



Assessing child well-being through a new multidimensional child-based weighting scheme index: An empirical estimation for Portugal

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ABSTRACT

Assessing child well-being through composite summary indexes is one of the most recent developments regarding child well-being measurement. Using a new index that takes into account the children's own perspectives, this paper presents empirical evidence on the main determinants of overall child well-being. Econometric estimations, based on a sample of 1246 children enrolled in the 3rd–6th grades of schools located in the Northern region of Portugal, convey two main results: (1) the parents' educational background and professional status, in particular, an unemployed father, are the most important factors affecting child well-being and (2) children from households with double or foreign nationality are worse off than those with Portuguese nationality. These results support the positive role of policies targeting the qualifications and employment opportunities for parents, as well as the need for inclusive policies for immigrant households as a way to improve their children's well-being.

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1. Introduction

Assessing child well-being through composite summary indexes is one of the most recent developments regarding child well-being measurements (Ben-Arieh, 2008). Evidence can be found in several research studies focusing on composite measures of child well-being that have proliferated throughout the U.S.A. and Europe, namely those by Land et al. (2001, 2007), Bradshaw et al. (2007), Bradshaw and Richardson (2009), Moore et al. (2007, 2008), Bastos et al. (2004, 2008) and Bastos and Machado (2009).¹

Although representing a valuable contribution to the field, the abovementioned studies have some methodological shortcomings (Fernandes et al., 2012a,b), namely the fact that they do not properly take into account children's perspectives (e.g., Land et al., 2001, 2007; Bradshaw et al., 2007; Moore et al., 2007, 2008; Bradshaw and Richardson, 2009), and equal weights are attributed to each indicator and to each dimension of well-being (e.g., Land et al., 2001, 2007; Bradshaw et al., 2007; Moore et al., 2007, 2008; Bastos et al., 2004, 2008; Bradshaw and Richardson, 2009).

Bearing these methodological challenges in mind, Fernandes et al. (2012a) proposed a weighted microdata composite index

of child well-being which incorporates the children's individual perceptions about relevant aspects of their lives. This proposal, however, lacks as yet empirical validation.

This essay departs from the methodological contribution of Fernandes et al. (2012a) and econometrically assesses the determinants of child well-being. In the pursuit of this objective, data on Portuguese children enrolled in the third, fourth, fifth and sixth grades was gathered. Results from the estimation exercise are then compared with those from previous research work in the field.

Hence, this paper is structured as follows: first, a literature review is conducted on the main features and results of the most recent and relevant research works on the measurement of child well-being through composite summary indexes (Section 2); the next section (Section 3) proceeds to explain the methodology used to operationalize the proposed index and outline some hypotheses regarding the results we expected to obtain; Section 4 describes the main statistics of our results and estimates an OLS model in order to assess the factors that explain variations in the overall child well-being; in Section 5 some of the policy implications of our results are discussed; and, finally, Section 6 draws some conclusions.

2. Literature review on the main works focusing the measurement of child well-being through composite indexes: features and findings

This review covers four major works (and their extensions) on composite indexes of child well-being: the Child and Youth

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¹ Fernandes et al. (2012b) provide a detailed description of the several methodologies used in these studies.

Table 1
Composite indexes of child well-being: main features, type of data analysis conducted and main relevant findings.

Index	Main features	Type of data analysis conducted	Main explanatory variables considered/relation with well-being	
<i>The Child and Youth Well-Being Index in the US</i> – Land et al. (2001)	28 indicators distributed over 7 dimensions	Aggregated data on children mostly gathered from adults and residually from children	<ul style="list-style-type: none"> • Exploratory analysis: trends over time for all domains of well-being and overall well-being and trends according to age and race/ethnic groups for the CWI 	Age (older children) (–) Race/ethnicity (white non-Hispanic) (+) Gender (female) (+)
<i>The Expanded Child and Youth Well-Being Index in the US</i> – Land et al. (2007)	44 indicators distributed over 7 dimensions	U.S. Uniform weighing scheme	<ul style="list-style-type: none"> • Exploratory analysis: trends over time for all domains of well-being and overall well-being and trends according to age, race/ethnic groups and gender for the CWI and the expanded CWI 	Age (older children) (–) Race/ethnicity (non-white) (+) Gender (female) (+) Age (older children) (–)
<i>A Microdata Child Well-Being Index (NSAF)</i> – Moore et al. (2007)	29 indicators distributed over 5 dimensions	Microdata on children gathered from adults	<ul style="list-style-type: none"> • Exploratory analysis: <ul style="list-style-type: none"> • Mean scores for all domains of individual and conditions well-being and trends over time • Sociodemographic distribution of individual well-being according to gender, race/ethnicity, family structure, parents education, house tenure, citizenship, county, household income and welfare receipt • Sociodemographic distribution of conditions well-being according to age, gender, race/ethnicity, immigrant status, welfare benefits and geographic unit (urbanicity) • Exploratory analysis: <ul style="list-style-type: none"> • mean scores for all domains of individual and contextual well-being according to age, gender, race/ethnicity and poverty (income) • Correlations between domains • Econometric model: OLS estimates: <ul style="list-style-type: none"> • Dependent variable: individual overall well-being and domain specific well-being 	Race/ethnicity (white non-Hispanic) (+) No parents/single parent family (–) Parents with no high school degree (–) Family does not own the house (–) Low household income (–) Welfare benefits (–) Immigration status 0 County of residence 0 Gender (female) (+)
<i>A Microdata Child Well-Being Index (NSCH)</i> – Moore et al. (2008)	69 indicators distributed over 7 dimensions		<ul style="list-style-type: none"> • Independent variables: age, gender, race/ethnicity, family context, community context and sociodemographic context 	Age (older children) (–) Race/Ethnicity (white non-Hispanic) (+) Family context (+) Community context (+) Socio-demographic context (+)
<i>Index of Child Well-Being in the EU</i> – Bradshaw et al. (2007)	51 indicators distributed over 23 domains/8 dimensions (clusters)	Europe Aggregated data gathered from adults and children	<ul style="list-style-type: none"> • Exploratory analysis: percentages and individual indicators, domain-specific indexes and overall index scores across countries 	<i>(Ranking of countries according to well-being scores)</i>
<i>Index of Child Well-Being in Europe</i> – Bradshaw and Richardson (2009)	43 indicators distributed over 7 dimensions (clusters)	Europe Uniform weighing scheme	<ul style="list-style-type: none"> • Exploratory analysis: <ul style="list-style-type: none"> • percentages and individual indicators, domain-specific indexes and overall index scores across countries; 	<i>Correlations of some individual indicators with overall well-being</i> Child income poverty (–)

Table 1 (Continued)

Index	Main features	Type of data analysis conducted	Main explanatory variables considered/relation with well-being	
A Deprivation Index – Bastos et al. (2008)	Portugal – area of Lisbon	Microdata on children gathered from children	Living in a poor household (–)	
			<ul style="list-style-type: none"> • sensitivity analysis and internal relationships: indicators' correlations with overall well-being and with each domain of well-being • Associations with independent factors: GDP, Gini coefficient, percentage of broken families and social expenditure 	Jobless households 0
			• Exploratory analysis:	Housing problems (–)
				Children who report high life satisfaction (+)
			<ul style="list-style-type: none"> • Distribution according to family characteristics (number of members, parents education level, parents professional situation, financial difficulties, . . .), to child characteristics (age, gender, ethnicity, . . .) and by geographical area • Mean and median scores of the deprivation index and contributions of each dimension to the deprivation index • Econometric model: Logit estimates: 	Impact on the probability of living in a household with low economic/financial resources
			<ul style="list-style-type: none"> • Dependent variable: households' economic/financial resources • Independent variables: gender, ethnicity, parents education level, parents professional situation, perception of financial difficulties, number of cars in the household, extra-curricular activities, liking school, type of house and housing conditions, basic consumption goods, parents engagement 	Ethnicity (white non-Eastern) (+)
			<ul style="list-style-type: none"> • Exploratory analysis: • Deprivation index by dimensions according to sociodemographic attributes: ethnicity, family typology, parents level of education, child's life evaluation, child's municipality of residence, occupational group of parents/guardians, parents/guardian work situation, difficulty in paying for expenses, income poverty status 	Number of siblings (high) (–)
			<ul style="list-style-type: none"> • Econometric model: Logit estimates: • Dependent variable: households' economic/financial resources • Independent variables: gender, ethnicity, parents education level, parents professional situation, perception of financial difficulties, number of cars in the household, extra-curricular activities, liking school, type of house and housing conditions, basic consumption goods, parents engagement 	Parents professional situation (low qualified) (–)
			<ul style="list-style-type: none"> • Exploratory analysis: • Deprivation index by dimensions according to sociodemographic attributes: ethnicity, family typology, parents level of education, child's life evaluation, child's municipality of residence, occupational group of parents/guardians, parents/guardian work situation, difficulty in paying for expenses, income poverty status 	Perceptions of financial difficulties (–)
			<ul style="list-style-type: none"> • Econometric model: Probit estimates: • Dependent variable: deprivation status • Independent variables: ethnicity, family typology, parents education level, parents unemployment, difficulty in paying for expenses, income poverty, feeling of happiness, parents professional occupation, geographical region of residence and an interaction variable of income poverty with geographical region of residence 	Housing (problems) (–)
A Composite Index of Deprivation – Bastos and Machado (2009)	20 indicators distributed over 4 dimensions	Non-uniform weighting scheme	Ethnicity (white non-Gipsy) (+)	
			No parents (–)	
			Parents level of education (low) (–)	
			Unemployed parents (–)	
			Low household income (–)	
			Geographical area of residence (–)	
			Children's life satisfaction (+)	

Well-Being Index by Land et al. (2001, 2007), the Microdata Child Well-Being Index by Moore et al. (2007, 2008), the Index of Child Well-Being in Europe by Bradshaw et al. (2007) and its later version by Bradshaw and Richardson (2009), and, finally, the Deprivation Index by Bastos et al. (2004, 2008) and its most recent version by Bastos and Machado (2009). Given that the details on the methodologies used in these works are analysed in Fernandes et al. (2012a,b), in this section we focus on their main features, type of data analysis conducted and main findings on the factors that explain variations in well-being. Table 1 summarizes this information. The last column of Table 1 will be particularly relevant for Section 3.3 where a group of hypotheses regarding the factors that explain differences in child well-being will be formulated and tested.

The Child and Youth Well-Being Index by Land et al. (2001, 2007) analyses a set of indicators dating back to 1975 for children in the United States. In the prior version of the index (Land et al., 2001), 28 indicators distributed over seven domains of well-being (material well-being, health, social relationships, safety/behavioural concerns, productive activity/educational attainment, place in community, emotional/spiritual well-being) were chosen. Data on these indicators were collected from parents and the children themselves and derived from different surveys. When building the composite index, aggregated data was used for the individual indicators and a uniform weighting scheme was applied. The expanded Child and Youth Well-Being Index (Land et al., 2007) includes an additional set of 16 indicators, totalling 44 indicators, also distributed over the seven domains mentioned previously. The methods remained the same for this later version of the index. In the 2001 work (Land et al., 2001), the results of the individual indicators and the overall well-being index were analysed in terms of trends over time and trends according to age and race/ethnic groups. The 2007 research (Land et al., 2007) further introduced gender as a key variable to analyse the results obtained for the overall well-being index. The authors concluded that the well-being of younger children improved over the time period considered, whereas the well-being of older children declined, being pre-school children better off than other age groups – cf. Land et al. (2001, 2007). Regarding trends in race/ethnic groups over time, Land et al. (2001, 2007) found that the overall well-being increased for all race/ethnic groups, but white non-Hispanic children tend to do better than children from other races/ethnicities. Although male children do better over time in some domains and female children in others, with well-being having increased equally for both genders over time, female children tend to have higher levels of well-being in comparison to males – cf. Land et al. (2007).

The Microdata Child Well-Being Index, developed by Moore et al. (2007, 2008) was also built for children in the US, but microdata were used instead of aggregated data. In the first version of the index (Moore et al., 2007), 29 indicators distributed over five domains (three domains of individual well-being, child health and safety, child educational achievement and cognitive attainment, and child social and emotional development, plus two domains of contextual indicators, family processes and family demographic, social and economic status) were collected from a survey that, although focusing on children, was based on answers from adults. A uniform weighting scheme was used at the aggregating stage of individual indicators to construct the individual well-being index and then, the overall index of the condition of children, to which the two contextual domains were added. The second version of the index (Moore et al., 2008) used 69 indicators distributed over seven domains (individual well-being included physical health, psychological health, social health and educational/intellectual well-being, and contextual domains included family, community and socio-demographic features of the family). The dataset also focused on children, but information was collected from adults. Two separate indexes, an index of individual

well-being and an index of contextual well-being, were computed, using a uniform weighting scheme as well. In both works (Moore et al., 2007, 2008) the authors mainly conducted an exploratory analysis, looking at the mean scores and the distribution of children across dimensions of well-being according to some selected variables. The 2007 version (Moore et al., 2007) of the index carried out this analysis according to age, gender, race/ethnicity, family structure, parents' education level, housing tenure, citizenship/immigrant status, county of residence/geographical unit (urbanicity), household income, and welfare benefits. The authors concluded that, overall, female children do better than males whereas older children tend to do worse in terms of well-being. Also, white non-Hispanic children tend to have less cumulative problems than children belonging to other race/ethnic groups. Additionally, the authors found that children who do not have parents or belong to a single-parent family, children whose family does not own the house where they live, whose family has a low income and is on welfare benefits, tend to have lower levels of well-being than their counterparts (Moore et al., 2007). Immigration status and county of residence do not seem to be important to well-being. In the 2008 work, Moore et al. (2008) added another instrument of data analysis, the estimation of an OLS model, to determine the impact of certain variables on the individual well-being of children, overall and domain-specific. These results support the conclusions already drawn from the exploratory data analysis, namely: female children tend to do better than male children; well-being scores tend to be lower for older children; white non-Hispanic children do better. Also, family context, community context and socio-demographic context² are shown to be all significantly associated with overall individual well-being and domain-specific well-being, and they all contribute positively to well-being in the several domains (Moore et al., 2008).

The Index of Child Well-Being in Europe by Bradshaw et al. (2007) and Bradshaw and Richardson (2009) was developed to analyse and compare child and youth well-being performance in the European Union Member States. The first version of the index (Bradshaw et al., 2007) focused on the EU25, considering 51 indicators distributed over 23 domains which were organized into eight clusters (material situation, housing, health, subjective well-being, education, children's relationships, civic participation, and risk and safety). The data came from several surveys and was collected both from adults and children. When aggregating individual indicators into the overall well-being indicator, a uniform weighting scheme was used. The more up-to-date index (Bradshaw and Richardson, 2009) considered the EU27 countries plus Norway and Iceland, and dropped one of the clusters considered previously (civic participation), using 43 indicators distributed over the other seven clusters considered in the first version of the index. The methodology used remained the same. Both versions of the index (Bradshaw et al., 2007; Bradshaw and Richardson, 2009) consist in an exploratory analysis in order to establish a country ranking according to the well-being scores. The 2009 (Bradshaw and Richardson, 2009) research work went a bit farther, namely by analysing correlations between certain indicators and the overall well-being, as well as correlations between dimensions of well-being, in addition to investigating associations between the overall well-being index and some independent factors, such as the GDP, the Gini coefficient, the percentage of broken families and social expenditure. Some

² Family context covers: parental engagement, guardianship, home environment and health coverage; community context covers: supportive neighbourhood, neighbourhood support for parenting, neighbourhood safety, school safety; and socio-demographic context pertains to: socioeconomic well-being (household income), human capital (parents' level of education), family structure and family size – cf. Moore et al. (2008).

interesting results are the following: child income poverty, children living in poor households and children for whom housing problems are reported to exist, are all negatively associated with overall well-being; there is a positive correlation between children who report high life satisfaction and the overall well-being; also, living in a jobless household does not seem to be significantly associated with overall well-being.

The Child Deprivation Index by Bastos et al. (2008) and Bastos and Machado (2009) was developed and tested on Portuguese children living in the area of Lisbon. The first version of the index (Bastos et al., 2008) considered 12 indicators distributed over five domains (family characteristics, housing, health, education and social integration). Data were collected from the children themselves. In this version of the index, when aggregating individual indicators into the overall index, the authors used a uniform weighting scheme. However, in the more recent index (Bastos and Machado, 2009), besides having reduced the number of dimensions to four (family characteristics were excluded), the authors employed a different non-uniform weighting scheme, placing more emphasis on indicators in which deprivation was not widespread. In both works (Bastos et al., 2008; Bastos and Machado, 2009), the authors conducted two types of data analysis: exploratory analysis and modelling. Mean and median scores and distribution analysis were the main descriptive statistics instruments used. The model estimated in the 2008 work (Bastos et al., 2008) is a Logit model intended to assess the probability of a child living in a household that has economic/financial difficulties. From all the factors considered, the authors concluded that the most relevant are the following: ethnicity, where white and non-Eastern children seem to do better than other children; a high number of siblings increases the chance of a child living within a household with economic/financial difficulties, as does having parents with low qualified jobs; the perception of financial difficulties seems to be a good predictor of household economic/financial difficulties as well, as is the existence of housing problems. The 2009 work (Bastos and Machado, 2009) follows a similar approach, but this time using a Probit model and taking as dependent variable the actual deprivation status. All the factors considered are relevant determinants of the probability of being deprived, namely: ethnicity, family type, parents' level of education, parents' unemployment, difficulty in paying expenses, income poverty, children's life satisfaction, parents' profession, geographical area of residence and an interactional variable that includes geographical area of residence and income poverty. Some results are worth mentioning: white non-Eastern children seem to do better than other children; children with no parents have a higher probability of being deprived, as do children whose parents are unemployed; there is a negative association between the parents' level of education and the probability of being deprived; children living in low-income households have a higher likelihood of being deprived; living in a certain geographical area and being income-poor increases the probability of being deprived; and, finally, there is a negative association between the children's life satisfaction and the probability of being deprived.

3. Methodological considerations

3.1. Data gathering procedures and sample representativeness

The target population of our study is the child population attending the third, fourth, fifth and sixth grades of public and private schools in the North region of Portugal.³ Data on a series of selected

indicators organized by eight dimensions of well-being (material well-being, housing, neighbourhood context, health behaviours, school, leisure and recreation, social relations and psychobiological characteristics) was gathered through two questionnaires⁴ applied to the children themselves and their parents/carers. Each of the questionnaires is intended to assess different perspectives on the items: parents report objectively on these items and child report their subjective perceptions on the same items.⁵ The questionnaires were sent to the schools that agreed to take part in the study, together with precise instructions on how it should be applied. Children answered the questionnaire in the classroom and the parents' questionnaire was sent home to be completed and then returned. The process of data gathering took place between April and June of 2011.

In order to obtain a representative sample of children to be surveyed, we considered the number of children enrolled in each school cycle (1st cycle: 3rd and 4th grades; 2nd cycle: 5th and 6th grades⁶) in public and private schools in the North region of Portugal. Then, the proportion of children enrolled in private and public schools was calculated for each school cycle. We intended to survey around 1940⁷ children in the region selected, thus it was necessary to determine the number of schools necessary to administer the questionnaires in order to reach that target number, with the additional requirement that only one class from each grade (3rd–6th) per school would be answering the questionnaire. Efforts were made to include at least one school from each of the sub-regions (NUTS III) in the country's North region. Schools were then randomly selected according to these specifications. The sample collected results from the application of the questionnaires to 1262 children and their parents/carers. This represents a response rate of about 65% for the target sample.⁸

Some cases had to be excluded from the analysis due to unsolvable inconsistencies between the child's and the parents' answers to the questionnaires, so the number of cases was reduced to 1246.⁹ Some descriptive statistics for the respondent sample can be found in Table 2.

⁴ Questionnaires are available upon request to the corresponding author.

⁵ Given the need for a match between parents' reports and children's reports on the several items considered as relevant in this study, the questionnaires presented to children did not contemplate open answers or the possibility for them to suggest things that might influence their well-being. This might be considered a setback in what concerns the full realization of children's right to participation in measurement processes that involve their well-being, but a relevant trade-off between free answers and the need to orient children's answers was at stake and it was important to guarantee that we had the exact information necessary to implement the methodological proposal that is here put forth. We thank one of the referees for raising this issue.

⁶ Elementary education in Portugal is divided into 3 cycles: 1st cycle covering the first four years of schooling; 2nd cycle, the 5th and 6th grades; and 3rd cycle, 7–9th grades.

⁷ Initially, we considered the whole Portuguese child population attending the 3rd–6th grades but due to the large amount of data this would involve, and because of time constraints, we decided to focus our study on the country's North region. Thus, in a first stage, we targeted a sample of 5000 children attending the 3rd–6th grades, the corresponding proportion of children from the North region being around 1940.

⁸ This response rate corresponds to the entire child sample surveyed. However, the sample over-represents the proportion of children attending the 1st cycle in private schools. With regard to the 2nd cycle in private schools, the response rate was about 57% of the target sample, approximately 55% of the target sample for children attending the 1st cycle in public schools, and about 50% for children enrolled in the 2nd cycle in public schools.

⁹ The exclusion of cases was made based on inconsistencies between the children's and the parents' answers concerning the existence of siblings or other children in the household. For all other cases where the inconsistency related to non-absolute answers, these were corrected. For the cases where data to be reported by children was missing, the parents' answer was considered, and for the cases where data to be reported by parents was missing, the children's answer was considered.

³ According to the Portuguese Ministry of Education (www.gepe.min-edu.pt), in 2008/2009 and for the North region of the country, around 183,500 children were enrolled in the third, fourth, fifth and sixth grades of the elementary school system.

Table 2
Main statistics for the respondent sample.

Main variables		Percentage of the total children inquired	
Age	8 y.	17.6	
	9 y.	26.3	
	10 y.	24.0	
	11 y.	19.6	
	12 y.	11.1	
	13 y.	1.3	
Gender	Male	47.2	
	Female	52.8	
School grade	3rd	27.8	
	4th	28.0	
	5th	21.3	
	6th	22.8	
Type of school	Private	26.8	
	Public	73.2	
Household nationality ^a	Portuguese	94.3	
	Portuguese and other	2.2	
	Other	3.5	
Household income level	No income	2.8	
	From 1€ to 433€	10.5	
	From 434€ to 867€	24.4	
	From 868€ to 1300€	31.9	
	From 1301€ to 1734€	10.0	
	From 1735€ to 2600€ More than 2600€	10.5 9.8	
Professional situation		Mother	Father
	Employed	72.9	84.2
	Unemployed	21.8	9.1
	Retired	1.0	2.1
	Other/not applicable	4.3	4.6
Education level		Mother	Father
	No education	1.5	1.2
	Basic school (1st to 9th grade)	56.3	61.4
	High school (10th to 12th grade)	18.3	19.4
	Higher education (Bachelor's degree, Master, PhD)	23.9	18.0
Reported happiness ^b		Child	Parents
	1	0.4	0.1
	2	0.2	–
	3	0.5	–
	4	0.7	0.7
	5	3.4	2.1
	6	2.4	2.3
	7	5.0	7.4
	8	13.7	19.3
	9	16.5	23.0
10	57.1	45.2	

^a The original parents' questionnaire also included a question about the household's ethnic origins, but due to the large amount of missing data, this information was considered unsuitable for analysis.

^b Almost three quarters (73.6%) of the children reported being extremely happy (rated at 9 or 10) and less than 2% reported low levels (below 5) of happiness. The parents' answers are less extreme but still quite optimistic, with 68.2% claiming that their offspring are quite happy (rated at 9 and 10) and less than 1% thinking their children are not really happy (rated at below 5). This means that reported happiness is skewed. This result is consistent with what has been found in literature on other countries (e.g., Rees et al. (2010), Bradshaw and Keung (2011), and Casas et al. (2012)). Nonetheless, this is an interesting point to investigate in future research work.

3.2. Computation of the composite child well-being index

To compute the overall child well-being index, we first calculated the indexes of the individual well-being domains. The well-being domains here considered are the following¹⁰:

1. Material well-being: covers income and deprivation related item.

2. Housing context: reports to housing physical conditions.

3. Neighbourhood context: covers neighbourhood infrastructures and safety.

4. Health behaviours: focuses food and health habits.

5. School: reports to children's involvement in school and with teachers.

6. Leisure and recreation: covers leisure and recreation activities.

7. Social relations: reports to children's relations with parents, friends and peers.

8. Psychobiological well-being: focuses children's physical and psychological traits.

¹⁰ For further details on the selection of domains, see Fernandes et al. (2012a).

Each domain is composed by its domain related indicators on which both parents and children reported (the complete list is presented in Appendix, Table A1).¹¹

Regarding the objective individual indicators (reported by parents), two rules of thumb were considered: “having” (for positive indicators, “not having” for negative indicators) is better than “not having” (“having” for negative indicators) and “having more” is better than “having less”. Thus, considering a positive indicator from any one of the dimensions defined, we assumed that, for every child, if he/she has a certain item (scoring 1), then he/she is better off than a counterpart that does not have that item (who scores 0). Following this same line of reasoning, if an individual has more of a certain item (scores more than 1), then that individual is better off than another one who has the item but in less quantity. Additionally, we also considered the degree of importance the child gives each item. Hence, if a child has a certain item, his/her well-being increases according to the importance he/she attaches to that item. For example, if the child has an item (scores 1 in objective terms) and on a scale from 1 to 5, rates it at 4, then his/her well-being score for that item will be 4; if a child does not attribute any importance to that item (reports 1 in terms of degree of importance), then his/her well-being score will be 1. On the other hand, if the child does not have that item, he/she will be attributed a negative score according to the degree of importance he/she awards the item, plus 1 (so negative scores can go from -4 to -1). Also in this vein, if the child does not have the item and does not value that item, then his/her well-being score will be 0.

To calculate the index for each of the well-being dimensions, a simple additive formula was applied, but different weights were considered for each item. A point should be made regarding this choice. It is widely recognized that, in the absence of estimates on the importance individuals and/or a population places on certain aspects of life, the most appropriate weighting system is equal weights (Hagerty and Land, 2007; see also Fernandes et al., 2012a). However, studies have shown (Hagerty and Land, 2007; Haisken-DeNew and Sinninig, 2007; Rodrigues and Andrade, 2010) that taking into account the subjective perceptions of individuals or groups of individuals on the relative importance of indicators and dimensions of well-being may lead to substantially different results regarding their life situations.¹² Accordingly, these subjective perceptions should be taken into account when engaging in a measurement exercise such as the one we intend to develop here and this justifies our choice regarding the weights assigned to each indicator and dimension.¹³

The weights here considered thus resulted from the ranking of items by the children. For each dimension, children were asked to organize the individual items from first (most important) to last (least important). Following a procedure similar to that adopted by De Kruijk and Rutten (2007) in the calculation of a composite poverty index for the adult population of the Maldives, a greater weight was attributed to items placed first, the second greatest weight to items placed second, and so on, according to the following formula:

$$w_{ji} = 1 + \frac{r_{lr} - r_{ji}}{\sum_{i=1}^n (1 + r_{lr} - r_{ji})}$$

where w_{ji} refers to the weight attributed by the child to indicator i ($i = 1, \dots, n$) of dimension j , r_{lr} refers to the lowest rank possible and r_{ji} refers to the rank attributed by the child to indicator i of dimension j . From the formula follows that that $0 > w_{ji} > 1$ and we imposed that all the weights have to sum one for each dimension.

The main statistics regarding the weights attributed by the respondent sample of children to each of the dimensions of well-being are summarized in Table 3.

It is possible to conclude that, for the respondent sample, the material well-being (36.8%) and psychobiological characteristics (24.8%) dimensions are most frequently given the highest weight (that is, they are ranked first by children) and that the leisure and recreation dimension (27.8%) is most frequently given the lowest weight (placed last by children). Also, the material well-being, housing context, health behaviours and psychobiological characteristics dimensions have (in this order) the highest mean weights and the leisure and recreation dimension has the lowest mean weight of all dimensions.

To compute the overall well-being index, the individual well-being indexes were summed using the same procedure, attributing a different weight to each of the dimensions of well-being, which also resulted from the children's ranking.^{14,15} So the general form of the overall index is as follows:

$$OCWI = W_{MW}MWI + W_{HC}HCI + W_{NC}NCI + W_{HI}HI + W_{SI}SI \\ + W_{LR}LRI + W_{SR}SRI + W_{PC}PCI$$

where $OCWI$ is the Overall Child Well-being Index and W_i refers to the weight attributed by the child to each of the dimensions $i = MW, \dots, PC$ in overall well-being (being MWI: material well-being index; HCI: housing context well-being index¹⁶; NCI:

¹⁴ Since the index comprises so many items, it was very likely that any given child might be missing an item, which ended up having an impact on the overall sample size. Missing data regarding the parents' answers varied between 8% and 14%. As for children's answers, missing data regarding the ranking varied between 13% and 22% and for the degrees of importance, reported by children also, missing data varied between 2% and 6%. Consequently, for analysis purposes and in order to maximize the sample size, we imputed the missing data. Data was imputed considering the most common responses (modal response) according to selected features of the household and/or the child (income category, sex, age, school year, having siblings, etc.). This method was adopted to impute missing data in the parents' answers and children's answers regarding the degrees of importance. In terms of the weight given to each indicator and dimension, missing data was imputed using the mean weights, also determined according to a set of child characteristics (sex, age and school year). We chose not to impute missing data for income or for other variables characterizing the household and the child (nationality, mother's and father's education level and employment situation, type of school attended by the child, child's age, gender and school grade, reported degree of happiness by parents and by the child).

¹⁵ In order to assess if the imputation of missing data had an influence on the results obtained, we calculated average differences and respective p -values for both cases, where imputation of missing data was made and where it was not. Results revealed that average scores do not suffer major changes when missing data is imputed.

¹⁶ One indicator had to be excluded from the Housing Context Indicator (HCI), that of overcrowding, hence we ended up considering six and not seven individual indicators for this dimension. Not that we think that overcrowding is unimportant for well-being in the housing dimension but we concluded that the question for

¹¹ For further details on the selection of indicators see Fernandes et al. (2012a).

¹² For further details on these studies and conclusions see Fernandes et al. (2012a).

¹³ An additional remark should be made concerning the choice of weights based on children's perceptions. There might be objections to this weight choice based on the argument that they may be biased (e.g., children's answers might be conditioned by short-term desirability, parent's recommendations, conformity to peers, adaptation on the possessed items, etc. – we acknowledge one of the referees for pointing out these possible limitations). However, similar arguments may also arise regarding studies that have based their weights on the adult population's perceptions (Hagerty and Land, 2007; Haisken-DeNew and Sinninig, 2007; Rodrigues and Andrade, 2010). The main problem at stake here is the choice between “subjective” reports versus “objective” reports. This problem is very close to the old discussion of subjective measures versus objective measures of well-being. Ed Diener has extensively studied this problem (see, e.g., Diener, 1994; Diener and Suh, 1997, 1998) and, albeit recognizing the limitations of subjective measures of well-being, such as the influence momentary factors and resilience or capacity for adaptation may exert on the individual's perceptions, he showed that there is some stability and reliability to these subjective perceptions (Diener and Suh, 1998). These same properties might hold for subjective weights (versus objective weights). We acknowledge the existence of objections to the use of subjective weights as there are also limitations to the use of “objective” weights (for a discussion on the advantages and disadvantage of different kinds of weighting procedures see Decang and Lugo, 2010), and our departing point is the conclusions taken in Section 3.2.

Table 3
Weights the respondent sample of children attributed each dimension of well-being.

Dimensions	Weights (ranking)	Relative frequency (% of respondent sample)	Mean weight
Material well-being (MWI)	0.2222 (1°)	36.8	0.1588
	0.1944 (2°)	14.8	
	0.1667 (3°)	10.8	
	0.1389 (4°)	8.0	
	0.1111 (5°)	6.7	
	0.0833 (6°)	6.4	
	0.0556 (7°)	7.1	
	0.0278 (8°)	9.5	
	100		
Housing context (HCI)	0.2222 (1°)	8.6	0.1474
	0.1944 (2°)	28.9	
	0.1667 (3°)	15.9	
	0.1389 (4°)	13.8	
	0.1111 (5°)	11.9	
	0.0833 (6°)	9.9	
	0.0556 (7°)	7.2	
	0.0278 (8°)	3.9	
	100		
Neighbourhood context (NCI)	0.2222 (1°)	2.8	0.1097
	0.1944 (2°)	7.6	
	0.1667 (3°)	20.1	
	0.1389 (4°)	12.3	
	0.1111 (5°)	12.1	
	0.0833 (6°)	13.8	
	0.0556 (7°)	16.1	
	0.0278 (8°)	15.2	
	100		
Health behaviours (HI)	0.2222 (1°)	13.8	0.1483
	0.1944 (2°)	15.7	
	0.1667 (3°)	20.5	
	0.1389 (4°)	23.2	
	0.1111 (5°)	9.9	
	0.0833 (6°)	6.7	
	0.0556 (7°)	4.9	
	0.0278 (8°)	5.3	
	100		
School/education (SI)	0.2222 (1°)	4.8	0.1213
	0.1944 (2°)	8.6	
	0.1667 (3°)	12.6	
	0.1389 (4°)	18.0	
	0.1111 (5°)	26.2	
	0.0833 (6°)	13.5	
	0.0556 (7°)	10.8	
	0.0278 (8°)	5.5	
	100		
Leisure and recreation (LRI)	0.2222 (1°)	0.9	0.0796
	0.1944 (2°)	2.8	
	0.1667 (3°)	5.5	
	0.1389 (4°)	8.5	
	0.1111 (5°)	12.3	
	0.0833 (6°)	22.9	
	0.0556 (7°)	19.3	
	0.0278 (8°)	27.8	
	100		
Social relations (SRI)	0.2222 (1°)	7.9	0.1149
	0.1944 (2°)	11.7	
	0.1667 (3°)	10.8	
	0.1389 (4°)	10.4	
	0.1111 (5°)	12.6	
	0.0833 (6°)	18.1	
	0.0556 (7°)	19.0	
	0.0278 (8°)	9.6	
	100		
Psychobiological characteristics (PCI)	0.2222 (1°)	24.8	0.1332
	0.1944 (2°)	12.7	
	0.1667 (3°)	8.4	
	0.1389 (4°)	7.9	
	0.1111 (5°)	8.8	
	0.0833 (6°)	8.0	
	0.0556 (7°)	13.4	
	0.0278 (8°)	15.9	
	100		

neighbourhood context well-being index; HI: health index; SI: school/educational well-being index; LRI: leisure and recreation well-being index; SRI: social relationships well-being index; PCI: psychobiological characteristics index).

The general form of the indexes for the individual dimensions of well-being is the following:

$$MWI = w_{MW1}f_{MW1} + w_{MW2}f_{MW2} + w_{MW3}f_{MW3} + w_{MW4}f_{MW4} + w_{MW5}f_{MW5}$$

$$HCI = w_{HC1}f_{HC1} + w_{HC2}f_{HC2} + w_{HC3}f_{HC3} + w_{HC4}f_{HC4} + w_{HC5}f_{HC5} + w_{HC6}f_{HC6} + w_{HC7}f_{HC7}$$

$$NCI = w_{NC1}f_{NC1} + w_{NC2}f_{NC2} + w_{NC3}f_{NC3} + w_{NC4}f_{NC4} + w_{NC5}f_{NC5}$$

$$HI = w_{H1}f_{H1} + w_{H2}f_{H2} + w_{H3}f_{H3} + w_{H4}f_{H4}$$

$$SI = w_{S1}f_{S1} + w_{S2}f_{S2} + w_{S3}f_{S3} + w_{S4}f_{S4}$$

$$LRI = w_{LR1}f_{LR1} + w_{LR2}f_{LR2} + w_{LR3}f_{LR3}$$

$$SRI = w_{SR1}f_{SR1} + w_{SR2}f_{SR2} + w_{SR3}f_{SR3} + w_{SR4}f_{SR4} + w_{SR5}f_{SR5} + w_{SR6}f_{SR6} + w_{SR7}f_{SR7}$$

$$PCI = w_{PC1}f_{PC1} + w_{PC2}f_{PC2} + w_{PC3}f_{PC3} + w_{PC4}f_{PC4} + w_{PC5}f_{PC5} + w_{PC6}f_{PC6}$$

where f_{ji} is a function of x_{ji} and of g_{ji} , with x_{ji} referring to indicators $i = 1, \dots, n$ of dimension $j = MWI, \dots, PCI$ and g_{ji} to the degree of importance given by the child to indicator $i = 1, \dots, n$ of dimension $j = MWI, \dots, PCI$; w_{ji} refers to the weight attributed by the child to indicators $i = 1, \dots, n$ of dimension $j = MWI, \dots, PCI$.

3.3. Main hypothesis to test and model specification

As we intend to assess the factors that explain variations in child well-being, our model's dependent variable is overall child well-being. We considered an overall index (overall child well-being index, OCWI) and specific dimensions of children's well-being: material well-being, housing context, neighbourhood context, health, school/educational well-being, leisure and recreation activities, social relationships and psychobiological characteristics.

The empirical results from the relevant literature (reviewed in Section 2) show that child well-being and deprivation are influenced by child, parent, family and context-related variables (cf. last column of Table 1). The following hypotheses are thus mainly derived from those empirical results and not strictly from theory. Regarding the child-related variables, the literature normally includes gender (Land et al., 2007; Moore et al., 2007, 2008) and age (Land et al., 2001). In addition to these variables, we included the child's level of schooling, that is, the grade in which the child is enrolled (1st cycle: 3rd and 4th year of schooling, and 2nd cycle: 5th and 6th years of schooling). Accordingly, we hypothesize that:

H1. Child females tend to present generally higher levels of well-being than their male colleagues.

H2. Younger children tend to be better off in terms of well-being than older ones.

H3. Children enrolled in the 1st cycle of studies tend to present higher levels of well-being than children enrolled in the 2nd cycle.

The parent-related variables encompass their level of education (Bastos et al., 2008) and professional status, more specifically, whether they are unemployed or not (Bradshaw and Richardson, 2009; Bastos and Machado, 2009). So our hypotheses are the following:

H4. Children whose parents have a higher education degree tend to be better off in terms of well-being than those whose parents have a lower education degree.

H5. Children whose parents are unemployed tend to be worse off in terms of well-being than the other children.

Differently from Moore et al. (2008), who considered the issue of ethnicity,¹⁷ but following a similar line of reasoning, we include the family's nationality as a contextual variable; in particular, we distinguish native Portuguese families from those of foreign origin (even when they have double nationality, including the Portuguese):

H6. Children who live in Portuguese households tend to have higher levels of well-being than the other children.

We considered another contextual variable, the type of school, distinguishing children who are enrolled in public schools from those enrolled in private ones. Our hypothesis here is the following:

H7. Children enrolled in private schools tend to be better off in terms of well-being than the other children.

Summing up, the general model specification to be estimated is as follows:

$$\text{Well-Being Indicator}_i = \beta_1 + \beta_2 \text{Gender}_i + \beta_3 \text{Age}_i + \beta_4 \text{Schooling}_i + \beta_5 \text{Parents Educ}_i + \beta_6 \text{Parents Occup}_i + \beta_7 \text{Household Nation}_i + \beta_8 \text{Type School}_i + \mu_i$$

where i is the i th child, β_j is the estimator of the explanatory variable j ($j = \text{gender, age, schooling, parents' education, parents' occupational/professional situation, household nationality and type of school}$) and μ_i is the error (white noise) term for the i th child.

For dimensions other than overall well-being and material well-being, we consider an additional hypothesis:

H8. Children living in lower-income households (below 868€/month) tend to have lower levels of well-being.

We estimated all the specifications by means of the Ordinary Least Square (OLS) method (cf. Table 5), taking the logarithm of the variables that are expressed in absolute units in order to obtain a more straightforward interpretation (in elasticity terms) of the estimated coefficients.¹⁸ Since age and school grade, as well as the mother's and the father's education level, are highly correlated, we estimated four different models, where age and school grade are not simultaneously considered and the same for the mother's and father's level of education. Income level is not considered as an independent variable for overall and material well-being given that

this particular item had been ill-formulated. Since the questionnaires had already been distributed when we came to this conclusion, we maintained the indicator in the original formulation of this domain's index, but it was excluded from the calculations.

¹⁷ See footnote 9.

¹⁸ We also estimated these specifications using alternative econometric models, namely logit models, where the dependent variables were defined as binary variables assuming value 1 when the child belongs to the upper 50th percentile of the well-being indicator and 0 otherwise. The results yielded a similar outcome which confirms the robustness of the estimations.

it is one of the constituent indicators for the computation of those child well-being indicators.¹⁹

4. Factors explaining variations in child well-being: empirical results

4.1. Correlations between dimensions of well-being

We start by analysing the existing correlations between the several dimensions of well-being and the overall well-being and correlations among the different domains of well-being.

By construction, it is expected that some correlation between the overall child well-being index (OCWI) and its several domain-specific indexes emerges. Still, it is worth to analyse these results. Although all specific dimensions of child well-being are positively and significantly correlated (see Table 4) with the overall well-being index (OCWI), material well-being (MWI) presents a rather strong (Pearson) correlation ($\hat{\rho} > 0.600$), meaning that, on average, a child that is materially well positioned, reveals high overall well-being. The leisure and recreation (LRI) and social relationships (SRI) indexes present a reasonably high correlation with the overall well-being index, with correlation estimates around 0.400, whereas the remaining indexes (housing context, neighbourhood context, health and psychobiological characteristics) are not generally highly related to the overall well-being index. This latter evidence underlines the fact that the distinct indexes capture disparate dimensions of child well-being, thus reinforcing the need to analyse not only the determinants of the child's overall well-being, but also the other more specific dimensions.

It is interesting (and puzzling) to note that the overall well-being index and children's and parents' reported overall happiness (of children), although being positively and significantly related (respectively, $\hat{\rho} = 0.123$ and $\hat{\rho} = 0.276$), are weakly correlated, which might again reveal distinct underlying determinants. It is also interesting to notice that, although statistically significant, the correlation between children's report of happiness and children's happiness as reported by parents is not particularly strong. Finally, the correlations between specific indexes are, in general, quite low/weak reflecting the fact that they are measuring distinct features of child well-being.

4.2. Estimation of the factors influencing child well-being

It is important to note that all the models estimated present reasonable goodness of fit (see Table 5).²⁰ The estimates of the independent variables are quite stable between models, which reflect the robustness of the results.

From the estimation outcomes, it is apparent that the distinct dimensions of child well-being have different underlying influences or explanatory variables.

Specifically, for the overall child well-being index (OCWI) (Models 1–4) the results show that all variables, except gender, are statistically significant, the majority of which with a significance level of 1%. Thus, all hypotheses are validated excluding H1.

¹⁹ We also estimated OLS models for the case where no imputation of missing data was made. The results yielded a similar but less robust outcome than after imputation of missing data.

²⁰ In the OLS models, the F statistics reveal that the models are globally significant and adjusted R² for the overall well-being indicator (OCWI), material well-being indicators (MWI) and happiness indicators yield quite high figures (25–43%) for micro-based data – cf. Table 4. In the logistic estimations, the Hosmer and Lemeshow statistics revealed that, in general, excluding the leisure and recreation well-being indicator (LRI), all models have a reasonable fit (i.e., for the standard levels of significance, the null hypothesis that models represent reality well is accepted).

Table 4
Correlation matrix (Pearson correlation and p-values).

Domains/Variables	Mean	Min	Max	OCWI	MWI	HCI	NCI	HI	SI	LRI	SRI	PCI	Happiness as reported by children	Happiness as reported by parents
Overall child well-being (OCWI)	7.078	2.46	12.40	1	-	-	-	-	-	-	-	-	-	-
Material well-being (MWI)	13.249	-1.80	24.80	0.602 (0.000)	1	-	-	-	-	-	-	-	-	-
Housing context (HCI)	3.564	-2.71	5.00	0.343 (0.000)	0.203 (0.000)	1	-	-	-	-	-	-	-	-
Neighbourhood context (NCI)	1.937	-4.00	9.93	0.230 (0.000)	0.040 (0.237)	0.083 (0.014)	1	-	-	-	-	-	-	-
Health behaviours (HI)	6.410	0.10	15.20	0.148 (0.000)	-0.073 (0.030)	0.673 (0.000)	0.056 (0.092)	1	-	-	-	-	-	-
School/education (SI)	5.738	-1.30	9.00	0.285 (0.000)	0.175 (0.000)	0.132 (0.000)	-0.012 (0.715)	0.011 (0.744)	1	-	-	-	-	-
Leisure and recreation (LRI)	13.752	-1.17	20.00	0.483 (0.000)	0.243 (0.000)	0.103 (0.002)	-0.025 (0.454)	0.038 (0.255)	0.110 (0.001)	1	-	-	-	-
Social relations (SRI)	9.583	-0.73	15.47	0.394 (0.000)	0.140 (0.000)	0.540 (0.000)	0.112 (0.001)	0.063 (0.060)	0.173 (0.000)	0.182 (0.000)	1	-	-	-
Psychobiological characteristics (PCI)	3.731	-0.86	5.00	0.285 (0.000)	0.158 (0.000)	0.208 (0.000)	-0.011 (0.735)	0.006 (0.851)	0.159 (0.000)	0.109 (0.001)	0.081 (0.016)	1	-	-
Happiness as reported by children	9.006	1.00	10.00	0.123 (0.000)	0.070 (0.037)	0.078 (0.019)	-0.011 (0.753)	0.039 (0.249)	0.105 (0.002)	0.085 (0.011)	0.083 (0.014)	0.139 (0.000)	1	-
Happiness as reported by parents	8.911	1.00	10.00	0.276 (0.000)	0.177 (0.000)	0.238 (0.000)	0.049 (0.142)	0.034 (0.304)	0.175 (0.000)	0.207 (0.000)	0.313 (0.000)	0.234 (0.000)	0.359 (0.000)	1

Table 5
Factors explaining variations in child well-being [OLS estimates].

Dimensions/variables/fitness of the model		Overall well-being (OCWI in ln)			Material well-being (MWI in ln)				Housing Context well-being (HCI in ln)				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Child related variables	Gender (1 = girl; 0 = boy)	-0.005	-0.006	-0.004	-0.005	0.010	0.012	0.015	0.018	-0.023	-0.022	-0.033*	-0.031*
	Age (ln)	-0.158***		-0.176***		-0.118		-0.198**		0.002		0.036	
	School cycle (1 = 3rd and 4th grades; 0 = 5th and 6th grades)		0.044***		0.043***		0.027		0.032		0.007		0.001
Parents related variables	Mother's education level (ln)	0.223***	0.228***			0.527***	0.533***			0.173***	0.172***		
	Father's education level (ln)			0.251***	0.252***			0.538***	0.541***			0.038	0.038
	Mother professional status (1 = unemployed; 0 = other)	-0.067***	-0.067***	-0.061***	-0.062***	-0.192***	-0.193***	-0.202***	-0.203***	-0.010	-0.010	0.030	0.030
Family related variables	Father professional status (1 = unemployed; 0 = other)	-0.114***	-0.114***	-0.111***	-0.113***	-0.354***	-0.354***	-0.356***	-0.359***	-0.007	-0.005	-0.032	-0.030
	Income level (1 = Household income <868€/month; 0 = other)									-0.079**	-0.080**	-0.073**	-0.074***
	Nationality (1 = Portuguese nationality only; 0 = other)	0.081***	0.080**	0.087***	0.086***	0.086*	0.085*	0.095*	0.096*	0.027	0.026	0.074*	0.072
School related variable	Type (1 = Public; 0 = Private)	-0.051***	-0.051***	-0.049***	-0.050***	-0.132***	-0.132***	-0.131***	-0.135***	0.052	0.054	-0.028	-0.025
Constant		2081	1.694	2.100	1.677	2.514	2.225	2.706	2.234	1.619	1.618	1.691	1.770
N		808	810	786	788	811	818	789	796	810	818	788	796
Goodness of fit	Adjusted R ²	0.249	0.251	0.273	0.272	0.430	0.433	0.428	0.429	0.031	0.032	0.030	0.030
	F (p-value)	39.185 (0.000)	39.653 (0.000)	43.167 (0.000)	43.109 (0.000)	88.230 (0.000)	90.308 (0.000)	85.302 (0.000)	86.447 (0.000)	4.263 (0.000)	4.353 (0.000)	4.083 (0.000)	4.057 (0.000)

Notes: *** p-value significance level < 0.01; ** p-value significance level < 0.05; * p-value significance level < 0.10. Grey cells aim to highlight the coefficient estimates that are statistically significant for the conventional levels.

Dimensions/variables/fitness of the model		Neighbourhood context well-being (NCI in ln)				Health behaviours (HI in ln)				School well-being (SI in ln)			
		Model 13	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21	Model 22	Model 23	Model 24
Child related variables	Gender (1 = girl; 0 = boy)	-0.044	-0.043	-0.050	-0.050	0.012	0.008	0.010	0.005	0.037	0.042*	0.038	0.044*
	Age (ln)	0.531***		0.562***		0.104		0.110		-0.368***		-0.367***	
	School cycle (1 = 3rd and 4th grades; 0 = 5th and 6th grades)		-0.109***		-0.117***		-0.024		-0.026		0.056**		0.057**
Parents related variables	Mother's education level (ln)	-0.018	-0.029			-0.005	-0.005			0.074*	0.092**		
	Father's education level (ln)			0.108	0.116			0.058	0.070			0.050	0.051
	Mother professional status (1 = unemployed; 0 = other)	-0.025	-0.028	-0.023	-0.022	0.039	0.036	0.042	0.041	0.025	0.028	0.024	0.025
Family related variables	Father professional status (1 = unemployed; 0 = other)	0.125**	0.134**	0.133**	0.145**	0.000	0.003	0.008	0.012	-0.077*	-0.079*	-0.076*	-0.080*
	Income level (1 = household income <868€/month; 0 = other)	-0.049	-0.050	-0.030	-0.030	0.052	0.050	0.056*	0.055*	-0.087***	-0.093***	-0.096***	-0.106***
	Nationality (1 = Portuguese nationality only; 0 = other)	0.048	0.044	0.045	0.039	0.000	-0.001	0.016	0.015	0.097*	0.099*	0.124**	0.127**
School related variable	Type (1 = Public; 0 = Private)	-0.041	-0.036	-0.018	-0.008	-0.072**	-0.067**	-0.059*	-0.051	-0.020	-0.021	-0.029	-0.036
Constant		0.517	1.794	0.312	1.643	1.589	1.841	1.490	1.741	2.622	1.732	2.626	1.761
N		810	818	788	796	810	818	788	796	810	819	788	797
Goodness of fit	Adjusted R ²	0.020	0.013	0.025	0.018	0.003	0.001	0.004	0.003	0.067	0.057	0.067	0.057
	F (p-value)	3.024 (0.002)	2.299 (0.019)	3.479 (0.001)	2.797 (0.005)	1.297 (0.242)	1.132 (0.339)	1.347 (0.216)	1.266 (0.258)	8.236 (0.000)	7.142 (0.000)	8.097 (0.000)	7.001 (0.000)

Notes: *** p-value significance level < 0.01; ** p-value significance level < 0.05; * p-value significance level < 0.10. Grey cells aim to highlight the coefficient estimates that are statistically significant for the conventional levels.

Table 5 (continued)

Dimensions/variables/fitness of the model		Leisure and recreation well-being (LRI in ln)				Social relations well-being (SRI in ln)				Psychobiological characteristics (PCI in ln)			
		Model 25	Model 26	Model 27	Model 28	Model 29	Model 30	Model 31	Model 32	Model 33	Model 34	Model 35	Model 36
Child related variables	Gender (1 = girl; 0 = boy)	-0.055*	-0.054*	-0.045	-0.042	0.019	0.026	0.008	0.016	0.055*	0.053*	0.059**	0.058**
	Age (ln)	-0.740***	-	-0.782***	-	-0.165*	-	-0.085	-	-0.396***	-	-0.389***	-
	School cycle (1 = 3rd and 4th grades; 0 = 5th and 6th grades)	-	0.200***	-	0.207***	-	0.029	-	0.014	-	0.093***	-	0.086***
Parents related variables	Mother's education level (ln)	0.129**	0.157***	-	-	0.159***	0.193***	-	-	0.058	0.065	-	-
	Father's education level (ln)	-	-	0.123**	0.135**	-	-	0.044	0.079**	-	-	0.119**	0.116**
	Mother professional status (1 = unemployed; 0 = other)	-0.008	-0.014	0.013	0.004	-0.030	-0.041	0.004	-0.009	-0.006	-0.005	0.001	0.001
Family related variables	Father professional status (1 = unemployed; 0 = other)	-0.044	-0.045	-0.050	-0.053	0.019	0.023	-0.003	0.005	0.072	0.067	0.092*	0.085
	Income level (1 = Household income <868€/month; 0 = other)	-0.151***	-0.154***	-0.154***	-0.161***	-0.037	-0.038	-0.034	-0.037*	-0.091**	-0.092**	-0.079**	-0.081**
	Nationality (1 = Portuguese nationality only; 0 = other)	0.119*	0.113	0.109	0.108	0.076	0.075	0.111***	0.114***	0.032	0.033	0.029	0.032
School related variable	Type (1 = Public; 0 = Private)	-0.005	-0.007	-0.005	-0.012	0.037	0.046	-0.037*	-0.026	-0.037	-0.040	-0.022	-0.028
Constant		4186	2.373	4.298	2.403	2.438	2.005	2.396	2.148	2.315	1.358	2.230	1.305
N		811	819	789	797	808	818	786	796	810	816	788	794
Goodness of fit	Adjusted R ²	0.114	0.123	0.117	0.124	0.030	0.037	0.026	0.031	0.040	0.046	0.041	0.037
	F (p-value)	14.035 (0.000)	15.350 (0.000)	14.011 (0.000)	15.069 (0.000)	4.072 (0.000)	4.961 (0.000)	3.604 (0.000)	4.148 (0.000)	5.166 (0.000)	4.853 (0.000)	5.235 (0.000)	4.767 (0.000)

Notes: *** p-value significance level < 0.01; ** p-value significance level < 0.05; * p-value significance level < 0.10. Grey cells aim to highlight the coefficient estimates that are statistically significant for the conventional levels.

Dimensions/variables/fitness of the model		Happiness as reported by the child (in ln)				Happiness as reported by the parents (in ln)			
		Model 33	Model 34	Model 35	Model 36	Model 37	Model 38	Model 39	Model 40
Child related variables	Gender (1 = girl; 0 = boy)	-0.003	-0.004	-0.001	-0.001	0.003	0.010	0.006	0.013
	Age (ln)	-0.192***	-	-0.182***	-	-0.135***	-	-0.127***	-
	School cycle (1 = 3rd and 4th grades; 0 = 5th and 6th grades)	-	0.052***	-	0.049***	-	0.031**	-	0.030**
Parents related variables	Mother's education level (ln)	-0.032	-0.031	-	-	0.019	0.055**	-	-
	Father's education level (ln)	-	-	0.009	0.005	-	-	0.026	0.032
	Mother professional status (1 = unemployed; 0 = other)	0.030	0.028	0.032	0.029	-0.001	0.007	0.009	0.014
Family related variables	Father professional status (1 = unemployed; 0 = other)	0.046	0.044	0.039	0.036	-0.00005	0.008	-0.004	0.004
	Income level (1 = Household income <868€/month; 0 = other)	-0.035	-0.034	-0.022	-0.022	-0.027*	-0.031**	-0.023*	-0.035*
	Nationality (1 = Portuguese nationality only; 0 = other)	0.010	0.005	0.013	0.008	0.019	0.068**	0.030	0.088***
School related variable	Type (1 = Public; 0 = Private)	-0.053**	-0.054**	-0.042*	-0.044**	-0.025*	-0.021	-0.026*	-0.029*
Constant		2.680	2.219	2.605	2.174	2.477	2.060	2.439	2.069
N		800	810	777	787	802	812	780	790
Goodness of fit	Adjusted R ²	0.016	0.017	0.012	0.013	0.031	0.044	0.030	0.042
	F (p-value)	2651 (0.007)	2.742 (0.005)	2.221 (0.024)	2.255 (0.022)	4.208 (0.000)	5.698 (0.000)	4.047 (0.000)	5.295 (0.000)

Notes: *** p-value significance level < 0.01; ** p-value significance level < 0.05; * p-value significance level < 0.10. Grey cells aim to highlight the coefficient estimates that are statistically significant for the conventional levels.

Table 6
Summary of the main possible areas of intervention.

Dimensions and individual indicators		Parents report	Children's report
Material well-being (MWI)	Household net monthly income	<ul style="list-style-type: none"> • 37.8% earn less than 868€/month • 31.9% earn between 868€ and 1300€/month • 22.0% have meat/fish meals less than 3 times/week 	<ul style="list-style-type: none"> • 67.7% of the children think that their parents earning a salary/income is extremely important • 90.1% of the children place income in first place within the material well-being dimension • 40.3% of the children think that having fish/meat meals is extremely important • 73.3% of the children place having fish/meat meals in first place within the set of items pertaining to deprivation
	Having fish/meat meals		
Housing context (HCI)	36.8% of children place the material well-being dimension as the most important		
	House has damp ceilings and/or walls	<ul style="list-style-type: none"> • 18.4% live in houses with damp ceilings and/or walls 	<ul style="list-style-type: none"> • 41.2% of the children think that not having a house with damp ceilings and/or walls is extremely important
Neighbourhood context (NCI)	28.9% of children place the housing context dimension as the second most important		
	Safe in the neighbourhood for children to walk around alone	<ul style="list-style-type: none"> • 43.2% of the parents feel it is not safe for their children to walk alone on the neighbourhood 	<ul style="list-style-type: none"> • 65.0% of the children think that feeling safe when walking alone on the neighbourhood is extremely important • 48.6% of the children place feeling safe in the neighbourhood in first place within the neighbourhood context dimension
Health behaviours (HI)	20.1% of children place the neighbourhood context dimension as the third most important		
	Number a times a day the child brushes teeth	<ul style="list-style-type: none"> • 20.7% of the children brush their teeth less than 2 times a day 	<ul style="list-style-type: none"> • 58.4% of the children think that washing their teeth frequently is extremely important
School well-being (SI)	23.2% of children place the health behaviours dimension as the fourth most important		
	Child has repeated a school grade	<ul style="list-style-type: none"> • 10.2% of the children have repeated a school grade 	<ul style="list-style-type: none"> • 73% of the children think that not repeating a grade is extremely important • 46.5% of the children place not repeating a school grade in first place within the school well-being dimension
Leisure and recreation (LRI)	26.2% of children place the school well-being dimension as the fifth most important		
	Child has extra-curricular activities	<ul style="list-style-type: none"> • 10.5% of the children do not have an extra-curricular activity 	<ul style="list-style-type: none"> • 35.8% of the children think that having extra-curricular activities is extremely important • 66.2% of the children place having extra-curricular activities in first place within the leisure and recreation dimension
Social relations (SRI)	27.8% of children place the leisure and recreation dimension as the eighth most important (last place)		
	Child talks to parents	<ul style="list-style-type: none"> • 37.9% of the children do not talk daily with their parents 	<ul style="list-style-type: none"> • 50.8% of children think that talking to parents/people responsible for them is extremely important
Psychobiological characteristics (PCI)	19% of children place the social relations dimension as the seventh most important		
	Child has chronicle/long-term disease	<ul style="list-style-type: none"> • 10.4% of the children have some kind of chronicle/long-term disease • 20.4% of the children have concentration problems 	<ul style="list-style-type: none"> • 48.9% of children think that having a chronicle/long-term disease is extremely serious • 34.0% of the children think that having concentration problems is extremely serious
	Child has concentration problems		
	24.8% of the children place psychobiological characteristics dimension as the most important		

Most importantly, parent-related variables emerge as a critical determinant of overall child well-being, particularly the parents' education level. Both the mother's and the father's education level contribute positively to the overall well-being of children. This result is in line with findings from earlier studies (e.g., Bastos et al., 2004; Moore et al., 2008; Bastos and Machado, 2009).

Moreover, having unemployed parents strongly reduces the overall child well-being, which is also in line with existing studies (e.g., Bastos et al., 2004; Bastos and Machado, 2009). It is interesting

to note that, for our sample, the father's unemployment impacts more severely on the child's overall well-being than the mother's.

Although child-related variables (involving hypotheses H1–H3) turn out to be less relevant than the parents' or family domains, age is negatively related to well-being, which is in accordance with results from other studies, such as Moore et al. (2007, 2008). This means that, considering all the remaining factors constant, on average, younger children tend to be better off than their older counterparts. Conversely, but consistent with the latter finding that

well-being decreases with age, children in the third and fourth grades are better off than children in the fifth and sixth grades.

Children living in households with only Portuguese members (hypothesis H6) seem to do better than children in households whose members have double nationality (including the Portuguese) or who are foreigners. Bastos et al. (2004) and Bastos and Machado (2009), focusing on a sample of Portuguese children living in the Lisbon area, obtained similar results, albeit their dependent variable was household's economic/financial hardship and child deprivation, respectively, rather than child well-being. Analysis by race/ethnicity in other countries has also shown that there are differences related to nationality factors (Land et al., 2001, 2007; Moore et al., 2007, 2008).

Finally, children attending public schools (hypothesis H7) are worse off in terms of overall well-being than children in private schools.

Whereas in earlier studies, such as Moore et al. (2007, 2008) and Land et al. (2007), boys present lower levels of well-being than girls, we fail to find significant evidence that gender influences the children's overall well-being (hypothesis H1).²¹

We also estimated the effects of income and of the socio-demographic factors mentioned above on the dimensions of well-being considered in this analysis (material well-being, housing context, neighbourhood well-being, health behaviour, school well-being, leisure and recreation, social relationships and psychobiological characteristics) and on happiness, as reported by children and parents.

In the material well-being dimension and in all four estimated models, the child-related variables (H1–H3) do not seem to be important determinants of this kind of well-being, with the exception of age in one of the four models estimated. On the other hand, parent-related variables (education level and unemployment) (H4 and H5) have the greatest and most meaningful impact on the children's material well-being. Levels of higher education for both mother and father translate into higher material well-being levels for their children. Conversely, if the mother or father is unemployed, the child's material well-being will be lower, most strongly if it is the father who is unemployed. Similar to the case of overall child well-being, children living in households whose members are all Portuguese seem to have more material well-being than children living in double nationality or foreign households (H6), and children attending public schools do worse in this domain when compared to children in private schools (H7).

Two of the four models estimated for the housing context dimension show that gender has a significant influence on this kind of well-being, at a significance level of 10% (H1), female children being worse off than male. Other child-related variables (age and school cycle – H2 and H3), however, have no significant impact on well-being in the housing context domain. From the parent-related variables considered (H4 and H5), only the mother's education level has a strong positive impact on children's housing well-being. Income level (H8), although not as relevant as the mother's education level, also has a significant impact on this dimension: children in households with incomes lower than 868€/month are worse off than children living in households with a higher income. Living in a Portuguese household is a relevant determinant only in one of

the four models estimated and at a significance level of 10% (H6). The type of school attended does not have a significant impact on housing well-being.

Older children and children enrolled in the 5th and 6th grade (H2 and H3) seem to be better off than their counterparts in the neighbourhood context dimension. Although both seem to be significant, the impact of age is greater than the impact of school year. From the parent-related variables (H4 and H5), only the father's unemployment seems to be significant for neighbourhood well-being and, unexpectedly, in a positive way. It is hard to explain this result. We can only speculate about its reasons. One explanation could be related to the inclusion of one particular individual indicator in this dimension: the number of times children play in the street. It may be the case that unemployed fathers are more prone to allowing their children to play outside than other parents. We do not have, however, any proof of this or literature to confirm this possibility.

The health domain does not seem to be consistently influenced by any of the variables considered in the four models. Low income level (H8) is significant for well-being in this domain in only two of the four models, at a significance level of 10%, and in a surprisingly positive way. This means that children living in households with incomes lower than 868€/month are better off than their counterparts. The type of school attended (H7) is significant in three of the four models estimated. It seems that children in public schools do worse than children in private schools in terms of health behaviour. None of the other variables considered (H1–H6) are significant for the health well-being dimension.

School well-being is significantly influenced by most variables in all four models. In two of the four estimated models, female children do significantly better than their male counterparts, although this is only true at a significance level of 10% (H1). Older children do significantly worse than younger children in school well-being, where age is the variable with the strongest impact on this dimension (H2). On the other hand, children enrolled in the 3rd and 4th grades do significantly better than children in the 5th and 6th grades (H3). The mother's level of education (H4) also has a significant and positive impact on children's well-being in the school dimension, whereas the father's unemployment (H5) also has a significant yet negative impact on school well-being. Children from households with lower levels of income (H8) do significantly worse in this domain and children living in Portuguese households are better off than other children (H7). Most of these results are consistent with those obtained by Moore et al. (2008), who concluded that child-related variables, as well as ethnicity and socio-demographic context, are all significant for educational and cognitive well-being.

Leisure and recreation activities are most and significantly influenced by age (H2), with younger children being better off than older children. School cycle (H3) is also relevant and its impact on leisure and recreation well-being follows the same kind of pattern as for age. Gender is significant in two of the four estimated models, at a significance level of 10%. Female children seem to do worse in this domain than male children. From parent-related variables, the mother's and father's education level are the most significant for leisure and recreation activities (H4). The higher the parent's level of education, the greater the child's well-being. Concerning family-related variables, low income (H8) has significant influence on child's well-being in this dimension. Children from households with a net monthly income lower than 868€ do worse than other children. Nationality (H6) is significant in only one of the four models estimated and at a significance level of 10%. Here children living in households with Portuguese nationals only seem to do better than children living in double nationality households or foreign households.

The social relationships domain is not consistently and significantly influenced by most of the variables considered, except for

²¹ Similar to Bastos and Machado (2009), we also estimated an OLS and a Logit model for overall child well-being where happiness as reported by the children was included as an independent variable (see Appendix, Table A2 for the results). The goodness of fit tests show that these models are robust and all variables including happiness as reported by the children are significant, the exception being gender, as was the case before. The main determinants of overall child well-being are still age, mother's and father's education level and father's professional status. For the OLS model, the impact of reported happiness on overall well-being varies between 0.057 and 0.081.

the mother's education level (H4). Children whose mothers have higher education do better in terms of social relationships. The father's educational level is also significant for one of the models estimated, but its impact on the child's well-being is weaker. Age (H2) is significant for only one of the four estimated models estimated, with younger children doing better in this dimension than older children. Income level (H8) is also significant for only one of the estimated models, showing that children living in lower-income households do worse than their counterparts. These results are analogous to those obtained by Moore et al. (2008), who conclude that child-related variables and socio-demographic context are significant for the social well-being domain. Nationality (H6) is determinant for children's social relationships in two of the estimated models. Children enrolled in public schools (H7) do worse in social relationships than children in private schools, but the impact of this variable is significant for only one of the estimated models and not noticeably strong.

Finally, all child-related variables have a significant influence on the physical and psychological domain of well-being (H1–H3), in line with the results obtained by Moore et al. (2008). Here female children do better than their male counterparts. Older children are worse off in this dimension than younger children, where age is the variable with the strongest impact on the children's psychobiological characteristics. The influence of school cycle goes in the same direction as age, but its impact is weaker. From the parent-related variables, the father's education level (H4) is the one that most and significantly influences well-being in this dimension. Children whose fathers' have higher levels of education seem to be better off than children whose fathers have lower levels of education. The father's unemployment (H5) is also significant, but for only one of the four estimated models. Unexpectedly, its influence on children's psychobiological characteristics is positive. Children from households with low levels of income (net monthly income below 868€) (H8) seem to do worse than other children whose households earn higher incomes. These results are also similar to those obtained by Moore et al. (2008) for the impact of the socio-demographic context on the physical and psychological well-being domains.

Now turning to reported happiness, it seems that the estimated models are less capable of explaining and predicting variations in (subjective) child well-being. Goodness of fit tests show that, although significant, the models explain a very low percentage of the variability in children's reported happiness, reported either by children themselves or by parents. However, in terms of happiness as reported by children, age (H2) and school cycle (H3) significantly determine their degree of happiness, where older children and children enrolled in the 5th and 6th grades tend to report lower levels of happiness. None of the parent-related variables (H4 and H5) or family-related variables (H6 and H8) have any significant influence on the children's reported happiness. The type of school attended (H7) is also significant for children's reported happiness, where children enrolled in public schools tend to report lower levels of happiness. In spite of the existing impact of these few variables, it is legitimate to conclude that subjective and self-reported data alone is not enough to evaluate and understand overall well-being and that it is desirable to combine subjective information with objective information, as is the case of our proposed index. This content is supported by Diener and Suh (1997, pp. 213) who underline the necessity to combine "social indicators, subjective well-being measures and economic indices" in order to make "informed policy decisions". As for children's happiness reported by parents, the significant variables are the same as those for happiness reported by children, together with the income level (H8) and nationality (H6), the latter one being significant in only two of the four estimated models. Here, reported happiness for children living in lower-income households is lower and reported happiness for children living in households of Portuguese nationality only is higher than

the reported happiness for children living in households with double nationality or foreign households. The same comment made about the children's reported happiness is valid to parent's report on their children's happiness. Although a few more variables show up as relevant, this type of subjective measure is less informative than the combined index we propose. These conclusions also reinforce the evidence of a weak correlation between the OCWI and the two measures of happiness, and confirm the possibility of different underlying explaining factors (cf. Section 4.1)

These exploratory findings on the reports of happiness, both by children and their parents, and their relation to overall well-being, are very interesting and worthy of a deeper future analysis.

4.3. Impacts of considering different weighting schemes: equal weights versus weights derived from children's perceptions

In order to determine whether considering a uniform weights scheme or, alternatively, a non-uniform weighting scheme render different results, we estimated an OLS model for the determinants of the overall child well-being (OCWI) considering the two different scenarios, our proposed composite index with different weights and Scenario 1 which corresponds to the results obtained for the uniform weighting scheme (this topic is further discussed and developed elsewhere – see Fernandes et al. (2012a)). The main results of this estimation are presented in Table A3 in Appendix. These results show that the explanatory variables of overall well-being are identical for both weighting schemes. Specifically, age, school cycle, mother's and father's level of education, mother's and father's professional situation, nationality of household members and type of school attended (public or private) all emerge statistically significant for both scenarios (for the most part p-value is lower than 0.01 – cf. Table A3). Nevertheless, at least two highlights need to be made.

First, we can conclude that the impact of the mother's and father's education level on overall well-being, as well of the mother's and father's professional status for our proposed index is almost twice the impact of the same variables when considering the equal weights system (that is, Scenario 1). Furthermore, the ordering of the explanatory variables that most contribute to differences in the overall well-being of children also suffers some change: in Scenario 1 age is the most important determinant, followed by both parents' education level and then the nationality of the household, but when using our proposed index, the most important determinant of overall well-being is both parents' level of education, followed by age and then the father's employment situation (cf. Table A3).

Wrapping up, the main conclusion we can take here is that using a non-uniform weighting scheme that derives from children's perceptions emphasizes the importance of the set of explanatory variables related to children's parents and places them as the ones that most account for changes in the overall well-being of children. This conclusion is especially important when the definition of policy goals is the end goal of a measurement exercise such as the one here developed.

5. Policy implications

In Section 4 we concluded that the parents' education and employment status are extremely relevant for child well-being. This means that policies promoting adult education and employment opportunities not only have an impact on the adults' own skills and promote poverty reduction (European Commission, 2011; Bastos et al., 2011), but may also improve child well-being. This policy orientation is adopted in the Portuguese National Strategy for Social Protection and Social Inclusion (Portugal, 2008).

From the results in Section 4 we can also draw some policy implications related to the immigrant population. According to those results, children living in Portuguese-only households tend to do better than children living in double-nationality households (including the Portuguese) and in foreign households. This means that policies promoting social integration of immigrant households with children contribute to improve child well-being, especially in the school dimension and also in the social relationships domain. Bastos et al. (2008) also reach a similar conclusion. Some of these policies could be the facilitation of labour market integration of the immigrant communities, access to social services and social support or access to legal support concerning their rights (Portugal, 2008).

Moving now to results related to child poverty, 37.7% of the children live in households with a net income below 868€/month, and 31.9% of the children live in households that earn between 868€ and 1300€/month (see Table 6). Also, more than half (67.7%) of the children consider that their parents earning a salary/income is extremely important. Additionally, over one third of the children place material well-being at the top of the domain ranking. What this all means is that income poverty has a strong position in the whole set of child well-being problems. For this reason, there is a case for income support policies (combination of income transfers and fiscal benefits) targeting poor households with children if we want to fight against child poverty, as suggested by Bastos et al. (2011) and by the Social Protection Committee report (European Commission, 2011).

There are also some specific areas of material well-being that deserve attention, namely the children's diet (Table 6): 22% of the children have fish/meat meals less than 3 times a week and 40.3% of the children find it extremely important to have fish/meat meals. So children's nutrition remains an important element of well-being that needs to be addressed and, therefore, any policy that aims to improve child well-being has to consider child nourishment. Bastos et al. (2011) also find this to be an important aspect of social policy for children. Measures dealing with school meals, for example, can be relevant for this purpose (Portugal, 2008).

Housing conditions is also another area of possible intervention, since over 40% of children think it matters a lot not having damp ceilings and/or walls at home, even though only 18.4% of them actually do live in houses with damp ceilings and/or walls (Table 6).

So, policies aiming at improving housing conditions may have a positive impact on child well-being, as is recognized in the Portuguese National Strategy for Social Protection and Social Inclusion (Portugal, 2008).

Almost two-thirds of the children think that it is extremely important to feel safe when walking alone in their neighbourhoods, and almost 50% place neighbourhood safety at the top of the most important items within the neighbourhood dimension. Also, 43.2% of the parents feel that it is not safe for their children to walk alone around the neighbourhood (Table 6). This means that promoting neighbourhood safety may also be important to improve child well-being.

Since health is an important aspect for child development and well-being (Bastos et al., 2011), child health care is a domain in which public interventions should be reinforced (European Commission, 2011). Almost 60% of children find brushing their teeth frequently extremely important, but about 20.7% actually brush their teeth less than twice a day. So, promoting hygiene campaigns for children and their parents may be important. Also, 10.4% of the children have some kind of chronicle/long-term disease. Almost 50% find it extremely serious to have a chronicle/long-term disease and around 1/4 of them rank the psychological characteristics dimension first as the most important dimension of well-being (Table 6). So, promoting children's medical assistance in these cases may be very important for child well-being.

School failure is also relevant: 73% of the children think that not repeating a grade is extremely important and around 10.2% of the children have repeated at least one school grade. Additionally, 20.4% of the children have concentration problems, where over one third of the children think this to be an extremely serious condition (Table 6). This means that designing measures to support and monitor children with learning problems and to promote educational success, as well as the development of services for psychological support within the school context (Bastos et al., 2008, 2011) can be helpful to improve children's well-being.

When compared to other dimensions, social relationships do not rate as the most important for children (the modal response from children places the social relationships domain in seventh place).²² However, it should be noted that more than one third of the children (37.9%) do not talk daily with their parents about themselves and their problems, despite the fact that just over 50% actually find it extremely important to talk to their parents (Table 6). Hence, the promotion of measures to support parenting and the development of parenting skills might be useful for the improvement of child well-being, not only in this dimension, but also in others, namely in terms of health behaviour. The Portuguese National Strategy for Social Protection and Social Inclusion (Portugal, 2008) recognized the importance of these types of measures.

Finally, although in 19.0% of the cases, leisure and recreation activities are rated last by the children when compared to other dimensions, they are still important for child development (Bronfenbrenner and Morris, 1998) and also for child social integration (Bastos et al., 2008, 2011). Yet, around 10.5% of the children from our sample do not have any kind of extra-curricular activity (Table 6). So, policies to improve child well-being should include facilitating the access to extra-curricular activities which otherwise would be mostly available for children whose parents can afford to pay for them.

These policy implications are based on results related to children from a specific region (Northern region of Portugal), that is, the sample of children surveyed is not representative of the whole Portuguese child population. Hence, any generalization should be taken with caution. This does not mean, however, that the results presented in previous sections and the policy implications just described are not valid. In fact, as already mentioned in Section 4, they are in line with what has been concluded in studies on specific child populations, as the one developed by Bastos et al. (2004, 2008) and Bastos and Machado (2009), but also in studies with child samples that have a representative nature, such as the ones developed by Bradshaw and colleagues, Land and colleagues or Moore and colleagues (Land et al., 2001, 2007; Bradshaw et al., 2007; Bradshaw and Richardson, 2009; Moore et al., 2007, 2008).

6. Concluding remarks

This paper empirically tested a new composite child well-being index, in order to analyse the importance of considering the children's own perspectives when engaging in a measurement exercise. This testing was conducted resorting to several instruments: simple statistical analysis, analysis of correlations between domains, estimation of an OLS econometric model in order to assess the main factors that show to influence overall child well-being and comparison of the results obtained for the proposed index with the

²² One explanation for this result could be related to the phenomenon of commercial pressure on children identified by Pugno (Pugno, 2009): "... the pressure applied by the commercial and industrial systems tends to push children towards a materialistic orientation and away from the appreciation of relationships". However, we do not have any evidence on the applicability of this claim to our sample of children.

ones obtained for an alternate calculation scenario (equal weights, with no incorporation of children's perceptions). The results show that introducing subjective components (specifically, the different weights) based on children's opinions changes the outcomes of child well-being measurement, especially in terms of the ordering of the main factors that explain variations in overall well-being. The parents' level of education and their professional situation, in particular the father's unemployment status, emerge as the most important factors. The policy implication of these results is that improving qualifications and employment opportunities for parents can have a positive impact on children's well-being.

Nationality was also shown to be relevant for overall well-being and children from households with double nationality (including the Portuguese) or foreign only do worse than others. These results support policies targeting the social inclusion of immigrant households as a way of improving their children's well-being.

The analysis carried out also revealed that the dimension that correlates the most with overall well-being is material well-being. This domain was the most highly rated by children themselves. Thus, policies consisting in income transfers to poor households may still be needed to cope with child poverty.

Although being in line with previous literature in the field, these results are dependent on the specific population from which data was collected – children enrolled in schools from the Northern region of Portugal—and, thus, should be taken with caution. This asks for further inquiry into the results obtained, namely, expanding the research to other regions of the country and analyse if the conclusions differ substantially or not. We do not, however, expect this to happen, since the results that we reached are similar to what has been obtained for other samples of children, with or without a representative nature.

Possible interesting directions for future research concerning the measurement of child well-being through the methodology proposed are the following: a more complete characterization of the children's living conditions, namely information on the household composition; analysis of the interactions between dimensions of well-being, namely the connections between contextual, inter-accional and personal characteristics variables.

One particularly interesting outcomes of our analysis was the one obtained for child reported happiness, either by children themselves or by their parents, and its relation to overall child well-being. Happiness is skewed (which is something that has already

Table A1
Complete list of indicators.

Dimensions	Indicators
<i>Material well-being</i>	<ul style="list-style-type: none"> • Household income; • Number of times: <ul style="list-style-type: none"> • A week the household provides the child with meat/fish (or vegetarian equivalent) meals. • Every year the household. <ul style="list-style-type: none"> • Buys new shoes/clothes for the child. • Celebrates special occasions (e.g., birthday party). • Has a vacation away from home.
<i>Housing context</i>	<ul style="list-style-type: none"> • Total number of rooms in the house. • Child has his/her own bedroom. • Child has his/her own be. • House has: <ul style="list-style-type: none"> • rotten windows, doors and/or floors; • damp ceilings and/or walls; • a flushing toilet; • a shower/bathtub.
<i>Neighbourhood environment</i>	<ul style="list-style-type: none"> • Access to public transports. • Access to stores/markets/supermarkets. • Public spaces where the child can play (e.g., streets, parks, playgrounds, etc.). • Streets are safe for children to walk around alone. • Number of times the child plays in the street without adult supervision.
<i>Health (behaviours)</i>	<ul style="list-style-type: none"> • Child eats fruit and/or vegetables at least once a day. • Child has three meals a day. • Number of times in a day child brushes teeth. • Number of times in a year child has doctor appointments (excluding when sick).
<i>School/education</i>	<ul style="list-style-type: none"> • Child has repeated a grade. • Child has been suspended/expelled from school. • Child's relationship with teacher(s). • Child has help with homework.
<i>Leisure and recreation</i>	<ul style="list-style-type: none"> • Child has extra-curricular activities (e.g., sports, music, etc.). • Child has leisure activities at home (e.g., reading, watching TV, playing computer games, etc.). • Child has leisure activities outside the house (e.g., going to the movies, to the theatre, to the circus, etc.).
<i>Social relations</i>	<ul style="list-style-type: none"> • Child plays/spends time with parents/caregivers. • Child plays/spends time with brother(s)/sister(s)/other children living in the household; • Child talks about him/herself to parents/caregivers. • Child talks about him/herself to brother(s)/sister(s)/other children living in the household. • Number of close friends the child has. • Average number of days the child spends playing with friends. • Child's relationship with other children, besides friends.
<i>Physical and psychological traits</i>	<ul style="list-style-type: none"> • Child has physical and/or mental limitations/handicaps. • Child is physically underdeveloped. • Child has chronicle/long-term disease (e.g., asthma, diabetes, etc.). • Child has concentration problems. • Child has aggressive behaviours. • Child reveals lack of interest in his/her surroundings.

Table A2
Happiness reported by the child as an independent variable.

Dimensions/variables/fitness of the model		Overall well-being (OCWI in ln)–OLS estimates				Overall well-being (OCWI in ln) – Logit estimates			
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Child related variables	Gender (1 = girl; 0 = boy)	–0.004	–0.005	–0.003	–0.004	–0.087	–0.095	–0.094	–0.098
	Age (ln)	–0.138***		–0.160***		–1.750***		–1.976***	
	School cycle (1 = 3rd and 4th grades; 0 = 5th and 6th grades)		0.039**		0.040***		0.577***		0.547***
Parents related variables	Mother's education level (ln)	0.226***	0.230***			1.980***	2.031***		
	Father's education level (ln)			0.250***	0.251***			2.535***	2.544***
	Mother professional status (1 = unemployed; 0 = other)	–0.068***	–0.068***	–0.059***	–0.060***	–0.535***	–0.530***	–0.518**	–0.523**
Family related variables	Father professional status (1 = unemployed; 0 = other)	–0.117***	–0.117***	–0.110***	–0.112***	–0.982***	–0.979***	–0.834***	–0.845***
	Income level (1 = Household income <868€/month; 0 = other)								
	Nationality (1 = Portuguese nationality only; 0 = other)	0.084***	0.083***	0.092***	0.092***	0.833**	0.827**	1.021**	1.018**
School related variable	Type (1 = Public; 0 = Private)	–0.045***	–0.045***	–0.046***	–0.047***	–0.469**	–0.466**	–0.378**	–0.389**
Happiness variable	Happiness as reported by the child (ln)	0.081***	0.080***	0.057**	0.057**	1.270***	1.227***	1.146***	1.126***
Constant		1.847	1.512	1.935	1.547	–0.780	–5.034	–0.646	–5.401
N		797	799	774	776	797	799	774	776
Equal or above percentil 50%						415	416	403	402
	Below					382	383	371	372
Goodness of fit	Adjusted R ² /% correct	0.254	0.255	0.270	0.270	67.4	69	68.6	68.8
	F/Hosmer and Lameshow (p-value)	34.808 (0.000)	35.229 (0.000)	36.712 (0.000)	36.756 (0.000)	3.337 (0.911)	5.145 (0.7429)	9.752 (0.283)	8.724 (0.366)

* p-value significance level < 0.10.

** p-value significance level < 0.05.

*** p-value significance level < 0.01.

Table A3
Determinants of the overall child well-being: NON-uniform weights versus EQUAL weights [OLS estimates].

Dimensions/variables/fitness of the model	OCWI (in ln) – Proposed index: NON-uniform weights				OCWI (in ln) – Scenario 1: EQUAL weights			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Child related variables								
Gender (1 = girl; 0 = boy)	-0.005	-0.006	-0.004	-0.005	0.007	0.011	0.008	0.014
Age (ln)	-0.158***	0.044**	-0.176***	0.043**	-0.210***	0.060**	-0.226**	0.061**
School cycle (1 = 3rd and 4th grades; 0 = 5th and 6th grades)								
Mother's education level (ln)	0.223**	0.228**	0.251***	0.252**	0.159**	0.192**	0.173**	0.189**
Father's education level (ln)								
Mother professional status (1 = unemployed; 0 = other)	-0.067**	-0.067**	-0.061**	-0.062**	-0.032**	-0.031**	-0.028**	-0.030**
Father professional status (1 = unemployed; 0 = other)	-0.114**	-0.114**	-0.111**	-0.113**	-0.071**	-0.066**	-0.069**	-0.066**
Family related variables								
Nationality (1 = Portuguese nationality only; 0 = other)	0.081**	0.080**	0.087**	0.086**	0.084**	0.108**	0.087**	0.119**
School related variable								
Type (1 = Public; 0 = Private)	-0.051**	-0.051**	-0.049**	-0.050**	-0.058**	-0.054**	-0.057**	-0.060**
Constant	2081	1.694	2.100	1.677	2.514	2081	2.219	1.647
N	808	810	786	788	811	808	811	820
Adjusted R ²	0.249	0.251	0.273	0.272	0.227	0.245	0.237	0.240
F (p-value)	39.185 (0.000)	39.653 (0.000)	43.167 (0.000)	43.109 (0.000)	35.012 (0.000)	39.042 (0.000)	35.946 (0.000)	36.983 (0.000)

* p-value significance level < 0.10.

** p-value significance level < 0.05.

*** p-value significance level < 0.01.

been found in other works), there is some correlation between happiness reported by children and children's happiness as reported by their parents, but it is not strong and, also, the correlation between the measures of happiness and the overall well-being are not strong and the respective underlying explaining factors seem to not be the same. These findings are relevant and also deserve to be further developed in future research work.

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Appendix A.

See Tables A1–A3.

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