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Child Mental Health Measurement: Reflections and Future Directions

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1. Introduction

Over the course of the past decades, mental health has enjoyed increased interest, particularly in research on subjective health and well-being. In 2008, the EU has launched the European Pact for Mental Health and Well-being in which European Member States declared mental health as an important health issue and recognized it as their responsibility to undertake action. The Pact for Mental Health and Well-being recognizes youth and education as one of the top priority areas for action and sees prevention and reduction of mental disorders (i.e. mental ill-health) as one of the primary objectives (European Commission & WHO, 2008).

According to the World Health Organization's [WHO] definition, health is not "merely the absence of disease or infirmity", but "a state of complete physical, mental and social well-being" (WHO Constitution, 1946). Essential to this definition of health is that it has a positive slant (through the use of the term well-being) and stresses the equal importance of physical, mental and social health. Mental health can further be subdivided into two dimensions: Mental ill-health and positive mental health (Lehtinen et al., 2005). Positive mental health is a resource and is essential to subjective well-being (Lehtinen et al., 2005). Frequently, however, "mental health" is used when actually referring to "positive mental health" and as a consequence is also often (mis)understood as mental health problems or even as mental health diseases/disorders, and not in the positive sense. The persistence of the negative understanding of mental health is largely due to the fact that past and current epidemiological research largely was based on mental health problems and/or illness (Zubrick & Kovess-Masfety, 2005). Many instruments have been developed focusing on mental health problems, thus capturing non-positive outcomes rather than mental health, as such.

"[W]ith its awareness of human capital and education, [modern society] puts a new emphasis on children as the resource of the future, low fertility strengthens children's position as a scarce future resource" (Frønes 2007, p. 7). Upon the background of an

increasing prevalence of chronic disease and mental health problems – in adults and youth populations alike – research into mental health has become increasingly popular over the past years. The term "new morbidity" has been used to describe the changing morbidity pattern (from acute to chronic disease) and the rise of mental health problems (Palfrey et al., 2005). At the present, disabling mental health problems occur worldwide in 20% of children and adolescents (WHO, 2001). This is an alarming number, especially knowing that mental health problems can have a negative effect on the entire society, with consequences, such as loss of productivity and social functioning (Jané-Llopis & Braddick, 2008). The fact that children and adolescents are affected as well is particularly worrisome. We know for instance that the risk for mental health problems in childhood is higher if there is a lack of resources; in the long run this can have effects even later in life (Jané-Llopis & Braddick, 2008). Many adulthood mental health problems have their roots in childhood (WHO, 2005; Jané-Llopis & Braddick, 2008), and therefore monitoring of mental health in children is a promising strategy, particularly in times of profound societal changes (Mortimer & Larson, 2002). Early detection of problem areas is crucial, and therefore, it is essential that monitoring systems are established based on sound indicators.

It is important to stress that despite the above mentioned negative trends, the overall level of mental well-being in Europe is still high (Jané-Llopis & Braddick, 2008). And thus, it is worthwhile not to limit ourselves to only observing patterns of mental health problems, but to look at the positive side as well, in other words: how is the mental health situation in children and adolescents? How can it be measured adequately in this population group to enable identification (screening) of those with good mental health vs. those who are at risk for poor mental health?

The main objective of this chapter is to give the reader a better understanding and appreciation of child mental health measurement, its current state-of-the-art, and additionally, to generally raise attention to this important field of public health. Drawing upon the authors' expertise and involvement in child and adolescent mental health research, the chapter will briefly go into the history of positive mental health and well-being, including important concepts and definitions of mental health, well-being and indicators. The heart of the chapter will be on selected indicators of (positive and ill-) mental health and subjective well-being. Although surely not comprehensive in all regards, this chapter provides a solid background on this research field and the current state-of-the-art of child mental health measurement. A brief discussion with an outlook will close the chapter.

2. Conceptualization of mental health in children and adolescents

2.1 Concepts of mental health and well-being

Coming back to the WHO Definition from the introduction which defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2001, p. 1), the relationship between health and well-being becomes evident. There are two important ideas that emerge from this: first of all, we see that "mental health is an integral part of health, mental health is more than the absence of mental illness, and mental health is intimately connected with physical health and behaviour" (WHO, 2005, p. 2). From this perspective one can also see that "mental health is the foundation for well-being and effective functioning for an individual and for a community" (WHO, 2005, p. 2).

Common terms often used in association with mental health are "emotional and behaviour problems", "Mental health problems", "Children's well-being", "Psychological health", "Health-related quality of life", "Behavioural problems", just to name a few (Ravens-Sieberer et al., 2008a). However, several of these are synonyms of "ill-mental health" and not terms that in any way describe positive mental health. According to the two continua model, mental health and mental ill-health (mental illness) are related but distinct dimensions (Westerhof & Keyes, 2010). Mental health is a positive phenomenon (Westerhof & Keyes, 2010) and is to be distinguished from ill-mental health.

As a matter of fact, the definition of positive mental health has a long history and goes back to the two traditions of well-being (hedonic well-being and eudaimonic well-being). According to Keyes (2002), good mental health consists of three components which are: emotional well-being (e.g. feelings of happiness and satisfaction with life), psychological well-being (e.g. positive individual functioning in terms of self-realization), and social well-being (e.g. positive societal functioning in terms of being of social value). He extends previous works of Ryff (1989) (six dimensions of psychological well-being) by adding five elements of social well-being which includes "optimal social functioning of inidividuals in terms of their social engagement and societal embeddedness" (Westerhof & Keyes, 2010, p. 111). According to Keyes, positive mental health consists of hedonic well-being and psychological and societal elements of eudaimonic well-being (Keyes, 2005, 2007; Westerhof & Keyes, 2010).

In the following, when using the term well-being, we use the term subjective well-being which is based on self-reports of happiness and life satisfaction (Schwarz & Strack, 1999).

2.2 Historical development: Positive mental health and well-being

Today's understanding of mental health and well-being is the result of scientific research and political activities over the past decades. Building upon the original definition of health (WHO, 1948), the definition of mental health is specified as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (WHO, 2005, p. 2). This contemporary definition contains also the positive view of mental health which is a precondition for well-being. In the eyes of Keyes (2006) the science on mental health and subjective well-being has now arrived at - after half a century starting with the work of Jahoda (1958) on positive mental health - its "third generation" of research which does not merely focus on the absence of illness but "also on the presence of subjective well-being" (Keyes, 2006, p. 1).

The concept of well-being first emerged in Greek philosophical writings. Already ancient civilizations considered health and well-being as one of their highest goods and values in life (Sigerist, 1941). However, the scientific interest in well-being did not begin until the 1950s, when the first indicators for quality of life were defined by social scientists to assess social change and to develop social policy (Land, 1975). The theories emerged during the recreation period after World War II where the "individual's perceptions and viewpoints, and the personal meaning and concerns about life" gained relevance in different scientific fields (Keyes, 2006, p. 2). Especially in philosophy (e.g. Phenomenology, cf. Husserl, 1913), sociology (e.g. Symbolic Interactionism, cf. Blumer 1962), and psychology (e.g. cognitive Psychology, cf. Neisser, 1967), as well as in humanistic theories (cf. Rogers, 1951; Maslow, 1968).

Sponsored by the Joint Commission on Mental Illness and Health in the United States, Marie Jahoda (1958) and Gurin et al. (1960) published two seminal reviews which Keyes categorize as the first research generation of subjective well-being (Keyes, 2006). Jahoda's review 'Current Concepts of Positive Mental Health' (1958) can be seen as pioneer work which shaped our current understanding and theories of positive mental health. Her work was later continued by other scientists like Carol Ryff (1989) who operationalized her theories on well-being (Keyes, 2006). In the first part of this important volume, Jahoda outlines the former understanding of mental health and emphasizes "that the absence of disease may constitute a necessary, but not a sufficient, criterion for mental health" (Jahoda, 1958, p. 15). Further, she investigates throughout a literature research six partly overlapping approaches to categorize positive mental health. They can be summarized as "Attitude of an individual towards his own self", "Self-actualization", "Integration", "Autonomy", "Perception of reality", "Environmental mastery". Yet, there is some criticism especially on the role of cultural influences affecting the understanding of mental health. Scientists, e.g. Murphy (1978), argued that western cultures are predominated by individualism and so other cultures which have a strong collectivistic viewpoint could have a different understanding of mental health. Therefore, cultural values have a strong influence on concepts of mental health (WHO, 2005). The second influential volume is an interview survey on approximately twenty-five hundred Americans conducted by Gurin, Veroff, and Feld (1960) covering the subjective dimension of mental health. Additionally, the volume "featured the hedonic stream of subjective well-being" (Keyes, 2006, p. 3) which together with the eudaimonic stream became more important and dominant in the "second generation" of research (Keyes, 2006). Hedonic well-being can be seen as a part of subjective well-being focusing predominantly on happiness and interest as well as satisfaction with life (Keyes, 2007). More generally contemplated is the existence of positive and the absence of negative affect (Deci & Ryan, 2008) and matches up with our everyday understanding of the word happiness (Waterman, 1993). In contrast, eudaimonia is a feeling of personal expressiveness, self-realization and life satisfaction (Waterman, 1993; Deci & Ryan, 2008). The latter tradition has lost importance in recent well-being research, but contributes important aspects to the concept of well-being (Deci & Ryan, 2008). Three articles stimulated and leveraged the research during this time: Schwartz & Clore (1983) studied how current mood states can affect judgments of happiness and satisfaction with life; Diener (1984) reviewed the first generation of subjective well-being with a focus solely on the hedonic streaming; Ryff (1989) operationalized different aspects of well-being. While the well-being theories became more and more elaborated, various multidimensional scales were developed to measure different aspects of the concept. Early scales for adults included, e.g. the Bradburn Schedule (1969) and the General Well-Being Scale (GWBS) (1969). The first signs of child and adolescent well-being measurement can be found in the "social indicators movement" in the 1960s. Seminal work published by Campbell and Converse (1972) deals with the development of subjective indicators of the quality of life (e.g. aspiration, expectations, and life satisfaction) and Sheldon and Moore's (1968) volume "Indicators of Social Change" conceptualized "objective measures, reviewing available data, and recommending data needs that would enable descriptive reporting on the status of society across domains" (Lippman, 2007, p. 40; Aborn, 1985). In later years, theoretical, normative and methodical changes in science spurred and formed the development of child indicators. Of particular relevance were the United Nation's Convention on the Rights of the Child (CRC) which raised a normative framework for an integral view on children; the "new" sociology of childhood considered it as an independent stage in and of his self and child development theories became more

dynamic processes interacting with the environment (Ben-Arieh, 2008). These theoretical changes gave rise to new methodological perspectives. To better capture children's own living conditions, especially on terms like mental well-being or peer-relations, subjective reports and child-centred indicators became necessary (Ben-Arieh, 2008).

Efforts to synthesize data into national and international "state of the child" reports began during the 1970s. At the international level, UNICEF published in 1979 the State of the World's Children Report (United Nations International Children's Emergency Fund [UNICEF], 1979) – at that time only basic survival indicators were included (e.g. infant and child mortality). In the 1990s, significant developments were made in the reporting. For instance, the Census Bureau published the first comparable report at an international level including domains on family structure, economic status, health and education (Lippman, 2007). Of particular note is the work of an international group of child health experts on a project called "Measuring and Monitoring Child Well-being: Beyond Survival" (Ben-Arieh & Wintersburger, 1997) with the intention to create international indicators which measure quality of life from a child's perspective, including indicators which go beyond the traditionally used survival indicators, such as social connectedness, civic and personal life skills and children's subculture (Lippman, 2007). Until now, a varying set of indicators exist to measure different aspects of child well-being. Crucial factors for the development of mental health indicators were obtained in the child indicators movement: Indicators for negative or risk factor were complemented by indicators for protective factors. Also, the indicators shifted from "well-becoming" (e.g. preparing children to be productive and happy adults) to "well-being" (Ben-Arieh, 2008).

As this short historical overview shows, there have been groundbreaking developments on the understanding and conceptualization of mental well-being. In the next two sections we will take a closer look at mental health measurement in children and adolescents. We will begin by briefly highlighting the importance of indicators in health monitoring while also pointing out the conceptual and methodological challenges.

3. Indicators as tools for health monitoring

The term indicator originates from the Latin word "indicator" which means "one who points out" or "indico" (=to point out). Indicators can cover anything from "indices, signs, and symptoms" to "calculated probabilities and systematic measurements" (Frønes 2007, p. 8), and include time and space. Bauer (1966) has referred to (social) indicators as "statistics, statistical series, and all other forms of evidence […] that enable us to assess where we stand and are going with respect to our values and goals" (p. 1). For policy makers, indicators provide valuable information on relevant public health issues, including their trend and direction of change (improvement or worsening) (Lippman, 2007). But also other groups, such as child advocacy groups, researchers, and media use them for various purposes (Ben-Arieh, 2008).

A good example of a widely-known and politically very influential programme is the OECD Programme for International Student Assessment [PISA]. PISA assesses to what extend knowledge and skills essential for participation in society have been acquired by 15-year-olds at the end of their compulsory education (www.pisa.oecd.org/). The PISA indicators of educational success and marginalization are "perhaps the most well-known example of highly elaborated comparative research indicators related to children" (Frønes, 2007, p. 7). The first PISA report in 2000 had a substantial national and international impact and PISA assessment continues to be an important strategy to benchmark improvements in education at international level.

The European Community Health Indicators Project (ECHI) is a similar effort, but has a different focus. Its aim is to lay the foundation for further development of health indicators targeting all population groups, not just school children. The initial projects on European Community Health Indicators (ECHI and ECHI-2) which were conducted between 1998 and 2005 developed ECHI indicator lists which formed the basis for the follow-up work in the ECHIM project. The ECHIM project is part of the European Health Strategy and builds upon the works of ECHI and ECHI-2. It has three main objectives (Kilpeläinen, Aromaa & the ECHIM project, 2008):

- to further develop health indicators (based on ECHI short list),
- to initiate implementation in the EU countries, and
- to enable the establishment of a Health Monitoring System.

Within ECHI, an indicator was defined as a characteristic of an individual, population or environment which is subject to measurement (directly or indirectly) and can be used to describe one or more aspects of the health of an individual or population (quantity, quality and time). According to ECHI recommendations, indicators must fulfil the criteria of validity, sensitivity, comparability (Kramers, 2003).

Despite advances in indicator development through projects such as ECHI, the development of positive mental health indicators for children and young people is really only beginning (Maher & Waters, 2005). While we seek to gain a better understanding of the magnitude of mental health problems in children, we seem to oversee the importance of measurement tools and indicators to facilitate this process. Monitoring of both positive mental health and mental ill-health (i.e. mental health problems) is essential for human development (Zubrick & Kovess-Masfety, 2005). Unfortunately, mental health research in children and adolescents currently lacks well-established indicators. It is primarily "needs driven", focusing on "illness" rather than "wellness", and in consequence, aimed at physical rather than mental health (Zubrick & Kovess-Masfety, 2005). Furthermore, it is too focussed on distress, and mental health problems, such as delinquency, suicide, depression (Maher & Waters, 2005), rather than positive mental health.

Presently, existing indicators on health are available through organisations, such as the European Union [EU], the Organisation for Economic Co-Operation and Development [OECD], and the World Health Organisation [WHO]. The EU sustainable development indicators provide 120 indicators, the OECD social indicators have 34 indicators on employment, society, general health and social cohesion, and the EU social protection indicators comprise 11 primary social protection indicators (whereby none on mental health). In 2009, the Innocenti Research Centre of the UNICEF has published a working paper on "Positive indicators of child well-being: a conceptual framework, measures and methodological issues" outlining frameworks for further development of positive indicators of well-being of children as well as the challenges involved (Lippman et al., 2009).

4. Child mental health measurement

4.1 Indicators of mental health

As mentioned in the introduction of this chapter, we have limited ourselves to a narrow selection of indicators which we consider suitable for several reasons. First of all, all of the indicators presented here are based on tools/instruments assessing the subjective

perspective of the child itself. Secondly, and this is perhaps even more important, the indicators are based on robust, scientifically valid measurement tools. Apart from having been frequently used in research studies in Europe (as well as internationally), the measures also fulfil the scientific criteria for indicators (as proposed by the ECHI group).

When child well-being is of interest, the preferred method of assessment is via the child's own subjective perspective (Lippman et al., 2009). How children and adolescents reflect and perceive their world and life may differ quite substantially today from adult's reality (Bradshaw et al. 2006). Increasing their participation and asking for their insight and view is an indispensable component of present and future research. "Current attempts to measure children's well-being are problematic because they fail to incorporate an analysis of broader contextual structural and political factors" (Morrow & Mayall, 2010, p. 162). Subjective indicators reflecting the "voice of the child" need to be complemented by objective models on well-being and indicators (Frønes, 2007, p. 11). Furthermore, indicators should be based on measurement tools, which have undergone extensive piloting and ideally have been used previously in surveys. Measurement tools need to be age-, gender-, and culturally-sensitive and should also take the individual's socioeconomic background into account (Erhart et al., 2006).

Many of the indicators which will be presented here originate from the KIDSCREEN survey ["Screening for and Promotion of Health-Related Quality of Life in Children and Adolescents - A European Public Health Perspective"] and the Health Behaviour in School-aged Children [HBSC] Survey.

4.1.1 The KIDSCREEN survey

The European KIDSCREEN project titled "Screening for and promotion of health-related well-being in children and adolescents: a European public health perspective (KIDSCREEN)" took place between 2001 and 2004 in 13 European countries (Austria, the Czech Republic, France, Germany, Greece, Hungary, Ireland, Poland, Spain, Sweden, Switzerland, the Netherlands and the United Kingdom) and had the aim to develop a standardised screening instrument for quality of life in children and adolescents. This instrument should be suitable for representative national and European health surveys and enable cross-cultural comparisons. The project, which also comprised data collection from large population-based samples in each of the participating countries, was part of the Quality of life and Management of Living Resources programme and was funded by the European Commission (EC) within the Fifth Framework Programme (EC Grant Number: QLG-CT-2000- 00751) (Ravens-Sieberer et al., 2001). The data collection targeted children between 8 and 18 years of age using both parents as well as children as information sources. The same kind of data collection tools (questionnaires) and the same assessment tools were used in all participating countries (Ravens-Sieberer et al., 2005). Data on physical health, mental health and socioeconomic status in children and adolescents in Europe was collected and the distribution of mental ill health and poor mental well-being estimated. Thee important instruments came out of the KIDSCREEN project: KIDSCREEN-52, KIDSCREEN-27 and KIDSCREEN-10. Single dimensions of these instruments and the global HRQoL score (KIDSCREEN-10) can be used as suitable indicators for quality of life resp. positive mental health. The KIDSCREEN-10 Mental Health Index assesses the child's perspective on his or her physical, mental and social well-being, identifies children at risk and suggests suitable early interventions. For this

reason it is particularly useful for identifying children with positive mental health. Section 4.4 of this chapter will present empirical results from the KIDSCREEN survey detailing the distribution of children with positive mental health in thirteen European countries.

Further information on the KIDSCREEN instruments is available at http://www.kidscreen.org.

4.1.2 The Health Behaviour in School-aged Children (HBSC) survey

The HBSC Study is a WHO-collaborative study dedicated to the study of adolescent health. The overall aim is to gain a better understanding of health behaviours, health, and well-being in children and adolescents at the age of 11, 13 and 15 years. HBSC is a cross-national study covering over 40 countries in Europe, North America and Israel. The design of the survey is cross-sectional and data collection is carried out every four years. The basis for each survey is a standardized research protocol which is renewed for each survey round. The survey is based on a questionnaire which consists of mandatory items (required from each country), and optional items which focus on topics of national interest. Mandatory items are part of the international file and enable cross-country comparisons. Data is collected in schools and the primary sampling unit is school class (or entire school in case this is not possible). Data is collected within a class period via questionnaire.

Further information on the HBSC Survey is available at: http://www.hbsc.org .

Collection of data on positive mental health is in line with the health definition of the WHO (Ravens-Sieberer et al., 2008a). Assessment of mental health is possible in one of two ways: positive mental health and negative (ill) mental health, and the HBSC and KIDSCREEN Surveys provide suitable instruments for both.

4.2 Positive mental health indicators

4.2.1 Quality of life and positive mental health indicator

One of the outputs of the European KIDSCREEN survey was the development of a screening tool for mental health. The KIDSCREEN-10 instrument is an index which assesses the child's perspective on his or her physical, mental and social well-being, thus enabling the identification of children at risk. As previously stated, the KIDSCREEN-10 Mental Health Index is a non-clinical measure of quality of life and positive mental health status and enables the assessment of school-aged children's general well-being. The index is especially sensitive for affective, cognitive, and psychovegetative, as well as psychosocial aspects of mental health.

The short instrument consists of ten items covering six aspects of quality of life (physical well-being, moods & emotions, autonomy, parent relation & home life, peers & social support, school environment). The short instrument consists of the following ten items and only takes a few minutes to complete:

- "Have you felt fit and well?"
- "Have you felt full of energy?"
- "Have you felt sad?"
- "Have you felt lonely?"

- "Have you had enough time for yourself?"
- "Have you been able to do the things that you want to do in your free time?"
- "Have your parent(s) treated you fairly?"
- "Have you had fun with your friends?"
- "Have you got on well at school?"
- "Have you been able to pay attention?"

Children at risk of poor quality of life are identified by coding of responses so that higher values indicate better quality of life. The KIDSCREEN-10 Mental Health Index was developed by means of a Rasch analysis which ensured that only those items which represented a global, unidimensional latent trait were included. The values on the individual items are summed up, Rasch person parameters (PP) are assigned to each possible sum score, and then the PP are transformed into values with a mean of 50 and standard deviation of approximately 10 (Ravens-Sieberer et al., 2006). A better differentiation between the children is made possible by the distribution of the Rasch scores that resemble the expected theoretical normal distribution. The index provides a good discriminatory power and shows only few ceiling or floor effects.

Validation work on this instrument indicates that it is a valid and well-tested stable child centred self-report measure (indicator) for child and adolescent general quality of life and mental well-being status. It has good psychometric properties, with high reliability and Rasch-scale properties. The index provides a good discriminatory power and shows only few ceiling or floor effects. The strong internal consistency reliability (Cronbach's Alpha = .82) and test-retest reliability (r = .73) allow precise and stable measurements (Ravens-Sieberer et al., 2006; Ravens-Sieberer et al., 2010).

The cut-off at T-value below 38 (which represents the lowest 10%) indicates lower quality of life resp. higher risk for poor mental health (Ravens-Sieberer et al., 2006). Comparisons with the European Community Health Indicators (ECHI) show that the Kidscreen-10 Index for children and adolescents corresponds well with the "General Quality of Life Indicator". The ECHI group proposes to use the Euroqol score from the Euroqol 5D instrument (Eurociss project) or alternatively the WHOQOL of the WHO (Kramers & the ECHI team, 2005) for adults.

Since its development, the instrument has been employed in several EU funded European research projects (KIDSCREEN, DISABKIDS, MHADIE, SPARCLE), in the Flash Eurobarometer and in the PROMIS roadmap initiative of the US NIH (National Institutes of Health) to develop a patient reported outcome measurement information system. The instrument is also used in the Health Behaviour in School-aged Children (HBSC) study as an indicator of positive mental health and has been translated into a variety of languages.

4.2.2 Psychological well-being indicator

Another positive mental health indicator is psychological well-being which refers to a child's or adolescents' positive emotions and perceptions, his/her satisfaction with life, covering various areas of his/her inner feelings and thus provides insight into an individual's mental health state. The psychological well-being dimension is one of ten dimensions of KIDSCREEN-52 and one of the five dimensions of KIDSCREEN-27 as shown in the figure below. In the latter, it also encompasses the Moods and Emotions and the Self-Perception scale of KIDSCREEN-52.
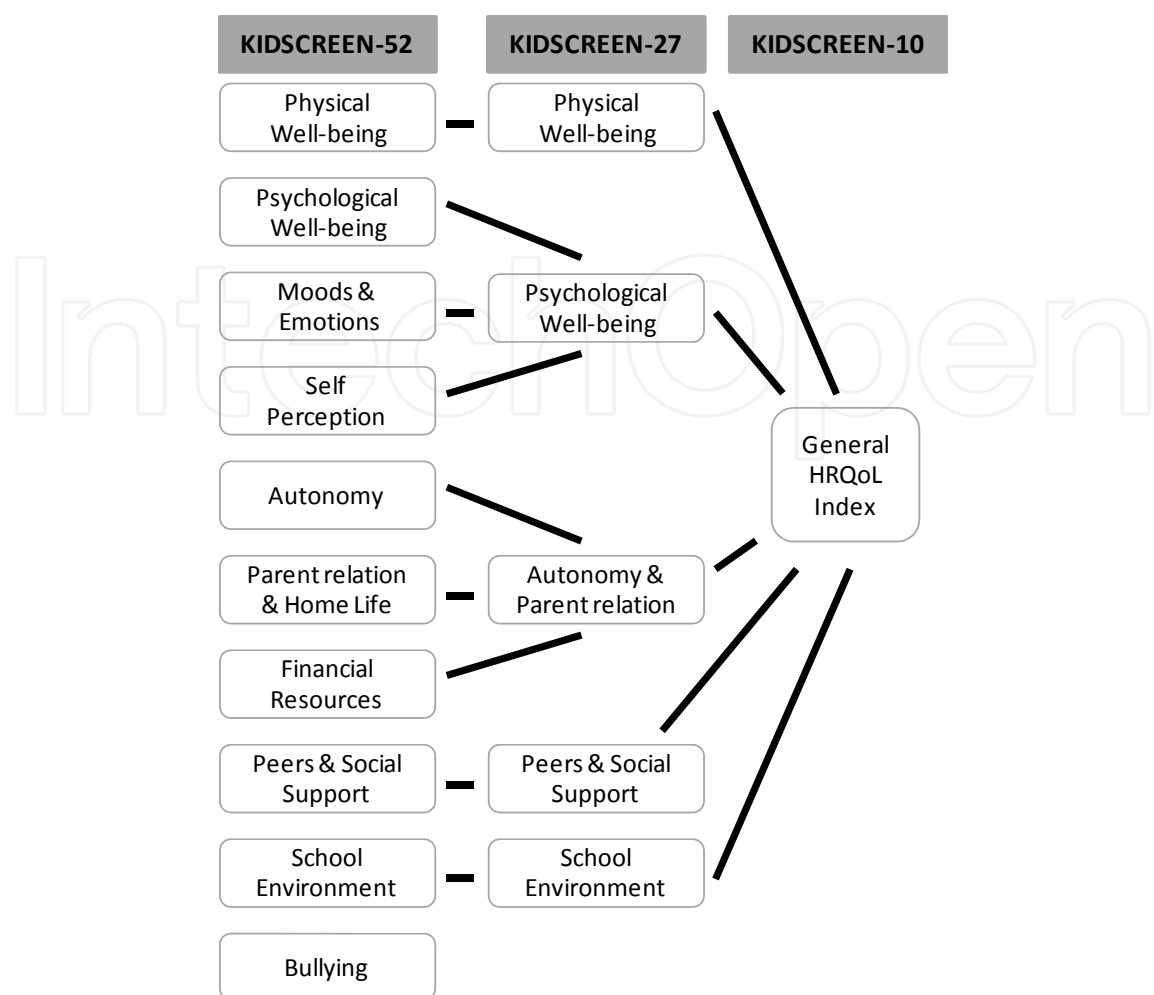
Fig. 1. Dimensions of the KIDSCREEN-52, -27, -10 (http://www.kidscreen.org/)

The KIDSCREEN-52 is part of a family of health-related quality of life instruments which were developed in several stages, beginning with literature searches, expert consultations (Delphi method) and focus groups with children and adolescents (Herdman et al., 2002; Ravens-Sieberer et al., 2006, 2008b). Using this approach, relevant health-related quality of life (HRQoL) dimensions and items could be identified (Ravens-Sieberer et al., 2006, 2008b). Reduction of items gathered in focus groups were done following EUROHIS guidelines (Nosikov & Gudex, 2003). Following this, a procedure of forward-backward-forward translation and harmonization was applied, followed by a pilot study and an item reduction analysis, which finally yielded a questionnaire comprising 52 items (Ravens-Sieberer et al., 2006, 2008b).

The KIDSCREEN-52 Psychological Well-being dimension assesses the psychological well-being of the child, which covers positive emotions and life satisfaction, including the child's or adolescents' positive perceptions and emotions, and positive feelings, such as happiness, joy and cheerfulness (Ravens-Sieberer et al., 2006). A low score on this dimension implies no pleasure in life/high dissatisfaction with life while a high score indicates happiness, positive view of life, life satisfaction and cheerfulness. The cut-off is at T-value of 36.91 and identifies the lowest 10% (Ravens-Sieberer et al., 2006). This dimension of the KIDSCREEN-52 (for children and adolescents) is comparable to the psychological well-being dimension for adults which is used as an indicator for general mental health in the ECHI report, and is

defined as the percent of the population below the cut-point of the energy-vitality scale from the SF-36 questionnaire (see ECHI long list, 2005).

4.2.3 Self-rated health (subjective health indicator)

The building blocks for good health are laid early in life, and therefore evaluation of health does not begin in adulthood but much earlier. Health is an important resource and poor health early in life can have long-term negative effects which may continue throughout adulthood (WHO, 2006). Being in good health – physically, emotionally and socially – helps young people deal productively with challenges in their development (Burt, 2002). In recent years, self-assessments of health have come more into use as they are based on an individual's perception and evaluation of his or her health. Focusing on the subjective perspective, self-rated health is usually founded on age-peer comparisons either consciously or unconsciously (Bjorner et al., 1996). It can be distinguished from more specific health constructs in that it captures an overall conception of health, rather than a summation across specific domains of health. Empirical studies have shown that self-reported health is an independent predictor of mortality (Idler & Benyamini, 1997). Benjamins et al. (2004) could also identify a relationship between self-reported health and cause-specific mortality, and moreover, also found gender effects for some causes of mortality. A gender effect in self-rated health was confirmed in a sample of children, whereby girls reported poorer health than boys (Cavallo et al., 2006). Another study on psychosocial, demographic, and health-related correlates of self-rated health showed that daily smoking, alcohol intoxication on at least one occasion, infrequent physical activity, and difficulty making friends were predictors of poor self-rated health (Kelleher et al., 2007). Seemingly, multiple independent correlates of adolescent self-rated health exist (Breidablik et al., 2009), whereby poor health increases by age and throughout adolescence (Wade & Vingilis, 1999).

The single item question on health is a suitable indicator of subjective health. Individuals are asked to indicate how they perceive their general health on a Likert scale. The answer categories are either four or five scaled. The Health Behaviour in School-aged Children (HBSC) study uses the four point Likert scale with answer categories: "excellent", "good", "fair", "poor". Those with either "fair" or "poor" health respectively "excellent" and "good" health are then combined into subgroups of individuals with "poorer health" resp. "better health" (Currie et al., 2004). Other studies, such as e.g. the European KIDSCREEN survey (Ravens-Sieberer et al., 2006), use the five-scaled answer categories: "excellent", "very good", "good", "fair", "poor". The main difference is the extra answer category "very good" which enables more differentiation on the positive end of the scale.

According to ECHI recommendations, preference should be given to the five answer categories (Kramers & the ECHI team, 2005). In the ECHI report, the WHO recommended instrument is proposed which is based on a five response category item: "How is your health in general?" (Answer options are: very good/good/fair/bad/very bad). The ECHI report further proposes to set the cut-off for perceived health at the % (very) good/less than good/less than fair. As noted in the ECHI report, very little focus was placed on the specific situation of children (ECHI long list 2005, p. 50).

Although no specific validation has been done on the self-rated health item in HBSC, several studies support its validity. It has shown multiple independent health-related

correlates, including medical diagnosis, and health complaints. The self-rated health item shows a certain degree of stability across time, suggesting that these self-reports are not simply a fluctuating subjective impression. Cavallo et al. (2006) analyzed the item in terms of its feasibility and psychometric robustness using the HBSC 2001/2002 data from all countries involved. The results confirm the trend of an increasing perception of poor health with increasing age in the pre-adolescence phase and a higher risk for perceived poorer health in girls, (Cavallo et al., 2006). HBSC showed this was a consistent finding across a large number of countries in Europe and North America (see also Currie et al., 2008).

4.2.4 Life satisfaction indicator

Well-being is a multi-faceted concept (Diener, 1984; Wilkinson & Walford, 1998) and comprises the individual's own evaluation of life, i.e. life satisfaction. It was not until the early 1990s that determinants of life satisfaction were studied (Suldo et al., 2006). Unlike other concepts, life satisfaction is relatively stable over time (Pavot & Diener, 1993). It is associated with depression, anxiety, suicide, work disability, fatal accidents and all cause mortality in adults (Fiscella & Franks, 1997; Helliwell, 2007; Koivumaa-Honkanen et al., 2001; Koivumaa-Honkanen et al., 2002; Koivumaa-Honkanen et al., 2004a; Koivumaa-Honkanen et al., 2004b). During adolescence, life satisfaction is influenced by life experiences and relationships, especially within the family context (Edwards & Lopez, 2006; Gohm et al., 1998; Rask et al., 2003) and school (Samdal et al., 1998). Psychosocial resources and school satisfaction, especially perceptions of feeling treated fairly, feeling safe and perceiving teachers as supportive (Samdal et al., 1998), are linked with high life satisfaction. School-related resources and their impact on overall life satisfaction are a central issue as the acquirement of academic competence constitutes one of the developmental goals in adolescence (Hurrelmann & Lösel, 1990). Moreover, school creates a social environment for young people which can provide them with additional resources. At the certain time, some social factors, such as bullying, can pose a risk as they may be associated with low life satisfaction and low subjective health (Gobina et al., 2008).

The Cantril Ladder is a measure of life satisfaction which has been widely used in the Health Behaviour in School-aged Children (HBSC) study. The measure is also a suitable indicator for life satisfaction in children and adolescents (Cantril, 1965). The measure consists of a Visual Analogue Scale with 11 positions (0 through 10) where children can mark the position on the scale demonstrating how satisfied they are with their life: "Here is a picture of a ladder. The top of the ladder "10" is the best possible life for you and the bottom "0" is the worst possible life for you. In general, where on the ladder do you feel you stand at the moment? Tick the box next to the number that best describes where you stand." The Health Behaviour in School-aged Children (HBSC) study uses the cut-off at "6 or above" to identify children and adolescents with a positive level of life satisfaction (normal to high life satisfaction) (Currie et al., 2004).

The Cantril Ladder has not been subject to structured validation studies at the international level, but observed relationships with quality of life and with self-rated health are in the expected range, and support claims about its validity. Analyses using data from the HBSC study show that the item is associated with the general health item and the Symptom Checklist (HBSC-SCL) (Cavallo et al., 2006).

4.3 Ill-mental health indicators

4.3.1 Psychological distress indicator

In the past, assessment of mental health was for the most part aimed at assessing mental ill health, with the focus being placed on mental health disorders and -problems. This has the disadvantage that the information gathered only enables separation between individuals with (signs of) mental disorders and healthy individuals (without any signs of mental health problems). No information is available on individuals "in-between", in other words about the position of the individual on a mental health continuum (Ravens-Sieberer et al., 2008a). Moreover, earlier instruments for measuring mental health problems in children were based and validated on experiences with child psychiatric patients and were often developed as screening instruments for patients in care. KIDSCREEN instruments overcome this drawback as they have been developed to measure mental health in the general population and have been validated in large population studies.

The KIDSCREEN-52 "Moods & Emotions" Dimension provides an important indicator of psychological distress which can be used to identify children with depressiveness, as well as those feeling lonely, sad, and unhappy (Ravens-Sieberer et al., 2006). This dimension of the KIDSCREEN-52 examines experiences of depressive moods and emotions, including stressful feelings, and how distressing these are to the individual. A low score indicates that the child or adolescent feels depressed, is unhappy and/or in bad mood. A high score in contrast, implies feeling good and being in a good mood. The cut-off identifying the lowest 10% is at a T-value of 37.76 (Ravens-Sieberer et al., 2006).

The "moods & emotions" dimension of KIDSCREEN-52 for children and adolescents corresponds to the indicator of psychological distress for adults in the general mental health section as published in the ECHI indicator list. In the ECHI report, psychological distress is defined as the percent of the population below the cut-point of MHI-5 score from the SF-36 questionnaire (see ECHI report, long list: http://www.echim.org/docs/echi_longlist.pdf).

The KIDSCREEN instruments are robust and psychometrically sound instruments suitable for the assessment of the health-related quality of life and mental health in children and adolescents between 8 and 18 years of age. The internal consistency reliability (Cronbach's Alpha) for the individual dimensions show for the "Moods & Emotions" dimension a value of 0.86 and for the "Psychological Well-being" dimension a Cronbach's Alpha of 0.89 (Ravens-Sieberer et al., 2008b; Ravens-Sieberer et al., 2006), both of which can be considered sufficiently high.

Both, the "Moods & Emotions", as well as the "Psychological Well-being" dimension of KIDSCREEN-52, correspond well with the published indicators of general mental health in the ECHI report (Kramers & the ECHI team, 2005), and are thus suitable indicators.

4.3.2 Subjective health complaints index

The presence of subjective health complaints and the frequency of their occurrence can serve as a good approximation for the individual's physical well-being. Health complaints tend to cluster together (Alfven, 1993; Mikkelsson et al., 1997; Starfield et al., 1984; WHO, 2006) and in this way cause immense burden – not only on the individual, but also on the health care system.

Within the international HBSC Study, the Symptom Checklist (HBSC-SCL) was developed to assess the various health complaints that might occur in children and adolescents. The

HBSC-SCL has proven to be a suitable and effective screening tool for the assessment of physical well-being. The Checklist includes symptoms, such as headache, abdominal pain, backache, feeling low, irritability or bad mood, feeling nervous, sleeping difficulties and dizziness (Haugland et al., 2001). The advantage of the HBSC-SCL is that it is not limited to somatic symptoms, but also contains a number of psychological symptoms and hence constitutes an instrument suitable for detecting psychosomatic complaints.

The HBSC-SCL assesses the occurrence of health complaints in children and adolescents and is a useful indicator for identifying individuals at risk for impaired health. The HBSC-SCL asks about the occurrence of the following symptoms in the last 6 months: Headache, Stomach ache, Back ache, Feeling low, Irritability or bad temper, Feeling nervous, Difficulties in getting to sleep, Feeling dizzy. Ravens-Sieberer et al. (2008c) developed an international scoring system for the HBSC-SCL which enables a cross-cultural and interval-scaled assessment of subjective health complaints and which can further be used to identify individuals at a greater risk of health complaints. This uni-dimensional scoring algorithm is based on seven of the eight items. A score below 41 indicates a "higher risk" for health complaints (Ravens-Sieberer et al., 2008c).

A number of validation studies have been made on the HBSC-SCL (Haugland & Wold, 2001; Haugland et al., 2001). Qualitative semi-structured interviews with early adolescents revealed that adolescents perceive the symptoms to be aversive physical and psychological states that interfere with daily functional ability and well-being. Consistent accounts as to how the different symptoms were defined were given, suggesting that adolescents have a common frame of reference when they rate their frequency of symptoms (Haugland & Wold, 2001). Differences emerged in their lay perspectives on the causes of such symptoms. While some explanations were consistent with a stress-model of health complaints, others were associated with developmental processes, such as growing pain, or ergonomic factors, such as low quality of air in classrooms etc.

4.4 Application of the mental health indicator (KIDSCREEN-10)

As previously mentioned, the mental health index (KIDSCREEN-10) is a non-clinical measure of mental health status. It does not permit identification of groups with defined burden of mental health problems, but allows measurement along a continuum (Ravens-Sieberer et al. 2008a).

As stated previously, KIDSCREEN-10 is an indicator of quality of life and (positive) mental health and in the following, we will apply it on a European sample of adolescents from 13 countries. The overall mean score is 48 with a standard deviation of 10. The results in Figure 2 show that some countries fall above and some below the European mean. Countries towards the left side of the figure tend to show better positive mental health compared to the countries at the right end of the figure which fall below the European average. Additional results show that variation in mental health scores was generally lower in countries with lower positive mental health scores (results not shown).

To gain a better understanding of the distribution of mental health, we will now look at selected sociodemographic characteristics, such as gender and socioeconomic status (approximated by family affluence [FAS]). Table 1 below shows the distribution of positive mental health across the 13 countries by gender. Comparisons across gender groups show that boys report better mental health across all countries than girls. This difference is significant in all but one country, and the effect sizes are generally small.
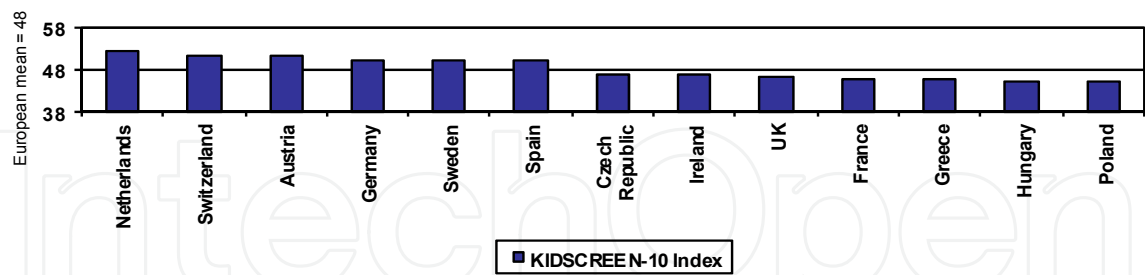
Fig. 2. Positive mental health index (KIDSCREEN-10) across 13 European countries[1,2]

Country	Girls m(SD)	Boys m(SD)	Effect (d)
Austria (n=878)	49.6 (8.9)	52.6 (9.4)	0.3***
Czech Republic (n=1016)	45.0 (7.1)	47.3 (7.8)	0.3***
France (n=622)	45.0 (8.4)	46.1 (8.0)	n.s.
Germany (n=1079)	49.3 (8.4)	51.0 (8.4)	0.2***
Greece (n=1146)	44.2 (7.6)	47.2 (8.0)	0.4***
Hungary (n=1839)	43.6 (7.6)	46.2 (8.9)	0.3***
Ireland (n=894)	45.5 (7.9)	48.1 (7.6)	0.3***
The Netherlands (n=1168)	50.2 (8.2)	53.6 (10.0)	0.4***
Poland (n=1120)	43.9 (7.9)	45.3 (7.3)	0.2**
Spain (n=522)	48.4 (9.6)	50.9 (8.7)	0.3**
Sweden (n=3097)	49.2 (10.0)	52.4 (10.0)	0.3***
Switzerland (n=1078)	49.6 (8.0)	52.6 (8.5)	0.4***
United Kingdom (n=883)	45.5 (8.3)	47.8 (8.5)	0.3***

** p<.01
*** p<.001

Table 1. Positive mental health (KIDSCREEN-10) in different countries according to gender[3,4]

Next, the analysis of positive mental health by family affluence shows that higher family affluence, i.e. growing up a in a better-situated family, is generally associated with a higher level of positive mental health (i.e. above the European average). This is depicted in Figure 3 by the increasing line (with one or two exceptions) and also in the distribution of % of children in low, middle and high FAS group per country (results not shown). Countries with higher mental health score means are also those with the least number of adolescents in the low FAS group.

[1] Mean scores of the KIDSCREEN-10 are depicted
[2] This figure was previously published in Ravens-Sieberer et al. (2008a).
[3] Effect size calculation was based on dividing the mean difference by the overall standard deviation (according to Cohen 1988).
[4] This figure was previously published in Ravens-Sieberer et al. (2008a).
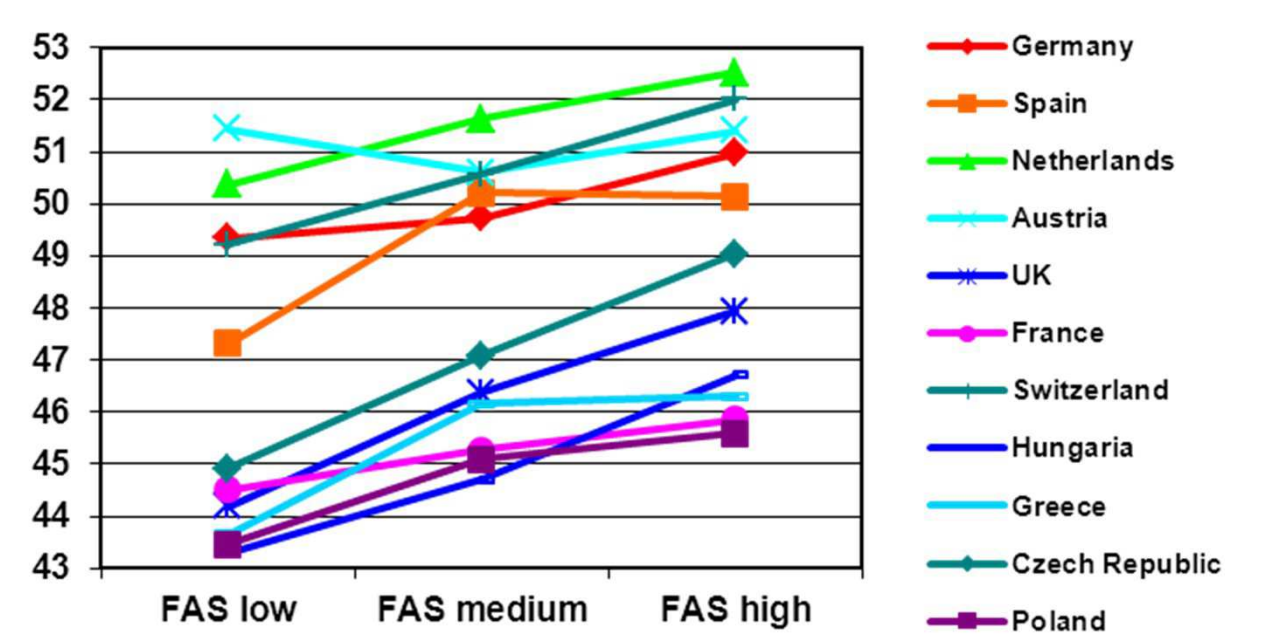
Fig. 3. Adolescent positive mental health (KIDSCREEN-10) and FAS in the participating countries (without Ireland and Sweden)[5]

The results that were presented here serve the purpose to exemplify the application of a robust measure of mental health in a European sample of children and adolescents. Results show the associations between the outcome (mental health) and various sociodemographic factors (age, gender, FAS) and in this way provide the basis for more comprehensive analyses of mental health status in children and adolescents in Europe.

5. Closing comments

The objective of this chapter was to give interested readers an insight into the state-of-the-art in child mental health measurement. Our aim was to show that progress has indeed been made in this vast field, and although we still do not have all the tools and information for a complete assessment of mental health in children and adolescents, we have been able to identify useful measures and important surveys at the European level which enable a good approximation. The complexity of the field has made it necessary for us to concentrate on a few indicators which in our view are good representatives of the respective constructs. The indicators and the results we have described in this chapter come from the HBSC and KIDSCREEN Studies and also reflect our insights from within the RICHE project.

The original idea for a publication on mental health measurement came up during the course of working in the RICHE project. RICHE stands for "Research into Child Health in Europe" and is an international project focusing on child health research in Europe. The project is funded within the EU 7th Framework Programme. RICHE embraces the full multi-disciplinary diversity of European research and addresses its fragmentation by making the parts visible. This is done in part via a platform which provides the opportunity for open exchange (http://www.childhealthresearch.eu/). The aims of the project are: to provide an inventory of current research; to identify research into child health measurement, statistics,

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5 The Figure was previously published in Ravens-Sieberer et al. (2008a).

and indicators; to identify gaps in child health research as perceived by stakeholders; and lastly, to develop roadmaps for the future of child health research in Europe based on all these findings. One of the objectives of the RICHE project is to produce an inventory of measurement and indicators to facilitate the implementation of existing methods and at the same time to initiate new developments through exchange and networking. Based on the notion that development and implementation of sound indicators is essential for developing child health with the European Union (Rigby et al., 2003), it is important that high quality indicators are available for analyses and political decision making. Health measurement is the core for developing prevention strategies in a life course perspective.

The review of research into child mental health measurement has revealed important advances, such as the development of quality of life and positive mental health indicators in the KIDSCREEN project, while on the other hand, also pointed out several shortcomings. The main shortcomings relate to the age-specification and the cultural adaptation of measurement tools. With regard to the age issue, our evaluation of measures of child mental health revealed that measurement tools generally target older children and adolescents, i.e. eight years and older. Many of the measurement tools come from the HBSC survey and all of these have originally been designed for 11-, 13-, and 15-year old children. Any application of these instruments on younger children would require further validation which to date has not been done. Although indicators based on KIDSCREEN measures are suitable for slightly younger children (beginning with age seven), they are not available for the very young children (0-6 year olds). For this young group, there is a clear gap on measurement tools, especially those enabling a valid and cross-cultural assessment of quality of life and well-being for the age group 0-3 years and for the age group 4-6 years. Generally, very young and young children are underrepresented in international data sources, and "a portrait of positive well-being among young children is not available, and in many cases, measures are lacking that are appropriate for their age" (Lippman et al., 2009, p. 24). This implies that many indicators are adolescent-focused and hence may point attention to matters relevant for adolescents which may be quite different from those that are essential for children (Bradshaw et al., 2006).

Another shortcoming of current research on indicators for child well-being lies in the cultural adaptation of the measurement tools. As mentioned above, all of the indicators presented here are based on measurement tools which have been developed within the European and North American context. In order to compare child well-being and quality of life in different cultural contexts outside of Europe (e.g. in Africa, Asia), cultural adaptations would need to be done with the instruments. Currently, this is a research challenge in this field and needs to be addressed in the near future.

6. Outlook

To end on a positive note, it is important to acknowledge that there are already a number of programmes on mental health and well-being in children and adolescents underway. A good example of a promising strategy is Scotland's "National Programme for Improving Mental Health and Wellbeing" which was launched in April 2008 with the purpose to identify a core set of indicators on mental health to support the national action plan on mental health ("mental health profile for Scotland"; Parkinson, 2009). Building upon the experience from the establishment of a mental health indicator set for adults (Parkinson,

2007), the same is now being done for the age group 18 years and younger. The goal is to "support and promote consistent and sustainable national monitoring of the state of mental health and associated contextual factors for children and young people in Scotland" (Parkinson, 2009, n.p.). Using different methods, such as a comprehensive review of literature on children's own views of mental health (Shucksmith et al., 2009), and wider consultations with researchers, policy makers and practitioners, as well as advisory groups will be used to inform the development of a framework on mental health and well-being. Direct consultations with children and young people on mental health indicators and the proposed framework will complement this information (Parkinson, 2009).

NHS Scotland is a good example of how research and policy making can work together to more forward on an important public health issue with high relevance not just in Scotland, but also at the European level. It highlights the importance of epidemiological data which delivers information relevant for development of policy making (Remschmidt & Belfer, 2005). HBSC and KIDSCREEN are good examples of this. Through regular, standardized data collection (such as through monitoring), health indicators can further help in the problem identification process as well as in its prioritization (Korkeila et al., 2006). By "screening" for certain (risk) groups or health problems, they are valuable tools for preventive action which requires early detection of hidden or manifest mental health problems (Erhart et al., 2009). In this sense, indicators are an important "bridge between health policy and scientific information" (Korkeila et al., 2006, p. 13).

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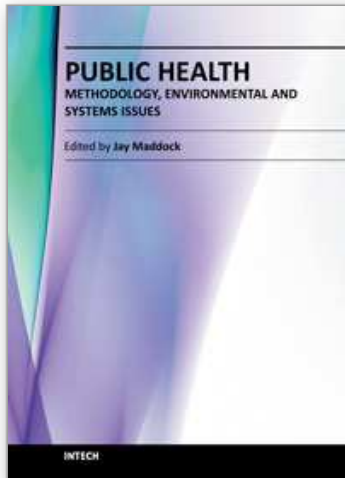
Public health can be thought of as a series of complex systems. Many things that individual living in high income countries take for granted like the control of infectious disease, clean, potable water, low infant mortality rates require a high functioning systems comprised of numerous actors, locations and interactions to work. Many people only notice public health when that system fails. This book explores several systems in public health including aspects of the food system, health care system and emerging issues including waste minimization in nanosilver. Several chapters address global health concerns including non-communicable disease prevention, poverty and health-longevity medicine. The book also presents several novel methodologies for better modeling and assessment of essential public health issues.

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