



Towards enhancing research on adolescent positive mental health

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Abstract

The positive mental health and well-being perspective represents innovative public health research of first-rank priority in Europe. Good mental health is both a state and a resource for everyday life. Hence, the concept often refers to a subjective feeling (hedonic component) as well as positive functioning (eudaimonic component). Different conceptualisations of mental health-related issues are a background to this paper, which gives a brief overview of three research issues in the Nordic countries. First, the development in the occurrences of adolescent mental health-related indicators such as life satisfaction, health, sleep, and school pressure. Second, review of Nordic methodological studies reporting on different mental health-related measures. Third, the selection of measures of positive mental health employed in the 2017–2018 Health Behaviour among School-aged Children (HBSC) data collection in the Nordic countries. Using the Nordic HBSC data for 2002–2014, it was found that symptom and problem-oriented analyses of mental health can improve our understanding of the challenges adolescents face. However, there is also a need to examine positive aspects of mental health in order to enhance our understanding of different mental health-related dimensions. New measures were included in the 2017–18 HBSC data collection in the Nordic countries, enabling researchers to answer different research questions including analysing factors mediating and moderating positive mental health among school-aged children. Extending the perspective from a symptom- and problem-oriented view to a more positive and asset-based perspective adds additional value to studies of mental health.

Keywords

positive mental health, measurement tools, adolescents, epidemiologic methods, Nordic countries

Introduction

Researching positive mental health needs to go beyond measuring self-rated health, life satisfaction and psychosomatic complaints. Therefore, in the Health Behaviour among School-aged Children (HBSC) study as well as in child public health, there has been a need to discuss different conceptualisations of positive mental health as well as measurement tools in this area. Positive mental health and its determinants have been identified as a priority according to the ROAMER Consortium for innovative mental health research in Europe (Forsman et al., 2015). Moreover, the second priority was public mental health research built on interdisciplinary perspectives in order to understand the complexity of the topic. The HBSC study already has a high level of interdisciplinarity, but the measurement of positive mental health is still a challenge.

Towards the concept of positive mental health

It has been argued that mental health has very little, if anything, to do with mental illness (MacDonald, 2006). The difference between a pathologic and salutogenic approach is noted for health in general (Antonovsky, 1987; Mittelmark et al., 2017) and is equally relevant for mental health. The emphasis on positive mental health is linked to the general health promotion approach, which focuses on positive health rather than illness (Barry 2009; WHO 1986). This paradigmatic change has implications for the school health services, as mental wellness is a key determinant of students' academic and developmental success; simply addressing the problems of individual students is not enough (Doll & Cummings, 2008). Moreover, mental health promotion is a distinct concept comprising a unique set of attributes and characteristics (see review by Tamminen et al., 2016). The concepts of positive mental health and mental disorders are used in parallel in common practice and research. Both positive mental health (also referred to as mental well-being) and mental disorder (often referred to as mental health problems or psychopathology) are required to complete mental health assessments and needed in research ("dual-factor model of mental health", Suldo & Shaffer, 2008).

However, many population surveys tend to measure the prevalence rates of mental illness rather than the rates of mental well-being (Stewart-Brown, 2002; Stewart-Brown, 2015). Moreover, to date there does not appear to be any common, universally accepted

definition of the concept of mental well-being (Davies, 2014; Herrman & Jané-Llopis, 2012; Stewart-Brown, 2013). That said, these researchers suggest that positive mental health equates to *mental well-being* or to *feeling good and functioning well*, which is unequivocally more than the mere absence of disease (Barry, 2009; Deci & Ruff, 2008; Ruff, 1989; Stewart-Brown, 2002).

There are several interesting perspectives on mental health such as its relationship with time as the concept of mental health varies as a function of time, place, culture and context (Rogers & Pilgram, 2005). The WHO has presented a definition of mental health as a: “state of well-being in which the individual realizes his or her own abilities, copes with the normal stresses of life work productively and fruitfully, and makes a contribution to his or her community” (WHO, 2001, p. 1). This definition challenges the idea that mental health is simply the opposite of mental ill health. Moreover, the importance of positive mental health for well-being and overall development has been emphasised by the WHO when they say: “Mental health and well-being are fundamental to quality of life, enabling people to experience life as meaningful and to be creative and active citizens. Mental health is an essential component of social cohesion, productivity, and peace and stability in the living environment, contributing to social capital and economic development in societies” (WHO, 2005, p. 1).

A good state of mental health is a resource for everyday life and contributes to quality of life and well-being (Barry & Jenkins, 2007). In other words, functioning aspects of mental health is also about enhancing competencies of individuals and communities and enabling them to achieve self-determined goals. Moreover, positive mental health is related to resilience (Srivastava, 2011) as well as empowerment (Reaburn & Rootman, 1998). This wide WHO perspective is a fine vision, but it is far from an operationalised concept suitable for surveys among school-aged children. Therefore, we need to look into different conceptualisations of positive mental health.

Margaret Barry describes mental health as “a positive emotion or affect such as subjective sense of well-being, and feelings of happiness, a personality trait encompassing concepts of self-esteem and sense of control, and resilience in the face of adversity and the capacity to cope with life stressors” (Barry, 2009, pp. 5–6). In her seminal book on positive mental health, Marie Jahoda proposed that positive mental health includes attributes such as an efficient perception of reality, self-knowledge, exercise of voluntary control over behaviour, self-esteem and self-acceptance, and the ability to form affectionate relationships and productivity (Jahoda, 1958). Her view on positive mental health is comprehensive and includes both feeling and functional aspects. Moreover, she also lifts the normative question: if happiness or well-being, satisfaction or contentment, freedom from conflict or tension are not in agreement with the current life situation, are we to designate those individuals as mentally ill? Thus, how the concept of mental health is defined has important practical implications.

In its forum on positive mental health, the journal *World Psychiatry* presented an overview of theories and models for conceptualising positive mental health (Vaillant, 2012) suggesting the following: (i) positive mental health has a score of over 80 on DSM-IV’s Global Assessment of Functioning scale; (ii) positive mental health is characterised by the presence of multiple human strengths rather than the absence of weaknesses; (iii) positive mental health can be conceptualised as maturity; (iv) positive mental health is the dominance of positive emotions; (v) positive mental health is associated with high socio-emotional intelligence; (vi) positive mental health is partly subjective well-being; and (vii) positive mental health correlates with resilience. Several commentaries were invited and suggested that an additional model of positive mental health is provided by positive psychology based on self-

determination theory (Sheldon, 2012). Another commentary noted that the concept of positive mental health is inextricably linked to that of psychological well-being (Fava, 2012). The WHO International Classification of Functioning, Disability and Health can be used as a frame of reference for positive mental health, especially for its functional aspect discriminating between function, capacity, environment, person and participation (Linden, 2012). The WHO (Five) Well-being Index (WHO-5) was highlighted by another commentator, as a conceptual framework and a subjective measure that covers basic life perceptions of well-being applied in studies all over the world (Beck, 2012). An additional commentary tentatively suggested the inclusion of spirituality as a component of positive mental health (Karlsson, 2012). Overall, the forum illustrated that there is a lack of agreement about what constitutes positive mental health (Stein, 2012).

The emergence of positive psychology has contributed to a greater focus on optimal human functioning (Seligman, Steen, Park, & Peterson, 2005). Subjective well-being is emphasised in positive psychology as well as in the salutogenic model (Mittelmark et al., 2017). One application of positive psychology within the school setting focuses on positive education (Seligman et al., 2009), which includes interventions targeting physical health and the five domains of positive mental health in the Seligman's PERMA framework: (a) *positive emotional* experiences or emotional wellbeing including developing healthy responses to difficult emotions; (b) *engagement* and immersion in activities; (c) social skills for healthy *relationships*; (d) *meaning* that refers to believing in one's life as being valuable and feeling connected to something greater than oneself; and (e) *accomplishment* of meaningful goals (Seligman, 2011). This model aligns the recommended multidimensionality of positive mental health (Kern et al., 2015). Results from longitudinal follow-up studies of positive education suggest that successful transitions into young adult roles and responsibilities may be facilitated by targeted mental health promotion interventions designed to foster both positive mental health and address mental health difficulties in adolescence (O'Connor et al., 2017).

Positive youth development (PYD) is grounded in developmental systems theory and presents another theoretical frame of reference. This theory has grown from dissatisfaction with the predominant view that underestimated the true capacities of young people by focusing on their deficits rather than their developmental potentials (Damon, 2004). PYD assumes that youths have the potential for positive change, and focuses on the development of personal and social assets rather than on reducing problem behaviour (Lerner et al., 2005). There are some core characteristics that compose positive youth development, often referred to as the Five Cs: (i) *Competence* (positive view of one's actions in domain specific areas including social, academic, cognitive, and vocational); (ii) *Confidence* (internal sense of overall positive self-worth and self-efficacy; one's global self-regard, as opposed to domain-specific beliefs); (iii) *Character* (respect for societal and cultural rules, possession of standards for correct behaviours, a sense of right and wrong [morality], and integrity); (iv) *Connection* (positive bonds with people and institutions that are reflected in bidirectional exchanges between the individual and peers, family, school, and community in which both parties contribute to the relationship); and (v) *Caring* (a sense of sympathy and empathy for others) (Eccles & Gootman, 2002). An additional sixth C: *Contribution* is relevant for a young person. This means that the young person contributes positively to self, to the community and in the end to the whole civil society. The PYD has been used for intervention research in Norway (Holsen et al., 2015; Larsen, 2016) as well as evaluation research in Sweden (Fredriksson, Geidne & Eriksson 2015). Research and evaluation efforts have linked eight contextual features supporting PYD: (1) safe and health-promoting facilities;

(2) clear and consistent rules and expectations; (3) warm, supportive relationships; (4) opportunities for meaningful inclusion and belonging; (5) positive social norms; (6) support for efficacy and autonomy; (7) opportunities for skill building; and (8) coordination among family, school and community (Larson, Eccles & Gootman, 2004).

As this brief review shows there are many interpretations and approaches to the concept of positive mental health. These theoretical perspectives illustrate the need for more distinctive definitions of the relevant components in the mental health/well-being complex in a way that facilitates operationalisations and measurements in surveys.

According to Decci and Ryan (2008), positive mental health includes both a hedonic component, which refers to subjective well-being and satisfaction, and a eudaimonic component, which includes positive functioning, engagement, fulfilment and social well-being (Deci & Ryan, 2008; Ryff, 1989). Our conclusion is that the operationalisation of the concept needs to be multidimensional to adequately reflect the real-life complexity of positive mental health. Moreover, the definition of positive mental health must be in terms that are culturally sensitive and inclusive – thus applicable to different countries – and psychometrically sound and validated. Such measures would aid in the assessment of trends and patterns in positive mental health among adolescents and adults alike. In this endeavour, it may be a converging possibility that existing data could be used as a proxy for more refined assessments of positive mental health.

Aims

The present review aims to explore different ways of enhancing research on adolescent positive mental health. An overview will be given on three research issues: (1) development of adolescent mental health in the Nordic countries; examining positive mental health using measures of excellent self-rated health, high life satisfaction, multiple weekly health complaints, sleep difficulties, and related factors such as ease of communication with parents and school pressure; (2) reviewing survey methodological development efforts associated with the HBSC study for selecting measures to be used in the Nordic countries; and (3) selection of measurement tools such as which measures of positive mental health to be used in HBSC data collections in the Nordic countries. The paper ends with discussing possible research questions for enhancing research on adolescent positive mental health that is possible with the selected collection of survey data.

Methods

Development of adolescent mental health: The HBSC data collected between 2002 and 2014 across five Nordic countries has been used in examining different trends, which are presented in detail in other articles in this special issue. The HBSC study has given us the opportunity to study different measures of mental health or related measures over a period of 12 years. Outcomes studied include: self-rated health, psychosomatic symptoms, life satisfaction, and sleep. The approach has been to analyse excellent self-rated health, high life satisfaction, and lack of psychosomatic symptoms and sleep, thus focusing on the positive aspects of mental health. The question is if such approaches can be considered as proxy measures of positive mental health. Furthermore, the development of two main factors associated with adolescents' mental health are also investigated in this study: (a) family communication and (b) schoolwork pressure.

Overview of methodological development: A review of publications and protocols for the HBSC data collection was employed to get an overview of scale methodological devel-

opment of scales used to measure positive mental health or related concepts. The focus was on studies from the five Nordic countries (i.e., Denmark, Finland, Iceland, Norway, and Sweden). These countries represent a group of relatively comparable welfare states, all of which have had adolescent and youth mental health on the research agenda within recent years (Due et al., 2014; Forte, 2013; Merikukka et al., 2017; Paananen et al., 2013; Befring, Frønes & Sørli, 2010).

Our research team, consisting of HBSC researchers from the five Nordic Countries (Eriksson, et al., 2019), discussed the possibilities of researching positive mental health using HBSC data. A background document was prepared including a summary of the methodological development and different scales used in the Nordic countries as well as other HBSC countries (Eriksson, 2017). An ideal situation would be that a measure had been used by the Nordic countries at previous HBSC data collections, thus giving a possibility for analysing time trends. The development of measures related to adolescent mental health, capturing other aspects than the ones related to mental symptoms or mental disease, has been on-going in various ways and directions in all the Nordic HBSC research groups.

Selection of measurement tools: It is essential to have access to high-quality measurement instruments assessing positive mental health. Even if there are many alternatives available, there is no golden standard. A database on 464 positive health indicators has been developed by the Department of Health Promotion at Bergen University (Rullesta, Kvisselien & Servan, 2017). In our selection of high-quality indicators, it is important to consider the content, carefully including positively worded items and ensuring alignment with the mental health framework (Rose et al., 2017). Moreover, the conceptual relevance for youth is essential, including psychometric properties (particularly valid for youth). The measures also need to be responsive to change in order to enable meaningful trend analyses.

There are some basic requirements for measures to be used in the HBSC studies. Translation of different items from different measures is essential in the challenge of finding a balance between securing consistency across countries and content validity (Harkness, 1999). This was found to be very important as the same word could mean different things in different Nordic countries. The work *thriving* is translated to “trivsel” in several Nordic languages, but in Sweden it has a completely different meaning. The desire to achieve comparability often requires methodological compromises in order to achieve functional equivalence (Hantris, 2005). Questions that are more abstract in nature, such as positive mental health, are more challenging to translate effectively (Johnson et al., 2006). Moreover, the translation needs to be age-appropriate when used among school-aged children. The piloting of new scales is a requirement, and this includes analysis of validity and reliability of measures as well as psychometric properties.

In the present study, the Nordic HBSC research team considered 30 different scales or variables that were related to positive mental health and its determinants (Eriksson, 2017). After a series of meetings, a suitable package of indicators was decided upon by the research team for inclusion in the 2017–2018 HBSC data collection in the five Nordic countries. During this process, an analytic framework was developed for the present research project, some of which are presented, resulting in the articles in this special issue and the present review.

Results

Development of adolescent mental health in five Nordic countries

The overall prevalence of adolescents having **high life satisfaction** has declined in most of the Nordic countries examined (Due et al., 2018). However, in 2002, Norway had the lowest

prevalence of high life satisfaction, but in the 12 years that followed Norway was the only Nordic country to show a positive development with an almost 10% point increase in the prevalence of high life satisfaction. Thus, in 2014, more than 40% of Norwegian adolescents had high life satisfaction, the highest level of all the Nordic countries included in the study.

The trend of **excellent self-rated health** for Nordic adolescents indicates a small overall improvement between 2002 and 2006, but a stable trend in the following periods up until 2014 (Potrebny et al., 2018). Two of the countries (i.e., Denmark and Iceland) show a relatively stable pattern over the 12-year period, while Finland and especially Sweden show a decline in the prevalence of students having excellent self-rated health. The only country to show a positive development in the prevalence of students having excellent self-rated health from 2002 to 2014 is Norway.

The prevalence of two or more **weekly health complaints** showed large differences by country over time and especially in 2014, when Iceland and Sweden showed an almost 10%-point larger prevalence of multiple weekly symptoms (about 35%) than Denmark, Finland and Norway (about 25%). The trend over time showed rising prevalence levels in Iceland and Denmark, a relatively stable level over time in Finland, large changes in Sweden over time with lowest levels in 2006 and 2010. The only country to show a decline by the end of the 12-year period was Norway.

The prevalence of **sleep difficulties** has increased over the 12-year period in Denmark, Iceland, and Finland (Thorsteinsson et al., 2018). In Sweden the prevalence fell from 26% to 21% from 2002 to 2006, but rose by 10% points from 2010 (21%) to 2014 (31%). The only country showing a positive development over the 12-year period was Norway; after an increase in prevalence of sleep difficulties from 2002 to 2010, the prevalence declines in 2014 to 17% the lowest prevalence of sleep difficulties in any of the five Nordic countries.

The prevalence of adolescents finding it **easy to talk to their mother or father or both** has been showing a positive development in all countries from 2002 to 2014 (Arnarsson et al., 2018). The development has been especially positive in the prevalence of communication with fathers, which has improved by around 10% in Denmark, Iceland, Finland, and Norway; thus the three latter countries have caught up with the high prevalence of positive communication with fathers in Sweden. In Denmark, the prevalence of easy communication with fathers is still the lowest (65%).

In the period 2002 to 2014, the level of **school pressure** was highest in Iceland and Finland (Löfstedt et al., 2018). In Denmark, Iceland and Finland, there was an increase in perceived school pressure over the period, whereas prevalence levels were decreasing in Sweden. In Norway, the prevalence level of feeling pressured by schoolwork was stable from 2002 to 2014. The older adolescents (15-year-olds) felt more pressure, and over the 12-year period gender differences increased, so that more girls than boys felt pressured by schoolwork in 2014. In 2002 the prevalence levels of school pressure were similar among boys and girls.

Methodological development

The review of methodological development shows increased efforts within the HBSC project in the different Nordic countries to improve the methodology employed. The HBSC project has been important for the development of the present research collaboration, offering opportunities for Nordic comparison as well as offering high quality options for data collection. However, none of the reviewed measures have been used in more than one Nordic country thus currently limiting any comparative trends analyses on data from the Nordic countries. These studies could be pilot studies, giving indication of usefulness if included in survey research in other countries.

In Denmark, methodological studies have been completed using nine different scales: General self-efficacy based on Schwartz's theoretical contribution (two items); Self-esteem based on Rosenberg's general self-esteem model (three items); Social competence based on the theoretical contribution by Gresham & Elliott (three items); School social capital (trust) based on Putnam's conceptualisation of social capital (three items); Loneliness, a four-item version of the widely used UCLA Loneliness scale; Positive mental health, a seven-item version of the Warwick Edinburgh Mental Well-being Scale; Social and emotional competences (assertiveness, empathy, and collaborative skills) based on theoretical contributions by Gresham & Elliott; Alienation based on the theoretical contribution by Seeman; and Sense of Coherence, Antonovsky's 13 item scale. The results of the methodological studies have been published in a series of papers and dissertations (Madsen et al., 2015; Madsen 2016; Meilstrup et al., 2016; Meilstrup, 2017; Nelausen, 2013; Nielsen, 2015; Nielsen, Koushede et al., 2015; Nielsen, Meilstrup et al., 2015; Nielsen et al., 2016; Rayce, 2013; Rayce et al., 2018).

In Finland, a scale measuring the Health Literacy for School-aged Children (HLSAC) has been developed and validated (Paakkari, Torppa, Kannas & Paakkari, 2016; Paakkari, Torppa, Vilberg, Kannas & Pakkari, 2018; Pakkari et al., 2019). The aim was to develop a brief, multidimensional, theory-based instrument to measure subjective health literacy among school-aged children, which is a resource for positive development. The Finnish HBSC team has published papers on psychosocial school environment (Haapasalo, Välimaa & Kannas, 2010), and emotional health in children with disabilities or chronic conditions (Boyce et al., 2009). Moreover, the Multisource Assessment of Social Competence Scale was developed in Finland and examined with regards to the consistency of the ratings of self, peers, teachers, and parents (Junttila, Voeten, Kaukiainen & Vauras, 2006). However, Finnish research has been mainly risk-oriented and important epidemiological studies have been conducted: "... longitudinal nationwide follow-up through childhood and adolescence shows that mental disorders have many social risk factors which are interlinked. In addition, low education, mental disorders and financial difficulties accumulate in early adulthood. There is a significant intergenerational transmission of disadvantage in a modern welfare society" (Paananen, Ristikari, Merikukka & Gissler, 2013, p.xxx).

The Icelandic team has not published methodological studies, but has papers focusing on related issues such as suicide risk (Arnarsson, Sveinbjornsdottir, Thorsteinsson & Bjarnason 2015), family communication (Bjarnarsson & Arnarsson 2011), ethnic differences in youth well-being (Runarsdottir & Vilhjalmsdottir, 2015), and differences in health and life satisfaction by sexual orientation (Thorsteinsson, Loi, Sveinbjornsdottir & Arnarsson 2017).

The Norwegian HBSC team included indicators on positive mental health and its determinants from 1997–98 and onwards. In the 1997–98 survey they developed an optional package on sense of coherence, which was used by six HBSC countries (Torsheim, Aarø & Wold 2001). The Norwegian HBSC team has published many papers on this area. Examples are a paper on school support and perception of life satisfaction (Danielsen, Samdal, Hetland & Wold, 2009), and another on body image and perceived health (Meland, Haugland & Breidablik, 2007).

The Swedish HBSC team at the Public Health Agency has mainly been working with the national reports, but during the last year an increased emphasis has been on the development of mental health among school-aged children. Hagquist has published on trends in mental health among younger and older adolescents (Hagquist, 2010) and methodological challenges (Hagquist & Andrich, 2004). Other researchers have studied psychosocial fac-

tors in the school (Plenty, Östberg & Modin, 2015) and school demands and psychosomatic health (Sonmark, Godeau, Augustine, Bygren & Modin, 2015).

Selection of measures of positive mental health

The HBSC data collection 2017–2018 includes information on contextual factors or resources (country, community, school, peer, and family), sociodemographic factors (age, gender, family affluence, parental employment, and family structure), health behaviours with specific relevance for positive mental health (sleep, physical activity, and medicine use), psychological resources as well as health, life satisfaction and well-being (Inchley, Currie, Cosma & Samdal, 2018). In addition to these mandatory questions, optional packages have been used. The Nordic researchers decided to use a common package of measures for positive mental health and its determinants in the 2017/28 HBSC data-gathering phase.

Content: Five measurement instruments have been included in the Nordic HBSC data collection. These were selected after considering the gaps in measures of positive mental health and its determinants. Published methodological studies support four of the five measures selected. A fifth study has been conducted but the relevant results have only been presented at an international conference and not peer reviewed yet.

The Warwick Edinburgh Mental Well-being Scale (WEMWBS): This scale intends to include dimensions of well-being and it has been validated and used in different countries (Ng Fat et al., 2016; Stewart-Brown, 2013, 2015; Tennant et al., 2007). The seven-item scale of the SWEMWBS was selected as suitable for use in these age groups. The scale has been used successfully in the Danish Methodological Study (Nielsen et al., 2016). The scale consists of seven items such as “I’ve been feeling optimistic about the future” and “I’ve been dealing with problems well” with response options “Always”, “Most of the time”, “Sometimes”, “Seldom”, and “Never”.

General self-efficacy: This scale consists to two items: “How often do you find a solution to a problem if you try hard enough?” and “How often do you manage to do things that you decide to do?” with the response options “Always”, “Usually”, “Sometimes”, and “Never”. It was based on Schwartzer’s theoretical contribution and this short version has been used in a series of studies (Meilstrup et al., 2016; Nielsen et al., 2016; Meilstrup et al., in press).

Self-esteem: This scale is based on Rosenberg’s general self-esteem model and it consists of three items: “I like myself”, “I am good enough as I am”, and “Others of my age like me” with the response categories: “Strongly agree”, “Agree”, “Neither agree nor disagree”, “Disagree”, and “Strongly disagree”. It has been used in the Danish Methodological Study (Nielsen et al., 2016).

Perceived social integration measured by Feeling of loneliness: One item was selected using the question “Do you ever feel lonely?” with response alternatives “yes, very often”, “yes, quite often”, “yes, sometimes”, and “no”. Loneliness is an important determinant for health development (Madsen, 2016). It has been used extensively also within HBSC (Kuntsche et al., 2004; Madsen et al., 2015; Rayce et al., 2009; Rayce, 2013).

Sense of unity: This is a new scale developed by Norwegian and Spanish researchers Samdal, Moreno, Morgan, Matos, Baban, and Wold (2016). Their conceptualisation of sense of unity is close to the psychological sense of community and the notion of connectedness. It is intended to capture the positive feeling of being part of a larger social structure, which provides a sense of common good as well as fostering good mental health (Larson, 2006). The scale consists of eight items such as “I feel a strong sense of togetherness”, where the respondent has to mark the rating that best applies to them from “Not at all true for me” to “really true for me”. The scale has shown good reliability in a Norwegian study (.89) and

meaningful correlation with indicators of mental health, social support, and school well-being (Samdal et al., 2016).

Analytical strategy: The Nordic HBSC data will first be used for methodological analysis to ensure the quality and relevance for analysing positive mental health. Then descriptive analysis will give starting points for analysis of determinants and modelling of mediators and moderators for different aspects of positive mental health.

Discussion

The aim of the present paper was to examine the development of adolescent mental health, the outcome of methodological studies, and the selection of measures of positive mental health among school-aged children in the Nordic countries.

The analysis of positive mental health (e.g., self-rated health, life satisfaction, multiple health complaints) showed interesting trends when comparing the Nordic countries. Overall, our studies showed negative developments on all four mental health indicators over time in Denmark, Iceland, Finland, and Sweden, while prevalence levels improved for all indicators among Norwegian adolescents over the same time period. Communication with parents has shown positive trends in the same time period across the Nordic countries, while prevalence of feeling pressured by schoolwork has grown in Denmark, Iceland, and Finland, decreased somewhat in Sweden, and shown a stable trend in Norway over the years 2002 to 2014.

An important challenge for future research is to try and understand why the different mental health indicators have developed the way they have over the years from 2002 to 2014. Potential contributing factors to the trends in mental health indicators are migration, the school system, and changes in inequality and poverty. Another challenge is to supplement the current research with measures on positive mental health that are consistent across countries and measures such as on migration.

A second issue concerned methodological developmental efforts in the HBSC project and whether these efforts could assist in the selection of measures to be used in the different Nordic countries and other HBSC countries. The present review assisted in the selection of scales and items that were included in the HBSC data collection 2017–2018. Pilot studies are a requirement for new modules to be included in the HBSC study. Thus, there have been special methodological studies (Madsen et al., 2015; Meilstrup et al., 2016; Nielsen, Koushede et al., 2015; Nielsen et al., 2016; Rayce et al., 2018; Meilstrup et al., 2019), but only in single countries. Moreover, there was no previously used measure of positive mental health from previous data collections available for more than one country.

The third issue concerned the selection of measures of positive mental health. There are many options for measuring positive mental health (Rullesta, Kvissellien & Servan, 2017). The scales that have been designed to measure positive mental health and used in previous studies have often based their indicators on concepts such as resilience, self-esteem, self-efficacy, optimism, life satisfaction, hopefulness, perceptions and judgement about sense of coherence, meaning in life, and social integration (Barry, 2009). A recent systematic review of instruments measuring mental well-being among adolescents found 11 instruments in studies published 1998–2016 that fitted their inclusion criteria, which included at least one item assessing feeling and one item assessing functioning (Rose et al., 2017). WEMWBS was one of the scales that was found to be acceptable for use among adolescents. This is in line with our selection of this scale as a measure to be used in the Nordic HBSC data collection. Moreover, a recent Norwegian study showed that the short version of the WEMWBS

was most suitable for use among Norwegian adolescents (Ringdal et al., 2017). Methodological questions for future research include whether positive mental health can be measured by employing the WEMWBS and to examine the relationships between indicators of subjective health, life satisfaction, multiple health complaints symptoms, and positive mental health measures.

In addition to the WEMWBS, general self-efficacy and self-esteem were included in the 2017–18 HBSC data collection as these have been found to be important psychological concepts in the understanding of positive mental health. Measures of two additional sociological concepts have been selected for researching adolescent mental health: (a) perceived social integration and (b) sense of unity. In a Finnish study, perceived social integration or loneliness has been found to be a major risk factor for health and well-being of school-aged children (Lyyra, Välimaa & Tynjälä, 2018).

These five measures (i.e., self-efficacy, self-esteem, WEMWBS, sense of unity, and loneliness) will be the basis of studies of prevalence among Nordic adolescents answering the following questions: What is the prevalence of each measure of the positive mental health and well-being among school-aged children in the Nordic countries? What is the prevalence of high and low positive mental well-being in boys and girls across different countries?

An important step in the research process is the analysis of determinants and modelling of mediators and moderators for different aspects of positive mental health. The HBSC study has collected data covering a broad range of variables on multiple levels (Eriksson, et al., 2019; Inchley et al., 2018). The Nordic data gives us the opportunity to do analysis on multiple levels: individual, school, and macro-level. At the individual and school level, determinants of the five positive mental health indicators will be analysed with regards to impact and interactions between risk and protective factors at family and peers; as well as examine possible moderators and mediators such as socioeconomic background, self-efficacy and sense of unity. Macro-level associations with positive mental health measures will be analysed in future studies.

The national differences among the Nordic countries will be analysed using additional statistic as per previous HBSC studies. One example is the analysis of gender equality, where linear multilevel regression analyses indicated that adolescents in countries with relatively high levels of gender equality report higher life satisfaction than their peers in countries with lower levels of gender equality (de Looze et al., 2017).

The development of the present research program offers great opportunities for high quality research. Among important challenging macro-level questions are: How do wealth and other defined macro-level factors (e.g., human development) influence positive mental health and well-being? How do macro-level factors interact with individual factors? What kind of contextual factors at the societal and cultural level contribute to explain cross-national differences of subjective health and positive mental health during adolescence? Which are the socio-contextual factors explaining gender mental health inequalities during adolescence in different countries?

The trend analysis presented in the different papers in the present journal issue (Due et al., 2018; Potrebny et al., 2018; Due et al., 2018a; Thorsteinsson et al., 2018; Arnarsson et al., 2018; Löfstedt et al., 2018) can also be extended to include 1985–2018 for most of these indicators. What are the long-term trends (1985–2018) in mental health and well-being in the Nordic countries? Which factors (e.g., changes in social inequality, changes in national indicators of welfare, changes in national school and health policy) can explain the observed trends in mental health and well-being? Which influences may participation rate

in surveys and possible changes in the willing to report mental health issues among adolescents have for assessment of trends in different aspects of mental health?

Conclusion

During the planning procedures for the 2017/2018 HBSC data collection, the process of selecting, translating and piloting the additional indicators of positive mental health was successfully completed. This gave us the opportunity to follow data gathering with quality research on these and other research questions, thus enhancing our understanding of positive mental health and its importance for school-aged children.

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