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A REVIEW ESSAY ON CHILD WELL-BEING MEASUREMENT: UNCOVERING THE PATHS FOR FUTURE RESEARCH

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Abstract

The research on indicators on the state of child well-being is a growing field and one that has experienced several changes through time. Due to the growing supply of data on children, and in order to facilitate conclusions and tracking trends, researchers have been led to develop child well-being summary indexes. Several proposals have already been presented. In the present work, we critically review the most prominent summary child well-being indexes recently constructed, the Index of Child and Youth Well-Being in the United States, the Child Well-being Index for the European Union, the Microdata Child Well-Being Index, and the Deprivation Index. The examination is carried out according to the contributions and innovations the indexes have brought to the field. A critical assessment of the methods used in the construction of the indexes is made and their main limitations identified. Accordingly, some future lines of research to improve child well-being measurement through summary indexes are put forward.

Keywords: child well-being, measurement, composite indices.

JEL-Code: I31; I32

1. Introduction

1.1 On the need to study and measure child well-being

It has been widely recognized that experiences of poverty in childhood, which constrain children's well-being in the immediate, can result as well in constrains in their later lives (Secretary of State for Social Security, 1999; Hobcraft, 2002; Kiernan, 2002; Piachaud and Sutherland, 2002; Sparkes and Glennester, 2002; Ridge, 2004; European Commission, 2008). Studies have also demonstrated that children have been, and still are, more affected by poverty than any other group (Cornia and Danziger, 1997; European Commission, 2008) and that they are at a higher risk of poverty than the average population member (Tsakloglou and Papadopoulos, 2002).

In 2005, 19% of the child population of the EU27 was at-risk-of-poverty, while the risk-of-poverty rate of the total population was of 16% (European Commission, 2008). In some less developed countries of the EU, for instance, Portugal, that number, for that same year, was even larger, 24% of the children were at risk of poverty (European Commission, 2008), and in spite of some visible improvements in child well-being - in 2006 the at-risk-of-poverty rate for children diminished to 21%, against 18% for the total Portuguese population -, children remain a particularly vulnerable group in the country (Portugal, 2008). So it becomes clear that child well-being deserves attention, at both the national and international levels, for at least two important reasons: the relevance of the problem in itself – poverty affects children in the present but also affect their future lives -, and, also the dimension of the problem – the numbers speak for themselves, child poverty is a widely spread and persistent problem.

However, assessing child well-being cannot be reduced to the measurement of poverty, especially when poverty measures focus on income only. As researchers have come to acknowledge (namely, Ben-Arieh, 2000, 2006, 2008b; Land et al., 2001; Aber et al., 2002; Hoelscher, 2004; Bradshaw et al., 2006, 2007; Moore et al., 2007, 2008; UNICEF, 2007; Bradshaw and Richardson, 2009), the well-being of children depends on several dimensions and, being so, measurement should take into account a vast array of indicators.

It is now broadly accepted that social indicators do play a determinant role in social policies formulation (Ben-Arieh, 2000), but still there is a lack of indicators that can actually be used to assess how children are faring (Ben-Arieh, 2000); this mainly because they tend to have the family, instead of the child, as unit of analysis and also, seldom children are directly

surveyed, their parents are usually the respondents. Recent works (Land et al., 2001, 2007; Bradshaw et al., 2006, 2007; Moore et al., 2007, 2008; Bastos et al., 2004, 2008; Bastos and Machado, 2009; Bradshaw and Richardson, 2009) have tried to overcome this gap – as are the cases of the studies that we will be reviewing below. However, there is still plenty to be done in the field, since most of the existing surveys do have the family as the unit of analysis or, when that does not happen, children are usually not the respondents, and so, any research work that is based on those surveys becomes compromised when the aim is to measure the real state of children. This means that child monitoring has been less than perfect, because children have not been treated as a completely independent group (Ben-Arieh, 2000), with particular characteristics and needs and, therefore, a group that deserves direct approaching, different indicators and, consequently, different policies. This gap of information constitutes another justification for the existing necessity to study and measure child well-being.

Summing up, we can, thus, highlight, at least, three main reasons why child well-being requires special attention:

1. The problem of child well-being is not contained in the present lives of children; it has repercussions on their future;

2. Children are still one of the groups most afflicted by poverty;

3. There is still a basic lack of "direct" information about children's lives.

1.2 On the recent trends on child well-being measurement

The research on indicators on the state of child well-being is a growing field and one that has experienced several changes through time. From all major shifts that have occurred three and most recent ones deserve to be highlighted (see Ben-Arieh, 2000, 2006, 2008): 1) an increasing child-centred focus; 2) this child centred approach goes beyond mere survival and multidimensionality emerges as an essential perspective; 3) an increasing reliance on single composite indexes that can summarize children's situations, instead of considering several disparate indicators.

The first of these three evolution trends points out to two relevant aspects of the child indicators movement, deeply inspired by both the frame settled out by the Convention on the Rights of the Children (CRC) (1989)[1] and the developments in the social psychology field, namely by the emergence of the ecological model of human development (Bronfenbrenner

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[1] From now on the abbreviation "CRC" will be used when referring to the Convention on the Rights of the Children.

and Morris, 1998). On the one hand, these frameworks have drawn attention to the need to focus on children when studying children. That is, the child should be the unit of analysis instead of the family or household where he/she is integrated. This is something that the main research works on this field have progressively come to pursuit (e.g., Land et al., 2001, 2007; Hoelscher, 2004; Bradshaw et al., 2006, 2007; Moore et al., 2007, 2008; Bastos et al., 2008; Bastos and Machado, 2009; Bradshaw and Richardson, 2009).

On the other hand, the CRC and the ecological model of human development have also highlighted the need, when assessing the state of children, to inquiry about the several dimensions which can affect their lives, that is, the issue of multidimensionality in child well-being - the second of the major trends above mentioned. Indeed, researchers have come to realize that child well-being cannot be regarded as unidimensional, which means that mere indicators of family income poverty are not enough to measure the extent of what the welfare of children is. This explains why most of the recent studies on the subject (e.g., Ben-Arieh, 2000, 2006, 2008b; Land et al., 2001, 2007; Aber et al., 2002; Hoelscher, 2004; Bradshaw et al., 2006, 2007; Bastos et al., 2008; Bastos and Machado, 2009; Bradshaw and Richardson, 2009; Moore et al., 2007, 2008; UNICEF, 2007; Bradshaw and Richardson, 2009) now consider several indicators of different aspects of children's lives when analysing how they are faring.

One of the latest developments concerning the dimensions of well-being is the introduction of the element of subjective well-being. Indeed, several recent studies on children (e.g., Aber et al., 2002; Bradshaw et al., 2007; UNICEF, 2007) include that additional aspect of well-being, claimed to be as crucial as any other. However, consensus about which dimensions - and their boundaries - should be considered is not yet evident. As we shall see later on, when comparatively analysing the works of Land et al. (2001, 2007), Moore et al. (2007, 2008), Bradshaw and colleagues (2007, 2009) and Bastos and colleagues (2008, 2009), dimensions definition and delimitation vary considerably across these studies.

Treating the problem of child well-being as a multidimensional one and the consequent growth of data on children ignited the third above mentioned evolution, and most recent one: the aggregation of indicators into one single composite index. Although aggregating indicators can lead to some opacity on what are the most critical areas of child well-being (UNICEF, 2007), that exercise remains useful for several reasons. Firstly, it makes measurement of progress easier (Ben-Arieh, 2008). Secondly, comparisons on trends across different demographic groups, localities and regions are facilitated (Ben-Arieh, 2008). It is in

this regard that the studies by Land et al. (2001, 2007), Bradshaw and colleagues (2007, 2009) or Moore and colleagues (2007, 2008) have been developed and are now renowned references.

There are still, however, improvements that need to be done concerning the indicators' aggregation methodology, namely in what respects the importance each indicator should have when aggregating them into one single composite index. Most of the existing work on this field considers that there is no valid reason for attributing different weights to each indicator, and agreement on a different weighting scheme is still yet to come (Hagerty and Land, 2007).

It should be noticed that all of the mentioned leading research on summary indicators do not allow for interactions between dimensions. Dimensions are simply added up and that sum is supposed to represent the overall well-being of children. However, Bronfenbrenner and Morris' work on human development suggests that there are "synergistic interdependencies" (Bronfenbrenner and Morris, 1998: 999) between the several relevant aspects of children's lives and, for that same reason, the effects of those components cannot simply be conceived as additive. Bradshaw et al. (2006) seem to recognize the existence of such interrelationships, but due to complexity in comparisons between countries, they argue, the option was to leave out considerations of that kind in the construction of the summary index.

Side by side with these evolutions, and also partially inspired by the CRC - where the children's right to be heard is recognized -, the discussion on children as agents in their own lives and as agents in their own well-being assessment has been present and growing. Researchers have tried to tame this issue in several ways. Some authors (e.g., Ridge, 2002; Sutton et al., 2007) have focused on understanding what are children's perspectives on poverty, deprivation and social exclusion. Others (e.g., Hoelscher, 2004; Van der Hoek, 2005; Redmond, 2008, 2009) have focused on how children deal and cope with hardship in their lives, highlighting how they exercise their agency when faced with economic adversity. Some other authors (e.g., Ridge, 2002; Van der Hoek, 2005; Sutton et al., 2007; Redmond, 2009) also draw attention to the need to focus on children as agents of exclusion themselves. The relevance of involving children in the definition and measurement of their own well-being is another aspect that has recently been highlighted (Sutton et al., 2007; Redmond, 2008, 2009). Regarding this last evolution, however, considerable research work is yet to be done (Redmond, 2009), namely, directions on how can children better be involved in the measurement of their own well-being still do not amount. Ben-Arieh (2005) is one of the few authors who dealt with this issue by mentioning the need to make children part of the studies

design, since research has clearly shown that children do know what is important for them, and should, therefore, in this sense be involved in the study and measurement of their own well-being.

Summing up, two relevant open research issues regarding the child well-being measurement can be identified and further explored:

1. Being children the centre of the analysis, to recognize the multidimensionality of their well-being implies the need to define its relevant dimensions.

Such definition should not be arbitrary but instead based on theoretical and/or empirical justifications - having the child as the unit of analysis as often as possible and also taking into consideration children's own perspectives on their well-being. Although the fundamental groundings for choosing dimensions have already been set in most research work, we argue that the validation of such choices has not been sufficiently explored, since there is still no consensus about which dimensions should be taken into account, neither there are clearly defined boundaries between dimensions.

2. In order to have a clear picture of the overall well-being of children, the construction of summary indicators are on demand.

The way/method for aggregating indicators is the main problem that arises here. Additionally, interactions between dimensions have to be properly taken into account.

These two research issues have as common background the problem of how to involve children in the measurement of their own well-being.

The main purpose of this paper is to review the existing literature on measurement of child well-being (Section 2) aiming at highlighting its main pitfalls and paths for future research (Section 3), along the lines summarised above.

2. Where we stand on child well-being measurement through summary indexes

In this section we review the most relevant and leading research work concerning child well-being measurement through summary indicators. Four studies deserve being mentioned: the index of child and youth well-being in the United States, by Land and colleagues (2001, 2007); the index of child well-being in the EU, built by Bradshaw and colleagues (Bradshaw at al., 2007; Bradshaw and Richardson, 2009); the microdata child well-being index, by Moore et al. (2007, 2008); and, finally, the child deprivation index of Bastos et al. (2004, 2008) and Bastos and Machado (2009). The analysis of these works is organized according to

the contributions they brought to the research field. As so, Land and colleagues' work (2001; 2007) is mentioned first because it constitutes one of the first and most prominent efforts in building a child well-being summary index for the United States, based on aggregated longitudinal data (collected from several surveys), which allows tracking the evolution and trends of child well-being in the country. Secondly comes Bradshaw and colleagues' studies (2007, 2009), with their contribution for the construction of the first aggregated data based summary child well-being index for the European Union, which has been key for comparisons between European countries. Moore and colleagues' work (2007, 2008) comes after with their main contribution on the usage of one single microdata survey, which allows to do more than just describe the proportion of children with a particular outcome. Finally, we describe Bastos and colleagues' deprivation index (20008, 2009), based on a microdata survey, collected from children themselves, and where a different from uniform distribution (which is the method adopted by the other mentioned indexes) aggregation method is employed.

However, before the description of each of these works a quick review of earlier studies in the field and on what they have done for the study and measurement of child well-being is in order.

2.1. Earlier works on the measurement of child well-being

The concern about children's situation is not a new one; several reports and studies on the subject have been published around the world since at the least the 60s decade of the twentieth century (Ben-Arieh and Goerge, 2001). UNICEF alone has been publishing the State of the World's Children report, since 1979, and also The Progress of Nations, since 1993 (Ben-Arieh, 2000; Ben-Arieh and Goerge, 2001). However, the most significant rise in the interest on child well-being and growth of reports and studies on the subject started around the 90s decade of the last century (Ben-Arieh, 2000; Ben-Arieh and Goerge, 2001). The global ratification of the CRC in 1989 most definitely played an important role in this increasing interest for child well-being monitoring (Ben-Arieh, 2008).

UNICEF's reports on child well-being have undoubtedly played a major role in this area (Ben-Arieh, 2000; Ben-Arieh and Goerge, 2001; Ben-Arieh, 2008). Although being multi-topic reports on the whole child population, until recently they mostly dealt with survival issues and, in spite of being child oriented, they tended not to use children as the unit of analysis (Ben-Arieh and Goerge, 2001).

By the early 1990s other international initiatives, reports and studies were developed by international organizations, such as the WHO or the OECD, by national governments and academic groups and, also, by NGO's (Ben-Arieh and Goerge, 2001). Many of these were multi-topic, covering several areas of child well-being, but others tended to focus specific topics (e.g., children's health or education) or specific child population targets (e.g., children at risk or homeless children) (Ben-Arieh and Goerge, 2001).

The reports just mentioned and another large number of works developed until the end of the 1990s, but also in the early years of the 21st century (e.g., Brown, 1997; Brooks-Gunn and Duncan, 1997; Aber, Gershoff, Brooks-Gunn, 2002; Hoelscher, 2004; see also Ben-Arieh and Goerge, 2001, for other references), have consisted on the compilation of indicators for the several dimensions of child well-being, mostly using the family instead of the child as unit of analysis. Some research has also focused on recommendations concerning the choice of child well-being indicators (e.g., Moore, 1997, 1999) and other studies on summarizing the state of the art regarding child well-being measurement (Ben-Arieh, 2000; Ben-Arieh and Goerge, 2001).[2] However, the growing data supply on children has led to difficulties in taking conclusions about the state of the children and how it has progressed over time, mainly due to problems in interpreting large batteries of indicators (Ben-Arieh, 2008). This has led to the most recent effort by researchers in developing composite summary indices (Ben-Arieh, 2008). In the next section we will be reviewing some of these works.

2.2. Recent works on child well-being summary indexes

2.2.1. The index of child and youth well-being in the United States

The work of Land et al. (2001) is an attempt to answer and summarize questions around child indicators and how children are faring in the United States. The authors do so by engaging in what they call a "measurement exercise", that is, the construction of the "Index of Child and Youth Well-Being".

This research starts by reviewing work on the of quality of life and major approaches to the concept, to then conclude that seven domains of life are relevant when analysing adults, and

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[2] Other research works could be mentioned at this point, but our aim here is not to go thoroughly through all that has been done in the field. Our intention is merely to give a quick brush through the main developments in child well-being measurement that have led to what is the main topic of this paper, the construction of child well-being composite summary indices. For more on earlier works in this domain one might resort to references given in Ben-Arieh (2000) and Ben-Arieh and Goerge (2001). For other early works exclusively dedicated to children see also Cornia and Danziger (Eds.) (1997), Brooks-Gunn et al. (Eds.) (volumes I and II - 1997), Micklewright and Stewart (2000), Vleminckx and Smeeding (Eds.) (2001), Bradshaw (Ed.) (2002) or Ridge (2004).

those same domains, with some adaptations, are applicable to children and youth. The identified domains are:

- material well-being: covers poverty, employment and income;

- health: includes mortality rates and personal health;

- social relationships: assesses single parented families and home changes;

- safety/behavioural concerns: covers engagement in risky activities, such as smoking, drinking and drug using;

- productivity/educational attainment: assesses school related scores;

- place in community: includes school enrolment and civic engagement;

- emotional/spiritual well-being: covers religious activities and suicide rates.

After determining which domains are important, the authors compiled 28 basic indicators of child and youth well-being, based on available national data, and then, after analysing each indicator in each dimension, constructed the summary index of child and youth well-being, giving all components equal weighting.

Recently, the index was expanded to include 16 new indicators (Land et al., 2007), distributed along the dimensions earlier identified. The approach to the index remains nevertheless the same.

This is a quite relevant and instructive research study on the construction of a child well-being index and also deserves being mentioned because of the use of longitudinal data in the analysis, which allows following trends in child well-being in the US. On the other hand, one of the main disadvantages of the study is, as in many others, the usage of aggregate data of existing datasets, what may constrain some conclusions, namely, the usage of aggregated data only allows to describe the proportion of children with a particular outcome, as opposed to microdata which allows to determine whether an individual child has one or more particular outcomes, hence, giving more meaning to what a child-centred perspective is (Moore et al., 2007, 2008). Also, the data considered to the construction of this index has different origins; it consists of an array of indicators compiled from different surveys (Land et al., 2001, 2007), which means that the sample is not stable throughout that set of indicators. Additionally, although many of the surveys in which the authors based themselves use children as the unit of analysis, being that in some children are actually the respondents, children's own views

about their well-being are not properly considered. As the authors themselves mention (Land et al., 2001), only two out of the 28 indicators are based on subjective well-being responses, being these based on responses from parents of the children and not from children themselves. Moreover, equal weights are assumed for each of the indicators used in the construction of the index and no interactions between dimensions are considered nor even the recognition of their existence.

2.2.2. The index of child well-being in the EU

The index of child well-being is the result of the work of Bradshaw et al. (2007) and can be characterised as an attempt to summarize and monitor child well-being at the European level, based on already available data for the EU 25.

The analysis is carried out on a rights-based and multi-dimensional understanding of child well-being, where the CRC and the ecological human development model take a special place. Having these theoretical frameworks as background, the authors analyse child well-being in eight clusters, which include relevant topics to children from their own point of view and also topics pertaining adult's responsibility for the well-being of children, covering 23 domains and a total of 51 indicators. The clusters and domains are:

- material situation: provides information on child income poverty, deprivation and parental worklessness;

- housing: covers overcrowding, local environment and space, and housing problems;

- health: addresses children's health at birth, immunisation, and health behaviour;

- subjective well-being: inquires about self-defined health, personal well-being, and well-being at school;

- education: covers educational attainment, educational participation, and youth labour market outcomes from education;

- children's relationships: provides information about family structure, relationships with parents, and relationships with peers;

- civic participation: addresses participation in civic activities and political interest;

- risk and safety: inquires about child mortality, risky behaviour, and experiences of violence.

In the aggregation stage, the indicators are combined to form domains, domains are combined to form clusters, and, finally, clusters are combined to form the overall index. The authors state to have found no theoretical or empirical justification for weighting, and so, aggregation is carried out assuming equal weights for all variables (Bradshaw et al., 2007).

More recently, in result of the availability of new data, the index was updated and expanded to the EU27 countries, plus Norway and Iceland (Bradshaw and Richardson, 2009). The more up-to-date data does not include information on citizenship, so the authors dropped out this domain, but the methodology used in the construction of the index remains the same. The main differences to the previous index consist on changes and improvements in the used indicators in accordance with criticisms and reflections on the previous list (Bradshaw and Richardson, 2009), namely, differences in the choice of indicators, where, the authors soughed to use indicators representing what children think and feel about their lives (Bradshaw and Richardson, 2009). This is the case of the indicators chosen for the subjective well-being and the children's relationships dimensions (for a complete list of the indicators, see Appendix, Table B).

This work constitutes an important way forward in the child indicators movement, since, instead of just collecting indicators, the authors try to come up with a single composite number that summarizes children's situations. This is, in fact, one of the most recent and valuable evolutions in the field. However, at least two shortcomings on Bradshaw and his colleagues' work need being mentioned, one related with data availability and the other with the methodology the authors followed.

As previously mentioned, the index of child well-being in the EU is constructed based on surveys already published and, so, aggregated data is used to analyse child well-being. Also, since indicators are collected from different surveys, namely the Health Behaviour in School-Aged Children (HBSC) and the OECD Programme for International Student Assessment (PISA), the sample of children being considered is not always the same. Also, the used data is many times not available for the same years and not for the same children age group (HBSC is on children aged 11, 13 and 15, as for PISA is based on 15 and 16 year-olds). Finally, since the used surveys were constructed for specific purposes (namely, the HBSC was built to assess children's health behaviours and the PISA was built in order to assess children's knowledge and skills acquired with education), some elements of child well-being end up not being represented or ill-represented (Bradshaw et al., 2007). For example, in the material situation dimension, the authors argue it would be desirable to have data on relative child

poverty rate, absolute child poverty rate, poverty gaps for children, an indicator of persistent poverty for children and a subjective poverty measure but only two of these measure are available, the relative child poverty rate and the relative average poverty gap (Bradshaw et al. 2007). Also, when measuring deprivation, the authors use indicators from different surveys focusing different child age groups (Bradshaw et al. 2007; Bradshaw and Richardson, 2009), where some are child centred and others use the household as unit of analysis (for example, in the measurement of deprivation, percentage of households with children reporting lack of consumer durables is combined with indicators of educational deprivation from PISA, which is a survey that uses children as the unit of analysis - Bradshaw and Richardson, 2009).

Additionally, in spite of the most recent effort of the authors to include indicators that take into account children's views, even being this related to the fact that surveys do not have that type of data available, the truth is that only residually they accomplish that task. As mentioned earlier, only very few of the used indicators really translate children's thoughts about their own lives. Furthermore, in the aggregation stage, Bradshaw and his colleagues assume that each indicator and each dimension have the exact same weight, meaning this that the authors presume that each and every indicator and, also, each dimension contribute in the exact same way to child well-being, which is most probably not the case. Another shortcoming of the methods employed by the authors is that they consider dimensions to be completely independent from each other. Although recognizing the existence of such interrelationships, the authors opted to leave out considerations of that kind in the construction of the summary index on the justification of the complexity in comparisons between countries (Bradshaw et al., 2007).

2.2.3. A microdata child well-being index

Having in mind the criticisms about the aggregated data generally used in studies on indicators and indexes of child well-being, Moore et al. (2007) developed their work using microdata representative of U. S. children, then proceeding to compare their results with those of the most prominent studies on the subject in the U. S. that have used aggregated data. The authors analysed other studies on child well-being and proposed their own indicators and index based on the National Survey of America's Families (NSAF).

A key feature of this work is the distinction that Moore and colleagues establish between domains of well-being and contextual variables, being the first related with the question of how children are faring and the second pertaining to aspects of children's environment that

influence their well-being (Moore et al., 2007). Variables were then selected from the NSAF according to the domains of well-being most commonly used in research on the subject, as were contextual variables. Three domains of well-being were identified:

- child and health safety, lodging indicators on health status and sports practicing;

- child educational achievement and cognitive development, which includes indicators on school engagement;

- child social and emotional development, where several indicators on psychological well-being and behaviour are used;

and two types of contextual variables:

- family processes, which includes indicators on religious services attending, community engagement, child-parent relation;

- family demographic, social and economic status, where indicators such as family type and income are explored.

A total of 17 indicators were used to summarize the child well-being dimension and 12 to characterize the contextual dimension. At the micro-level, an individual well-being index is then calculated and then the contextual variables are added to form an overall condition of children index. To obtain measures for the United States child population as whole the micro-level index scores were averaged.

More recently, improvements in domains definition were carried out, which led Moore et al. (2008) to consider four key individual child well-being domains and three contextual well-being domains. The domains were defined as follows (Moore et al., 2008):

- individual child well-being:

  - physical health: refers to the biological status of individuals and includes overall health and functioning, weight, and involvement in healthy lifestyle;

  - psychological health: includes how individuals think about themselves and their future, how they handle and cope with situations and being free of problems;

  - social health: refers to several elements related to how well an individual is able to get along in the social ecology, including basic skills, engagement in constructive activities, ability to be able to relate emotionally to people and make friends;

- educational/intellectual: includes skills related to a child's ability to learn, remember, reason adequately for their age, being able to apply cognitive skills to be productive and engaged in school;

- contextual well-being:

  - family: includes the structure of the family, resources in the home, and relationships between the individuals;

  - community: neighbourhoods and/or communities are the immediate context in which individuals and families interact and engage with others and with institutions of society, being neighbourhoods both spatial and social units;

  - sociodemographic: social and economic features of families which affect child well-being.

The research was carried out using now the National Survey of Children's Health (NSCH), from which 69 indicators were taken and included in the computation of the indices for each domain and for the well-being indexes. Two composites indexes are calculated, a child well-being index, created by summing the four individual well-being domains, and a contextual well-being index, created by summing the three context domains. Opposed to Moore et al.'s previous work (2007), the two indexes are analysed separately in order distinguish trends in child well-being from trends in context (Moore et al., 2008).

In both the NSAF and the NSCH indexes, items are equally weighted within sub-domains and sub-domains are also equally weighted when aggregated into the overall index.

As pointed out above, this research work has two distinctive and important features, the use of microdata and the breakdown of child well-being into two dimensions, individual well-being and contextual well-being; the first alone puts it quite ahead of previous studies, generally based on aggregate data. Nevertheless, some shortcomings can be pointed out. The major limitations of this study are related with limitations of the data survey used. The two surveys used, NSAF and NSCH, were developed for specific purposes, the first for the study of welfare reform and devolution and the second for the purpose of health status of children monitoring and so, in both cases the list of indicators is somewhat incomplete and also some relevant dimensions are actually missing (Moore et al., 2007, 2008). For example, in the NSCH there are very few measures related to school context and so, although schools are considered an important contextual domain, it ends up not being taken into account in this research work (Moore et al., 2008). Additionally, since in both surveys (NSAF and NSCH)

parents are the respondents (Moore et al., 2007, 2008), children's own views about their well-being are disregarded. Additionally, as was the case of the previously reviewed indexes, an equal weighting system is applied in the aggregation stage of the index construction and no interactions between dimensions are realized to exist nor considered.

2.2.4. A multidimensional measurement of poverty

Acknowledging that most studies about children focus on their families, Bastos et al. (2004, 2008) and Bastos and Machado (2009) choose to measure child poverty based not only on family income but also on what they call "child deprivation". In this line, a child suffers from income poverty if he/she is a member of a family with scarce income and is deprived if he/she does not have a consumption pattern according to what is generally accepted (Bastos et al., 2004). To measure child deprivation five categories of variables were defined (Bastos et al., 2004, 2008):

- family living conditions: number of family members, education level of parents, subjective perception of the family's economic resources;

- housing: physical conditions of the house, infrastructures and neighbourhood;

- health: nutrition, medical care and child's perception of his/her own health conditions;

- education: school success, family support and child's perception of school;

- social integration: extra-curricular activities, playtime, holidays, mobility, favourites games and child's perception of the urban space.

A counting deprivation index was then computed where items are considered to have equal weighting, and results are analysed together with income poverty.

More recently, Bastos and Machado (2009) developed a notion of deprivation considering it to be a state of well-being deficit in the most fundamental domains to the functioning of a child. In this work the identified domains are reduced to four: education, health, housing and social integration. Individual deprivation for each indicator is measured in terms of degree according to a membership function (Bastos and Machado, 2009). Here the authors apply a different aggregation method concerning the weights given to each indicator. The weights are defined as a log of an inverse function of the average deprivation level, placing more importance on indicators in which deprivation is not widespread – namely, in the education dimension, child's positive perception of school, in the health dimension, regular bath, in the housing dimension, adequate housing, and in the social integration dimension, practice of

extra-curricular activities come up as the most relevant indicators and, therefore, with the higher weights in their respective dimensions - and, therefore, emphasizing items for which non-possession translates, the authors argue, into a strong feeling of deprivation (Bastos and Machado, 2009). A composite index of deprivation for the whole population is then calculated as a weighted sum of the membership medium value for each indicator, allowing for the evaluation of the deprivation intensity. The same index can also be defined for each dimension.

All the studies considering the multidimensional measurement of poverty (Bastos et al., 2004, 2008; Bastos and Machado, 2009) were carried out using sample surveys applied to children randomly selected from students attending the third and fourth years of primary education in public schools in the area of Lisbon (Portugal). Children themselves answered the questionnaire and some indicators translating children's own views about their well-being are included (for example, child's positive perception of school or child's positive perception of the neighbourhood (Bastos et al, 2004, 2008; Bastos and Machado, 2009). In this sense, and taking the earlier criticisms into account – the overlooking of children's views and the uniform weighting scheme -, the work developed by Bastos and her colleagues is of considerable importance in the child literature both at the international level and utmost in Portugal as it continues to be an under-explored subject in this latter country (Bastos et al., 2008).

Although one of the strengths of the most recent of the works of Bastos and Machado (2009) consists in the aggregation method, where a non-uniform weight system is used, the method employed is still an imperfect approximation to the real weights, since it is based on possession/non-possession of the items considered as indicators for each dimension. This means that if most of the children are not deprived in a certain indicator, that indicator will have the highest weight within its dimension, which is the case of the above mentioned indicators (child's positive perception of school, regular bath, adequate housing and practice of extra-curricular activities) -, and not on how relevant those items actually are to children and to their well-being. Moreover, as it happens with other indexes previously mentioned, interactions between dimensions are not recognized.

Given the limited cohort and geographical scope of the study - it focuses on children attending two years of the primary public education (third and fourth grades) and of a specific (high developed) area of Portugal, Lisbon -, it would be interesting to assess whether the conclusions would remain the same when applying similar methods and index to the whole

geographical area of the country and to a larger sample of students, including students enrolled in more advanced schooling years (5th and 6th grades), from public and private schools located in urban and rural areas. Studies have demonstrated (see, for example, Fan and Chen, 1998; Alderman et al., 2001; Reeves and Bylund, 2005; Lubienski and Lubienski, 2006) that differences do exist between students attending rural versus urban schools and private versus public schools, not only in educational achievement but also in what concerns the socio-demographic characteristics of the students, and so this diversity should be considered and compared when analysing child well-being.

3. Summary and the way forward

From the analysis of the summary indexes just described several conclusions can be drawn.

First, the number of dimensions considered in the construction of the indexes varies greatly, from four dimensions (Bastos and Machado, 2009) to a total of eight dimensions (Bradshaw et al. 2007). Additionally, in spite of our effort to identify common domains, as summarized in Table 1 (see also Table A1 in Appendix), the indicators considered in each dimension for each of the indexes are not always the same and it often happens that for some authors one specific indicator is considered to belong to one dimension and for other authors a similar indicator is placed in a completely different dimension. For example, that is the case of school enrolment indicators, placed in the education domain by most authors but being considered by Land and colleagues (2001, 2007) as indicators characterizing the civic participation dimension. This also happens with health care indicators, which are placed in the health dimension by Bastos and colleagues (2008, 2009), but Moore and colleagues, instead, regard them as belonging to the family processes domain, in spite of considering in their index an independent health domain as well. Other examples and details on the indicators used in each index can be found in Table A1 in Appendix. The total number of indicators used in each of the indexes also varies greatly, ranging from 12 to 69 indicators.

As previously mentioned, every single one of the indexes has made an important contribute to the child well-being indicators field, as summarized in Table 1[3]. Land and colleagues' (2001, 2007) work has had significant impact because it represents one of the first most significant efforts to summarize child well-being in one single number, for the United States, using longitudinal data, which allows tracking child well-being through time and identifying trends. As for Bradshaw and colleagues' (2007, 2009) work, its relevancy comes from the fact that it

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[3] See also Appendix.

represents the first noteworthy attempt to measure child well-being through a summary index for the European Union, allowing for comparisons between European countries and ranking them according to the level of child well-being. Moore and colleagues' (2007, 2008) research work is mostly significant because, opposite to Land and colleagues and Bradshaw and colleagues work, it uses microdata to analyse child well-being, which is of the most utterly importance because it allows to have a better insight into individual child well-being, namely it helps determining whether an individual child has one or more particular outcomes, instead of giving a general idea about the proportion of children having a particular outcome. Finally, Bastos and colleagues' (2008, 2009) work represents a particularly relevant way forward in the field of child well-being measurement through summary indicators for two reasons: first, the data survey used results from questionnaires where children were the respondents themselves and where the authors sought to capture children's own perceptions about their lives (Bastos et al., 2008); second, the latest version of the index (Bastos and Machado, 2009), uses a non-uniform weighting scheme (which was not the case for all the previously mentioned indexes, where an uniform weighting scheme was used), placing more importance in indicators where non-possession is not widespread and, thus, the authors argue, translating non-possession of those items as a strong feeling of deprivation.

Despite the important contribution of the indexes reviewed, they fall short on several aspects.[4] Land and colleagues (2001, 2007) and Bradshaw and colleagues' (2007, 2009) works use aggregated data, from different surveys, and sometimes from different years, and respecting different age groups. Their conclusions, although important, do not allow examining the specificities of different children, and can only inform us about the proportion of children having certain results. These two works, along with Moore and colleagues' (2007, 2008), also fail to adequately translate children's views about their well-being, either because the surveys used do not have children as the main respondents or because there is a lack of sufficient indicators which can adequately represent children's own perceptions about their lives.

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[4] In Table 1 (and also Table A2 in Appendix), a summary of the limitations of the indexes can be found.

Table 1 – Comparing Indexes: dimensions, contributions and limitations/general characteristics

Dimensions, Indicators, Contributions and Limitations/General characteristics	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Dimensions								
Material situation/ Socio-economic context	X	X	X	X	X	X	X	
Housing and environment/ Neighbourhood Context			X	X		X	X	X
Health/ Physical Health	X	X	X	X	X	X	X	X
Education/ Cognitive achievement	X	X	X	X	X	X	X	X
Social relationships/ Social health	X	X	X	X	X	X	X	X
Subjective well-being/ Psychological well-being	X	X	X	X	X	X		
Risk and safety/ Behavioural concerns	X	X	X	X				
Civic participation/ Place in community	X	X	X					
Other domains: Family processes/ Family context					X	X		
Total number of indicators	28	44	51	43	29	69	12	20
Contributions	Introduction of a summary index for the United States using longitudinal data	Introduction of a summary index for the United States using longitudinal data	Introduction of a summary index for the European Union which allows comparisons between countries	Introduction of a summary index for the European Union which allows comparisons between countries	Introduction of a summary index for the United States using microdata	Introduction of a summary index for the United States using microdata	Introduction of a summary index for a specific area of Portugal taking into due consideration children's perspectives	Introduction of a summary index using a non-uniform weighting scheme
Limitations/General characteristics								
Type of data used	Aggregated	Aggregated	Aggregated	Aggregated	Microdata	Microdata	Microdata	Microdata
Children's perspectives	Generally overlooked	Generally overlooked	Generally overlooked	Generally overlooked	Generally overlooked	Generally overlooked	Not overlooked	Not overlooked
Weighting scheme	Uniform	Uniform	Uniform	Uniform	Uniform	Uniform		Non-uniform
Interactions between dimensions	No interactions between dimensions	No interactions between dimensions	No interactions between dimensions	No interactions between dimensions	No interactions between dimensions	No interactions between dimensions	No interactions between dimensions	No interactions between dimensions

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Another limitation common to most of the indexes, except for the one developed by Bastos and Machado (2009), is the usage of an equal weighting system in the calculation of the summary index. This constitutes a constraint because it is plausible, if not desirable, to assume that not all indicators and dimensions contribute in the same way to global well-being (Hagerty and Land, 2007), and, in that sense, conclusions can actually be quite different when using a different weighting scheme. It is in regard that the attempt of Bastos and Machado (2009) of using a non-uniform weighting scheme is the way forward. However, the solution these latter authors adopted is somehow an imperfect one since it is based on possession/non-possession and not on the real importance each indicator and dimension has to the well-being of children. The weighting scheme the authors use places more importance on indicators in which deprivation is not widespread (Bastos and Machado, 2009), meaning this that indicators in which the majority of the child population has positive outcomes are given more importance, and so, they will have a greater weight. That is the case, for example, of the items child's positive perception of school, regular bath, adequate housing and practice of extracurricular activities (Bastos and Machado, 2009). But the simple fact of a great number of children having a certain item does not necessarily mean that the item is more relevant for their well-being than any other, nor it means that those who do not have that same item can be considered to have less well-being; it depends on the real importance they place on having or not that item.

Finally, a restriction common to all of the indexes is that neither of them considers interactions between dimensions. As previously mentioned, according to Bronfenbrenner and Morris (1998), there are "synergistic interdependencies" between the several relevant aspects of children's lives. Being so, the existence of such interactions might allow for different conclusions when analysing child well-being through summary indexes that consider different dimensions of well-being.

According to the limitations just pointed to the indexes here reviewed, one theoretical consideration and two different lines of research to be developed can be identified.

It seems clear that there is no definite rule for defining dimensions and their boundaries. It would be therefore desirable to find a common theoretical background that would help define dimensions and indicators more clearly, in order to allow for the construction of summary indexes that would be applicable across regions and countries, making comparisons possible and more accurate.

Now we turn to the two above mentioned possible future lines of research. First, it is desirable to use microdata instead of aggregated data, preferably from just one survey where children are for the most part the respondents. The data collected from children should translate as accurately as possible their own views about the several dimensions of their well-being. Accomplishing this might allow to build a weighting system based on the real importance each considered item and dimension has for children, thus allowing for more reliable conclusions about how children are faring. Although this line of research implies two conceptually different issues - the use of microdata versus macrodata, and taking in consideration children's perspectives on their lives -, they are intertwined and we need to consider them together in order to make this step forward in the measurement of child well-being.

The second line of investigation, theoretically based on Bronfenbrenner and Morris' (1998) model, would be to find a more appropriate model for combining indicators when aggregating them into one single composite index, which would allow for interactions between domains.

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Appendix

Table A1: Comparative complete list of indicators, by main domains, for all Indexes

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore et al.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Income poverty								
	• poverty rate – all families with children; • median annual income – all families with children.	• poverty rate – all families with children; • median annual income – all families with children.	• at risk of poverty rate (60% of median equivalised income after social transfers); • relative poverty gap (60% of median equivalised income).	• child poverty (60 per cent of median equivalised income after transfers): 0-17 years; • relative child poverty gap (60% of median equivalised income): 0-17 years.	• prior year income below the poverty threshold.	• household income.		
Deprivation/Possessions								
	• rate of children with health insurance coverage.	• rate of children with health insurance coverage; • food security, ages 0-17 – percentage of children in food-insecure households; • lack of an usual source of health care, ages 0-4 (excludes visits to the Emergency Room).	• percentage of children reporting low family affluence; • percentage of children reporting less than six educational possessions; • percentage of children reporting less than ten books in the home.	• households with children with an enforced lack of consumer durables (per cent); • households with children reporting economic strain (per cent); • pupils with less than 6 education possessions (per cent); • pupils with less 10 books in the household (per cent).	• household member does not own home.		• the child is considered deprived.	
Material situation/ Socio-economic context								
Employment/Unemployment								
	• secure parental employment rate.	• secure parental employment rate.	• children aged 0-17 living in jobless households.	• children aged 0-17 living in jobless households.				
Human capital								
					• neither parent has a high school diploma or GED (general educational development test).	• highest level of household education.	• mother's education level; • father's education level.	
Family structure						• child does not live with 2 biological/adoptive parents.	• family structure.	• number of brothers/sisters.	
Family size						• more than three children in household.	• number of children in the household.		

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Main domains		The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Housing and environment/ Neighbourhood Context	*Overcrowding*			▪ rooms per person in households with children.	▪ rooms per person in households with children.				▪ existence of personal space to sleep.
	Housing problems			▪ percentage of households with children under 15 reporting at least two housing problems.	▪ households with children reporting more than one housing problems.			▪ adequate housing.	▪ adequate housing; ▪ child's positive evaluation of the house.
	Local environment/Safety of the neighbourhood			▪ percentage of households with children who think it is unsafe or very unsafe to walk around in their area at night; ▪ percentage of households with children under 15 scoring six or more on a scale of physical environment problems.	▪ households with children who report crime in the area; ▪ households with children reporting pollution or dirt as problems in the area.		▪ neighbourhood considered safe; ▪ bad influences in neighbourhood.		▪ child's positive perception of neighbourhood.
	Supportive neighbourhood environment						▪ neighbours help each other out; ▪ neighbours can be counted on.		
	Neighbourhood support for parenting						▪ neighbours watch out for each other's children; ▪ neighbours can be trusted to help children.		
	Safe school						▪ school considered safe; ▪ parent concern about bullying.		
	Consumer goods							▪ availability of common consumer goods.	▪ availability of common consumer goods.

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
	Health at birth							
	▪ infant mortality rate; ▪ low birth weight rate.	▪ infant mortality rate; ▪ low birth weight rate.	▪ infant mortality rate; ▪ low birth weight.	▪ mortality rate, infant (per 1.000 live births); ▪ low birth weight newborns (lower than 2,5kg, per cent).				
	Immunisation							
		▪ child immunization rate, ages 19-35 months.	▪ measles; ▪ DPT3 (final dose to prevent diphtheria, pertussus, and tetanus); ▪ Pol3 (final dose to prevent polio).	▪ immunization, measles (per cent aged 12-23 months); ▪ child immunization rate, DPT3 (per cent aged 12-23 months); ▪ child immunization rate, Pol3 (per cent aged 12-23 months).				
	Health behaviour							
Health/ Physical Health	▪ rate of over weighted children and adolescents, ages 6-17.	▪ rate of over weighted children and adolescents, ages 6-17.	▪ young people who brush their teeth more than once a day; ▪ young people who eat fruit everyday; ▪ young people who eat breakfast every school day; ▪ mean number of days when young people are physically active for one hour or more of the previous/typical week; ▪ young people who are over weighted.	▪ children who brush their teeth more than once a day; ▪ children who eat fruit daily ▪ children who eat breakfast every school day; ▪ children's physical activity; ▪ children who are overweight.	▪ not on a sports team in past year.	▪ adequate sleep; ▪ vigorous exercise; ▪ Tv viewing.	▪ child visits the doctor only when sick; ▪ availability of food around the house when child is hungry.	▪ regular medical care; ▪ regular dentist care; ▪ regular bath; ▪ balanced nutrition; ▪ adequate number of hours of sleep.
	General health status and safety							
	▪ mortality rate, ages 1-19; ▪ rate of children with very good or excellent health (as reported by their parents).	▪ mortality rate, ages 1-19; ▪ rate of children with very good or excellent health (as reported by their parents).			▪ fair or poor health status; ▪ limiting health condition.	▪ overall health; status; ▪ weight; ▪ oral health status.		
	Chronic health conditions							
	▪ rate of children with activity limitations (as reported by their parents).	▪ rate of children with activity limitations (as reported by their parents).				▪ limiting condition; ▪ asthma; ▪ sensory disability; ▪ skeletal or muscular disability; ▪ diabetes; ▪ developmental delay or physical impairment.		

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Education/ Cognitive achievement								
Educational achievement	▪ reading test scores, average of ages 9, 13, 17; ▪ mathematics test scores, average of ages 9, 13, 17.	▪ reading test scores, average of ages 9, 13, 17; ▪ mathematics test scores, average of ages 9, 13, 17; ▪ science test scores, age 9; ▪ science test score, age 13; ▪ science test score, age 17.	▪ reading literacy attainment; ▪ mathematics literacy attainment; ▪ science literacy attainment.	▪ reading literacy achievement; ▪ mathematics literacy achievement; ▪ science literacy achievement.	▪ does poorly at school work.	▪ parent concern about achievement.		▪ academic success.
Educational enrolment			▪ children aged 0-2 in registered childcare; ▪ percentage of 15-19 year olds in education.	▪ full-time and part-time students in all institutions (per cent of 15-19-years-old); ▪ school enrolment pre-primary (per cent gross).				
Youth labour market outcomes from education/Youth inactivity			▪ percentage of the youth population not in education and not employed aged 15-19; ▪ percentage of pupils aged 15 years aspiring to low-skilled work.	▪ inactive youth age 15-19 (per cent).				
School problems					▪ skipped school 2+ times in past year; ▪ expelled or suspended from school in past year.	▪ home contacted because of problems at school; ▪ grade repetition since kindergarten.	▪ number of times the child has repeated a grade.	
Learning difficulties						▪ parent concern about learning difficulties; ▪ learning disability (diagnosed).		
Cognitive development						▪ child reads for pleasure.		

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(cont.)

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Education/ Cognitive achievement	*Educational support outside of school*							
					▪ no lessons outside of school in past year.		▪ child has help in doing homework and in clarifying doubts.	▪ family's support to school.
	Educational goods							
								▪ computer access; ▪ classroom adequately warmed.
	Child's perception of school							
								▪ child's positive perception of school.

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Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Social relationships/ Social health								
Family structure	■ rate of children in families headed by a single parent.	■ rate of children in families headed by a single parent.	■ single parent families; ■ step families.					
Relationship with parents		■ family meals around a table several times a week; ■ just talking with parents several times a week.		■ children who find it easy to talk to their mothers; ■ children who find it easy to talk to their fathers.		■ closeness; ■ communication.		■ playing with parents on weekends.
Relationship with peers and other people/Positive and negative social behaviours			■ young people finding their peers kind and helpful.	■ children who agree that their classmates are kind and helpful.	■ doesn't get along with other kids.	■ child shows respect for teachers and neighbours; ■ child gets along well with other children; ■ child tries to understand people's feelings; ■ child tries to resolve conflicts; ■ child argues too much; ■ child bullies or is cruel or mean to others; ■ child is disobedient; ■ child is stubborn, sullen, or irritable.		■ playing with friends that live near the house.
Activity engagement					■ did not participate in clubs in past year.	■ participation in sports; ■ participation in clubs or organizations; ■ participation in organized events or activities; ■ participation in community service or volunteer work.	■ practice of extra-curricular activities; ■ where holidays are spent	■ practice of extra-curricular activities; ■ having weekends and holidays away from home; ■ cultural habits;
Moving out	■ rate of children who have moved within the last year.	■ rate of children who have moved within the last year.						

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Personal well-being/Internalizing problems and self-esteem								
	▪ suicide rate, ages 10-19 .	▪ suicide rate, ages 10-19 .	▪ young people above the middle of the life satisfaction scale; ▪ young people feeling like an outsider or left out of things; ▪ young people feeling awkward and out of place; ▪ young people feeling lonely.	▪ children who report high life satisfaction.	▪ has been nervous or tense; ▪ feels worthless or inferior; ▪ feels sad or depressed.	▪ depression or anxiety (diagnosed); ▪ parent concern about depression or anxiety; ▪ child feels unhappy; ▪ parent concern about self-esteem; ▪ child feels worthless or inferior.		
Spiritual well-being								
	▪ rate of weekly religious attendance, grade 12; ▪ percent who report religion as being very important, grade 12.	▪ rate of weekly religious attendance, grade 12; ▪ percent who report religion as being very important, grade 12.						
Self-defined health								
Subjective well-being/ Psychological well-being			▪ young people rating their health as fair or poor.	▪ children who rate their health as fair or poor.				
Well-being at school								
			▪ young people feeling pressured by school work; ▪ young people liking school a lot.	▪ children who feel pressured by school work; ▪ young people liking school a lot, 11, 13 and 15 years.				
Externalizing problems								
					▪ can't concentrate for long; ▪ acts too young for age; ▪ lies or cheats; ▪ has trouble sleeping.	▪ behavioural or conduct problems (diagnosed); ▪ ADHD (attention deficit hyperactivity disorder).		
Coping skills								
						▪ parent concern about coping skills.		

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
	Risky behaviour							
Risk and safety/ Behavioural concerns	▪ teenage birth rate, ages 10-17; ▪ rate of cigarette smoking, grade 12; ▪ rate of alcoholic drink, grade 12; ▪ rate of illicit drug use, grade 12.	▪ teenage birth rate, ages 10-17; ▪ rate of cigarette smoking, grade 12; ▪ rate of alcoholic drink, grade 12; ▪ rate of illicit drug use, grade 12; ▪ rate of cigarette smoking, grade 8; ▪ rate of cigarette smoking, grade 10; ▪ rate of alcohol drinking, grade 8; ▪ rate of alcohol drinking, grade 10; ▪ rate of illicit drug use, grade 8; ▪ rate of illicit drug use, grade 10.	▪ cigarette smoking: lifetime use 40 times or more; ▪ drunkness: lifetime 20 times or more; ▪ cannabis: experience of use in lifetime; ▪ inhalants: experience of use in lifetime; ▪ teenage pregnancy rate; ▪ 15 year-olds who have had sexual intercourse; ▪ young people who used condoms during their last sexual intercourse.	▪ adolescent fertility rate (births per 1.000 women aged 15-19); ▪ 15-years-old who have had sexual intercourse; ▪ 15-years-old who used condom at last sexual intercourse; ▪ children who smoke at least once a week; ▪ 13 and 15 year old who have been drunk at least twice; ▪ 15-years-old who have ever used cannabis in their lifetime.				
	Experience of violence							
	▪ rate of violent crime victimization, ages 12-17; ▪ rate of violent crime offenders, ages 12-17;	▪ rate of violent crime victimization, ages 12-17; ▪ rate of violent crime offenders, ages 12-17;	▪ young people involved in physical fighting in previous 12 months; ▪ young people who were bullied at least once in previous 12 months.	▪ children involved in physical fighting at least once in the past year; ▪ children who have been bullied at school at least twice in the past 2 months.				
	Child mortality							
			▪ accidental and non-accidental deaths under 19 per 100,000.	▪ all child deaths: all under 19 deaths per 100.000 children.				

Main domains	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore e tal.	A deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
	Participation in common daily life activities							
Civic participation/ Place in community	▪ rate of preschool enrolment, ages 3-4; ▪ rate of persons who have received a high school diploma, ages 18-24; ▪ rate of youths not working and not in school, ages 16-19; ▪ rate of person's who have received a bachelor's degree, ages 25-29.	▪ rate of preschool enrolment, ages 3-4; ▪ rate of persons who have received a high school diploma, ages 18-24; ▪ rate of youths not working and not in school, ages 16-19; ▪ rate of person's who have received a bachelor's degree, ages 25-29; ▪ rate of children read to daily by a family member ages 3-5; ▪ rate of children enrolled in a centre-based childcare program, ages 3-5; ▪ rate of skipping more than 6 classes in the past month, grade 12.						
Participation in civic activities		▪ volunteering, grade 12 – rate of youths who volunteer more than once a week within a community.	▪ young people's participation in two or more civic activities.					
Political interest		▪ rate of voting in presidential elections, ages 18-20.	▪ young people reporting political interest above the median score.					
Parental engagement					▪ parent never attends religious services; ▪ parent never volunteers.	▪ parent attends child's activities or events; ▪ parent has met child's friends; ▪ family has TV rules; ▪ family eats meals together.		
Guardian functioning					▪ parent is highly aggravated; ▪ child regularly spends time unsupervised by adult.	▪ parent physical health status; ▪ parent mental health status; ▪ parent copes with demands of parenting; ▪ parent has emotional help with parenting.		
Health care					▪ no dental care in past year.	▪ health care insurance; ▪ dental insurance; ▪ personal doctor or nurse; ▪ preventive medical care visits.		
Child care					▪ no child care in past year.			
Outings					▪ child does not go outings.			
Home environment						▪ parent exercises regularly; ▪ household members use cigarettes, cigars or pipe tobacco; ▪ home considered safe.		

Table A2: Methods and interpretation, contributes and limitations of the Indexes

Methods, Contributions and Limitations	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore et al.	A Deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
General methodology								
Methods and interpretation	▪ Seven domains are considered. ▪ Each of the time series of the key indicators is indexed by a base year (1975 or 1985), being the base year assigned a value of 100 and subsequent values of the indicator are taken as percentage changes between the base year and each subsequent year for each item. ▪ To obtain an index score for each domain, indicators scores are summed and divided by the number of items in the index domain. ▪ To obtain the composite index, the mean of the index values across domains is calculated.		▪ Eight domains are considered. ▪ Indicators are combined to form domains, domains combined to form clusters, and clusters combined to form the overall index. ▪ In order to obtain rank order and degree of dispersion, calculate z scores for each indicator and average the z scores to obtain an average score for a domain; the averaged z score for the domains were averaged to create a cluster average and the averages of the cluster z scores were averaged to obtain the overall index score.	▪ Seven domains are considered.	▪ Three well-being domains and two contextual domains are considered. ▪ Thresholds are set for problematic levels on each individual item. ▪ Each child has a value of 1 or 0 for each component, 1 meaning negative scores and 0 meaning positive scores. ▪ A overall child well-being index score is obtained by summing the 3 well-being scores; ▪ To obtain the overall condition of children index, the two contextual domains are added to the child well-being index. ▪ The micro-level scores are averaged to obtain summary measures for the U.S. child population.	▪ Four well-being domains and three contextual domains are considered. ▪ Cut-off points are defined for each item. ▪ Each child receives for each component a score of 0 or 1, where 0 means no well-being and 1 means well-being. ▪ The child well-being index is created by summing the 4 individual well-being domain scores. ▪ The contextual well-being index is created by summing the 3 context domain scores.	▪ Five domains are considered. ▪ Thresholds for each indicator are set for each child. ▪ Indicators are then organized into dimensions.	▪ Four domains are considered ▪ Deprivation for each indicator is quantified in terms of degree. ▪ A membership function is used, varying between 0 and 1, where 0 represents no deprivation and 1 total deprivation; numbers between 0 and 1 translate into partial deprivation. ▪ The summary measure of deprivation for the whole population is a weighted sum of the membership medium value for each indicator. ▪ The index can also be defined for each dimension of well-being by summing the correspondent indicators.
Weighting scheme								
	▪ Equal weights are assumed throughout the calculation of the indexes.		▪ Equal weights are assumed throughout the calculation of the indexes.		▪ Equal weights are assumed throughout the calculation of the indexes.	▪ Equal weights are assumed throughout the calculation of the indexes.	▪ Equal weights are assumed throughout the calculation of the index.	▪ The weights are defined as a log of an inverse function of the average deprivation level, placing more importance on indicators in which deprivation is not widespread.
Interpretation								
	▪ A value greater (lesser) than 100 means the social condition measured has improved (deteriorated).		▪ The average of the domains represents overall child well-being and countries are ranked according to it.		▪ Higher scores indicate higher average number of problems.	▪ Higher score indicate more individual and more contextual well-being.	▪ The index is a counting indicator, which can vary between 0 and 12. ▪ The bigger the index the more intense is the level of child deprivation.	▪ The index varies between 0 and 1 and evaluates deprivation intensity.

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Methods, Contributions and Limitations	The Child and Youth Well-Being Index in the US (2001) – Land et al.	Expanded Child and Youth Well-Being Index in the US (2007) – Land et al.	Index of Child Well-Being in the EU (2007) – Bradshaw et al.	Index of Child Well-being in Europe (2009) – Bradshaw and Richardson	A Microdata Child Well-Being Index (NSAF) (2007) – Moore et al.	A Microdata Child Well-Being Index (NSCH) (2008) – Moore et al.	A Deprivation Index (2008) – Bastos et al.	A Composite Deprivation Index (2009) – Bastos and Machado
Contributions	▪ Constitutes one of the first efforts to summarize child well-being in one single composite index for the United States, using longitudinal data and tracking child well-being evolution through time.		▪ Constitutes one of the first efforts to summarize child well-being in one single composite index for the European Union, with country ranking according to the results obtained.		▪ Constitutes one of the first efforts to summarize child well-being in one single composite index for the United States using microdata, giving a new meaning to what a child-centred perspective of well-being is.		▪ Constitutes one of the first efforts to summarize child well-being in one single composite index for a specific area of the country of Portugal, using microdata collected directly from children and for the specific purpose of measuring their global well-being, hence taking in due consideration children's perspectives on their well-being.	▪ Introduces a new weighting scheme, different from equal weighting, placing more importance on indicators in which deprivation is not widespread.
Limitations — *Survey limitations*	▪ The index is constructed based on aggregated data and on different surveys, not built for the purpose of measuring global child well-being.		▪ The index is constructed based on aggregated data and on different surveys, not built for the purpose of measuring global child well-being.		▪ The index is constructed based on surveys not built for the purpose of measuring global child well-being.		▪ The survey covers a limited population of Portuguese children, not representative of the country's child population.	
Limited account of children's perspectives	▪ Children's perspectives on their well-being are not properly taken into account due to lack of indicators.		▪ Children's perspectives on their well-being are not properly taken into account due to lack of indicators.		▪ Children's perspectives on their well-being are not properly taken into account due to the fact that children were not directly surveyed.			
Weighting scheme	▪ An uniform weighting scheme is used to aggregate indicators.		▪ An uniform weighting scheme is used to aggregate indicators.	▪ An uniform weighting scheme is used to aggregate indicators.	▪ An uniform weighting scheme is used to aggregate indicators.	▪ An uniform weighting scheme is used to aggregate indicators.	▪ An uniform weighting scheme is used to aggregate indicators.	▪ A non-uniform weighting scheme is used but it can be considered an imperfect approach to the real weights of indicators since it does not translate the true relevance items have for children's well-being.
Interactions between dimensions	▪ No interactions between dimensions are taken into account.		▪ No interactions between dimensions are taken into account.	▪ No interactions between dimensions are taken into account.	▪ No interactions between dimensions are taken into account.	▪ No interactions between dimensions are taken into account.	▪ No interactions between dimensions are taken into account.	▪ No interactions between dimensions are taken into account.