Data**

Data were from the Children's Worlds study ([www.isciweb.org](http://www.isciweb.org)), an international survey of children's subjective well-being. The countries included in the Children's Worlds survey are more diverse than the kind of countries included in previous analyses reviewed above, including rich and poor countries, and from every region of the World including Europe, Africa, South America, East Asia and South America. This study is the first of its kind in which children themselves are respondents, making scales relevant to children around their perceptions of important aspects of their lives. The analysis presented here draws on data from the second wave of the survey, undertaken in 2013-14. Approximately 52,000 children were sampled overall (a minimum of around 1,000 from each age group in each country), and the survey was school-based, covering children in the school years where the average ages were eight, ten and 12. A limitation arising from this sampling method is that results are only representative of children in schools within the participating countries. Additionally, only children in the school year in which the average ages were ten and 12 were asked questions of relevance to the topic of this paper, so children in the school year in which the average age was eight are excluded from the analysis. The remaining sample comprised 35,417 children overall, and valid data on key variables was available for 98% (34,534) of these children. The (unweighted) number of children in each country, along with other details of the sample and relevant variables, are shown below in table 2.

## **3. Variables**

### ***3.1 Control variables***

Previous research has established that some demographic factors – such as age, gender, and household structure – relate to child subjective well-being. While such research lacks the diverse international coverage of children available in the Children's Worlds study, these variables were believed to provide important controls and were therefore included in analysis. Specifically, age, gender, number of parents in the child's household, and whether the child lived with any siblings and/or any grandparents were controlled for. However, it must be borne in mind that across such a diverse group of countries, western norms around household structure cannot be assumed to apply. As a result, care was taken to avoid assumptions about the cultural meanings of having no, one or two parents in a child's household, and of having grandparents living in the child's home. These factors were included in models, but were not assumed, for example, to indicate 'nuclear', 'lone parent', and 'extended' family types – rather, the meanings of different family structures will be culturally specific and, in themselves and in their association with children's subjective well-being, would form the basis of valuable future analysis.

### ***3.2 Economic and material living conditions***

Three kinds of measure of material resources were used in the analysis: a measure of individual material resources, indicators of inequality in school and country groups in terms of access to these material resources, and indicators of national-level wealth and inequality. These are now detailed in turn.

#### ***3.2.1 Individual material resources***

Gathering data on individual children's material living conditions is complex at both the practical level (children may struggle to provide accurate data on subjects normally used to

assess material living conditions, such as household income and household resources), and the theoretical level (even if children could supply such data, there is a question as to how far it can be assumed that household resources and income represent children's individual living standards). The Family Affluence Scale (Currie, Elton, Todd and Platt, 1997) was developed to address the practical issue of how to gain data on children's household resources, but does not address the question of whether *household* resources are a good indicator of *individual* material living conditions. In the context of the Children's Worlds study, this is further complicated by the economically and culturally diverse range of countries – for example, while Main (2013) developed an index of material deprivation designed based on children's perceptions of their needs and intended to be used with child respondents, this is specific to the economic and cultural situation of the UK and cannot be assumed to be more widely applicable, especially to much poorer countries and countries with very different cultural heritages. The material resources scale used in the Children's Worlds survey (Rees and Main, 2015) was developed based on a range of sources, including items intended to be broadly applicable to children across the range of countries, while avoiding homogeneity in countries at different extremes of the wealth spectrum (ie. avoiding all children in poorer countries lacking all items, and avoiding all children in richer countries having access to all items). Specific items included:

- Clothes in a good condition to go to school (clothes)
- Access to a computer at home (PC)
- Access to the internet (internet)
- Mobile phone (mobile)
- Own room (room)
- Books to read for fun (books)
- Family car for transportation (car)
- Own stuff to listen to music on (music)

The proportion of children lacking each item within and across participating countries is shown in table 1.

**Table 1: Proportions lacking each item by country and overall**

	<b>Clothes</b>	<b>PC</b>	<b>Internet</b>	<b>Mobile</b>	<b>Room</b>	<b>Books</b>	<b>Car</b>	<b>Music</b>
<b>Algeria</b>	2.53	47.09	55.28	60.46	62.02	27.35	41.6	55.02
<b>Nepal</b>	3.23	87.21	93.39	24.55	41.71	30.4	92.87	46.53
<b>Estonia</b>	0.62	2.89	2.22	4.12	27.94	4.45	13.83	11.71
<b>Spain</b>	2.13	5.7	6.94	44.43	18.49	9.72	13.39	14.14
<b>Colombia</b>	1.02	21.54	24.85	23.03	39.31	29.13	63.78	42.27
<b>Turkey</b>	4.9	18.16	22.95	59.73	33.26	10.18	42.49	42.97
<b>Ethiopia</b>	17.27	97.03	98.18	86.25	85.92	63.63	97.79	82.74
<b>S Korea</b>	0.95	3.82	3.03	10.21	11.13	4.09	7.45	9.68
<b>Germany</b>	2.11	16.22	8.98	7.6	10.82	20.89	6.62	5.37
<b>England</b>	0.27	5.51	3.27	15.73	17.34	9.53	10.98	5.08
<b>Israel</b>	1.34	5.04	5.92	19.77	29.22	6.78	7.75	18.7
<b>Romania</b>	0.82	13.49	20	17.69	36.55	11.7	41.3	13.25
<b>Norway</b>	0.28	2.05	0.7	2.51	7.04	3.52	3.22	1.14
<b>Poland</b>	1.07	2.45	3.7	5.35	7.99	14.18	10.87	9.41
<b>S Africa</b>	3.32	37.66	39.69	26.94	42.39	17.69	28.46	28.49
<b>Total</b>	<b>2.81</b>	<b>24.46</b>	<b>25.61</b>	<b>27.33</b>	<b>31.35</b>	<b>17.62</b>	<b>32.03</b>	<b>25.74</b>

A scale of material resources was summed by adding up the number of items children lacked (that is, the more items lacked, the higher the score). Mean scores on this scale are shown in table 2, along with key details of the sample and other variables described next. More details about the scale are presented in the findings section, where its structure and characteristics are explored in more depth.

### *3.2.2 School- and country-level material resources*

For school- and country-level material resources, mean scores and the standard deviations of scores on the material resource scale (detailed above) were calculated for each school and each country. These are intended to represent school- and country-level access to material resources and inequalities in such access.

### *3.2.3 Country-level economic indicators*

No data were available on the economic situations of children's households or schools. For country-level economic resources, Gross Domestic Product per capita (GDPPC) and Gini coefficients were imputed for each participating country. GDPPC was included to provide a measure of overall national wealth; Gini coefficients were included to provide a measure of (in)equality in the distribution of wealth within participating countries (with a coefficient of 0 representing complete equality, and 100 representing complete inequality). GDPPC and Gini coefficients were not normally distributed and so the natural log of each was used in the models.

## **3.3 Subjective well-being**

Subjective well-being was measured using the Personal Well-being Index – School Children (PWI-SC). This is a multidimensional measure of children's subjective well-being (Cummins and Lau, 2005). It was adapted from the adult PWI scale specifically for use with school children, drawing on simpler wording of items than were used with adults. Children were asked to rate

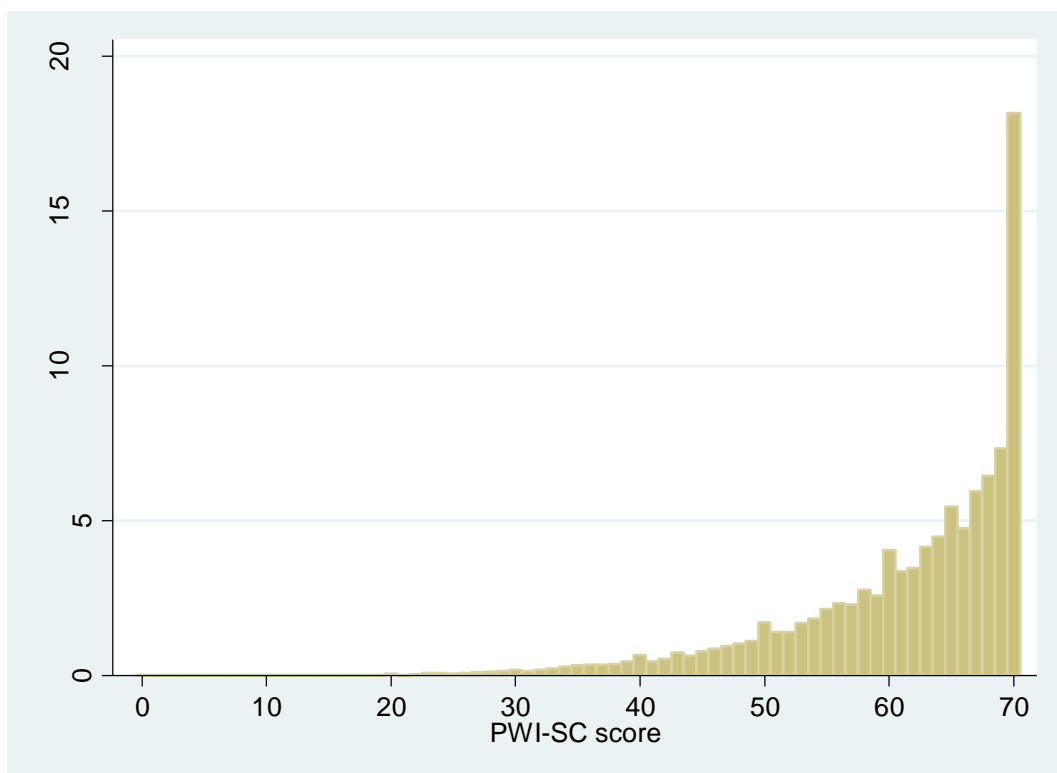


their satisfaction with various aspects of their lives on a 0-10 scale, with 0 representing 'not at all satisfied' and 10 representing 'totally satisfied'. Items comprised:

- All the things you have
- Your health
- Things you want to be good at
- Your relationships with people, generally<sup>6</sup>
- How safe you feel
- Doing things away from home
- What might happen to you later in life

Responses were then summed to form a scale ranging from 0-70. As would be expected in a subjective well-being measure, the distribution of responses was negatively skewed - shown in figure 1 (see, for example, Cummins (2003) and Lim (2008)).

**Figure 1: Distribution of scores on the PWI-SC**



### ***3.4 Summary of included variables***

Table 2 provides a descriptive summary of the variables used in analysis, with details of the deprivation scale overall and at the school level presented in table 3. A weighting variable was used which was constructed based on three criteria: to account for selection probability; to ensure the sample represented the population within each country in terms of age and gender; and to ensure that each country had an equal weight in comparative analysis (ie. countries with larger samples were weighted downwards so that they did not overly influence findings). It should be noted that weighting does not compensate for differential response rates based on

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<sup>6</sup> This item was included in the Children's Worlds survey in place of Cummins' item, 'getting on with people you know'.

participant characteristics (e.g. socio-economic status, etc). In table 2, unweighted numbers of participants and schools are provided for each country, but percentages are based on weighted totals.

**Table 2: Descriptive statistics for the sample**

Country	n	n schools	Age		Gender		N parents			Siblings		Grandparents		PWI-SC	GDP	Gini
			10	12	Boy	Girl	0	1	2	Yes	No	Yes	No			
Algeria	2,343	29	49.86	50.14	53.15	46.85	2.53	7.76	89.71	86.57	13.43	25.96	74.04	60.76	5360.70	35.3*
Colombia	1,850	29	49.61	50.39	48.73	51.27	4.78	35.72	59.49	68.56	31.44	25.57	74.43	64.56	7831.20	53.5
England	2,246	45	49.84	50.16	51.10	48.90	1.83	30.79	67.37	83.21	16.79	4.81	95.19	60.47	41787.50	32.3
Estonia	1,961	47	49.83	50.17	50.98	49.02	2.35	22.41	75.24	72.04	27.96	22.04	77.96	61.17	18783.10	32.7
Ethiopia	1,884	100	50.09	49.91	49.80	50.20	4.73	14.49	80.78	86.32	13.68	22.09	77.91	56.64	505.00	33.6
Germany	1,918	69	50.15	49.85	48.40	51.60	0.96	22.58	76.46	76.69	23.31	15.77	84.23	61.74	46268.60	30.6
Israel	1,817	39	50.13	49.87	47.61	52.39	0.83	9.67	89.50	91.09	8.91	6.76	93.24	63.25	36051.10	37.6
Nepal	1,939	88	49.83	50.17	49.56	50.44	2.80	10.84	86.36	84.66	15.34	59.98	40.02	56.19	694.10	32.8
Norway	1,873	38	49.59	50.41	43.75	56.25	0.73	23.63	75.65	84.88	15.12	5.05	94.95	63.39	100818.50	26.8
Poland	2,117	65	49.94	50.06	51.03	48.97	0.76	14.59	84.65	72.50	27.50	32.96	67.04	62.93	13648.00	32.8
Romania	2,816	139	49.81	50.19	52.48	47.52	4.36	13.04	82.60	67.99	32.01	35.11	64.89	65.50	9499.20	27.3
S Africa	2,064	28	48.66	51.34	45.84	54.16	6.03	29.04	64.93	77.67	22.33	34.04	65.96	58.09	6617.90	65.0
S Korea	4,998	232	50.00	50.00	46.30	53.70	0.71	8.06	91.23	84.87	15.13	13.16	86.84	57.49	25977.00	31.1
Spain	2,684	105	49.80	50.20	50.21	49.79	0.66	22.48	76.86	78.32	21.68	9.94	90.06	62.58	29863.20	35.8
Turkey	2,004	35	49.88	50.12	50.31	49.69	0.50	7.14	92.36	85.74	14.26	19.30	80.70	64.77	10971.70	40.0
<b>Total</b>	<b>34,354</b>	<b>1,088</b>	<b>49.80</b>	<b>50.20</b>	<b>49.29</b>	<b>50.71</b>	<b>2.29</b>	<b>18.09</b>	<b>79.62</b>	<b>80.07</b>	<b>19.93</b>	<b>22.16</b>	<b>77.84</b>	<b>61.30</b>		

n and n schools columns based on unweighted data; all other columns show % based on weighted data

\*Data on GDP per capita and Gini coefficients obtained from whichever of the World Bank or the CIA World Factbook had the most recent measure; only measures dated after 2011 were included, with the result that Algeria was not included in models incorporating Gini coefficient as the most recent measure was from 1995.

**Table 3: Material resources scale descriptive statistics overall and at the school level**

Country	School level				Overall			
	Mean	SD	Max	Min	Mean	SD	Max	Min
Algeria	3.21	0.62	4.38	1.97	3.43	2.00	8	0
Colombia	2.38	0.90	4.25	0.24	2.38	1.78	8	0
England	0.66	0.25	1.30	0.31	0.66	0.97	8	0
Estonia	0.67	0.28	1.38	0.17	0.67	0.92	6	0
Ethiopia	6.28	0.67	7.75	4.10	6.27	1.25	8	0
Germany	0.76	0.31	1.81	0.28	0.77	0.99	8	0
Israel	1.37	0.83	3.50	0.39	0.90	1.16	7	0
Nepal	3.95	0.64	5.43	2.33	3.96	1.54	8	0
Norway	0.20	0.11	0.50	0.00	0.20	0.54	6	0
Poland	0.55	0.23	1.13	0.13	0.54	0.98	8	0
Romania	1.50	0.81	4.13	0.12	1.51	1.58	8	0
S Africa	0.49	0.29	2.20	0.00	2.24	1.03	8	0
S Korea	2.24	0.93	3.75	0.41	0.49	1.86	8	0
Spain	1.14	0.46	2.13	0.33	1.13	1.13	7	0
Turkey	2.33	0.70	4.32	1.04	2.32	1.72	8	0
<b>Total</b>	<b>1.84</b>	<b>1.70</b>	<b>7.75</b>	<b>0</b>	<b>1.83</b>	<b>2.11</b>	<b>8</b>	<b>0</b>

SD-standard deviation; max-maximum; min-minimum

## 4. Analysis

Analysis is presented in two sections. Firstly the nature and characteristics of the material resources scale are explored, drawing on descriptive statistics and linear regression models examining the characteristics associated with the levels of material resources children reported access to. In these models, the hierarchical nature of the data is addressed through the use of Stata's `-svy-` commands, compensating for clustering around schools in the national samples. Secondly, multilevel models are presented assessing the associations between material resources and subjective well-being taking into account the hierarchical nature of the Children's Worlds data. The nature of the research question and the Children's Worlds study informed the decision to use a multilevel modelling approach. Multilevel models allow for an examination of the effects of individual- and group-level variables on individual-level outcomes. Since children participating in the study were recruited within schools and within countries, it may be expected that children within the same school and within the same country may vary in similar ways, and be more similar to one another, compared with children from different schools and countries. The type of multilevel model used in this analysis – a random intercepts and random slopes model – permits the examination of both fixed and random effects; that is, it allows for an examination of the random effects of different levels of analysis, and also of how fixed effects vary at different levels. Based on the analysis here, this meant that not only could the impact of individual, school, and country-level material resources on individual subjective well-being be examined, but the data could also be examined in terms of whether the mean levels of subjective well-being, and the associations between predictors of subjective well-being and outcomes, varied between school- and country groups.

Analysis was performed using Stata, and multilevel models used the `-xtmixed-` command. Initially, a random effects model (ie. including only the dependent variable, PWI) was tested including country and school as random effects levels but with no fixed predictors. Random effects were retained if their standard deviation was greater than 0.001. The fixed portion of the model was then built starting with the individual level then adding school and country level predictors. Control variables were entered first, followed by material resources and economic variables. Variables were retained if they made a statistically significant contribution to the model.

## 5. Findings

### 5.1 *The material resources scale*

As noted above, the material resources scale was created by summing the number of items lacked by children. The decision was taken to use a simple sum of the items lacked rather than apply prevalence weighting to the scale, as (in line with Hallerod et al.'s (1997) findings) prevalence weighting tends to make little difference to final results and can complicate interpretation of the resulting scale, which no longer has scores representing cumulative numbers of items lacked. Cronbach's Alpha was used to test the reliability of the material resources scale. Cronbach's Alpha scores vary between 0 and 1, with 1 indicating higher reliability and 0 indicating lower reliability, based on the internal consistency of scale items<sup>7</sup>. Nunnally et al. (1994) suggest that 0.70-0.95 represent acceptable values of Cronbach's Alpha; Tavakol and Dennick (2011) suggest scales failing to meet this threshold may be improved through introducing additional items (as the statistic is based partially on the number of contributing items), and revising or deleting items which do not contribute to the scale.

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<sup>7</sup> Cronbach's Alpha does not provide information on the dimensionality of measures; it is beyond the scope of this paper to provide a detailed analysis of the material resources scale, which is detailed further in Rees and Main (2015).

The overall Cronbach's Alpha for the scale, and the scores for each country, are shown in table 4. Across all participating countries, the scale is within Nunally et al's (1994) recommended range with an Alpha of 0.80. However, within each country the scale falls short of this standard. The extent of this shortfall varies from a score of 0.66 in Algeria and South Korea, suggesting that the scale is close to adequate, to a score of 0.37 in Germany, where the scale clearly falls far short of the expected standard. In terms of the contributions of specific items, the overall Cronbach's Alpha would be fractionally improved by the removal of 'clothes', with all other items making a contribution to the score; the removal of 'clothes' would also make fractional improvements in Algeria, Nepal, Colombia, Romania, and South Africa. The scale would be fractionally improved through the removal of 'books' in Colombia, Turkey, Germany, and Poland; by the removal of 'mobile' in Estonia and Spain; and by the removal of 'car' in Nepal. However, improvements resulting from these removals would be very minor, and as the overall score was within the acceptable range and no clear picture emerged for the removal of items across all country scores, all items were retained in subsequent analysis. The lack of an acceptable Cronbach's Alpha in any participating country perhaps reflects the challenge of measuring material resources over such a diverse group of countries. The inclusion of a wider set of items, reflecting the cultural and economic characteristics of a wider range of countries, is indicated in future research, to improve the measure for use at the individual country level. Thus while it is acknowledged that this scale requires a great deal of further development, and ideally the input of children in participating countries, it represents one of the first efforts to examine the impact of material resources on subjective well-being across a very diverse group of countries. As above regarding family structure, a great deal more work in this area is indicated and one of the aims of this article is to provide a starting point for such work.

**Table 4: Cronbach's Alpha for the material resources scale, overall and within each country**

Country	Cronbach's Alpha
<b>Overall</b>	<b>0.80</b>
Algeria	0.66
Colombia	0.63
England	0.43
Estonia	0.40
Ethiopia	0.54
Germany	0.37
Israel	0.55
Nepal	0.43
Norway	0.40
Poland	0.56
Romania	0.65
S Africa	0.65
S Korea	0.66
Spain	0.38
Turkey	0.60

To provide insight into the face validity of the items comprising the material resources scale, as well as the scale as a whole, items were tested for significant association with children's reports of their satisfaction with all the things they have (which in the later analysis forms part of the PWI, used to measure subjective well-being). A significant and negative association would be expected if items and the scale they form represent a valid measure of material resources which is relevant to children's own conceptions of their material wants and needs.

Table 5 shows the beta coefficients associated with individual resources and the material resource scale, when entered alone into a linear regression predicting scores on the variable

asking children to rate their satisfaction with all the things they have. In the overall sample, as shown in the second row of the table, all resources are significantly associated with children's satisfaction with their things. The full material resources scale, as shown in the final column of the table, is significantly associated with children's satisfaction with their things, overall and within each country. Looking to the individual items, having clothes in a good condition to go to school has no significant association with children's satisfaction with their things in four countries (England, Estonia, Romania and South Korea); access to the internet has no such significant association in one country (England); having a mobile phone has no significant association in four countries (Colombia, Estonia, Germany and Norway); having their own room has no significant association in two countries (Germany and Nepal); having a car has no significant association in five countries (England, Ethiopia, Germany, Nepal and Norway); and having access to things to play music has no significant association in one country (Germany). Looking to the individual countries, one of the items has no significant association with children's satisfaction with their things in Colombia, Ethiopia, Romania, and South Korea; two of the items have no such significant association in Estonia, Nepal and Norway; three of the items have no significant association in England; and four of the items have no significant association in Germany. Thus the individual items appear to have the highest face validity in Algeria, Israel, Poland, South Africa, Spain and Turkey, in which countries all items are significantly associated with children's satisfaction with their things. Conversely, in England and Germany in particular, many of the contributing items may not be providing a good measure of children's perceptions of their material wants and needs.

**Table 5: Beta coefficients from linear regressions of material resources items and scale on children's satisfaction with their things**

	Clothes	Computer	Internet	Mobile	Room	Books	Car	Music	Full scale
Overall	-2.43**	-1.19**	-1.17**	-0.90*	-0.92**	-1.28**	-0.77*	-1.11**	-0.32**
Algeria	-3.45**	-1.69**	-1.55**	-0.91**	-1.15**	-1.77**	-1.26**	-1.16**	-0.56**
Colombia	-1.85**	-0.50**	-0.54**	-0.21 NS	-0.36**	-0.48**	-0.24*	-0.30**	-0.16**
England	-2.14 NS	-0.66*	-0.26 NS	-0.41**	-0.49**	-0.49*	-0.17 NS	-1.01**	-0.29**
Estonia	-2.47 NS	-2.25**	-2.16**	-0.34 NS	-0.85**	-1.52**	-0.65**	-1.19**	-0.66**
Ethiopia	-1.94**	-1.13**	-2.06**	-1.31**	-1.47**	-1.94**	-0.63 NS	-1.40**	-0.86**
Germany	-2.11**	-0.44**	-0.43*	-0.23 NS	-0.09 NS	-0.38**	-0.41 NS	-0.52 NS	-0.28**
Israel	-1.38**	-2.01**	-1.71**	-0.46**	-0.53**	-1.06**	-0.72**	-0.92**	-0.44**
Nepal	-1.45**	-0.38*	-0.46*	-0.65**	-0.30 NS	-0.44**	-0.07 NS	-0.42**	-0.23**
Norway	-0.53*	-0.66**	-1.37**	-0.51 NS	-0.47*	-1.18**	-0.27 NS	-1.13*	-0.42**
Poland	-1.79**	-1.06*	-0.76*	-0.39*	-0.59**	-0.61**	-0.43**	-0.68**	-0.31**
Romania	-2.27 NS	-0.69**	-0.56**	-0.40**	-0.34**	-0.52**	-0.27**	-0.61**	-0.20**
S Africa	-1.56**	-0.56**	-0.62**	-0.91**	-0.52**	-0.88**	-0.42**	-1.13**	-0.31**
S Korea	-0.69 NS	-1.09**	-1.28**	-0.53**	-0.82**	-1.54**	-0.58**	-0.80**	-0.35**
Spain	-0.69*	-0.72**	-0.74**	-0.24**	-0.28*	-0.53**	-0.57**	-0.47**	-0.29**
Turkey	-1.38**	-0.73**	-0.80**	-0.47**	-0.84**	-0.91**	-0.59**	-0.64**	-0.33**

NS Not significant \* Significant at the 0.05 level \*\* Significant at the 0.01 level

An additional test of the validity of the scale was performed through a comparison between access to material resources (both the mean level of resources in each country and the standard deviation of scores on the material resources scale within each country) and national-level measures of wealth and inequality, namely the GDP per capita and the Gini coefficients for each country. Given that individual-level access to material resources does not and is not intended to represent a measure of either national wealth or inequality, a perfect relationship would not be expected; however it would be expected that the measures may correlate. Further, it would be expected that the strongest correlations would be between the respective measures of the levels of resources available (means of the material resources scale, and GDP), and of inequalities in access to resources (standard deviations on the material resources scale, and Gini coefficients).

Table 6 shows rankings of countries by material resources (mean and standard deviation), GDP and Gini coefficient. The material resources scale does, as expected, not produce a ranking of countries identical to that produced by GDP and Gini coefficients. However, based on Spearman's Rho, significant correlations were found between means on the material resources scale and GDP ( $r=0.83$ ), and between standard deviations on the material resources scale and Gini coefficients ( $r=0.72^{**}$ ). The associations between means on the material resources scale and GDP, and standard deviations on the material resources scale and Gini coefficients, are illustrated in chart 2 and 3 respectively.

**Table 6: Country rankings by mean of material resources, GDP, standard deviation of material resources, and Gini coefficient**

Country	Mean material resources	GDP	SD material resources	Gini
Norway	1	1	1	1
S Korea	2	6	6	4
Poland	3	8	5	8
England	4	3	3	5
Estonia	5	7	2	6
Germany	6	2	4	3
Israel	7	4	8	11
Spain	8	5	7	10
Romania	9	10	10	2
S Africa	10	12	14	14
Turkey	11	9	13	12
Colombia	12	11	12	13
Algeria	13	13	15	<i>N/A</i>
Nepal	14	14	11	7
Ethiopia	15	15	9	9

**Chart 2: Mean material resources and GDP per capita**





	scale								
Norway	0.20	0.19	0.17	0.17	0.13	0.18	0.20	0.18	0.20
S Korea	0.49	0.40	0.42	0.45	0.38	0.39	0.46	0.45	0.48
Poland	0.54	0.45	0.43	0.40	0.46	0.49	0.50	0.52	0.53
England	0.66	0.61	0.56	0.57	0.49	0.51	0.63	0.61	0.66
Estonia	0.67	0.55	0.53	0.62	0.39	0.62	0.64	0.64	0.66
Germany	0.77	0.72	0.71	0.57	0.66	0.69	0.68	0.61	0.75
Israel	0.90	0.71	0.82	0.83	0.61	0.72	0.84	0.85	0.88
Spain	1.13	0.99	1.00	1.04	0.95	0.69	1.06	1.08	1.11
Romania	1.51	1.38	1.11	1.39	1.15	1.33	1.31	1.38	1.50
<b>Overall</b>	<b>1.83</b>	<b>1.58</b>	<b>1.52</b>	<b>1.66</b>	<b>1.52</b>	<b>1.56</b>	<b>1.58</b>	<b>1.59</b>	<b>1.80</b>
S Africa	2.24	1.96	1.96	2.07	1.82	1.97	1.85	1.87	2.21
Turkey	2.32	1.90	1.90	2.22	1.99	1.73	2.10	2.14	2.28
Colombia	2.38	1.97	1.76	2.09	1.99	2.15	2.14	2.17	2.37
Algeria	3.43	2.89	3.02	3.16	2.82	2.84	2.90	2.97	3.41
Nepal	3.96	3.51	3.08	3.66	3.55	3.72	3.14	3.12	3.93
Ethiopia	6.27	5.45	5.30	5.64	5.42	5.41	5.29	5.30	6.10

A further consideration is the structure of children's access to material resources across the participating countries. Unfortunately, as noted above, comparatively few questions regarding children's broader objective living conditions were included in the Children's Worlds survey; but the control variables outlined above (i.e. age group, gender, number of parents in the child's home, whether they live with siblings, and whether they live with grandparents) can be used to offer some initial insight into whether the factors associated with children's access to material resources are broadly similar in the diverse national contexts. This was tested through linear regression analysis for each country, examining the predictors of scores on the material resources scale.

Results are presented in table 8. On the whole, these factors have very limited power to predict variation in children's access to material resources across all surveyed countries, with the proportion of variance explained by the models ranging from 0% (in Nepal) to 7% (in Romania and Spain). This indicates the need for a wider range of predictors in future research, including ideally measures relating to the material and financial resources available to children's households as well as other factors whose relevance may vary in different national and cultural contexts. Turning to the predictors in this model, a negative beta coefficient indicates greater access to material resources (since the scale is a sum of resources lacked), while a positive coefficient indicates lower access. Age was a significant predictor in nine of the 15 countries, with 12-year-olds having greater access to material resources in eight of these countries, and lower access in only one country – Colombia. Gender was a significant predictor in five countries, with girls having greater access in three of these (Norway, Poland and South Korea), and lower access in two (Algeria and Nepal). The number of parents children live with was significant in seven countries, and in almost all cases living with one or two parents was associated with greater access to material resources. The only exception to this is in South Africa, where those living with one parent have greater access than those living with none, but those living with two parents are not significantly different to those living with no parents. Of the seven countries where living with siblings is significantly associated with access to material resources, this is associated with lower levels of access in all but one country – Algeria – where those living with siblings have greater access to resources. Living with grandparents only had a significant association with access to material resources, with those in Estonia having lower access to material resources if they lived with grandparents, and those in Germany having greater access to such resources.

**Table 8: Linear regressions examining the predictors of material resources in each country**

		Algeria	Colombia	England	Estonia	Ethiopia	Germany	Israel	Nepal	Norway	Poland	Romania	S Africa	S Korea	Spain	Turkey
Age group (ref: 10)	12	-0.02 NS	0.41**	-0.33**	-0.06 NS	0.04 NS	-0.23**	-0.32**	-0.04 NS	-0.08*	-0.02 NS	-0.31**	-0.07 NS	-0.13**	-0.53**	-0.29*
Gender (ref: boy)	Girl	0.44**	0.21 NS	-0.11 NS	0.02 NS	0.08 NS	-0.06 NS	-0.01 NS	0.15*	-0.06*	-0.24**	0.08 NS	0.04 NS	-0.17**	-0.08 NS	-0.01 NS
N parents (ref: 0)	1	0.54 NS	-0.24 NS	-0.11 NS	-0.01 NS	-0.10 NS	0.12 NS	-1.11*	0.33 NS	-0.20 NS	-0.71 NS	-1.19**	-0.02 NS	-0.07 NS	-0.97**	-1.10 NS
	2	0.01 NS	-0.86**	-0.36 NS	-0.39*	-0.27 NS	-0.15 NS	-1.23**	0.24 NS	-0.29 NS	-1.11 NS	-1.56**	0.90**	-0.56*	-1.19**	-1.03 NS
Siblings (ref: no)	Yes	-0.23*	0.29**	0.21**	0.03 NS	0.31 NS	0.18**	-0.03 NS	0.07 NS	0.04 NS	-0.02 NS	0.53**	0.15 NS	0.08 NS	0.23**	0.29*
Grandparents (ref: no)	Yes	-0.02 NS	-0.08 NS	-0.05 NS	0.12*	-0.05 NS	-0.17**	0.16 NS	-0.05 NS	0.03 NS	0.08 NS	0.07 NS	-0.01 NS	0.04 NS	-0.02 NS	0.07 NS
Constant		3.39	2.49	0.99	0.93	6.19	0.90	2.29	3.63	0.51	1.70	2.69	2.73	1.08	2.40	3.25
R <sup>2</sup>		0.02	0.05	0.05	0.04	0.01	0.03	0.03	0.00	0.02	0.05	0.07	0.05	0.03	0.07	0.01

NS not significant \* Significant at the 0.05 level \*\* Significant at the 0.01 level

## ***5.2 Material resources and subjective well-being***

As noted above, a multilevel modelling approach was selected to examine the impact of material well-being on subjective well-being across the schools and countries included in the Children's Worlds survey. However, as a starting point single-level linear regression models were run for each country, using Stata's `-svy-` command to compensate for clustering at the school level. These models offer insight into the power of material resources to explain variation in subjective well-being at the country level, and provide a comparison between the various participating countries in terms of the magnitude of associations.

Results are shown in table 9. Beta coefficients are presented for linear regressions examining the association between material resources and subjective well-being, controlling for age group, gender, number of parents the child lives with, whether they live with siblings or not, and whether they live with grandparents or not. Only material resources has a significant association with subjective well-being across all the countries. Whilst the magnitude of this association varies (from a loss of -0.77 points in Colombia and in Nepal, to a loss of 2.85 points in Estonia), the direction of the association – i.e. that increasing levels of lack of material resources is association with decreasing levels of well-being – is consistent. Looking to the proportion of variation explained by the model, this varies from 4% in Nepal, to 14% in Turkey. Thus the association of material resources to subjective well-being, while present across the different countries, differs in magnitude. This supports the need for using multilevel modelling techniques to examine the impact of material resources on subjective well-being across the diverse countries, while taking into account the different levels at which the Children's Worlds data is clustered (i.e. schools and countries).

**Table 9: Linear regression models showing associations between material resources and subjective well-being in the 15 countries**

		Algeria	Colombia	England	Estonia	Ethiopia	Germany	Israel	Nepal	Norway	Poland	Romania	S Africa	S Korea	Spain	Turkey
Age group (ref: 10)	12	-1.06 NS	-1.51**	-2.33**	-1.80**	-0.53 NS	-3.53**	-0.50 NS	-1.78*	-1.61**	-3.34**	-0.75*	-0.65 NS	-5.61**	-3.10**	-3.73**
Gender (ref: boy)	Girl	1.29**	1.43**	-1.23*	1.08*	0.76 NS	-0.90*	0.75 NS	1.78**	-0.89 NS	-0.43 NS	0.57*	-0.83 NS	-2.31**	-0.12 NS	0.13 NS
N parents (ref: 0)	1	1.96 NS	2.18 NS	1.91 NS	1.32 NS	-0.76 NS	-2.56 NS	-0.38 NS	2.57 NS	-0.77 NS	3.83 NS	0.51 NS	-0.24 NS	-0.43 NS	2.37 NS	0.63 NS
	2	2.11 NS	3.24 NS	4.15*	2.41 NS	1.86 NS	0.33 NS	0.03 NS	2.65 NS	0.56 NS	5.14 NS	0.83 NS	1.19 NS	2.64 NS	2.86 NS	3.92 NS
Siblings (ref: no)	Yes	0.30 NS	1.19 NS	-0.34 NS	-0.02 NS	0.95 NS	0.12 NS	0.77 NS	0.96 NS	0.91 NS	-0.97 NS	-0.05 NS	1.79*	-0.64 NS	0.70*	-0.44 NS
Grandparents (ref: no)	Yes	-0.53 NS	0.92 NS	0.61 NS	0.04 NS	-0.92 NS	-0.31 NS	0.48 NS	-1.96**	-0.89 NS	1.21*	0.24 NS	-0.13 NS	-0.24 NS	0.28 NS	-0.71 NS
Material resources scale		-1.36**	-0.77**	-2.67**	-2.85**	-2.04**	-2.00**	-2.45**	-0.77**	-2.69**	-2.49**	-1.08**	-1.62**	-1.58**	-1.84**	-1.44**
Constant		63.19	62.66	60.90	61.34	67.33	65.79	64.57	57.05	64.28	60.80	66.43	60.47	60.52	62.98	66.78
R <sup>2</sup>		0.10	0.07	0.08	0.11	0.08	0.12	0.10	0.04	0.07	0.11	0.09	0.10	0.10	0.08	0.14

Table 10 shows key stages in the process of building the models as described above. Several variables discussed above are not present in these models as they did not make a significant contribution. Variables omitted from the models as a result of non-significance include<sup>8</sup>:

- Gender, siblings and grandparents (controls) as individual-level fixed effects
- The standard deviation of material resources as a school- or country-level fixed effect
- GDP per capita and Gini coefficient as country-level fixed effects

Model 1 shows that there are reasonably sizeable random effects at both the school and the country level. Model 2 shows that, as we may expect from previous research, subjective well-being declines with age and is impacted by the number of adults in a child's household. However, between them these two control variables only explain about 2% of the variation in subjective well-being. Model 3 demonstrates that the material resources scale offers a significant improvement to the model, tripling its explanatory power. However it must be borne in mind that at 6% the model still offers little insight into how subjective well-being varies according to characteristics and experiences. This corroborates previous findings that individual-level material resources are important to children's subjective well-being, but also indicates that further work may be needed to develop a scale which is relevant to children in diverse national and cultural settings.

Models 4 and 5 introduce fixed effects at first the school then the country level. At each level, predictors relating to lower-order levels are included (e.g. individual-level material resources is included at the school and the country level). The result of this is that the variables at the individual level show the slope associated with the predictor in the overall sample, and the school and country levels show the standard deviation of this slope between schools and countries. As noted above, GDP per capita and Gini coefficient were found to make very minimal differences to the slopes at the country level ( $SD < 0.0001$ ), and so are not included in these models. However, individual level material resources and school mean material resources make a substantial contribution in model 4, and when country effects are added in model 5 these remain substantial. On the country level, individual-, school- and country means of material resources make a significant contribution.

In addition to these models, shown in table 10, it is possible to produce Best Linear Unbiased Predictions (BLUPs) of fixed-effect variables at school and country levels. Due to the large number of schools ( $n=1,087$ ), BLUPs at the school level are not presented. BLUPs for country-level fixed effects (individual, school, and country-level material resources) are presented in table 11. These can be interpreted as the slopes for these variables, at the country level. The country-level intercept is also presented in table 11. The importance of allowing different intercepts at the country level is revealed in these findings: compared to an overall intercept of 62.90, country-level intercepts vary from 56.92 in South Korea to 66.08 in Turkey – a difference of nearly 10 points on the 70-point scale. An examination of the country-level BLUPs also reveals substantial differences in the slopes for each country based on material resources related variables. The strongest country-level impact of individual-level material resources can be found in Estonia, where children lose 2.70 points on the scale for each item they lack. In contrast, children in Nepal lose only 0.72 points for each item lacked. The impact of school-level material resources on individual-level well-being within countries is also relatively large but varied between countries; children in South Korea lose only 1.42 points based on the level of material resources within their schools, while children in Nepal, in contrast to the limited loss based on individual lack, lose 2.35 points based on school-level material resources. That is, in Nepal, individual access to resources appears to make less of a difference to subjective well-

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<sup>8</sup> Models including these variables were constructed in the background work for this paper and are available on request.

being than attending a school where the average level of resources is lower does. Similarly, material resources at the country level make a substantial difference (as for school-level material resources, in all countries more than one point on the subjective well-being scale is lost for each decline of one material resources item on the country average scale). At the country level, children in Ethiopia are least impacted, losing 1.38 points on the subjective well-being scale compared to children in other countries. Children in Nepal are again the most affected, losing 2.15 points compared to children in other countries.

**Table 10: Multi-level Models**

		<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Individual level</b>						
Age group (Ref: 10)			-1.73**	-1.88**	-2.01**	-2.03**
N parents (Ref: none)	1		1.11**	0.87**	0.86**	0.90**
	2		2.95**	2.31**	2.28**	2.28**
Material resources				-1.52**	-1.58**	-1.77**
Constant		61.32	59.63	63.06	63.10	62.90
Wald $\chi^2$		-	212.73**	155.64**	148.80**	185.40**
r <sup>2</sup>		-	0.02	0.06	0.06	0.06
<b>School level</b>						
School level: SD (CI)	Mat. res.				0.93 (0.64-1.35)	0.81 (0.57-1.15)
	School mat. res.				0.23 (0.03-1.91)	0.25 (0.04-1.45)
	School level	2.92 (2.24-3.80)	2.93 (2.24-3.85)	2.78 (1.98-3.90)	1.15 (0.70-1.88)	1.17 (0.74-1.87)
<b>Country level</b>						
Country level: SD (CI)	Mat. res.					0.66 (0.51-0.87)
	School mat. res.					0.36 (0.19-0.68)
	Country mat. res.					0.52 (0.14-1.89)
	Country level	2.58 (1.84-3.61)	2.40 (1.65-3.51)	2.25 (1.54-3.28)	2.69 (1.91-3.79)	2.48 (1.29-4.78)
Log likelihood		-105480.04	-105249.89	-104529.30	-104326.99	-104273.56

\*\* denotes significance at the 0.01 level; \* denotes significance at the 0.05 level. SD: Standard Deviation; CI: 95% Confidence Interval



**Table 11: Country-level intercepts and BLUPs**

	<b>Country intercept</b>	<b>Individual mat. res. slope</b>	<b>School mat. res. slope</b>	<b>Country mat. res. Slope</b>
Algeria	63.65	-1.35	-1.69	-1.66
Colombia	65.19	-0.86	-1.77	-1.54
England	61.39	-2.63	-1.73	-1.81
Estonia	61.71	-2.70	-1.50	-1.80
Ethiopia	64.35	-1.45	-2.10	-1.38
Germany	62.37	-1.90	-1.63	-1.79
Israel	64.24	-2.60	-1.52	-1.71
Nepal	60.68	-0.72	-2.35	-2.15
Norway	63.02	-2.35	-1.83	-1.77
Poland	63.23	-2.41	-1.83	-1.76
Romania	66.02	-1.04	-1.92	-1.57
S Africa	61.77	-1.78	-1.92	-1.88
S Korea	56.92	-1.58	-1.42	-1.90
Spain	63.40	-1.72	-1.59	-1.75
Turkey	66.08	-1.45	-1.69	-1.44

## 6. Discussion

This analysis draws on data from the Children's Worlds survey to explore links between national level indicators of wealth and inequality (GDP, Gini coefficients, and average levels of material resources), individual indicators of material well-being (the material resources children report having access to), and subjective well-being. With respect to findings from other studies it is still necessary to get data about indicators of children's financial and material living conditions and how they are associated with their subjective well-being. And we need more research on the question of how such associations vary between different countries and within countries.

Using the multi-level models we get some important insights on children's material well-being, and the levels of wealth and inequality in societies within which children live. A main result is that national-level monetary indicators of material well-being (ie. GDPPC and Gini coefficients) are not related to PWI. However, the material resources index used in the Children's Worlds study remains important in predicting children's subjective well-being – both at an individual level, at a school level, and at a country level. That is, although indirect (monetary) indicators of material well-being do not help to explain variation in subjective well-being within or between countries, a more direct measure based on the resources children have access to (and school- and country-level averages of this) can provide insight into how different levels of material provision impact children's lives.

From a child research perspective it is interesting to bear in mind that some of the variables which can be omitted from the models as a result of non-significance include gender, siblings and grandparents as individual-level fixed effects, the standard deviation of material resources as a school- or country-level fixed effect and GDP per capita and Gini coefficient as country-level fixed effects (see above). The supportive role of grandparents is discussed especially for the subjective well-being of children. But in this analysis the effects are not significant for the sample as a whole (although it should be borne in mind that such associations were not our primary research question and alternative approaches, including examining differing effects in different countries, may be better suited to exploring these associations).

Model 2 has shown that age and number of adults in households have an effect on levels of subjective well-being, but explain only 2% of the variation. This is also interesting because in general we can see that age differences matter a lot. On average, across all participating countries, subjective well-being declined between the ages of 10 and 12. Nevertheless, the low explanatory power of age in the model shows that it would be an over-simplification to explain variations only with developmental stages in childhood and adolescence. Structural and material aspects of children's lives are more important. To this end, Model 3 demonstrates that the material resources scale offers a significant improvement to the model, tripling its explanatory power (but still explaining only around 6% of the variation).

In general therefore, a key finding of our research is that child-level material deprivation as an approach to poverty measurement can be used together with the concept of subjective well-being of children to provide insight into children's lives and happiness. As Main and Besemer (2014) argued, this can facilitate an understanding of what constitutes poverty in line with Montserrat, Casas and Moura (2015) where the analysed dimensions of poverty (material conditions, education, satisfaction with home and subjective poverty) were negative predictors for the Domains Satisfaction General Index. However, more research has to be done on the question how the indicators used in Children's Worlds corresponds with children's individual material resources in all countries – here, we have

avoided referring to the material resources scale as an indicator of deprivation since the meanings and prevalence of items varies widely between the different participating countries.

Our analysis results also show that while the level of material resources at individual, school, and country mattered for children's subjective well-being, the variability in the distribution of material resources did not. All of the measures trying to capture the levels of inequality in material resources (S.D. of material resources at school and country levels and Gini coefficient at country level) were not statistically significant factors affecting children's subjective well-being at the individual level. The findings suggest that children might be more sensitive towards the 'absolute' level of materials resources than to comparisons with those they encounter in their daily lives. However, an alternative interpretation may be that the material resources included in the Children's Worlds survey require development in order to ensure they are adequately measuring those most important to children in the diverse range of national and cultural contexts included in the study.

The BLUPs findings presented in Table 4 also show interesting results. We find that the effects of individual material resources are different across the countries. It seems that the effects are stronger in England, Estonia, Israel, Norway, and Poland than the others. It should be also noted that the magnitude of influences material resources have differ between individual-level and school-level across countries. For example, Ethiopia and Nepal showed lower level of effects at the individual level, but higher level of effects at the school level. While further study is needed to establish what these findings mean, it is clear at this point that the relationship between children's subjective well-being and material resources should be understood within different cultural and socio-economic settings.

Finally, it is important to note that the purpose of this paper is to offer a starting point with regards to understanding the associations between children's material resources and their subjective well-being in internationally comparative work. The limitations of the index of material resources are detailed above; a great deal of work is needed to develop and refine such indices, particularly making them in consultation with children. Such work may firstly increase the explanatory power of a material resources measure through its increased pertinence to the lives of the children in question; and secondly may help offer insight into how and why associations differ between countries.

## References

- Abdallah, S., Main, G., Pople, L., & Rees, G. (2014) *Ways to well-being: Exploring the links between children's activities and their subjective well-being*. The children society
- Andresen, S., Fegter, S., Hurrelmann, K. Pupeter, M., & Schneekloth, U. (2015). Child Poverty in Germany: Conceptual Aspects and Core Findings. In E. Fernandez, A., Zeira, T. Vecchiato and C. Canali. (Eds), *Theoretical and Empirical Insights into Child and Family Poverty: Cross national perspectives* (pp. 127-140). Dordrecht: Springer.
- Bradshaw, J., Martorano, B., Natali, L. & de Neubourg, C. (2013). Children's Subjective Well-being in Rich Countries, *Child Indicators Research*, 6, 4, 619–635.
- Bradshaw, J. (2015) Child poverty and child well-being in international perspective. In E. Fernandez, A., Zeira, T. Vecchiato and C. Canali. (Eds), *Theoretical and Empirical Insights into Child and Family Poverty: Cross national perspectives* (pp. 59-70). Dordrecht: Springer
- Bradshaw, J., Keung, A., Rees, G., & Goswami, H. (2011). Children's subjective well-being: International comparative perspectives. *Children and Youth Services Review* 33, 548–556
- Casas, F., González, M., Navarro, D. & Aligué, M. (2013). Children as Advisers of Their Researchers: Assuming a Different Status for Children. *Child Indicators Research*, 6, 193-212.
- Cummins, A. R. (2003). Normative life satisfaction: Measurement issues and a homeostatic model. *Social Indicators Research*, 64, 2, 225-240.
- Cummins, R. A. & Lau, A. L. D. (2005) *Personal Well-being Index-School Children (PWI-SC)*. Manual. Available online at <http://www.deakin.edu.au/research/acqol/instruments/wellbeing-index/pwi-school.pdf>.
- Currie, C. E., Elton, R. A., Todd, J., & Platt, S. (1997). Indicators of socioeconomic status for adolescents: the WHO Health Behaviour in School-aged Children survey. *Health Education Research*, 12, 3, 385-397.
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95, 3, 542-575.
- Dinisman, T., Montserrat, C. & Casas, F. (2012). The subjective well-being of Spanish adolescents: Variations according to different living arrangements. *Children and Youth Services Review*, 34, 12, 2374-2380.
- 
- Gross-Manos, D. (2015). Material deprivation and social exclusion of children: Lessons from measurement attempts among children in Israel. *Journal of Social Policy* 44, 1, 105-125
- Klocke, A., Clair, A., & Bradshaw, J. (2014). International Variation in Child Subjective Well-Being. *Child Indicators Research*. 7, 1, 1-20.
- Lim, H. E. (2008). The use of different happiness rating scales: Bias and comparison problem? *Social Indicators Research*, 87, 259-267.
- Llosada-Gistau, J., Montserrat, C., & Casas, F. (2015). The subjective well-being of adolescents in residential care compared to that of the general population, *Children and Youth Services Review*, 52, 150-157.
- Main, G. (2013). *A child-derived material deprivation index*. Unpublished thesis, available online at <http://etheses.whiterose.ac.uk/5516/>
- Main, G., & Bradshaw, J. (2012). A child material deprivation index. *Child Indicators Research*, 5(3), 503-521.
- Main, G., & Besemer, K. (2014). Children's Material Living Standards in Rich Countries. In A. Ben-Arieh, F. Casas, I. Frønes, & J. Korbin (Eds). *Handbook of Child Well-Being*, (pp. 1445-1477). Springer Reference.

- Montserrat, C., Dinisman, T., Baltatescu, S., Grigoras, B.A. & Casas, F. (2015). The Effect of Critical Changes and Gender on Adolescents' Subjective Well-Being: Comparisons Across 8 Countries. *Child Indicators Research*, 8, 1, 111–131
- Montserrat, C., Casas, F., & Moura, J. (2015). Children's subjective well-being in disadvantaged situations, In E. Fernández, A. Zeira, T. Vechiatto, and C. Canali (Eds.), *Theoretical and Empirical Insights into Child and Family Poverty: Cross national perspectives* (pp. 111-126). Dordrecht: Springer.
- Helliwell, John F., Layard, R., & Sachs, J. (Eds.) (2015). *World Happiness Report 2015*. New York: Sustainable Development Solutions Network
- Rees, G., Goswami, H., Pople, L., Bradshaw, J., Keung, A., & Main, G. (2012). *The good childhood report*. England: The Children's Society and University of York.
- Rees, G., & Main, G. (Eds) (2015) *Children's views on their lives and well-being in 15 countries: An initial report on the Children's Worlds survey, 2013-14*. York, UK: Children's Worlds Project (ISCWeB)
- The Children's Society (2014). *The Good Childhood Report 2014*. London: The Children's Society
- UNICEF (2007). *Child poverty in perspective: An overview of child well-being in rich countries*, Innocenti Report Card 7. Florence, Italy: UNICEF, Innocenti Research Centre.
- UNICEF (2014). *Children of the Recession: The impact of the economic crisis on child well-being in rich countries*, Innocenti Report Card 12. Florence, Italy: UNICEF, Innocenti Research Centre
- World Vision (2013). *Wie gerecht ist unsere Welt? Kinder in Deutschland 2013 (Vol. 3)*. Weinheim: Worl Vision Kinderstudie.
- Nunnally, J., & Bernstein, L. (1994). *Psychometric theory*. New York: McGraw-Hill Higher, INC
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education*, 2, 53-55.