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Hanne Nissen Bjørnsen

Promoting Adolescent Mental Health

Positive Mental Health Literacy as a Concept and Working Strategy for School Health Services

NTNU
Norwegian University of Science and Technology

Doctoral thesis

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Thesis for the Degree of
Philosophiae Doctor
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“Teach Bravery not Perfection”

Summary

Background: Mental health is an integral component of people's health and wellbeing, and over the last years, adolescent mental health has received considerable attention as an important public health issue. Mental health literacy (MHL) is considered a significant determinant of mental health, with the potential to benefit both individual and public mental health. Research and practice have generally focused on mental ill-health; however, growing evidence shows the long-term benefits of promoting positive mental health. Positive MHL refers to people's understanding of how to obtain and maintain *good* mental health. Health is created within the settings of adolescents' everyday life; thus, schools represent an important arena for promoting adolescent mental health, and school health services are considered central in Norwegian municipalities' public health work. MEST [1] is a universal work and teaching strategy for school health services that aims to promote mental health by improving adolescents' positive MHL and mental wellbeing. The aims of this thesis were to develop a measure assessing positive MHL among adolescents, investigate the relationship between positive MHL and mental wellbeing, and finally, begin the process of evaluating MEST.

Methods: The participants were Norwegian upper secondary school students aged 15-21 years. The data were mainly collected by survey questionnaires, in addition to five focus group discussions (n=29) for the scale development. A pilot study (n=479) was conducted prior to the quantitative data collection at time one, i.e., fall 2016 (T1 n=1888), and the quantitative data collection at time two, i.e., spring 2017 (T2 n=1054), and a cohort (n=357) was followed from T1 to T2. Factor analysis was used for item reduction and assessment of the psychometric properties of the new measure. A linear regression model was used to investigate the relationship between positive MHL and mental wellbeing. Linear treatment effect modeling was used to estimate the average treatment effect of MEST and describe the observed statistical relationship between MEST participation and the levels of positive MHL and mental wellbeing between the MEST and non-MEST participants.

[1] MEST is the name of school health services' working strategy; not an acronym.

Results: The confirmatory factor analysis yielded a satisfactory fit for a 10-item one-factor model referred to as the mental health-promoting knowledge measure, i.e., MHPK-10. Positive MHL was associated with mental well-being in the study population and found to be a significant explanatory variable of mental well-being ($p \leq .01$). Positive MHL was significantly increased among the MEST participants compared to that among the non-MEST participants ($p = .02$). No significant difference was found in mental well-being between the MEST and non-MEST participants ($p = .98$). According to the average treatment effect analyses, MEST resulted in a significant 2.7 % ($p = .03$) average increase in positive MHL in both genders and a 9.7 % ($p = .03$) average increase in mental well-being among the females. No significant treatment effect of MEST was found in mental wellbeing overall ($p = .12$) or among males ($p = .99$).

Conclusions: The MHPK-10 measure of positive MHL is an important contribution to the literature on measuring MHL. Positive MHL has been identified as an important concept in mental health promotion work by school health services where a positive association was established between positive MHL and adolescents' perceived mental health. The results supports positive MHL to be included as an integral part of school health services mental health promotion work. These results further support investments in evaluations of MEST as a potential evidence-based working strategy for school health services' mental health promotion work in Norwegian upper secondary schools.

Sammendrag

Bakgrunn: Psykiske helse hos ungdom har fått stor oppmerksomhet de siste årene som en folkehelseutfordring som bør adresseres. Psykisk helsekunnskap eller mental health literacy (MHL) anses å være en avgjørende faktor for psykisk helse, både på individnivå og i folkehelsearbeid. Forskning og praksis har tradisjonelt fokusert på psykisk uhelse, mens forskningslitteraturen peker på langsiktige fordeler med å fremme *god* psykisk helse. Positiv MHL eller psykisk helsefremmende kompetanse er en del av MHL som til nå har fått lite oppmerksomhet. Psykisk helsefremmende kompetanse angår folks forståelse av og kunnskap om hvordan man bygger og opprettholder *god* psykisk helse. Helse og da også psykisk helse skapes der ungdommene lever sine liv, dermed blir skolen en viktig arena for å fremme ungdoms psykisk helse. Skolehelsetjenesten er en lavterskel og lovpålagt helsetjeneste som er samlokalisert med skolen, og regnes som en sentral aktør i norske kommuners folkehelsearbeid. MEST[2] er en universell arbeids- og undervisningsstrategi for skolehelsetjenesten, som tar sikte på å fremme psykisk helse med målsetning om å påvirke ungdommens psykisk helsefremmende kompetanse, samt opplevd mentalt velvære. Formålet med denne doktorgraden var å utvikle et instrument som måler psykisk helsefremmende kompetanse blant ungdommer; å undersøke forholdet mellom psykisk helsefremmende kompetanse og opplevd mentalt velvære, og til slutt å starte prosessen med å evaluere MEST som arbeidsstrategi for skolehelsetjenesten i videregående skole.

Metoder: Deltakerne i studiet var ungdom i alderen 15-21 år fra fem videregående skoler i Trondheim kommune. Data ble samlet inn ved hjelp av spørreskjema i tillegg til fem fokusgruppediskusjoner (n=29) som ble brukt i utvikling av måleinstrumentet. En pilotstudie (n = 479) ble utført før kvantitativ datasamling høsten 2016 (T1 n = 1888). Datainnsamling to (T2 n = 1054) ble utført våren 2017. En utvalg av ungdommer (n = 357) ble fulgt fra T1 til T2. I skalautvikling ble faktoranalyse brukt til reduksjon av antall spørsmål og vurdering av skalaens psykometriske egenskaper. Multippel lineær regresjon ble brukt for å undersøke forholdet mellom psykisk helsefremmende kompetanse og

[2] MEST er navnet på en arbeidsstrategi utviklet for skolehelsetjenesten, ikke et akronym.

mentalt velvære. Lineær behandlingseffektmodellering ble brukt til å estimere gjennomsnittlig behandlingseffekt av MEST; det observerte statistiske forholdet mellom to grupper elever der en gruppe har deltatt i MEST og en gruppe ikke har deltatt i MEST når det gjelder skårer på psykisk helsefremmende kompetanse og mentalt velvære.

Resultater: Faktoranalysen ga støtte for et valid og reliabelt endimensjonalt instrument for måling av psykisk helsefremmende kompetanse blant ungdom; MHPK-10. Psykisk helsefremmende kompetanse ble funnet å være en signifikant forklarende variabel av opplevd mentalt velvære blant ungdommene ($p = \leq.01$). Psykisk helsefremmende kompetanse økte signifikant mer over et skoleår blant MEST-deltakere sammenlignet med ikke-MEST-deltakere ($p = .02$). Ingen signifikant endring ble funnet i opplevd mentalt velvære mellom MEST og ikke MEST-deltakere ($p = .98$). Ifølge gjennomsnittlige behandlingseffektanalyser ga MEST en gjennomsnittlig økning på 2,7 % ($p = .03$) i psykisk helsefremmende kompetanse for begge kjønn, og en gjennomsnittlig økning i mental velvære blant jenter på 9,7% ($p = .03$). Ingen signifikant behandlingseffekt av MEST ble funnet i mental velvære totalt ($p = .12$) eller blant gutter ($p = .99$).

Konklusjon: Måleinstrumentet MHPK-10 for psykisk helsefremmende kompetanse er et viktig bidrag i litteraturen om måling av MHL. Psykisk helsefremmende kompetanse har blitt identifisert som viktig i skolehelsetjenestens arbeid, og avhandlingen støtter psykisk helsefremmende kompetanse som en integrert del av skolehelsetjenestens psykisk helsefremmende arbeid. Psykisk helsefremmende kompetanse har vist seg å ha en sammenheng med opplevd psykisk helse hos ungdom og resultatene støtter ytterlige investeringer i videre evalueringer av MEST som en kunnskapsbasert arbeids- og undervisningsstrategi for skolehelsetjenesten i videregående skole.

Table of contents

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Hanne Nissen Bjørnsen

Abbreviations

ATE	Average Treatment Effect
BFT	Barne og Familietjenesten [Children and Family Services]
CI	Confidence interval
BPNT	Basic Psychological Needs Theory
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
GRR	General Resistant Resources
HL	Health Literacy
MEST	MEST til ungdom [name of school health services' working strategy, short for "coping" and meaning "most" for adolescents]
MHL	Mental Health Literacy
PMeHL	Positive Mental Health Literacy (same as positive MHL)
Positive MHL	Positive Mental Health Literacy (same as PMeHL)
PCA	Principal Component Analysis
PYD	Positive Youth Development
REK	Regional Committee for Medical and Health research Ethics
SoC	Sense of Coherence
T1	Time 1
T2	Time 2
WHO	World Health Organization
Ω	Omega
α	Alpha

List of papers

This PhD-thesis is based on the three papers listed below. The papers will be referred to by their Roman numerals throughout the thesis.

Paper I

Bjørnsen, H. N., Eilertsen, M. E. B., Ringdal, R., Espnes, G. A., & Moksnes, U. K. (2017). Positive mental health literacy: development and validation of a measure among Norwegian adolescents. *BMC Public Health, 17*(1), 717. doi:10.1186/s12889-017-4733-6

Paper II

Bjørnsen, H. N., Espnes, G. A., Eilertsen, M. B., Ringdal, R., Moksnes, U. K. (2017). The Relationship Between Positive Mental Health Literacy and Mental Well-Being Among Adolescents: Implications for School Health Services. *Journal of School Nursing*, 1059840517732125. doi:10.1177/1059840517732125

Paper III

Bjørnsen, H. N., Ringdal, R., Espnes, G. A., Eilertsen, M. B., & Moksnes, U. K. (2018). Exploring MEST: a new universal teaching strategy for school health services to promote positive mental health literacy and mental wellbeing among Norwegian adolescents. *BMC Health Services Research, 18*(1), 1001. doi:10.1186/s12913-018-3829-8

1. INTRODUCTION

Mental health is an integral component of people's health and wellbeing, and recently, adolescent mental health has received considerable attention as an important public health issue (Adelman & Taylor, 2006; Norwegian Institute of Public Health, 2014; Patton et al., 2018; WHO, 2013). Adolescence is an important period in one's lifespan, and growing evidence shows the long-term benefits of promoting positive mental health; however, research and practice have generally focused on mental health problems, disorders and their treatment (Stengård & Appelqvist-Schmidlechner, 2010). In the recent literature, mental health literacy (MHL) has been recognized as an important factor in promoting youth mental health with potential to benefit both individual and public mental health (Kutcher, Bagnell, & Wei, 2015; Wei, McGrath, Hayden, & Kutcher, 2015). MHL consists of four components related to the knowledge and abilities necessary to benefit mental health (Kutcher, Wei, Costa, Gusmao, Skokauskas, & Sourander, 2016). Component one, which is central for health promotion, focuses on *good* mental health and, in this thesis, is referred to as positive MHL. Positive MHL refers to knowledge regarding and ability to obtain and maintain *good* mental health and is complementary to the following three consecutive components of MHL: understanding mental disorders, reducing stigma and understanding treatment and self-help strategies (Kutcher, Wei, & Coniglio, 2016). Few, if any, studies have addressed the full concept of MHL (Kutcher, Wei, Costa, et al., 2016), and no studies have addressed or measured the component of positive MHL to date.

This thesis was conducted as a part of a larger research project titled "Health Promotion – Worthwhile? Reorienting community health care services", which is funded by the Norwegian Research Council. This thesis is based on a collaboration with school health services in Trondheim municipality, where positive MHL and mental wellbeing have been the main foci of a mental health promoting working strategy developed by school health services in 2014, called MEST. MEST has not been previously described or evaluated.

Health is achieved where adolescents live their everyday life (WHO, 1986); thus, schools have been recognized as an important context for promoting mental health among adolescents, and a whole school approach is considered necessary for successful mental

health promotion (O'Reilly, Svirydzenka, Adams, & Dogra, 2018; Weare & Nind, 2011). In Norway, school health services are central in municipalities' public health work; this work represents a school-based health service with a statutory focus on health promotion and disease prevention (Regulations on health centers and school health services 2018; Health and care services act 2011; National professional guidelines for school health services 2017) and, thus, is a vital part of a well-functioning whole school approach for mental health promotion.

Grounded in a collaboration with MEST, the overall aim of this work was to study positive MHL as a concept and working strategy for school health services engaging in mental health promoting work in upper secondary schools. The specific aims of this thesis were to develop a measure assessing positive MHL among adolescents and test the psychometric properties of this measure (paper I), to investigate the relationship between positive MHL and mental wellbeing and discuss the results' implications for school health services (paper II), and, finally, to start the process of evaluating MEST and provide a foundation for future investments in evaluations of MEST (paper III).

2. BACKGROUND

2.1 Adolescence

Adolescence is an important and critical transitional period in life associated with challenges and opportunities for growth and development (Mulye et al., 2009; WHO, 2017). A foundation for various health behaviors is established, yielding great potential for health promotion and public health interventions (Paakkari, Torppa, Kannas, & Paakkari, 2016; Patton & Viner, 2007). Several definitions of adolescence exist, and in this thesis, adolescence is defined as the period of life that starts with the biological, hormonal, and physical changes of puberty and ends at the age at which an individual attains a stable, independent role in society (Blakemore & Mills, 2014). This definition highlights the complexity of adolescence. The starting point is associated with major physical and biological changes, and the endpoint depicts high expectations regarding the outcome of the changes occurring during adolescence. Adolescence represents a time in life characterized by increased demands for learning new knowledge and skills, managing affect, and developing relationships and social behavior while considering long-term goals and consequences (Steinberg, 2005). Furthermore, adolescence is a phase of transitions in life during which an independent identity is developing, educational and vocational decisions are made, and lifestyle choices and the formation of interpersonal relationships are important (Stengård & Appelqvist-Schmidlechner, 2010). Thus, there are increasing demands and expectations, and adolescents are expected to acquire knowledge and abilities that are important for eventually assuming adult roles in society (WHO, 2018). This unique and demanding state of life not only involves challenges and risks of maldevelopment and mental health problems but also represents a window of opportunities for health education and improving health; thus, adolescents constitute an important population in the public health perspective (Mulye et al., 2009).

Studies have found that adolescence occupies a greater proportion of the life course with greater relevance for human development than previously thought and that over the last generation, adolescence has evolved to encompass a longer period of time (Patton & Viner, 2007). The age range between 10-19 years has commonly been used to describe the age of adolescents (Canadian Paediatric Society, 2003); however, recently,

the age range of 10-24 years has been suggested to be a more appropriate age span reflecting adolescent growth and common understandings of this life phase in modern societies (Sawyer, Azzopardi, Wickremarathne, & Patton, 2018). Extended adolescence creates an opportunity for current and future adolescent generations to acquire greater assets, knowledge and capabilities before entering the adult phase of life. Because adolescents are in this developmental transition and are particularly sensitive to influences from their environments, comprehensive investments in adolescent health and wellbeing should be given a high priority (Sheehan et al., 2017).

2.2 Positive youth development

Positive youth development (PYD) is an emerging conceptual framework for investment in the adolescent population (Masten, 2014; Catalano, Berglund, Ryan, Lonczak, & Hawkins, 1998). PYD promotes a shift from a problem and risk factor focus preventing single negative outcomes to a positive approach that builds upon adolescents' personal and environmental strengths and considers young people resources while acknowledging heterogeneity and variation in development (Masten, 2014). Previous research indicates that a large proportion of adolescents demonstrate healthy development while building upon personal and environmental strengths even if they possess risk factors for negative outcomes (Travis & Leech, 2014). PYD directed the focus of this thesis to *good* mental health as follows: the focus is on the enhancement of positive qualities and building good mental health instead of on repairing weaknesses and mental ill-health. Previous research has yielded results indicating that targeting the positive aspects of mental health and mental wellbeing leads to the potential to optimize adolescent development into healthy adulthood (Masten, 2014; Clonan, Chafouleas, McDougal, & Riley-Tillman, 2003).

2.3 Salutogenesis

This thesis focuses on the factors that promote *good* mental health and is, thus, grounded in the theoretical framework of salutogenesis. The term salutogenesis refers to the origin of health and was described by the Israeli sociologist Aaron Antonovsky to constitute activities that enhance or promote our health (Antonovsky, 1987; Lindström & Eriksson, 2010) as a complementary perspective to the pathogenic perspective focusing on the risk of disease. The theory seeks to explain "What creates health?" and, as in this thesis,

"What leads to mental health among adolescents?" instead of "What leads to mental ill-health and disorders?" According to salutogenic theory, considering health as a state along an ease/disease continuum is fundamental, and this theory focuses on the movement of people toward the healthy end of the continuum regardless of their present or previous states. Salutogenesis seeks to explain how factors promoting health differ from factors modifying the risk of disease and is consistent with the broad academic movement toward a positive perspective of human life (Mittelmark et.al., 2017), e.g., the conceptual framework of PYD and health promotion. Antonovsky formulated the concepts of Sense of Coherence (SoC) and General Resistance Resources (GRR) to explain how health is achieved based on salutogenic logic (Antonovsky, 1996; Eriksson & Lindstrom, 2007). In recent research, other concepts, such as resilience, coping, thriving, and quality of life, are included in salutogenic theory and described under the salutogenic umbrella, which consists of concepts important for health and wellbeing (Mittelmark et.al., 2017). Consistent with the salutogenic perspective, evidence suggests that learning to build good mental health predicts better health outcomes than focusing on preventing mental disorders, and this perspective applies at both the individual and population level of health promotion (Kusan, 2013). Salutogenesis is the origin of health promotion and one of the strongest theories of health promotion currently used as a theoretical basis for public health work (Lindstrom & Eriksson, 2006; Lindstrom & Eriksson, 2010).

2.4 Health, mental health and wellbeing

The World Health Organization (WHO) states there is no health without mental health, and mental health is clearly an integral part of the WHO's definition since 1946; health is defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, n.d., c). Health is a complex and multidimensional concept that includes different interrelated aspects, such as social, spiritual, mental and physical health and wellbeing, and individuals can feel healthy both with and without an illness (WHO, n.d., c). The scope of this thesis is mental health; however, the other dimensions of health are fully acknowledged to also be highly important for an understanding of the comprehensive picture of adolescent mental health.

Mental health includes our emotional, spiritual and social wellbeing and affects how we think, feel, react and act; mental health is defined by the World health organization (WHO, 2014) as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to her or his community" (WHO, 2014). Therefore, mental health is the foundation of wellbeing and functioning for both individuals and communities and is not merely the absence of mental disorders or mental ill-health (WHO, 2005). In accordance with the salutogenic view, mental health is considered a continuum that applies to everyone and is not static; health changes and can actively be improved regardless of where on the continuum an individual or population is situated at any given time.

2.4.1 Mental wellbeing

Mental wellbeing is an important concept that is an integral part of mental health and public health work. Mental wellbeing focuses on the positive aspects of mental health rather than only the absence of mental illness (WHO, 2005). Mental wellbeing is not considered a state that is either present or absent, is considered a part of the mental health continuum and should be interpreted within the sociocultural context of adolescents. Since mental wellbeing is often considered a highly individual matter, there is no universally accepted definition of the concept (WHO, n.d., b). However, there are known commonalities important for mental wellbeing, and in this thesis, Clarke et al.'s following definition is fundamental for the understanding of mental wellbeing: "a positive and sustainable mental state that allows individuals to thrive and flourish" (Clarke et al., 2011). Mental wellbeing may include both feelings and functioning (Taggart, 2015), and the hedonic and eudaimonic perspectives are considered leading theoretical approaches to mental wellbeing (Ringdal, Bradley Eilertsen, Bjornsen, Espnes, & Moksnes, 2017). Happiness is the focus of the hedonic perspective, while the eudaimonic perspective focuses on functioning (Ryan & Deci, 2001). Notably, a fully lived life includes being unhappy, sad, angry and unwell, and people with good mental health experiencing mental wellbeing often also experience these feelings, which are necessary and normal (Galderisi, Heinz, Kastrup, Beezhold, & Sartorius, 2015).

Some common factors are known to be important for or a threat to mental wellbeing in a population, and these factors were considered as covariates in this thesis. There is consensus in the literature that *loneliness* is harmful to health; more specifically, a significant negative relationship has been reported between loneliness and wellbeing among adolescents (Shaheen, Jahan, & Shaheen, 2014). *Stress* is considered a normal part of life, and the WHO defines mental wellbeing as the ability to cope with normal life stressors (WHO, n.d., b); however, stress is also considered a central threat to adolescent wellbeing (Anuradha, Yagnik, & Vibha Sharma, 2012; Grant et al., 2003), and adolescents can experience various levels of stress ranging from normative stressors as a part of daily life to severe nonnormative stressors (Anuradha et al., 2012). According to the WHO and previous research, *health literacy* is key for improving health outcomes, reportedly improves health and mental wellbeing and is a fundamental component of wellbeing in a modern society (Sorensen et al., 2012; World Health Organization Regional Office for Europe, 2013). Even though mental wellbeing is not merely the absence of mental disorders, *anxiety* and *depression* are commonly considered to influence wellbeing; mental wellbeing is an important aspect of mental health, and anxiety and depression constitute the core of internalizing difficulties observed among adolescents (Sletten & Bakken, 2016).

2.4.2 Adolescent mental health

Adolescent health in high-income countries, such as Norway, is generally good; however, there are important health challenges to address; obesity, physical inactivity, substance abuse and mental health problems account for the greatest proportion of health problems (Patton et al., 2018). Mental health problems account for a large and growing proportion of ill-health among European adolescents and are considered an important threat to the wellbeing of adolescent populations (Stengård & Appelqvist-Schmidlechner, 2010).

Worldwide, 10-20 % of children and adolescents are reported to experience mental disorders (WHO, 2017). In Norway, it is estimated that at any given time, 15-20 % of children and adolescents aged between three and 18 years have reduced functioning due to symptoms of mental disorders (Norwegian Institute of Public Health, 2014). Mental health problems in the adolescent population have recently received considerable

attention as an important public health issue that needs to be addressed, and studies have reported that adolescent mental health problems appear to have reach historic all-time highs in both Norway and other developed countries (Adelman & Taylor, 2006; Norwegian Institute of Public Health, 2014; Patton et al., 2018; Stengård & Appelqvist-Schmidlechner, 2010; WHO, 2013). Ongoing discussions in the literature speculate whether these historic high rates represent a true increase or primarily an expression of the increased attention to and openness about mental health problems and/or a lower threshold for reporting mental problems and considering mental health symptoms problematic (Bor, Dean, Najman, & Hayatbakhsh, 2014; Sletten & Bakken, 2016; Thapar, Collishaw, Pine, & Thapar, 2012; von Soest & Wichstrom, 2014).

A recent literature review conducted by Norwegian researchers concludes that a significant increase in mental health problems among adolescents, especially among girls, has occurred over the last three decades (Sletten & Bakken, 2016). In addition, six trend studies conducted in Nordic countries documented an increase in mental-ill health. Two of these studies found no change (Sourander et al., 2012; Wangby, Magnusson, & Stattin, 2005), while the other four studies found a significant increase in mental ill-health among adolescents (Hagquist, 2010; Henriksen, Nielsen, & Bilenberg, 2012; Sigfusdottir, Asgeirsdottir, Sigurdsson, & Gudjonsson, 2008; Torikka et al., 2014). Furthermore, the Norwegian Institute of Public Health recently reported that the proportion of girls aged between 15 and 20 years diagnosed with mental illness has increased by approximately 40 % over the last five years from 15 % in 1998 to 25 % in 2015 (Reneflot et al., 2018). This finding is consistent with the recent increased attention paid to adolescent mental health problems. It has been suggested that among boys, mental health problems have likely remained stable or slightly decreased over the last years (Sletten & Bakken, 2016). However, a 2018 report based on a study involving approximately 25,000 adolescents from Oslo, Norway describes an increase in mental health problems among boys (Bakken, 2018). Notably, the numbers presented by the Norwegian Institute of Public Health are based on population studies conducted in Norway using diagnostic criteria for mental disorders (e.g., ICD-10). Furthermore, the statistical analysis performed in Norway's population study "health and living conditions survey" rely on symptom measures, such as Hopkins-Symptoms Checklist's cut-off values, to determine the

presence of mental disorders. Using these diagnostic criteria and cut of-values, the estimated proportion of adolescents experiencing mental ill-health is potentially higher than the number of clinically diagnosed mental disorders reported in many studies. Notably, better population studies are needed to estimate the burden of disease of mental health disorders among Norwegian children and adolescents (Reneflot et al., 2018).

Because approximately one of five Norwegian adolescents experience mental ill-health affecting their daily functioning and these numbers are increasing, mental health has emerged as a sensible area of focus in public health. A large and growing body of literature addresses mental ill-health, mental disorders and mental health issues in the adolescent population. However, less focus is found in the literature on good mental health and mental health promotion (Clarke et al., 2011).

2.5 Mental health literacy

Mental health literacy (MHL) is a relatively new concept and an emerging area of research in the field of health promotion. The construct of MHL originated from the domain of health literacy, and several definitions and models of health literacy exist (Kutcher, Wei, & Coniglio, 2016; Nutbeam, 2000; Sorensen et al., 2012). Health literacy is an evolving concept introduced in the early 1970s that has been increasingly used in both policy documents and scientific papers since 2000 (Ringsberg, Olander, Tillgren, Thualagant, & Trollvik, 2018). Health literacy is emphasized as an important social determinant of equity in health and is overall and broadly understood as the ability to make sound health decisions in the context of everyday life (Kickbusch, 2008; Ringsberg et al., 2018). In this thesis, MHL is considered a distinct component originating from health literacy that must be understood in the context of health literacy but studied separately. The term MHL was coined in the nineties in Australia to draw attention to the following neglected area: knowledge and beliefs regarding mental disorders (Jorm et al., 1997). Subsequently, MHL has evolved and is currently considered a composite term expanded from encompassing merely knowledge about mental disorders to a more comprehensive understanding of the knowledge and abilities necessary to improve one's or others' mental health and is often used to describe the outcomes of mental health education (Jorm, 2012). MHL has been acknowledged as essential for effectively

addressing youth mental health (Kutcher, Wei, Costa, et al., 2016). A recent definition of MHL outlined the following four key components:

"(1) Understanding how to obtain and maintain good mental health; (2) understanding mental disorders and their treatments; (3) decreasing stigma related to mental disorders; and (4) enhancing help-seeking efficacy (knowing when, where, and how to obtain good mental health care and developing competencies needed for self-care)"

(Kutcher, Wei, Costa, et al., 2016 p.567)

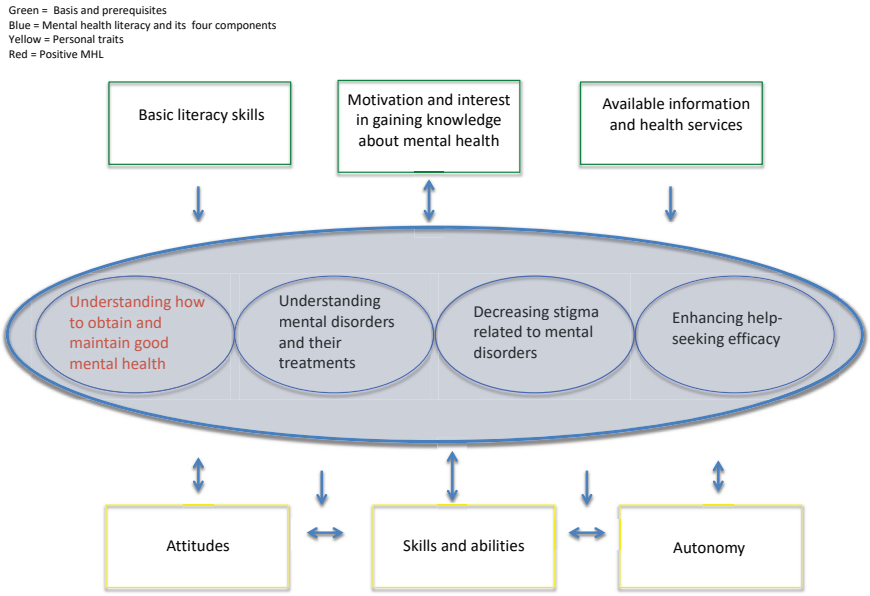
Kutcher, Wei, Costa, et al.,'s (2016) definition evolves Jorm's (1997) concept of MHL as merely knowledge of mental disorders and is consistent with the WHO's definition of mental health as a continuum involving both flourishing good mental health and mental ill-health and disorders (WHO, 2014).

Adolescents constitute a target population for MHL promotion (Broder et al., 2017), and MHL has shown to benefit both individual and public mental health (Kutcher et al., 2015; Wei et al., 2015). Knowledge is an indisputable element of MHL and is both an important part of the construct and an important outcome in assessing mental health promoting education activities (Kutcher et al., 2015; Kutcher, Wei, Gilberds, et al., 2016; WHO Regional Office for Europe, 2013). In the research literature, MHL is emphasized as an asset for mental health that can be strengthened through educational initiatives (Kutcher, Wei, & Coniglio, 2016). Research and practice related to MHL has generally focused on mental health problems, disorders and their treatment rather than positive mental health (Stengård & Appelqvist-Schmidlechner, 2010).

2.5.1 Positive mental health literacy

Throughout the work in this thesis, "positive MHL" (PMeHL in paper II) emerged as a term used to describe the first component of Kutcher et al.'s conceptualization of MHL as follows: *"(1) Understanding how to obtain and maintain good mental health".* Positive MHL does not exist in a vacuum; positive MHL interacts with other factors, other components of MHL, personality traits, literacy skills, availability of information and personal motivation. To depict and situate positive MHL within the broader concept of MHL, a model was developed to contextualize MHL for the purpose of this thesis (Figure 1).

Figure 1: Model of MHL



2.5.2 Assessment of mental health literacy

Despite the understanding of MHL as an increasingly important concept in the research literature and the field of public health and health promotion, quantitative research investigating the assessment of MHL has been limited, and substantial limitations in the current ability to measure MHL have been identified (O'Connor, Casey, & Clough, 2014). Several different measures for assessing MHL have been developed since the original vignette measure developed by Jorm et al. in 1997 (Jorm et al., 1997). Since 1997, several other measures have been developed (e.g., (Jung, von Sternberg, & Davis, 2016; Stan Kutcher et al., 2015; Campos, Dias, Palha, Duarte, & Veiga, 2016; O'Connor & Casey, 2015)); however, considerable limitations exist in the existing measures (O'Connor & Casey, 2015). Most available instruments assess either specific dimensions of MHL (e.g., knowledge of mental disorders, stigma, and help-seeking strategies) or specific mental health problems or diagnoses (e.g., schizophrenia, anxiety, and depression). Considering the updated understanding and definition of the construct of MHL and the limitations of existing measures, there is a need for new instruments to

provide a more up-to-date assessment of MHL (Dias, Campos, Almeida, & Palha, 2018). A gap between the current Kutcher et al. conceptualization of MHL and available measures of MHL was identified during the initial phase of this thesis; no consistent measure of MHL measuring all four components or a measure of positive MHL, i.e., understanding how to obtain and maintain good mental health, were found (Bjornsen, Eilertsen, Ringdal, Espnes, & Moksnes, 2017). Assessing MHL is important for identifying knowledge gaps related to mental health in the adolescent population, informing the development of mental health promoting interventions, and evaluating these interventions (Campos et al., 2016).

To measure positive MHL, it is necessary to ground positive MHL in a theory based on theoretically known factors important for good mental health and mental wellbeing. The basic psychological needs theory (BPNT) is a subtheory of the human motivation macrotheory known as Self-Determination Theory (Deci & Ryan, 2000). The BPNT asserts that autonomy, competence and relatedness are important factors predicting individuals' mental wellbeing (Deci & Vansteenkiste, 2004). Autonomy refers to individuals' abilities to make choices based on their own will (Deci & Ryan, 2000). Competence refers to the ability to cope with normal challenges in life and experience mastery, efficacy and skillfulness rather than incompetence (Deci & Ryan, 2000). Relatedness refers to the importance of social support or feeling significant and connected to other people (Deci & Ryan, 2000). All three components are important for the understanding of mental wellbeing in adolescence. Hence, autonomy, competence and relatedness were used to theoretically understand what positive MHL encompasses and develop a measure. The BPNT was used to ground positive MHL in dimensions theoretically known to be important for good mental health; furthermore, the BPNT has been identified as an applicable conceptual framework for studying health-related behavior (Ng et al., 2012).

2.6 Mental health promotion and public health

Similar to health promotion, mental health promotion involves actions that support people in adopting and maintaining healthy lifestyles that create living conditions and environments conducive to good health (WHO, 2016). Mental health promotion is

considered a resource-focused approach to mental health aiming to improve mental health by fostering individual competencies and psychological strengths and using community resources (Kobau et al., 2011). The prevention of mental disorders and promotion of mental health are distinct but overlapping strategies; prevention of mental ill-health is seemingly a consequence of successful mental health promotion. Focusing on mental health promotion rather than mental illness prevention has been shown to be effective in promoting child and adolescent mental health in several studies (O'Mara & Lind, 2013). The promotion of mental health is an important public health responsibility, and recently and consistently with the Ottawa charter (WHO, 1986) and the theoretical framework of salutogenesis and PYD, a shift from solely focusing on disease prevention to also including a focus on mental health promotion has been observed in public health strategies (Kobau et al., 2011).

Public health is defined as "the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society" (Nutbeam, 1998). Overall, public health is concerned with promoting and protecting the health of populations and the communities in which people live, learn, work and play. These populations can be as small as a school's student population or as large as an entire country or world region. Norwegian white papers on public health state that the main goals of the public health work in Norway are to achieve a population experiencing better living conditions, create a society promoting health among Norwegian populations and reduce social inequalities in health, i.e., health promotion (Norwegian Ministry of Health and Care Services, 2013, 2015).

2.6.1 School health services and mental health promotion

School health services, representing the only primary health care services in Norway with a health promotion and disease prevention mission statement (Norwegian Directorate of Health, 2017). School health services are considered central actors in Norwegian municipalities' public health work, and school nurses are an essential profession in school health services. School nursing represents the only[3] health care profession with

[3] School nurses include primary care nurses for children aged 0-5 years (the Norwegian profession "Helsesykepleier")

continuing education in health promotion and disease prevention among children and adolescents. Regulations related to school health services work states that the purpose of school health services is to promote health, prevent disease, promote social and environmental conditions, promote equity in health and prevent, detect and stop violence, abuse and neglect (Regulations on health centers and school health services, 2018). School nurses are considered important public health practitioners that are uniquely positioned and bound by professional regulations to help promote the mental health of young people (Adelman & Taylor, 2006; Regulations on health centers and school health services, 2018). In several studies, schools are identified as an optimal context for promoting adolescent mental health (O'Connor, Dyson, Cowdell, & Watson, 2018). Most Norwegian adolescents spend a large portion of their day at school, and one approach that is found to be particularly effective in promoting health in this context is the whole school approach (O'Mara & Lind, 2013; O'Reilly et al., 2018). The whole-school approach is understood to include the whole school environment of school staff, students and partners connected to school, and as a collective, collaborative actions aiming to improve wellbeing and student learning. School health services should play an important role in the whole school approach for the young student population by addressing diverse health problems (American Nurses Association and National Association of School Nurses, 2015; Regulations on health centers and school health services, 2018). Thus, school health services are an essential, albeit often omitted, part of the whole school approach. Traditionally, the open door policy has been the main service offered at upper secondary schools, and the universal public health responsibilities of school nurses have been somewhat unclear and ambiguous. However, the new national professional guidelines for school health services reaffirm the following content grounded in the Norwegian act on health and health care: school health services represent a health promoting and disease preventing service not a treatment focused service (Health and care services act, 2011, § 3-2; Norwegian Directorate of Health, 2017; Regulations on health centers and school health services, 2018). Even though mental health promotion in the adolescent population is increasingly targeted by several different school-based programs, the evidence base of the universal mental health promoting working strategies used by school health services is found to be scarce by the author.

2.6.2 School-based mental health promotion programs in Norway

Throughout the last decade, a wide range of mental health programs and interventions have been implemented and tested in schools with varying levels of success both internationally (O'Reilly et al., 2018; Weare & Nind, 2011) and in Norway (RKBU (North), 2018). In Norway, the Regional Centre for Child and Youth Mental Health and Child Welfare (RKBU North) has conducted evaluations of mental health promotion interventions among children and adolescents on behalf of the Norwegian Directory of Health. The effects of the following six interventions targeting mental health promotion in schools have been documented to be sufficient (documented evidence level ≥3 on a 1 - 4 scale): "Respekt", "VIP", "Venn1", "Alfa", "Zippys venner", "Olweus", and "PALS" (RKBU (North), 2018). However, school health services' role, responsibilities and working strategies is not focus in these interventions and programs. Research investigating school-based MHL interventions is still scarce, and there is insufficient evidence to claim that school mental health literacy programs have a positive impact on knowledge improvement, attitudinal change or help-seeking behavior (Wei, Hayden, Kutcher, Zygmunt, & McGrath, 2013). Furthermore, there is a declared need for research investigating the effectiveness of school-based MHL programs (Wei et al., 2013). In Norway, a single study found indications of the positive impacts of the MHL program "Alle har en psykisk helse" (mental health for everyone); however, the documentation of the effect is considered insufficient (documented evidence level 2 on a 1 - 4 scale where ≥3 is considered sufficient). "Alle har en psykisk helse" (mental health for everyone) is designed to include the promotion of mental health literacy (MHL) among adolescents (RKBU (North), 2018). "Alle har en psykisk helse" (mental health for everyone) has shown a positive impact on adolescents' MHL by increasing the recognition of mental disorders, prejudice and knowledge about where to seek help (Skre et al., 2013). Knowledge regarding how to obtain and maintain good mental health, i.e., positive MHL, was not included in the study and has not been found to be addressed in any studies addressing MHL.

2.7 MEST: a universal working strategy for school health services

MEST is a universal work and teaching strategy for school health services that aims to promote mental health among the adolescent population. The core aim of MEST is to increase adolescents' positive mental health literacy and impact resources for mental wellbeing by focusing on adolescents' assets and promoting personal and contextual factors necessary for *good* mental health. MEST is a short version of the Norwegian word for "coping", i.e., the full name is "MEST til ungdom" (More for adolescents). MEST was developed in 2014 by school nurses in the municipality of Trondheim, BFT Heimdal, as an interdisciplinary mental health and wellbeing promoting working strategy for school health services. MEST focuses on promoting good mental health by concentrating on adolescents' capacities to make sound mental health decisions in the context of their everyday lives (i.e., mental health literacy) and manage normal emotional variations, normative stress and pressure. Through MEST, school health services offer open school seminars, classroom seminars and smaller group discussions in which adolescent students participate voluntarily. The seminar topics are determined based on the results of an anonymous digital survey answered by students at the beginning of each school year. The survey includes questions regarding school satisfaction, personal and social/contextual recourses for health, and knowledge of school health services and items asking about the mental health-related areas the adolescents wish to learn more about. Then, school health services deliver targeted seminars and discussion groups to students based on the survey results throughout the following school year. The seminar topics may include stress management, relaxation techniques, normal emotional variations, sleep hygiene, body image, self-esteem, and autonomy, e.g., making decisions based on one's own will and recognizing personal limits.

Even though the seminars may differ, they are based on the framework guided by MEST as follows: 1) introduction providing a theoretical understanding of the topic of the seminar, 2) providing practical examples with which adolescents can identify, and 3) providing the adolescents with at least one specific and useful tool related to the subject of the seminar. MEST recommends for school nurses and physical therapists to work closely together in planning and implementing these activities and including other occupational groups as appropriate.

3. AIMS

The aims of this thesis were to develop a measure of positive MHL and test the psychometric properties of the measure, explore the relationship between positive MHL and mental wellbeing, and establish a foundation for future decisions regarding the evaluation of school health services' new working strategy "MEST". These aims were achieved by conducting studies with the following aims:

Paper I

The aim of paper I was to develop and validate an instrument measuring adolescents' knowledge of how to obtain and maintain good mental health (positive MHL) and evaluate the psychometric properties of the new instrument. More specifically, the aim was to evaluate the factor structure, internal and construct validity, and test-retest reliability of the instrument.

Paper II

The aim of paper II was to investigate the relationship between positive MHL and mental wellbeing and then discuss the relationship's implications for school health services' mental health education among adolescents.

Paper III

The aim of paper III was to investigate the average mean group differences and the average treatment effect (ATE) differences in positive MHL and mental wellbeing between adolescents who participated in MEST and adolescents who did not participate in MEST.

4. MATERIAL AND METHODS

This thesis is mainly based on quantitative data. The author of the thesis and fellow PhD colleague Regine Ringdal collected all data used in this thesis in 2016/2017. A pilot study was conducted in the spring of 2016 to pilot the questionnaire as a part of the instrument development process (paper I). For the main survey, the data were collected at two time points using a study specific questionnaire (appendix A in Norwegian) at the beginning and end of the 2016/2017 school year (Time 1 (T1): September 2017 and Time 2 (T2): April-June 2017). MEST was offered at the schools between the data collection time points (T1 and T2). The data obtained at T1 were used as cross-sectional data in papers I and II. A smaller subset of adolescents was matched and followed from T1 to T2 to generate longitudinal data for the 361 adolescents included in paper III. In addition, five focus group discussions were conducted with adolescents during the winter of 2015/2016 as a part of the scale development (paper I) and for the preparation of and inspiration for compiling the questionnaire. For information regarding the timeline leading to T2 and the phases of the development of the measure, refer to Figure 1 in paper I (Bjornsen, Eilertsen, et al., 2017).

4.1 Participants and Procedures

The quantitative data were collected by a questionnaire consisting of validated and primary recognized scales for use in the adolescent population. The adolescents who participated in the main quantitative study were recruited from five upper-secondary schools in Trondheim municipality and were aged 15-21 years. The five schools were asked to participate because their school health services offered MEST at the time of recruitment for the study. The schools also offer various health promotion activities, such as a public health day, an adolescent health day and the "VIP" program, throughout the school year as a part of the regular operations of Norwegian upper secondary schools. The five schools received an invitation sent by e-mail to the school's principal. All five principals agreed to allow data collection for the current project at their school, allowing the teachers to administer the questionnaire to students during one 45-minute session of the teachers' choice. The teachers were encouraged to administer the questionnaire by their principal; however, each teacher decided whether to administer the questionnaire.

Thus, the students of teachers who decided to not administer the questionnaire were not given the opportunity to participate in the study. The flow of participants in T1 of the quantitative study is depicted in figure 2, paper I (Bjornsen, Eilertsen, et al., 2017). Three of the five schools that participated in the quantitative study also participated in focus group discussions. In addition, a sixth school participated in one focus group discussion, MEST was not offered at this school.

The six schools represent 60 % of upper secondary schools in the school district of Trondheim municipality where we find the city of Trondheim, the third largest city in Norway. The sample consists of five public schools and one private school with a Christian profile. The schools range in size from the largest school in the municipality (1087 students) to a smaller school (260 students) located in the rural area of the municipality with an agricultural profile. One participating school only involved students during their first year (n=170) in T1 and then withdrew from the study. In total, among the five schools participating in the quantitative study, 2981 students were involved. The schools offer a broad variety of both vocational and general courses. All included schools are located outside the city center of Trondheim (except for the school participating in only one focus group discussion, which is located in the city center). The school data collected represent Norwegian upper secondary schools, which are relatively similar in terms of sociodemographic factors. However, urban schools with a high academic focus may be underrepresented in the quantitative part of the study population, which might affect the generalizability of the results of the urban and high academic focus schools. However, one school that participated in the focus group discussions was located in the city center and is well known for its academic focus; thus, these adolescents' voices are also included in the study. Furthermore, the study population is derived from suburban neighborhoods in a larger Norwegian city; thus, the real rural adolescent population of Norway is not represented in this study, and one should exercise caution in generalizing the results. There is an even gender distribution at the schools, and the age span of 15-21 years limits the results to covering upper secondary schools; research conducted at elementary or middle schools or among older adolescents may yield different results.

4.1.1 Focus group discussions

Five focus group discussions involving 6-10 participants each were conducted at four upper secondary schools, one of these four schools did not offer MEST. These schools also participated in the quantitative part, except for one school, which only participated in one focus group discussion (the same school that did not offer MEST). During one-hour sessions, the discussions covered adolescents' understanding of good mental health and factors important for good mental health. Items from the instrument development process of the MHPK-10 were discussed. Two researchers (the author of this thesis and PhD colleague Regine Ringdal) moderated the focus group discussions. A semistructured interview guide (appendix B in Norwegian) was used during the discussions, and the discussions were audio-recorded. Finally, the two researchers noted their immediate responses, thoughts and questions. The recordings were transcribed by an assistant with no previous knowledge of the research project. The information from these interviews was used for the scale development, and no further analyses of the interviews were performed for the purposes of this thesis.

After obtaining the principals' consent to collect qualitative data at the schools, the participants were recruited through self-selection with the help of the student councils at the designated schools. Both genders were represented with a preponderance of girls. The focus group discussions were used to learn more about the study population and gain inspiration as well as for the item generation and face validation of items during the instrument development process (Vogt, King, & King, 2004). The focus groups were beneficial for obtaining rich data; the adolescents were able to build on each other's responses and provide valuable insight, feedback and corrections to the items and content of the positive MHL measure. A limitation to the focus group discussions is that the groups did not necessarily represent the population of adolescents. Furthermore, the moderator may have influenced and biased the data and contributed with energy that may have influenced the group discussion.

4.1.2 Expert panel

For the content validation of the items in the positive MHL measure, an expert panel of professionals was invited (N = 10) to evaluate and categorize the items. Three public

health nurses and six researchers within the field of health promotion (n = 9) accepted the invitation and provided iterative feedback during the item development. The invitations to participate in the expert panel were extended to the authors' associates with appropriate academic qualifications and professional expertise in the field of mental health and school health services (Bjornsen, Eilertsen, et al., 2017). The expert panel provided specialized input and opinions regarding the items and the instrument development process. By including both researchers and clinical school nurses, valuable input was received during the process of developing the items of the positive MHL instrument, e.g., the wording of the items and classification of the items in relation to the basic psychological needs theory. Limiting the expert panel to individuals within the field of health promotion may have narrowed the scales' applicability to other fields; however, it is important to develop a domain specific measure for use in health promotion that may be merged with existing measures of MHL in the future to obtain a global measure of all four components of MHL.

4.1.3 Pilot Study

During the spring of 2016, one school participated in a pilot study (n = 479). The pilot study was conducted to test the initial 15-item scale measuring positive MHL in addition to testing the following study logistics: how was the study received by teachers, administrative staff and students? Experience was also gained in terms of the practical issues concerning the administration of the survey, e.g., providing sufficient and readily available information and communication with the administrative staff organizing the information, performing reminders and storing the questionnaires. Experience and knowledge from the pilot study were used for further scale development and planning the main surveys at T1 and T2.

4.1.4 Quantitative data Time 1 (T1)

Five schools in Trondheim municipality participated at T1. The questionnaire was administered to 2,145 of the 3,281 (65.4 %) students available at the five schools, and 2,087 students responded with usable information (response rate of 97.3 %). The teachers were strongly encouraged by their principal to administer the questionnaire to the students; however, the survey administration depended on the teachers' willingness to

administer the questionnaire. Thus, the teachers served as the gatekeepers of the students' participation at the class level. This limitation applies to all quantitative data collection in this project (Pilot, T1 and T2).

4.1.5 Test-retest reliability

Three weeks after the initial data collection (T1), the new positive MHL instrument was administered to a discretionary sample subgroup (n = 219) of the original T1 sample to evaluate the test-retest reliability of the instrument using Pearson's correlation coefficient r (Bjornsen, Eilertsen, et al., 2017). This subgroup consisted of students from one of the schools participating at T1.

4.1.6 Known-groups validity

To test the construct validity of the positive MHL measure, a known-groups validity test was performed. Third-year nursing students from the Norwegian University of Science and Technology (NTNU) (n = 44) were expected to have more knowledge regarding the factors important for obtaining and maintaining good mental health than adolescents attending upper secondary school and, therefore, were included in the known-groups validity testing of the instrument.

4.1.7 Quantitative data Time 2 (T2)

One school withdrew before T2. Thus, at T2, four schools participated, the questionnaire was administered to 1,127 of the 2,811 (40.1 %) students available at the four schools, and 1,054 students responded with usable information (response rate of 93.5 %).

4.1.8 Cohort

To follow a student cohort and generate a longitudinal dataset, a six-letter code was created to anonymously match the students from T1 to T2. The questions were as follows: first two letters of the first school you attended as a kid, first two letters of the place where you were born, and first two letters of your name. The six-letter code allowed 34.2 % (361) of the students to be matched from T1 to T2. Of these 361 students, 357 (33.8 %) students were in the age range of 15-21 years and constituted the sample of the cohort of students from the four schools that could be followed throughout a school year during which MEST was offered (from T1 to T2). The low matching rate (34.2 %)

probably has several explanations. First, we learned that the questions challenged the students' feeling of anonymity, and some students reported that they chose to not answer the first section of the questionnaire. Furthermore, the questionnaire was not necessarily administered to the same students at T1 and T2 (the teachers decided which classes they administered the questionnaire to), and finally, there were duplicate codes.

4.2 Response rate

The overall response rate at T1 and T2 was 97.3 % and 93.5 %, respectively, and the response rate of the pilot study was 98 %. The very high response rates may be a result of how these rates were calculated; only those students who actually received the questionnaire were included in the denominator. During the pilot study and at T1 and T2, 46 %, 65.4 % and 40.1 % of the students at the schools, respectively, received the questionnaire and were included in the denominators calculating the response rates. The teachers served as the gatekeepers of participation in the survey, which might have influenced which students had a chance to participate. However, these decisions were made at the class level rather than the individual student level; thus, this study was less vulnerable to selection bias affecting the results. Among the students who received the questionnaire from their teacher, there was a high response rate. One possible reason is that the students were asked to respond to the questionnaire at school; 45 minutes were assigned to the task with an option to complete homework if they chose to not participate.

4.3 Ethics

This study was approved by the Regional Committee for Medical and Health Research Ethics (REK midt 2014/1996). Informed consent forms were used among participants aged ≤ 15 years (parental consent is required by law), whereas participants aged > 15 years consented by completing the questionnaire (The Health Research Act, 2008, § 17). Regardless of age, all students received the same information. The Data Protection Official (NSD) approved the inclusion of nursing students to test the known-groups validity of the MHPK-10 instrument (paper I). Since the teachers administered the survey, the students were asked to return the completed or blank questionnaires in the provided envelope to blind the teachers regarding participation to protect the students

from feeling coerced into participating by the teacher knowing who did and did not participate.

4.3.1 Information provided to the participants

For the adolescents, an informational video created by the researchers was posted on the students' e-learning platform (e.g., "*it's learning*"). Written information was provided to all students and the parents of the students aged 15 years (Appendix C). Furthermore, the first page of the questionnaire contained the same information (Appendix A in Norwegian), and an information letter (Appendix D in Norwegian) was read aloud by the teachers prior to administrating the survey. The researchers offered to attend staff meetings and provide information to the teachers administrating the survey; two schools accepted the offer, while the other schools' teachers were informed via e-mail only. The researchers were also available at each school's cafeteria or common area for a two-hour session prior to T1 to answer questions from the students or teachers.

4.4 Measures

Positive MHL and mental wellbeing are the main outcome variables in this thesis. The dependent and independent variables are presented along with the selected instrument, instrument properties and rationale for the selection of the specific instrument in table 1.

Table 1: Variables included in the thesis

Variable	Instrument	Instrument properties	Rationale/validation
Mental wellbeing	WEMWBS and SWEMWBS	WEMWBS: 14 items assessed on a five-point Likert scale ranging from (1) "not at all" to (5) "all the time"; higher mean scores indicate greater wellbeing (range 1-5) (Putz, O'Hara, Taggart, & Stewart-Brown, 2012). SWEMWBS: The SWEMWBS is a short version of the WEMWBS using 7 of the original 14 items (Stewart-Brown, Tennant, Tennant, et al., 2009).	The (S) WEMWBS enables the monitoring of the mental wellbeing of the general population and is validated for use among young people (Ringdal et al., 2017).
Positive mental health literacy	MHPK-10	Ten items assessed on a six-point scale ranging from (0) "do not know" and (1) "completely wrong" to (5) "completely correct"; higher mean scores indicate a higher level of knowledge (range 0-5) (Bjornsen, Eilertsen, et al., 2017).	The MHPK-10 is a newly developed, valid and reliable instrument for the measurement of adolescents' positive MHL (Bjornsen, Eilertsen, et al., 2017).
Health literacy	HLSAC	Ten items stating "I am confident that..." assessed on a four point Likert-scale ranging from (1) "not at all true" to (4) "absolutely true"; higher mean scores indicate a higher level of knowledge (range 0-5) (Paakkari et al., 2016).	The HLSAC scale is a brief multidimensional instrument suitable for monitoring children's and young people's health literacy (Paakkari et al., 2016).
Stress	ASQ-N	Thirty items rated on a five-point Likert scale ranging from (1) not at all stressful or is irrelevant to me to (5) very stressful; a higher sum score indicates a higher stress level (range 30-150). This seven-dimension instrument represents stress related to teacher/adult interactions, peer pressure, home life, romantic relationships, school attendance, school/leisure conflicts, and school performance (Moksnes & Espnes, 2011).	The ASQ was originally a 56-item inventory designed to measure normative stressors that adolescents may experience in their daily lives (Byrne, Davenport, & Mazanov, 2007). The Norwegian version ASQ-N is a reduced, valid and reliable 30-item version consisting of seven stress dimensions (Moksnes & Espnes, 2011).

Self-rated health	Single question	Assessed using the following item: "How is your current health?" With a response scale of (1) "very poor", (2) "poor", (3) "neither poor or good", (4) "good", and (5) "excellent" (Breidablik, Meland, & Lydersen, 2009).	There is extensive agreement in the literature that a simple global question asking about one's current health status is an important health indicator that provides a useful summary of how people perceive their overall health status and is a strong predictor of future health outcomes (Fayers & Sprangers, 2002; Joffer, Jerdén, Öhman, & Flacking, 2016).
Anxiety and depression	HSCL-10	Hopkins Symptom Checklist (HSCL-10) consists of ten items assessed on a six-point scale ranging from (1) "not at all" to (4) "extremely", and higher mean scores indicated a higher severity of anxiety and depression symptoms (range 1-4). Mean scores above 1.85 (cut off value) indicate anxiety/depression problems (Strand, Dalgard, Tambs, & Rognerud, 2003).	The HSCL-10 is an instrument measuring anxiety and depression symptoms (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Strand et al., 2003). The HSCL-10 is considered a reliable instrument for use among Norwegian adolescents (Haavet, Sirpal, Haugen, & Christensen, 2011).
Loneliness	Single question	Assessed by the following item covering the frequency of feeling lonely: "Do you ever feel lonely?" with response options of (1) never or almost never, (2) rarely, (3) sometimes, (4) regularly, and (5) almost all the time.	Single item, study specific question to assess how often the adolescents feel lonely.

(S) WMEMWBS (Short) Warwick-Edinburgh Mental-Wellbeing Scale, MHPK-10 Mental Health Promoting Knowledge, HLSAC Health Literacy for School-Aged Children, ASQ-N Adolescent Stress Questionnaire, SCL-10 Hopkins Symptom Checklist

4.5 Statistical analyses

The Pearson's correlation coefficient was calculated to determine the interitem correlations, bivariate correlations between factors and test-retest reliability. Independent samples t-tests were performed to investigate the mean group differences and determine the known groups validity. Cohen's *d* was used to interpret the effect sizes (Cohen, 1998) (papers II and III). Chi-square tests of independence were performed to evaluate the baseline differences between the two groups of MEST and non-MEST participants. Exploratory and confirmatory factor analyses (EFA and CFA) (paper I), ordinary least squares regression (OLS) analysis (paper II), average treatment effect analysis (ATE) (paper III) and descriptive statistics were performed. All analyses, except for the calculation of omega, were performed using Stata versions 14.2 and 15.1 (StataCorp. 2015, Stata Statistical Software: Release 14/15, College Station, TX: StataCorp LP). Chronbach's alpha was calculated as an indicator of included scales' reliability and internal consistency, values >.7 were considered satisfactory (Tabachnick & Fidell, 2014). The calculation of omega (Ω) for testing of the MHPK-10 scale quality was performed using Microsoft Excel (2011, version 14.7.1) and Stata version 14.2. Omega was used for the evaluation of scale reliability and internal consistency of the MHPK-10 because in contrast to alpha, omega does not require tau-equivalence or uncorrelated error variances (Crutzen & Peters, 2015). The significance level was set at $p \leq 0.05$.

4.5.1 Missing data

The data were assessed for missing values by thoroughly inspecting the data, performing descriptive statistics and inspecting the range of missing values for all variables. There was a low level of missing data in the data sets. The main scales were assessed to detect missing data completely at random (MCAR) by using Little's MCAR test (Little, 1988). Positive MHL (MHPK-10) and mental wellbeing (SWEMWBS) exhibited MCAR, suggesting that the missing data regarding these outcome measures are not related to these variables or the other variables in the model. No patterns of missing values were found, indicating that the data are representative (Christophersen, 2018). Thus, the values could be replaced without affecting the coefficient estimates (Christophersen, 2018). Missing age was the only variable that was replaced as follows: missing age was substituted by the mean age (17 years) due to the minimal variance in age across the sample (15-21 years). In the analyses, cases were deleted listwise.

4.5.2 Factor analysis (paper I)

Factor analysis is primarily used in psychology for the development of objective measures of latent constructs, such as personality and intelligence (Tabachnick & Fidell, 2014). A factor analysis was performed in this thesis for the development and evaluation of a measure assessing positive MHL, i.e., the MHPK-10 scale. Factor analyses attempt to determine which sets of items share common covariance characteristics to define the factors (Tabachnick & Fidell, 2014).

4.5.3 Exploratory factor analysis

An exploratory factor analysis (EFA) is performed to identify a model that fits the data as follows: two different models are specified to find the model that fits the data and has theoretical support (Schumacker & Lomax, 2004). The following three dimensions were modeled based on the three dimensions of the BPNT: autonomy, relatedness and competence; these dimensions were used in the scale development process, and a one dimensional model was tested based on positive MHL as one component of MHL. A principal component factor analysis (PCA) was performed to analyze the 15-item version of the MHPK instrument assessing positive MHL using data from the pilot study conducted in the early process of the scale development (paper I) to investigate the factor structure and dimensionality of the measure. A PCA was used to determine whether any clusters of items shared common variance with the main goal of item reduction, and to explain as much of the total variance as possible with as few factors as possible using linear structures; to analyze the correlation matrix to explain the variance and mathematically reduce the number of items (Acock, 2018). The minimum factor loading was set to 0.32 (Tabachnick & Fidell, 2014). If an item loaded at 0.32 or higher on two or more factors, that item was considered to exhibit split loading. A problem with PCA is that there are no readily available criteria for testing the solution; thus, the final choice among the alternative solutions of a PCA depends on the researcher's interpretation (Tabachnick & Fidell, 2014). However, a parallel analysis using the Kaiser criterion (retain factors with an eigenvalue >1) and a scree-plot were used in this process to determine how many factors to retain (Tabachnick & Fidell, 2014; Ulleberg & Nordvik, 2009). An orthogonal rotation varimax was used assuming the factors are uncorrelated. The factors are revealed to be highly correlated, therefore it is recommended to also test an oblique rotation in future studies using the data to evaluate whether the rotation affected the

results (Tabachnick & Fidell, 2014). On the other hand, the patterns of correlations and interpretation of the PCA were pretty straightforward, and, thus, the rotation is unlikely to be of great importance for the results; since the patterns of correlations in the data are fairly clear, the solution tends to be stable regardless of the method of rotation used (Tabachnick & Fidell, 2014, p. 690). During the scale development, in the PCA process, two solutions were found to be satisfactory, i.e., a tree-factor solution and a one-factor solution; consequently, there was some ambiguity regarding which solution to retain. Therefore, both models were tested using a confirmatory factor analysis (CFA).

4.5.4 Confirmatory factor analysis

A confirmatory factor-analysis (CFA) was used to evaluate the model fit. CFA is used to statistically test the significance of a hypothesized model (e.g., one- and three-factor model) and evaluate whether the sample data confirm the models (Schumacker & Lomax, 2004). A CFA was performed to test whether the ten items following the PCA of the new measure assessing positive MHL are consistent with the theoretical and empirical understanding of positive MHL (paper I). CFA tests whether the data fit the hypothesized measurement models found in a PCA. Positive MHL was modeled as a one-dimensional measure (based on the previous study using EFA and positive MHL as one component of MHL) and a three-dimensional measure based on the theoretical dimensions of the basic psychological needs theory used for the instrument development (autonomy, relatedness and competence) (Deci & Vansteenkiste, 2004). The model fit indices were assessed using the following cut-off values: Chi-square test ($\chi 2$) to evaluate the global model fit; the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) with values >0.90 considered adequate (preferably >0.95) (Tabachnick & Fidell, 2014); Root Mean Square Error of Approximation (RMSEA) with cut-off values <0.8 (preferably <0.5) (Bjornsen, Eilertsen, et al., 2017; Tabachnick & Fidell, 2014); and Standardized Root Mean square Residual (SRMR) with values <0.10 considered acceptable (Bjørnsen, 2017).

Other methodological approaches exist for scale development. DeVellis (2017) reports that item-response theory (IRT) is an alternative to CFA for analyzing items. IRT offers more flexibility in some key areas; however, neither method is without flaws, and the evaluation of the psychometric properties of a measure using either the IRT or CFA methodology alone may be incomplete (Meade & Lautenschlager, 2004). In the current thesis, CFA were chosen based on personal experience and availability of experienced supervision;

however, performing an IRT analysis prior to the CFA might have strengthen the results. Meade & Lautenschlager (2004) mention that small sample sizes and low commonalities among factors are main problems that may lead a CFA to yield misleading results; however, neither of these issues were problematic in the data used in the current CFA analysis.

4.5.5 Linear regression (paper II)

Ordinary least-squares (OLS) regression is a powerful technique for modeling the relationship between a dependent variable (mental wellbeing) and several independent variables (e.g., positive MHL).The main objective of paper II was to determine the unique variance in mental wellbeing due to positive MHL in the study population of adolescents (paper II). The assumptions of OLS were tested using the following parameters: Breusch-Pagan test for heteroscedasticity >0.05, variance inflation factor (VIF) testing for multicollinearity problems <5.00, Shapiro-Wilk's W-test for normality of residuals >0.01, Linktest for specification of the model >0.05, test for appropriate functional form >0.05, and Cook's D for influential observations <1.00 (Bjornsen, Espnes, Eilertsen, Ringdal, & Moksnes, 2017; Mehmetoglu & Jakobsen, 2017). Conservatively, a linear regression requires a continuous dependent variable (Tabachnick & Fidell, 2014). The scale measuring mental wellbeing (WEMWBS) is a Likert scale on which the WEMWBS items have five response categories with the following latent underlying variable that is continuous: mental wellbeing is a concept considered continuous and consists of an infinite number of possible values. Furthermore, there are always five or more values on the scales used to assess continuous data in the current thesis; thus, the underlying concepts are considered continuous, e.g., positive MHL and mental wellbeing; these concepts can be assigned an infinite number of values, but for practical reasons, we need to measure definite values, and finally, the intervals between the values are assumed to be somewhat equal. More emphasis is given to strong results ($p \leq .01$) in interpreting the results.

4.5.6 Average treatment effect (paper III)

In this thesis, one of the aims was to investigate whether MEST participation, i.e., treatment, had an effect on positive MHL and mental wellbeing, i.e., the outcomes, using the available observational data (paper III). Treatment effect modeling is used to describe the observed statistical relationship among the variables using observational data and is based on potential treated and untreated responses (Lee, 2005; Mitchell, 2015). This approach does not establish causal effects but rather estimates the potential effect of MEST on positive MHL and mental

wellbeing to initiate the process for further rigorous evaluations of MEST. The treatment effect framework is closely linked to structural form equations, which has been used in statistics and medicine to estimate potential responses using observational data and allows for the interpretation of the regression parameters as causal parameters (Lee, 2005). One of the main reasons for using the treatment effect framework to analyze observational data is to avoid biases from variables affecting both the treatment and the response (Lee, 2005). In paper III, linear treatment effect modeling, augmented inverse probability weighting (AIPW) and double robust estimators were used to estimate the average treatment effect of MEST on positive MHL and mental wellbeing based on MEST participation (i.e., treatment). The treatment effect is used to describe the observed statistical relationships between the MEST participants and non-MEST participants. AIPW models both the treatment and the outcome models and is consistent even if one of the models is miss-specified (Pinzón, 2013). Doubly robust estimators are suggested as the preferred estimators for estimating the average treatment effect in nonnormally distributed data (Tu & Koh, 2015) and are currently used because of the potential ceiling effects observed in the outcome variables positive MHL and mental wellbeing (paper III). Using treatment effect modeling, the potential-outcome means (POMs), average treatment effects (ATEs), and average treatment effects can be determined and compared among the MEST participants (average treatment effects among the treated) using observational data. Covariates are used to ensure that the treatment (MEST participation) and outcome (positive MHL and mental wellbeing) are independent from each other if conditioned on these covariates. The covariates for positive MHL were baseline (T1) positive MHL, parents' education level, years lived in Norway and grade level. For mental wellbeing, the covariates were baseline (T1) mental wellbeing, gender, anxiety and depression, school-related stress, loneliness, health literacy, and self-rated health (paper III). Using ATE is considered an initial evaluation and a solid foundation for further decisions regarding investment in more rigorous and resource intensive evaluations of MEST. The ATE does not assess causality or the aspects of MEST leading to its effectiveness. ATE provides an indication of whether an aspect of MEST may affect positive MHL and mental wellbeing, indicating a need for further rigorous evaluation, as the current method has its limitations, and conclusions regarding its effectiveness cannot be drawn.

5. RESULTS

Paper I: Positive Mental Health Literacy: Development and Validation of a Measure Among Norwegian Adolescents

Paper I reports the development and validation of the instrument MHPK-10 (Appendix E and F) measuring adolescents' knowledge of how to obtain and maintain good mental health (referred to as Positive MHL or PMeHL in paper II). A valid and reliable one-dimensional instrument was developed through an iterative process. Thirty-two items were initially generated, and 15 items were selected for a pilot study. A PCA was performed to identify the cross-loadings, and a one-factor solution was examined. After removing five problematic items, the CFA yielded a satisfactory fit for a 10-item one-factor model referred to as the mental health-promoting knowledge measure, i.e., MHPK-10. The test-retest evaluation supported the stability of the measure. McDonald's omega was $\Omega = 0.84$, and the known-groups validity test between adolescents and third-year nursing students provided evidence of good construct validity. A ceiling effect was found in the instrument, which should be considered in interpreting the scale scores. The instrument is found to have potential to complement existing measures of MHL and to be useful for assessing positive MHL among adolescents. However, additional evaluation of the instrument is needed. The instrument is found to be a starting point for further expanding the understanding of positive MHL. This tool may serve as an important measure in continuing the work towards understanding and evaluating mental health education interventions and exploring how universal mental health promoting initiatives affect positive MHL among adolescent populations.

Paper II: The Relationship Between Positive Mental Health Literacy and Mental Wellbeing Among Adolescents: Implications for School Health Services

Paper II examined the relationship between positive MHL and mental wellbeing and discussed the findings in relation to school health services' health promotion work. Positive MHL was found to be a significant explanatory variable of mental wellbeing among adolescents, and the regression model accounted for 41 % of the variance in the study populations' mental wellbeing ($p = \leq.01$). Furthermore, a weak gender difference was found in positive MHL. Then, paper II provides evidence recommending the inclusion of positive MHL as an integral component of school health services' mental health education for adolescents.

Paper III: Exploring MEST: a new universal teaching strategy for school health services to promote positive mental health literacy and mental wellbeing among Norwegian adolescents

In paper III of this thesis, the average mean group differences and the average treatment effect (ATE) of MEST on positive MHL and mental wellbeing were estimated using observational data by comparing a group of adolescents who participated in MEST with a group of non-MEST participants. Positive MHL increased significantly more between assessment points among the MEST participants compared to the non-MEST participants ($p = .02$). No significant change in mental wellbeing was found between MEST and non-MEST participants ($p = .98$). Estimating the ATE of MEST on positive MHL, the MEST participants showed a significant 2.1 % increase ($p = .04$) in the potential outcome mean of positive MHL compared to the nonparticipants. Estimating the ATE of MEST on mental wellbeing, the girls attending MEST exhibited a significant 9.7 % increase ($p = .03$) in the potential outcome mean of mental wellbeing compared with the girls who did not attend MEST, while no significant change ($p = .99$) was detected among the boys or the entire sample of both genders combined ($p = .123$). Paper III provided support for further investments in evaluating MEST as a promising working strategy for school health services to universally promote adolescent mental health. This study concludes that the results may be used as a foundation for investing in more resource-intensive evaluations of MEST, such as a randomized controlled trial, in the future.

6. DISCUSSION

The findings reported in this thesis have expanded the existing knowledge of MHL and how it is measured among adolescents. The work builds on, is an extension of, and contribute to the ongoing development of the important health domain of MHL. In particular, this thesis contributed new knowledge regarding positive MHL as a concept guiding the mental health promoting working strategies of school health services in Norwegian upper secondary schools. Previous research and traditionally in the practice field, school nurses have focused on adolescents' mental health problems (Stengård & Appelqvist-Schmidlechner, 2010). This thesis is grounded in the theory of salutogenesis and focuses on the creation of *good* mental health as a basis for positive youth development. The basic psychological needs theory is used as a foundation for understanding the basic principles of good mental health. Through three separate studies, a measure for positive MHL was developed and evaluated (paper I), the relationship between positive MHL and mental wellbeing was established (paper II), and MEST was investigated as a potential working strategy for the promotion of positive MHL and mental wellbeing among adolescents (paper III). Eeach paper included in the thesis builds upon the others, and are a part of a greater whole contributing new knowledge to the field of MHL and mental health promotion among adolescents.

6.1 MHPK-10 as a measure of positive mental health literacy (paper I)

Assessing MHL is important for identifying knowledge gaps in mental health, informing the development of interventions promoting mental health literacy, and evaluating these interventions (Dias et al., 2018; Campos et al., 2016). A review of scale-based measures shows that there are substantial limitations in the current ability to measure MHL (O'Connor, Casey, & Clough, 2014). The conceptualization used in many existing measures limits the assessment of MHL because these measures do not use up-to-date definitions; moreover, not all components of MHL are included (Kutcher, Wei, Costa, et al., 2016). MHL and its measures have previously focused on a restricted number of mental disorders, and thus, the focus was on knowledge and beliefs about mental ill-health rather than on the whole concept of mental health. No measure of positive MHL exists, and no global measure reflects Kutcher, Wei, Costa, et al.'s (2016) four components of MHL. Grounding this thesis and school health services' work in salutogenic theory, one cannot be content with allowing the existing measures of knowledge of mental disorders represent the whole concept of MHL in health promotion, as we cannot be content with reducing the risk factors in promoting mental health

from a salutogenic perspective. Simms (2008) argue that much time and consideration are needed to develop measures leading to reliable and valid inferences about people. Several methodological, statistical and theoretical competencies were used in the development of the MHPK-10 measure, and this work is an ongoing process requiring further testing, development and validation of the scale.

6.1.1 Scale development

Thinking clearly about the content of MHL was important during the early phase of the scale development especially since there is no consensus regarding the concepts that should be included in MHL. Furthermore, no consensus is found in the literature regarding how the construct should be measured (O'Connor & Casey, 2015; Spiker & Hammer, 2018). Previous studies developing measures of MHL have focused on knowledge of mental disorders and primarily assessed knowledge and believes related to mental health problems, which is consistent with the early definition of MHL provided by Jorm (Jorm et al., 1997). The operationalization of positive MHL is essential for work developing a measure of positive MHL, and a model was generated to help conceptualize positive MHL and its aspects (figure 1); furthermore, the model was used to clarify the assumptions and factors influencing MHL and positive MHL. The following definition of MHL, which was recently proposed by Kutcher et al. (2016), is the basis of the concept of positive MHL in this thesis: understanding how to obtain and maintain good mental health. The development of the MHPK-10 instrument followed scientifically recognized steps (DeVellis, 2017; Hinkin, 1998). The process of deciding what positive MHL encompasses was based on Kutcher et al.'s (2016) definition of MHL and further based on a collaboration among the author, school nurses and researchers in an expert panel and adolescents. The subsequent steps included consideration of items to include to measure positive MHL. As Solberg (Sohlberg & Sohlberg, 2013) highlights, asking the general research question "how is your positive MHL?" is unproductive. In collaboration with school nurses working with MEST and adolescents, the author generated a pool of items intended to assess positive MHL. Then, the dimensions autonomy, relatedness and competence of the basic psychological needs theory (BPNT) were used to classify the items as the theory claims that these three dimensions predict mental wellbeing (Deci & Vansteenkiste, 2004). Using the BPNT and an expert panel to develop the items and guide the decision-making process regarding which items to include, was useful as positive MHL is considered an individual matter. However, limiting the items

to those fitting one of the dimensions of the BPNT may have narrowed the measure. Moreover, items related to health behavior (e.g., substance abuse, physical activity, and diet) were eliminated, and only one item related to sleep hygiene was included. Further, the expert panel consisted of three school nurses, all of whom were involved in MEST; thus, the instrument may be affected by these school nurses' opinions regarding what constitutes positive MHL and not necessarily represent the opinions of the general population of school nurses. However, six researchers within the field of health promotion were included in the expert panel who evaluated the items to be included. The development of valid and reliable instruments is challenging regardless of the theoretical framework and methods guiding the process. Scale development is a rapidly evolving field; the methods used in this thesis are thoroughly discussed in the methods section.

6.1.2 Psychometric properties

A measure must have the following two broad types of psychometric properties: validity and reliability; these properties are considered key criteria for evaluating the quality of quantitative instruments (Polit & Beck, 2017). Reliability is the instrument`s ability to measure the construct of interest consistently. The positive MHL scale's reliability was evaluated by a test-retest, and McDonald's omega was used to evaluate the internal consistency of the measure, showing satisfactory reliability (paper I). Omega was used because in contrast to alpha, omega does not require tau-equivalence or uncorrelated error variances (Crutzen & Peters, 2015). Validity is a broad term referring to the extent to which a scale measures what it is supposed to measure (Polit & Beck, 2017). Validity was assessed by testing the face validity of the items in focus group discussions, and performing a known groups validity test between upper secondary school students and third-year nursing students because the third-year nursing students were expected to have higher levels of positive MHL than the 15- to 21-year-old adolescents in upper secondary school. Construct validity is a core component of a successful measure, and efforts were exerted to ensure construct validity by using the definition of MHL as the basis of the scale development process. Furthermore, the adolescents' opinions regarding the knowledge they think is important for obtaining and maintaining good mental health were obtained through focus group discussions, and a known groups validity test was performed. Since no gold standard exists for measuring MHL and the MHPK-10 is the first measure of positive MHL, convergent validity is problematic to establish. No corresponding construct expected to correlate with positive MHL was

identified; therefore, a known-groups validity test was performed to test the construct validity. The evaluation of the psychometric properties of the new measure indicates that the measure is valid and reliable. However, a scale's quality is not a static characteristic of a scale; the scale quality depends on the interpretation of the scale scores in each specific study (Crutzen & Peters, 2015).

Measurement is a fundamental activity of science (DeVellis, 2017), and even though most effort focused on the scale development process, further development and validation of the MHPK-10 scale are needed in the future. A valid and reliable measure of positive MHL is important for building a stable body of literature on positive MHL. In summary, the newly developed MHPK-10 has several strengths. Support for reliability and construct validity was found in two samples (T1 and T2), and the MHPK-10 represents a one-dimensional and well-targeted scale with acceptable model fit and factor structure reflecting the theoretical foundation of MHL and the basic psychological needs theory. Based on the current work, the MHPK-10 can be recommended for use in research at the population level among adolescents (Bjornsen, Eilertsen, et al., 2017). Future work on the scale should include working on reducing the ceiling effect. Further research and validation of the MHPK-10 scale in other populations could yield more evidence regarding the validity and reliability of the scale. Currently, several studies are ongoing to examine the MHPK-10 in different languages, populations, and countries, such as the USA, Denmark, China, Singapore, England, Taiwan, France, Crete, Iran and Portugal.

6.1.3 The construct of mental health literacy

The mental health literacy (MHL) construct emerged from the domain of health literacy and must be understood in that context (Kutcher, Wei, & Coniglio, 2016). According to the WHO (WHO, 2013), health literacy is a significant independent determinant of health and is "a stronger predictor of an individual's health status than income, employment status, education and racial or ethnic group (Wei, McGrath, Hayden, & Kutcher, 2016). As mental health literacy is a derivative of health literacy, it is expected to have a similar impact (Kutcher, Wei, Costa, et al., 2016). The concept of MHL evolved from functional literacy, and includes social and cognitive skills to improve and maintain good mental health. The concept is often applied in health care environments (Kutcher, Wei, & Coniglio, 2016). Studying MHL as a domain-specific element of health literacy has both advantages and disadvantages. On the one hand, Mackert, Champlin, Su, Guadagno and colleagues (2015)

argue that using domain-specific approaches to different aspects of health literacy, such as MHL, could lead to fragmentation and inconsistency in the field of health literacy, particularly in regard to measurement. On the other hand, Jorm (Jorm, 2015) argues that there are major advantages to a domain-specific approach to MHL to draw attention to a neglected field in both practice and research (Jorm, 2015). Throughout the work with this thesis, MHL was studied as a construct in the context of the systematic school-based mental health promotion working strategy of school nurses, i.e., MEST. MHL has been linked to mental health and mental health behaviors, but as Spiker & Hammer (2018) recently highlighted, the concept of MHL has the following problem: there are no clear boundaries of the concept, making it challenging to measure and study this concept. Recently, Spiker & Hammer (2018) suggested that in the future, MHL should be considered a theory rather than a construct. Spiker & Hammer claim that MHL as a concept is diluted by including additional constructs and argue that the construct of MHL has become too inclusive. The fragmentation and inconsistency of MHL are real problems in developing a scale measuring positive MHL, and in the following MHL is explored through the lens of theory and construct development, awaiting future thoughts regarding how to treat MHL.

In summary, theories are defined as concept structures (Sohlberg & Sohlberg, 2013). From a scientific theoretical perspective, there is a clear premise that definitions of concepts do not have a fair value and that they may be more or less suitable for a specific purpose (Sohlberg & Sohlberg, 2013). In the concept and theory perception of MHL, there is some convergence. The argument presented by Spiker & Hammer (2018) about the problems with an all-inclusive concept is relevant and important. Adding a multitude of components and making a concept more inclusive leads to the loss of precision and information. When arguing for a concept variant, the main argument refers to the specific advantages of an undifferentiated cluster highlighting that information regarding the different components is not lost, which is found true when studying the one component of positive MHL. However, when studying MHL overall, there are clear benefits to conceptualizing MHL as a theory. Spiker & Hammer (2018) clarified the disadvantages of an inclusive, undifferentiated concept, and these arguments are acknowledged since there could be an endless number of concepts included in MHL that could lead to violations of the principles of good construct definitions, particularly if the MHL continues to develop by including different constructs. MHL may be useful as a new theory in health promotion work in the future, and theory shapes the way practitioners and researchers collect and interpret evidence (Alderson, 1998).

However, the argument for the importance of studying positive MHL as a part of MHL in this thesis refers to the gap between the components in Kutcher, Wei, Costa, et al., (2016)'s definitions and the available measures for assessing MHL. In the future, developing MHL into a theory could serve as a theoretical foundation for mental health promotion interventions and work strategies, such as MEST, and provide a solid and relevant theoretical foundation for mental health promotion working strategies promoting MHL and mental wellbeing.

6.2 Positive mental health literacy and mental wellbeing (paper II)

In paper II, the main findings showed a positive relationship between positive MHL and mental wellbeing. This finding is consistent with Berkman, Sheridan, Donahue, Halpern, & Crotty, (2011) and Kutcher et al., (2015)'s findings showing that long-term health and wellbeing are strongly linked to the level of literacy people attain over the course of their lifetime. The positive relationship found between positive MHL and mental wellbeing is also consistent with previous research suggesting that MHL may serve as a foundation for good mental health in a life course perspective (Kutcher et al., 2015). The results also showed weak gender differences in positive MHL which may be due to the limitations of the methods used or a real but small gender difference. The study conducted by Furnham, Annis, & Cleridou (2014), found weak support for gender differences in mental health literacy among adolescents and reported that gender differences in MHL were smaller than previously thought.

Although MHL is an increasingly researched concept, relatively few studies have investigated this concept in the adolescent population (Attygalle, Perera, & Jayamanne, 2017). Studies investigating MHL have mainly focused on mental ill-health but not on knowledge of good mental health and mental wellbeing (Lam, 2014; Swannell & McDermott, 2015). Previous studies focusing on mental ill-health have revealed an association between low mental health literacy and mental health status, particularly depression and anxiety, in young people (Lam, 2014). Furthermore, previous research investigating MHL has established that knowledge of mental health symptoms can improve help-seeking intentions (Spiker & Hammer, 2018). Because several different instruments for measuring MHL exist and consensus regarding how to measure the concept is lacking, the findings reported in different studies investigating MHL are difficult to compare.

6.2.1 Salutogenesis as a foundation for positive MHL

Due to identified substantial limitations of existing measures, building a knowledge base of positive MHL based on previous studies is challenging. Therefore, the salutogenic theory is used as a foundation of positive MHL and its relationship to mental wellbeing. MHL is considered a resource and asset for building good mental health. Thus, in the salutogenic context, MHL may be interpreted as a GRR considering Antonovsky's broadest definition of GRRs as any characteristic that can facilitate tension management and promote SoC. SoC was Antonovsky's answer to the question of health's origin by combining cognitive, behavioral and motivational aspects with the three dimensions of comprehensibility, manageability and meaningfulness to progress towards the health and wellbeing end of the continuum (Eriksson & Lindstrom, 2007). Thus, to understand, manage and find meaning in the complex and often challenging lifetime of adolescence, knowledge of how to care for one's own mental health or MHL is an evident important factor. SoC is unsurprisingly associated with mental health (Mittelmark et al., 2017) and may serve as a link between mental wellbeing and mental health literacy.

6.3 Investigating MEST (paper III)

Given the increasing mental health issues and the importance of mental health among adolescents, it is essential for effective mental health initiatives and interventions to be identified, implemented and evaluated (Das et al., 2016); therefore, initiating an assessment of MEST is important. Furthermore, documenting the impact of complex mental health-promoting actions initiated by school health services is essential for advancing school health services' evidence-based practice and documenting the outcomes of new mental health promotion initiatives, such as MEST.

MEST is considered a complex intervention similar to most interventions targeting health in a modern society (Richards & Hallberg, 2015). Since MEST has not been previously investigated and data were available from two time points over a school year, it was considered reasonable to start by estimating the ATE of MEST on the following main variables MEST is intended to affect among adolescents: positive MHL and mental wellbeing. Modeling an average treatment effect for the establishment of a foundation for the further evaluation of MEST was found to be the most appropriate method during the initial phase of investigating MEST, which asked the question of whether MEST is effective in promoting adolescent mental health (paper III). Fundamentally, these types of questions are

questions of causality, and the gold standard for addressing these types of questions is randomized controlled trials (RCT) (Richards & Hallberg, 2015). For several reasons, RCT was not feasible for the initial evaluation of MEST at the time of planning and conducting the current study. The main reason was that MEST was in a stage during which randomization was not an option for practical and ethical reasons; MEST was in the initial phases of implementation at schools, and the school nurses worked towards its acceptance into the schools; thus, adding randomization to the equation was not an option. The researchers collected observational data during this phase and used ATE modeling, which was considered a sensible method for the initial evaluation of MEST. The models in paper III estimating the ATE of MEST on adolescents positive MHL and mental wellbeing showed that compared to adolescents who did not participate in MEST, those who participated in MEST exhibited a significant difference in positive MHL, and among girls, a difference in mental wellbeing was also revealed. These findings indicate that MEST participation seems to be beneficial for adolescents' positive MHL and girls' mental wellbeing.

When interpreting these results, it is important to consider the ceiling effects found in both the positive MHL and mental wellbeing measures; discussing statistical and practical significance is also important. Statistical significance is not related to the importance of the results but is related to the likelihood that the results are due to chance (Fethney, 2010). Practitioners are often more interested in the extent of change, e.g., whether the change makes a real difference in adolescents' lives rather than whether the observed result is likely to be due to chance. Furthermore, the sample size likely affects the p-values; if the sample size is large, even a small change yields a significant p-value. Furthermore, the ceiling effects in both the mental wellbeing and positive MHL measures might yield smaller variance in the results, and the differences are potentially larger than these measures are able to detect. Confidence intervals are one way to help researchers determine the estimated values in a wider population. Confidence intervals provide the possible range of values bracketed by lower and upper limits that encompass the unknown population value estimated by the estimated sample means. In paper III, it was estimated at a 95 % probability that the interval bounded by the lower and upper limits contains the 'true' population value with a 5 % probability that the interval does not contain the population value. The ATE is based on the difference between the two estimated sample means and does not reveal the actual values that might be observed in the wider adolescent population. ATE modeling is considered a feasible method using observational data and recommended as a preferred method for the initial

evaluation of MEST before investing in more resource-intensive evaluations. There are also limitations to estimating the ATE; although a significant increase in positive MHL and mental wellbeing was found among the girls MEST participants compared to those among the non-MEST participants, it is not possible to draw conclusions regarding the mechanisms of MEST or the aspects of MEST that are effective. We can only determine that MEST is effective. However, this knowledge is important as it provides a solid foundation for recommending further rigorous investment in investigating and evaluating MEST, especially its implementation and mechanisms of effect. Therefore, even though the estimation of the ATE of MEST on positive MHL and mental wellbeing indicates that MEST is beneficial for positive MHL and mental wellbeing, more research must be performed to rigorously evaluate MEST.

6.4 Methodological considerations

The methodological strengths and limitations of the work conducted in the present thesis need to be acknowledged. A broad range of various paradigms and methodological approaches exist in research; in the previous paragraph, ATE was discussed as one approach to initiating an evaluation of MEST, and in the methods section, alternative methods to scale development were discussed. The main goal of this thesis was to use an overall sound methodological approach to address the aims.

6.4.1 Focus group discussions

Phase one of the project included focus group discussions with adolescents. The focus groups were used to include adolescents' voices in the data collection process. Focus group discussions were used as a part of the instrument development of the measure of positive MHL (the MPHK-10 scale) in different phases, e.g., item generation and face validation of items.

Knowledge of the population being investigated is important. The literature discussing research methods states that research conducted without the involvement of the target group can be regarded as research waste (Richards & Hallberg, 2015); thus, it was an important priority to include adolescents early during the research process by conducting focus group discussions. However, the main use of the focus group discussions in the current thesis was for the instrument development of the MHPK-10 scale. Focus group discussions are recommended in the literature for enhancing the content validity of instruments and, ultimately, the validity of research findings (Vogt et al., 2004). Thus, the focus group

discussions were highly important for developing a solid measurement of the main variable in this thesis.

A main limitation of the focus group discussions in this thesis is that there was a preponderance of girls present in the discussions, which may have affected the results such that the results are more representative of girls' standpoint regarding mental health and positive MHL. However, boys were also very active participants in the discussions and were represented in each focus group discussion. The gender imbalance should be considered a limitation of the study even though the interviewers aimed to facilitate and balance the discussions to include both genders' opinions such that no gender or person dominated the discussions. However, since most participants were girls, their opinions may have influenced the results more than the boys' opinions. Moreover, one cannot be certain that the few boys choosing to participate in the focus group discussions represented the views and opinions of the general male adolescent population. This limitation may also apply to the girls, which is consistent with the limitation presented in the methods section, i.e., focus group participants do not necessarily represent the adolescent population.

6.4.2 Design and study population

Among the Norwegian population of 16- to 18-year-olds, 92.3 % are enrolled in upper secondary education (Statistics Norway, 2018) thus, a large proportion of the adolescent population is potentially available for participation in research conducted at Norwegian upper secondary schools. In the current data set, there was an even distribution of boys and girls. Furthermore, the distribution between vocational (38 %) and general studies (61 %) represented the distribution found overall in the general population at upper secondary schools, with 40 % of students studying vocational studies and 60 % of students studying general studies (Statistics Norway, 2018), suggesting that the study population was representative in regard to gender and line of study. The study population represents approximately 60 % of students in a Norwegian municipality with approximately 200,000 residents in both urban and rural areas. Although the schools represent two of the four school districts in the municipality, there are typically small differences in sociodemographic variables among the school districts in Norway. Altogether, the representativeness of gender, line of study and sociodemographic variables strengthen the generalizability of the results, even though there are still limitations to consider.

The non-random selection of the MEST participants is a main concern. Most frequently, students self-selected to attend the open MEST-seminars. In paper III, the adolescents who did not participate in MEST served as a control group for estimating the ATE of MEST on positive MHL and mental wellbeing. The nonrandom selection of MEST participants was considered by controlling for relevant covariates in the estimation of ATE. The baseline values (T1) of positive MHL and mental wellbeing were controlled for in the model; thus, we considered the possibility that adolescents with a higher or lower positive MHL or mental wellbeing might be more inclined to attend MEST seminars.

All schools offering MEST at the time of recruitment of the study are represented in this study's early phase (papers I and II). One school dropped out between T1 and T2, and, thus, in paper III, one school offering MEST is not represented. The large sample size and high response rates strengthen the findings. The regression model presented in paper II is based on cross-sectional data and does not allow for any casual inferences. While longitudinal data represent a strength in paper III, the data were obtained over one school year, limiting the study to short-term findings. Knowledge regarding whether the findings persist over a longer period is lacking. Further follow up data are not feasible due to the scope of this thesis; however, the work in this thesis is a foundation for further research and not considered the final conclusion.

6.4.3 Questionnaire and instruments

The main data used in the current thesis were quantitative and were collected by using a study-specific questionnaire. Survey questionnaires represent a convenient way of collecting data from a large number of adolescents, and the design of the questionnaire is important for ensuring that accurate data are collected and that the results are interpretable and generalizable (Jenn, 2006). Mainly, the following two types of errors are related to survey data: the measurement process and the representativeness of the population (Ringdal, 2014). The research process aimed to reduce the total survey error as much as possible. Regarding validity and reliability concerns, the questionnaire utilized was designed for the "health promotion worthwhile" project (work package III; school health services) and consists of validated and primarily recognized scales and single item questions for use in the adolescent population. Furthermore, using previously validated and recognized scales, the results were always interpreted while considering validity in the current population, and as a minimum, the Cronbach's alpha values of all scales were calculated and evaluated, all were satisfactory >.7.

A limitation to the questionnaire is that it is long. It was estimated to take 45 minutes for the adolescents to complete the questionnaire, but not all students were able to finish within the 45-minute time frame. The variables used in the thesis were determined during the early part of the questionnaire and, thus, were probably not influenced by missing values due to the participants not being able to complete the questionnaire; the low number of missing values strengthens this assertion.

A limitation related to the main variables positive MHL and mental wellbeing is that both variables exhibited a ceiling effect (Bjornsen, Eilertsen, et al., 2017; Ringdal et al., 2017), indicating that the instruments have limitations in regard to measuring and discriminating among levels of positive MHL and mental wellbeing over a certain level. A ceiling effect renders discrimination among the participants' high scores impossible; there is low variance in the responses because the top of the scale is too low, which may affect the interpretation of the results based on these two measures. The ceiling effects may have led to an underestimation of the ATE of MEST on mental wellbeing and positive MHL in paper III; therefore, the impact of MEST may be larger than that reported since the scales could not detect scores above the maximum of the scale, which was found to be too low. In addition, the relationship between positive MHL and mental wellbeing in paper II may be underestimated. Underestimation is considered less of a problem than overestimation in the current study since a hypothesized relationship was investigated in paper II and found to be statistically significant, and the associations may be even larger than those detected with the measures used in their current forms. The consequences of underestimation are not considerable. Furthermore, from a public health perspective, even small changes are important since moving many individuals in a positive direction may have a large health impact of the population.

The variables included in a questionnaire limit the variables that can be included as covariates in studies. Optimally, one should have a measure of global MHL for comparison with the new measure of positive MHL. To account for the lack of such an instrument, a known-groups validity test was performed. Furthermore, the measure of health literacy was first included in the T2 data collection; thus, no baseline health literacy values could be includes as a covariate. Consequently, we do not know whether the baseline health literacy levels may have affected the inclination to attend the MEST seminars. Finally, listwise deletion of cases was performed in the regression analysis; therefore, the variance in the

sample could have been reduced, which may have an impact on the results, especially in paper III.

6.4.4 Collaboration with school health services and MEST

The research group, including the author of the thesis, collaborated with BFT Heimdal MEST school nurses and the developers of MEST throughout the project. The research group received input regarding the project through formal expert panel discussions and less formal comments and feedback from the MEST group of school nurses. The researchers attended several MEST seminars and had ongoing discussions regarding how MEST has been implemented. The findings of the focus group discussions, researchers' observation of MEST seminars and quantitative studies were provided to the developers of MEST and used in the ongoing development and refinement of MEST. Thus, there was a two-way impact on this project as MEST influenced the direction of the research, and the ongoing research may have influenced the development of MEST. This impact could be considered both a limitation of the study and a strength. The limitation concerns the involvement of the researchers: one may argue that the researchers may be biased in interpreting the results; however, since no researcher is completely unbiased, being aware of one's own standpoint may limit the bias involved in the interpretation of the results. A major strength of this collaboration between the researchers and practitioners is that the findings may be more interesting and valuable to practitioners. Therefore, the results may be more likely to be incorporated into practice and contribute to an evidence-based practice of school health services' mental health promotion work among adolescents.

6.5 Future perspectives

6.5.1 Implications for research

The knowledge gained from this thesis may add to the discussion regarding how to treat MHL in future research; this study adds to the discussion of MHL as a construct or a potential new theory in mental health promotion. The new measure, i.e., MHPK-10, has the potential to complement existing measures of MHL and may yield new opportunities for MHL research to study global MHL and measure all four components of the concept. Especially important, from the health promotion perspective, is that a measure of positive MHL may be particularly interesting. Further validation of the new positive MHL measure is needed and currently ongoing in several countries. A foundation for further investments in studying the relationship

and gender differences in positive MHL and mental wellbeing was also established. Finally, a solid foundation for future research investigating MEST as a mental health promoting working strategy for school health services has been established and suggests that investing in further studies investigating the implementation and evaluation of MEST is warranted. Investing in adolescent mental health and wellbeing provides high economic and social returns; undoubtedly, providing resources for healthy adolescent growth, education and emotional development will yield large benefits for current and future generations (Sheehan et al., 2017).

6.5.2 Implications for practice

The findings reported in this thesis add to the knowledge base for school health services evidence-based practice. The ability to measure adolescents' positive MHL is central for school nurses' ability to adapt mental health education to the needs of the target population. Consistent with the Ottawa charter and its focus on health promotion and the reorientation of health care services, the findings obtained in this thesis suggest that the promotion of positive MHL by school nurses is beneficial for the adolescent population. However, health promotion actions is recommended to complement the current practices rather than reorient school health services. The public health role of school nurses at Norwegian upper secondary schools has traditionally been somewhat unclear, and expectations from both school nurses and society have been ambiguous. On the one hand, school nurses are expected to be health professionals providing individual services to students in need, be available at school and provide an open door policy service (Norwegian Directorate of Health, 2017). On the other hand, expectations are clearly stated in school nurses' professional guidelines and in addition to school nurses being central health workers in schools, they are expected to contribute at the universal level by promoting health and preventing disease (Regulations on health centers and school health services, 2018.; Norwegian Directorate of Health, 2017). Thus, complementing current practices by universally promoting positive MHL is suggested to fulfill school health services' important public health responsibilities by not solely offering open door policy service.

Schools have been positioned at the forefront of promoting positive mental health and wellbeing through implementing evidence-based interventions (O'Reilly et al., 2018). Research investigating the effects of school health services that are directly transferable to Norwegian conditions is limited (Dahm, Landmark, Kirkehei, & Reinar, 2010). Furthermore,

schools are considered to represent a preferred social structure to improve literacy, including mental health literacy (Kutcher et al., 2015). School health services are (in Norway) situated in schools, and it is a statutory service regulated by laws and regulations (Regulations on health centers and school health services, 2018.; Norwegian Directorate of Health, 2017). There is also a strong recommendation that school health services should have a systematic collaboration with the school to help ensure a good physical and psychosocial environment (Regulations on health centers and school health services, 2018.; Norwegian Directorate of Health, 2017). To fulfill the function of contributing to the school's health education and systematically collaborating with the school to ensure adolescents are exposed to positive physical and psychosocial environments, systematic work strategies are considered necessary. Based on the work in this thesis, positive MHL has the potential to be an important concept for evidence-based school health services. MEST has been identified as a promising work strategy utilizing the concept of positive MHL. The digital survey used by MEST may serve as a gateway to collaboration with teachers as school health services may offer targeted seminars for students based on the results of the survey. However, MEST needs further evaluation and refinement prior to its establishment as an evidence-based work strategy for school health services. A systematic approach to mental health promotion, such as MEST, may clarify the expectations for the public health work of school nurses not only for school health services but also for the teachers and school system. Mental health has recently been included as a topic covered in the curriculum of upper secondary schools. The findings in this thesis indicate that such coverage could represent a great opportunity for school nurses and teachers to collaborate and include positive MHL in mental health education.

7. CONCLUSIONS

MHL is an evolving concept important for mental health promotion among adolescents. Through the work in this thesis, a gap between the current conceptualization and available measures of MHL was identified. In mental health promotion, one cannot be content with allowing the existing measures of knowledge of mental disorders represent the whole concept of MHL. Therefore, a new valid and reliable measure of positive MHL, i.e., the MHPK-10, was developed. The new measure may help studies investigating MHL and the tailoring and evaluations of mental health education interventions provided to the adolescent population. Based on the positive relationship found between mental wellbeing and positive MHL this thesis has identified and discussed positive MHL as an important construct for the investment of promoting adolescent mental health in the context of school health services. Finding new approaches to improving mental health among adolescents is an important responsibility of Norwegian school health services. MEST is a new working strategy for school health services' mental health promotion work focusing on positive MHL and mental wellbeing described in this thesis. Based on the results of the current thesis, finding that positive MHL increased significantly more among the MEST participants compared to the non-MEST participants, and the significant average treatment effect of MEST on positive MHL, further investment in rigorous evaluations of MEST is recommended. Finally, it is important to emphasize that positive MHL is one small, but important, piece of the puzzle regarding the comprehensive picture of adolescents' mental health.

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PAPERS I-III

Paper I

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PAPER I

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Positive mental health literacy: development and validation of a measure among Norwegian adolescents

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Abstract

Background: Mental health literacy (MHL), or the knowledge and abilities necessary to benefit mental health, is a significant determinant of mental health and has the potential to benefit both individual and public mental health. MHL and its measures have traditionally focused on knowledge and beliefs about mental -ill-health rather than on mental health. No measures of MHL addressing knowledge of good or positive mental health have been identified. *Aim:* This study aimed to develop and validate an instrument measuring adolescents' knowledge of how to obtain and maintain good mental health and to evaluate the psychometric properties of the instrument. More specifically, the factor structure, internal and construct validity, and test-retest reliability were assessed.

Methods: The participants were Norwegian upper secondary school students aged 15–21 years. The development and validation of the instrument entailed three phases: 1) item generation based on the basic psychological needs theory (BPNT), focus group interviews, and a narrative literature review, 2) a pilot study (n = 479), and 3) test-retest (n = 149), known-groups validity (n = 44), and scale construction, item reduction through principal component analysis (PCA), and confirmatory factor analysis (CFA) for factor structure and psychometric properties assessment (n = 1888).

Results: Thirty-two items were initially generated, and 15 were selected for the pilot study. PCA identified cross-loadings, and a one-factor solution was examined. After removing five problematic items, CFA yielded a satisfactory fit for a 10-item one-factor model, referred to as the mental health-promoting knowledge (MHPK-10) measure. The test-retest evaluation supported the stability of the measure. McDonald's omega was 0.84, and known-groups validity test indicated good construct validity.

Conclusion: A valid and reliable one-dimensional instrument measuring knowledge of factors promoting good mental health among adolescents was developed. The instrument has the potential to complement current measures of MHL and may be useful when planning mental health promotion activities and evaluating public mental health education initiatives in adolescents.

Keywords: Mental health literacy, Adolescence, Measurement, Health promotion

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Background

Mental health in the Norwegian adolescent population has received considerable attention in recent years and has emerged as a public health concern that needs to be addressed [1]. Adolescence is considered an important transitional period in life during which individuals are particularly sensitive to contextual and surrounding influences; this unique state leads to challenges but also opportunities for improving health [2].

Health literacy (HL) concerns adolescents' capacity to make sound health decisions in the context of their everyday lives [3] and is considered critical for effective participation in health promotion [4]. HL is a multifaceted, complex and evolving concept, and Sørensen et al. [5] has developed a definition and conceptual model relevant for the further work of conceptualization and measure development for *mental* health literacy (MHL).

MHL is a component of HL and is also an evolving concept. MHL is considered a significant determinant of mental health and has the potential to benefit both individual and public mental health [6, 7]. MHL has been conceptualized in different ways since the term was first coined by Jorm and colleagues in 1997 [6, 8–10]. Traditionally, MHL and its measures have focused on knowledge and beliefs about mental -ill-health rather than on mental *health* [11]. However, in past years, MHL has evolved from a focus on mental -ill-health and risk factors to providing an asset for health that can be strengthened through educational initiatives [7]. Today, MHL broadly refers to the knowledge and abilities necessary to benefit mental health [9]. A recent definition of MHL outlines four key components:

> *"(1) Understanding how to obtain and maintain good mental health; (2) understanding mental disorders and their treatments; (3) decreasing stigma related to mental disorders; (4) enhancing help-seeking efficacy (knowing when, where, and how to obtain good mental health care and developing competencies needed for self-care)"*
>
> (Kutcher et al. [12]).

This conceptualization advances previous perceptions of MHL as merely knowledge of mental disorders and is in line with the WHO's definition of mental health, which states that mental health is more than the absence of mental disorders and includes wellbeing, optimal functioning and coping [13].

Several scales have been developed to capture the broad scope of MHL [8, 14–16]. However, the existing measures mainly address knowledge of the three latter components, namely mental disorders, stigma and help-seeking behaviors; no studies address knowledge of good or positive mental health [6]. Thus, a gap remains between the recent conceptualization of MHL [12] and available MHL measures. An instrument that rigorously measures the positive aspect of MHL can help determine a population's or individual's level of knowledge of factors promoting mental health. Furthermore, it could be used to evaluate interventions and educational initiatives to increase our understanding of the positive aspects of MHL and its associations with good mental health in adolescents.

A major challenge to developing a measure that assesses knowledge of factors promoting mental health is that individuals' conceptions of what is needed to obtain and maintain mental health are highly individualized. However, there are known commonalities of the factors essential for obtaining and maintaining mental health. In this study, the basic psychological needs theory (BPNT) [17] was utilized to ground the measure in dimensions that are theoretically known to be important to good mental health and has been identified as an applicable conceptual framework for studying health-related behavior [18]. According to the BPNT, good mental health can be predicted by three dimensions: competence, autonomy and relatedness [17]. Competence refers to experiencing mastery and effectiveness in managing one's environment. Autonomy refers to a sense of free will or acting out of one's own interests and values. Finally, relatedness addresses the desire to interact with, feel a connection to, and care for other people [19].

The aim of the current study was to describe the development of an instrument measuring adolescents' understanding of how to obtain and maintain good mental health (in this study referred to as mental health-promoting knowledge or MHPK) to represent MHL and to evaluate its psychometric properties. More specifically, the aims were to evaluate the factor structure, internal and construct validity, and test-retest reliability of the instrument.

Methods

The instrument was referred to as the MHPK and was developed in a three-step process (Fig. 1).

Phase 1: item generation

Items were generated through a deductive approach using BPNT as the theoretical foundation [17, 20]. BPNT was applied during the development of the instrument measuring the positive component of MHL, i.e., component one in the recent definition, to identify the factors that actively promote mental health. In addition, a review of the literature on MHL and the seven rights of mental health (identity, meaning, mastering, belonging, safety, participation and sense of community) [21] were utilized to conceptualize knowledge of good mental health when generating relevant items. Thirty-two items were initially

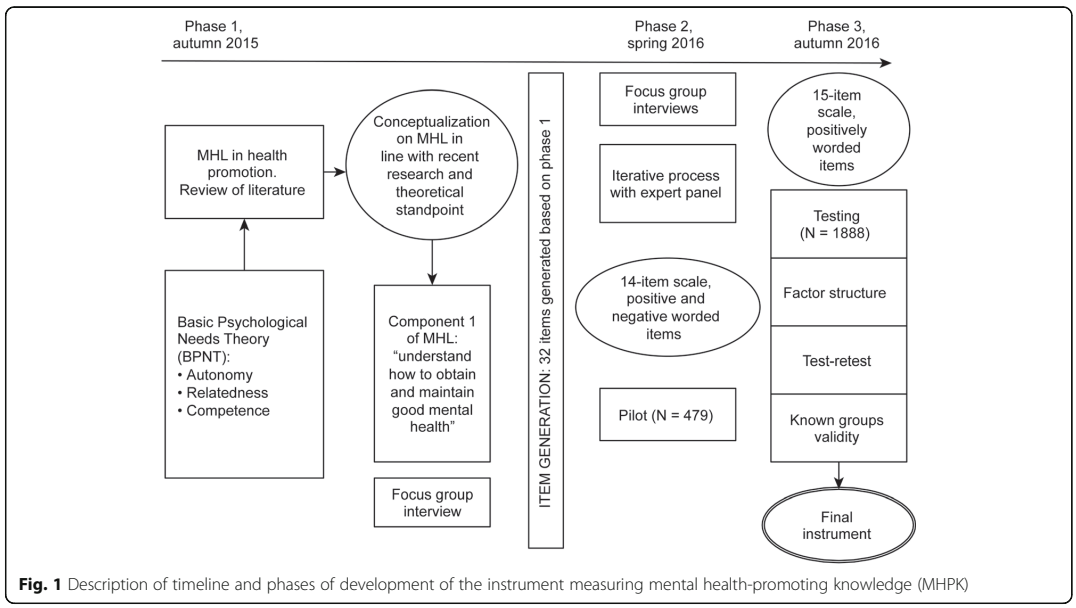

Fig. 1 Description of timeline and phases of development of the instrument measuring mental health-promoting knowledge (MHPK)

generated. Item generation was grounded in the three dimensions of BPNT and based on the narrative literature review and focus group discussions with adolescents. With the 32 items, all three dimensions of the BPNT were covered by a minimum of 7 items each, and recurrence in item proposals was observed. Hence, the decision was made within the research group to begin working with the pool of 32 items.

Focus group interviews

To explore and include adolescents' perceptions of good mental health, five focus group interviews were conducted [22]. Adolescents aged 15–21 years from four upper secondary schools in an urban area in mid-Norway participated in the discussions in phase 1 (Fig. 1). Participants were recruited through the schools' student councils by self-selection. There were 6–10 participants in each group, and both genders were represented, with a preponderance of girls. Semi-structured interview guides were developed in advance and used during the discussions. Mental health, factors important for good mental health, and items from the MHPK scale were discussed with the adolescents during an approximately one-hour session. The focus group discussions were transcribed, and adolescents' collective perceptions of items and factors important for good mental health were extracted and used in scale development. No further analysis of the focus group discussions was performed for the purpose of scale development.

Expert panel

For content validation, an expert panel was invited to participate in the study (n = 10). Three public health nurses and six researchers within the field of health promotion (N = 9) provided iterative feedback during item development. Invitations to participate in the expert panel were extended to authors' associates with appropriate academic qualifications and professional expertise in the field of mental health and school health services. The expert panel was asked to categorize items within the dimensions of competence, relatedness and autonomy. The items were included only if they were categorized in the same dimension and considered relevant by >7 members of the expert panel. This categorization eventually resulted in the inclusion of 15 items in the pilot study.

Phase 2: pilot testing

A questionnaire including the 15-item scale was piloted at one upper secondary school in phase 2 (Fig. 1). Following informed consent from the principal to pilot the questionnaire at the designated school, each teacher chose whether they wanted to administer the survey to their class. The questionnaire was then administered by teachers over a two-week period; the teachers chose the session for administering the questionnaire at their convenience. The questionnaire was then given to 490 of 1075 students (46%); n = 479 (98%) responded. Pilot data were explored using Stata [23], and initial principal

component analyses (PCA) were performed. Based on the focus group interviews, the expert panel comments and the pilot study results, two reversed items were deleted (e.g., in PCA, negative items generated a separate factor), one item was reworded, and two new items were added. In addition, "don't know" was added as a response option. A 15-item scale was constructed and evaluated in phase 3 of the present study.

Phase 3: participants

Sample 1

Over a three-week period in August 2016, a cross-sectional classroom survey was conducted at five upper secondary schools in an urban area in mid-Norway. Three of these five schools also participated in Phase 1, and one school also participated in the pilot study.

The questionnaire was administered to 2145 of 3281 students (65.4%), and n = 2087 (97.3%) responded with usable information (Fig. 2). The ages of the respondents ranged from 15 to 21 years. Seventy-four (3.9%) respondents did not report their age, and missing age values were replaced with the mean age of the sample (M = 17.02, SD = 1.04). The adolescent sample consisted of 51% girls and 49% boys; 62% of the students were from the "general studies" stream, whereas 38% of students were from "vocational studies" stream. When asked about their parents' education, 38% of the adolescents responded "do not know"; 4.8% reported that their parents had received primary school education; 19%, upper secondary school; 21.7%, less than 4 years of university education; and 25.8%, more than 4 years of university education.

Procedure

Principals gave informed consent for data collection at the designated schools. Information regarding participation was provided by the research team through the schools' teachers, and parents and students received written information letters. Furthermore, a short informational video was available to all participants on the schools' e-learning platform (i.e., "it's learning"). Teachers were responsible for allocating time and administering the survey, including reading aloud an information letter provided by the research group that stated that participation was voluntary and anonymous. Students aged 16 years or older gave consent for participation by completing the questionnaire, whereas written parental consent for students aged 15 was obtained. The study was approved by the Regional Committee for Medical and Health Research Ethics (REK midt 2014/1996).

Sample 2: known-groups validity

To further validate the instrument, third-year nursing students from the Norwegian University of Science and Technology (NTNU) were asked to respond to the

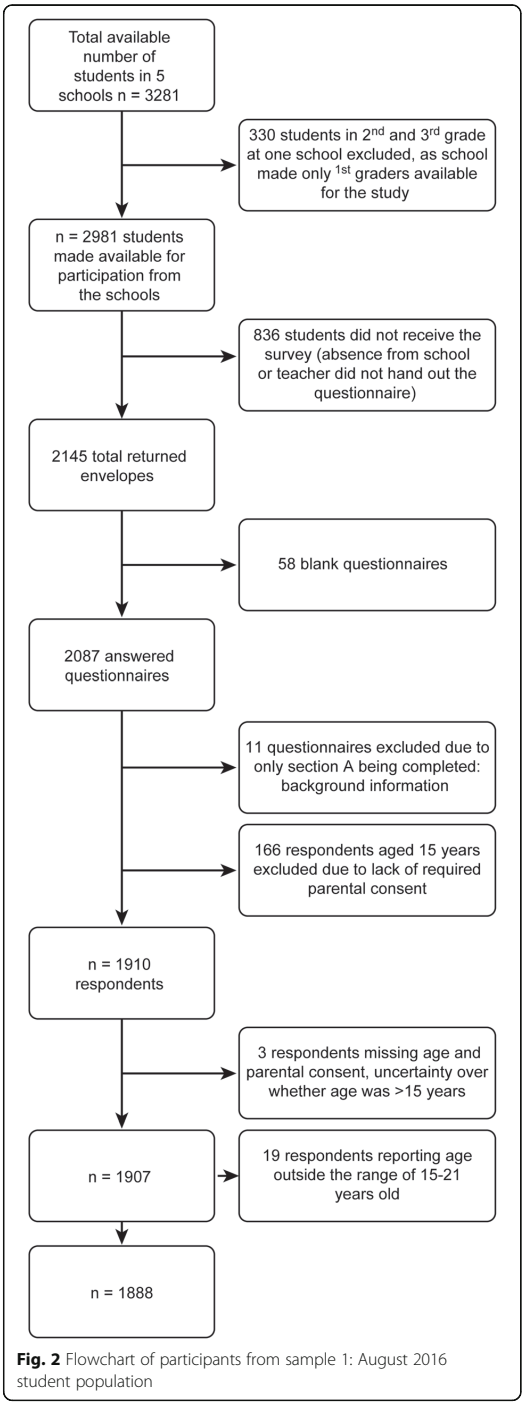

Fig. 2 Flowchart of participants from sample 1: August 2016 student population

MHPK instrument to complete a known-groups validity test. Third-year nursing students are expected to have higher levels of knowledge of the factors promoting mental health than adolescents aged 15–21 years, considering their educational background in mental health and health promotion. The instrument was distributed at the end of a regular lecture, and students who wanted to answer (n = 44) returned the completed MHPK before they left class, thereby forming a discretionary sample. The Norwegian Social Science Service (NSD) approved the inclusion of nursing students to test known-groups validity.

Measure

The MHPK scale was included as part of a questionnaire covering mental health and school health services. The MHPK measure consisted of 15 items representing statements of factors important to positive mental health; respondents were asked to rate each item on a six-point scale ranging from 1, "completely wrong", to 5, "completely correct", in addition to 0, "don't know".

Statistics

STATA version 14.2 (StataCorp. 2015, Stata Statistical Software: Release 14, College Station, TX: StataCorp LP [23]) and Microsoft Excel (2011, version 14.7.1) were used for statistical analyses.

The 15 items were initially analyzed using principal component analysis (PCA) orthogonal rotation by default to explore the factor structure and identify split loadings to reduce items; 0.32 was set as the minimum factor loading, and loadings >0.55 were considered good [24]. Data were examined for normality, frequency and patterns of missing data. Testing for normality revealed significant kurtosis and skewed data (p-value <0.001). The data were determined to have a non-normal distribution, and thus Satorra-Bentler (robust to non-normality) was used as an estimation method in the confirmatory factor analysis (CFA) [25, 26]. CFA was performed to evaluate the model fit of the factor structure based on the PCA and to identify problematic items by inspecting modification indices (MI). Two different models were estimated to find the best fit: a 10-item version with a one- or three-factor solution. The fit indices assessed with cut-off values included the following: Chi-square test (χ^2) to evaluate the global model fit; the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI), with values >0.90 considered adequate (preferably >0.95) [26]; Root Mean Square Error of Approximation (RMSEA), with cut-off values of <0.8 (preferably <0.5) [26]; and Standardized Root Mean square Residual (SRMR), where values <0.10 were considered acceptable [27]. Inter-item correlations and correlations between factors were evaluated using Pearson's r. McDonald's omega was calculated to evaluate the internal consistency of the measure [28].

Missing values

All items were examined for missing values. In total, 94.6% of adolescents (n = 1786) responded to all items, 3.4% were missing one or two items, and the remaining 2% were missing 3–14 items. Items were missing at random and were evenly distributed across the scale, ranging from 0.9% to 2.5% on each item. Cases were deleted listwise.

Test-retest reliability

Three weeks after the initial data collection, the instrument was administered to a discretionary sample subgroup (n = 219) of the original sample to evaluate the test-retest reliability of the instrument using Pearson's correlation coefficient, r. A test-retest correlation coefficient above 0.70 was considered acceptable.

Known-groups validity

To test the construct validity of the instrument, a known-groups validity test was performed; specifically, a two-tailed independent samples t-test was conducted to evaluate the mean group differences between the adolescent/student sample and the sample of nursing students. To evaluate the strength of the differences in mean scores between the adolescents and nursing students, the effect sizes were interpreted using Cohen's d [29].

Results

Principal component analysis

Fifteen items were included in the PCA. Parallel analysis, eigenvalues and scree plots were used to determine how many factors should be retained after PCA. Two factors had eigenvalues above 1 (4.8 and 1.2), and the scree plot leveled off immediately after the two factors [24, 27]. Factor 1 explained 48% of the variance, while factor 2 accounted for 12% of the variance; the other factors explained very little of the variance in the 15 variables. PCA revealed five problematic items (items 1, 3, 4, 9 and 10), referring to a split loading >0.32 on two factors. Items were removed after evaluation of the split loadings and careful consideration of the item content (Table 1). Removing the five initially problematic items resulted in a 10-item one-factor solution in the PCA that explained 41% of the variance; the other factors explained <10% of the total variance. The 10-item version was referred to as the MHPK-10 (a copy of the MHPK-10 can be found as Additional file 1). The results of bivariate correlations showed significant inter-item correlations of the 10 items ranging from r = 0.29 to 0.52.

Table 1 Items, descriptive statistics and factor loadings in PCA

Items	Mean	Split factor loadings 15-item version: n = 1786		Factor loadings 10-item version: n = 1813	Intended theoretical dimension
		Factor1	Factor2		
1. Having at least a good friend		0.50	0.56		Relatedness
2. Handling stressful situations in a good manner	4.20			0.62	Competence
3. Having influence on your own day		0.60	0.37		Autonomy
4. Acting out of your own wishes		0.59	0.44		Autonomy
5. Believing in yourself	4.62			0.70	Competence
6. Having good sleep routines	4.18			0.63	Competence
7. Making decisions based on own will	4.39			0.59	Autonomy
8. Setting limits for your own actions	4.30			0.66	Autonomy
9. Being a good friend		0.67	0.36		Relatedness
10. Feeling safe at home		0.70	0.42		Relatedness
11. Feeling that you belong in a community	4.58			0.66	Relatedness
12. Mastering your own negative thoughts	4.20			0.72	Competence
13. Setting limits for what is OK for me	4.41			0.72	Autonomy
14. Feeling valuable regardless of your own accomplishments	4.20			0.74	Relatedness
15. Experiencing school mastery	4.10			0.68	Competence
Explained variance per factor		48%	12%	41%	

BPNT was used for item development and included three dimensions: competence, relatedness and autonomy
Frequency N per item range was 1840–1871
Cases were deleted listwise

Confirmatory factor analysis of the final 10-item version

Following the PCA, the 10-item version was assessed in CFA to evaluate the factor structure. Two models were tested. The one-factor model was based on the PCA and referred to the concept of MHPK as one component of MHL. The three-factor model was based on the theoretical foundation of BPNT and its three dimensions for item development.

The model fit indices presented in Table 2 reveal a slightly better fit for the three-factor model than for the one-factor model; however, both models showed a decent fit to the data. The correlations between factors in the three-factor model were strong (0.82 to 0.97), and the one-factor model representing the positive component of MHL was theoretically preferred. A final 10-item one-factor model was therefore estimated and exhibited an adequate model fit (Fig. 3).

Table 2 Fit indices for CFA models. One- and three-factor solutions for the 10-item version of the MHPK

MHPK 10-item version							
Model	χ^2	df	χ^2 /df	CFI	RMSEA	SRMR	TLI
Single-factor	169.41[a]	35	4.84	0.946	0.046	0.035	0.930
Three-factor	114.25[a]	32	3.57	0.967	0.038	0.027	0.953

Note: All p values are statistically significant ($p < 0.001$)[a]; n = 1813

McDonald's omega (ω = 0.84) of the one-factor model was high, indicating support for the internal consistency of the one-factor solution based on the measure's internal structure [28]. The final 10-item one-factor model showed good to excellent factor loadings (0.57–0.72) and a reasonably good fit to the data (Fig. 3). Inspection of MIs indicated that item 8 covaried with several other items, revealing a covariance MI of 75.9 with item 7. After removing item 8, all MIs were ≤20. However, as the preset criteria for model fit were met, no modifications based on MIs were made [30].

Test-retest

The test-retest coefficient for the 10-item version was r = 0.74, indicating acceptable reliability of the instrument according to the a priori established cut-off value of 0.70.

Known-groups validity

The results of the independent samples t-tests showed that nursing students (M = 4.69, SD = 0.33) scored significantly higher on the scale than adolescents (M = 4.51, SD = 0.54), t = 2.2012, p = 0.0278. The difference in mean scores between adolescents and nursing students was 0.18 and of medium strength (Cohen's d = 0.40). The results support the instrument's construct validity by showing

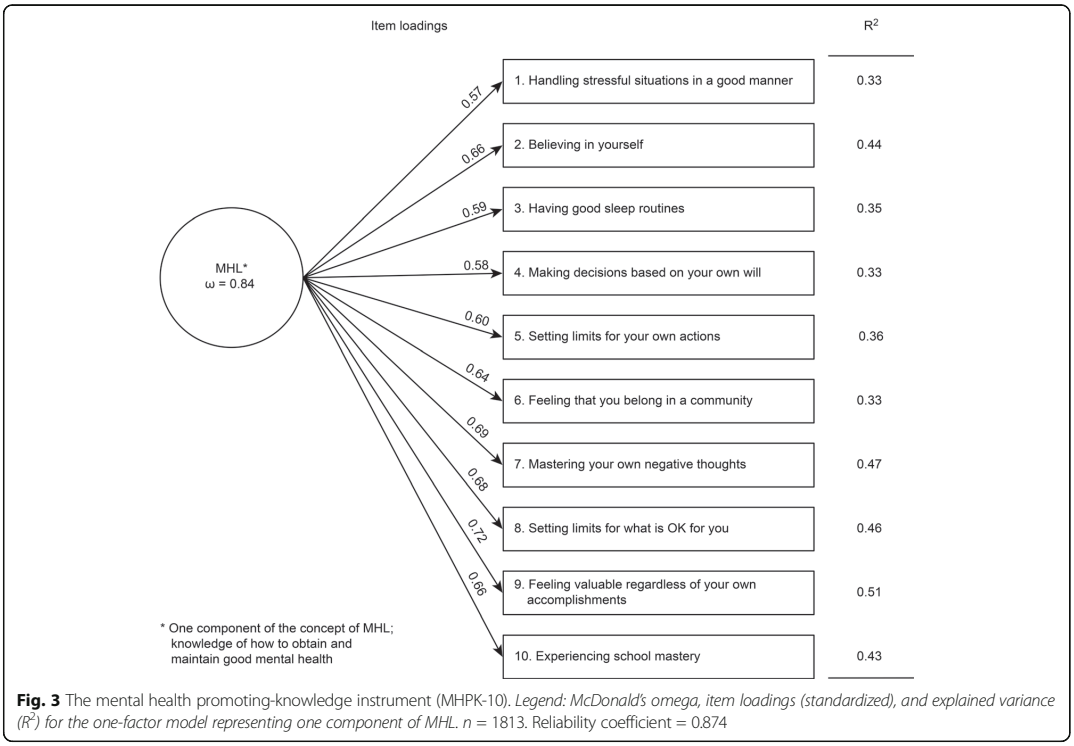

Fig. 3 The mental health promoting-knowledge instrument (MHPK-10). *Legend: McDonald's omega, item loadings (standardized), and explained variance (R^2) for the one-factor model representing one component of MHL. n* = 1813. Reliability coefficient = 0.874

that third-year nursing students scored significantly higher than adolescents on the measure of factors promoting good mental health, as expected.

Descriptive statistics for the MHPK-10

The adolescent population was used to generate descriptive statistics for the MHPK-10. The mean score was 4.51 (SD = 0.54 Minimum = 0, Maximum = 5, 95% CI = 4.29–4.53). The results of the MHPK-10 showed that 19.33% of the student population had an insufficient level of knowledge of factors promoting good mental health (a mean score < 4 was used as a preliminary cut--off for an insufficient level of knowledge since values 4 and 5 identifies the correct answer to each statement; however, this cut-off must be further evaluated). In terms of analyses using the MHPK-10, we suggest using mean scores and allowing two missing items per respondent.

Discussion

In this study, we successfully developed a valid and reliable instrument that measures adolescents' knowledge of factors promoting good mental health. In promoting mental health, there has been a shift from a problem-focused approach emphasizing the prevention of psychological distress and viewing mentally negative conditions as illnesses toward a greater focus on resources contributing to positive development and wellbeing [31]. Consequently, the positive conditions and factors involved in mental health promotion need to be assessed with relevant and psychometrically sound measures, such as measures of MHL. MHL has not been consistently conceptualized in the literature, and thus no gold standard for measuring the concept exists [14]. However, in the field of HL, complex conceptual models have been developed [5]. These models are useful to place MHL in a wider context, but it is important to emphasize that we do need a domain-specific approach for MHL to draw attention to a neglected area [10]. Mental health is an integral part of health [13], thus MHL may be merged with HL in the future, but for now, there is a need for a domain-specific approach for mental health to specifically meet the need for tailored measures in the evaluation of MHL interventions [10] and assessment of MHL levels in populations. The MHPK-10 measure is a contribution to the field of MHL and is based on the most recent conceptualization of MHL [14, 16]. When discussing the relationship between knowledge and health behavior in the final paragraph of this discussion section, MHPK will be discussed in the context of Sørensen et al.'s conceptual model of HL.

Development of the instrument

The approach used to develop the instrument followed scientifically accepted principles [20]. The major challenge was developing items that detected knowledge within the scope of MHL in health promotion without being overly intuitive. Intuitive items might have led to artificially high mean scores, subsequently missing adolescents with low knowledge of factors promoting good mental health. The results were skewed, which may be because the population had high levels of knowledge or because the scale was too intuitive. It is challenging to cover all aspects of MHPK because individuals' conceptions of what is needed to strengthen mental health vary. However, the items were based on a solid theoretical foundation, adolescents' opinions and acknowledged expertise to ensure a solid grounding for the instrument. Combined with the empirically determined seven mental health rights [21], substantial groundwork was established to ensure that the instrument had a theoretical and empirical foundation to measure factors promoting good mental health. Thus, the MHPK-10 is considered a solid starting point for further development and validation of a measure assessing one component of MHL: knowledge of how to obtain and maintain good mental health.

Factor structure

The PCA yielded support for a one-factor solution of the 10-item version of the MHPK reflecting component one (understanding how to obtain and maintain good mental health [7]) of the four components included in the definition of MHL. A three-factor structure was also evaluated considering the three dimensions of BPNT utilized to generate the items. The fit indices showed a slightly better fit for the three-factor model than for the one-factor model. However, the covariance between the three factors was high, and a one-factor solution corresponded better with the instrument as a measure of one component of MHL. Furthermore, the dimension relatedness in the three-factor solution was problematic and consisted of only two items. Thus, the instrument was constructed as a one-factor model with good to excellent factor loadings and a good overall McDonald's omega value corresponding to the intended component of MHL.

Evaluation of validity and reliability

According to the results, the reliability of the instrument was acceptable. The MHPK-10 demonstrated good internal validity and test-retest reliability. The test-retest analyses were used to assess the consistency and sensitivity of the measure over time. The known-groups validity test showed that the instrument was able to differentiate between those who were expected to have greater knowledge of factors promoting good mental health based on their university education and those who were expected to have less knowledge, namely, upper secondary school students. However, when examining the actual variance of the results, the differences in mean scores were small. Both groups had acceptable levels of knowledge. This finding can be interpreted as variations within the accepted level of knowledge that could be of clinical and practical relevance in mental health promotion. At this point, the instrument should not be used solely to detect whether a population has sufficient knowledge of factors promoting health but rather to identify the fraction of the population lacking this knowledge and areas in need of public mental health education.

Strengths and limitations

One strength of the current study is the large sample size and high response rate. A sound psychometric evaluation was performed to assess the MHPK-10 measure; the findings contribute to the field by enabling future use and call for further development and validation of the instrument. However, the results should be interpreted with some caution. The focus groups may have been subject to self-selection bias. The instrument may therefore be overly influenced by females' opinions on mental health, given the preponderance of girls in the focus groups. However, males were represented and contributed opinions and experiences in all focus groups and in the expert panel. For the survey, teachers served as administrators of the questionnaire and thus may have influenced which classes had the opportunity to participate in the study by serving as gatekeepers for student participation.

Finally, the MHPK-10 score distributions showed little variance in the mean scores and hence demonstrate a possible ceiling effect, indicating that the measure in its current form does not sufficiently discriminate among adolescents with high MHPK-10 levels. This ceiling effect may cause difficulties in establishing the discriminant validity of the scale.

Implications and future research

Future research should further refine the MHPK-10 to be less intuitive, thus yielding more variance in the item responses and reduce ceiling effects. Further testing of the scale is needed to evaluate the cut-off values for sufficient knowledge of factors important for good mental health. Further validation of the instrument across samples and age groups is also needed. The implications for adolescent mental health may include that the MHPK-10 identifies mental health promotion areas with low levels of knowledge in populations. Public health practitioners could subsequently target their mental health education toward the aspects with an identified need in particular populations. The MHPK-10 also has the potential to be used to evaluate mental health-

promoting education initiatives aimed at increasing knowledge of factors promoting mental health to improve and better tailor these initiatives. As MHL is considered an outcome of mental health promotion actions, every item in the MHPK-10 is considered applicable and translatable into public health practice; i.e., mental health education can be developed to improve knowledge of any of the items [32]. The MHPK-10 identified approximately 20% of the student population as having inadequate knowledge of factors promoting good mental health. This finding corresponds well with established numbers on adolescents' mental health status; specifically, 15–20% of Norwegian adolescents report mental health issues [1]. An important next step is to study the relationship between the MHPK-10 and mental health, in particular, how levels of knowledge of factors promoting mental health are related to self-reported mental health and mental health-promoting behavior.

MHL and health-promoting behavior

It is important to consider the difference between adolescents' knowledge of the factors that promote mental health and their possession of the skills to apply that knowledge. With respect to the process of applying the knowledge detected by the MHPK-10, Sørensen et al.'s HL model is a relevant model. Sørensen et al.'s model introduces competencies, knowledge and motivation of how to access, understand, appraise and apply health-related information as central in HL [4, 5]. According to the model, health-related knowledge empowers people to participate in health-promoting activities in communities [5], e.g., in a school setting. The MHPK-10 instrument measures knowledge of factors important to obtain and maintain good mental health on an individual level for use in a public health perspective. Although knowledge of these factors or mental health literacy does not necessarily lead to mental health-promoting behavior, we argue that knowledge is as a necessary foundation for making purposeful health-promoting decisions, in line with Sørensen et al.'s conceptual model of HL [5]. HL is known to affect health behavior and consequently health outcomes [4], and we expect MHL to have similar impact. Although knowledge does not necessarily mean skills, again, we argue that knowledge is fundamental for building skills to apply knowledge and a necessary starting point for promoting mental health among adolescents.

Conclusion

This study found support for a valid and reliable 10-item one-factor measure of adolescents' knowledge of factors promoting good mental health. A rigorous evaluation of the scale's psychometric properties was performed, and satisfactory internal consistency and construct validity were established. The MHPK-10 is a solid first step toward creating a sound measure of the positive aspects of MHL and has the potential to complement current measures of MHL for use in health promotion. The results are particularly applicable for guiding the development, targeting and evaluation of public mental health education initiatives, with the main goal of building a foundation for good mental health, wellbeing and productive future lives for adolescents. The MHPK-10 measure provides a novel contribution and requires further refinement and validation.

Additional file

Additional file 1: MHPK-10 instrument. A copy of the 10-item MHPK instrument that measures adolescents' knowledge of how to obtain and maintain good mental health. (PDF 105 kb)

Abbreviations

BPNT: Basic psychological needs theory; MHL: Mental health literacy; MHPK: Mental health-promoting knowledge

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Availability of data and materials

The raw data supporting the findings in this manuscript can be found at the NTNU Norwegian University of Science and Technology, Department of Public Health and Nursing, Trondheim, Norway and are available from the corresponding author on reasonable request.

Authors' contributions

HNB and RR performed the quantitative and qualitative data collection and prepared the data for analysis. UKM, MEBE and GAE obtained funding and supervised the project. HNB initiated the scale development, conducted the literature review, organized the expert panel and test-retest analysis, performed the data analysis and drafted the manuscript. All authors provided input on the manuscript and read and approved the final version.

Ethics approval and consent to participate

The study was approved by the Regional Committee for Medical and Health Research Ethics (REK midt 2014/1996). All participants were informed that participation was voluntary and anonymous through written letters, a video made by the research group that was available on the school's e-learning platform, and oral information provided by teachers in each class prior to distributing the questionnaires. Students aged 16 years and older gave consent for participation by completing the questionnaire, and written parental consent for students aged 15 was obtained.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Paper II

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The Relationship Between Positive Mental Health Literacy and Mental Well-Being Among Adolescents: Implications for School Health Services

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Abstract

Mental health education is a central part of school nurses' practice. Mental health literacy is an asset for health that educational initiatives can strengthen, and a significant determinant of mental health. This study was intended to examine the relationship between positive mental health literacy (PMeHL) and mental well-being to discuss its implications for school health services' mental health education. The relationship was assessed using a multiple linear regression model controlling for relevant covariates. Data were derived from a cross-sectional school-based survey including 1,888 adolescents aged 15–21 years (response rate 97.3%). A weak gender difference was found in PMeHL. The regression model accounted for 41% of the variance in adolescents' mental well-being; PMeHL was a significant explanatory variable of mental well-being. Accordingly, the current study found support for including PMeHL, or knowledge of how to obtain and maintain good mental health, as an integral component of school health services' mental health education among adolescents.

Keywords

mental well-being, positive mental health literacy, mental health literacy, adolescence, school health services, mental health promotion, school nursing

School health services play an important role in health care for the adolescent population by providing health education, promoting health, and addressing diverse health problems (American Nurses Association & National Association of School Nurses, 2015). Mental health in the adolescent population has received considerable attention in recent years and has emerged as a public health concern that needs to be addressed (Norwegian Institute of Public Health, 2014; World Health Organization, 2013). School nurses are in a position to provide mental health education and may therefore greatly influence adolescents' mental health and well-being (American Nurses Association & National Association of School Nurses, 2015); thus, determining what to include in the mental health education provided by school nurses is important.

Adolescence is characterized by a sense of increasing independence, emerging adult responsibilities, and the development of decision-making abilities. Learning and adopting health-promoting knowledge and behavior during this formative life period may improve healthy decision-making and health literacy among adolescents (Bröder et al., 2017). Health literacy involves having the knowledge and competence necessary to meet the complex health-related demands of our society (Sørensen et al., 2012). Health literacy is an essential life skill that represents a building block for health (Kickbusch, 2008) and is an outcome of health education initiatives (Nutbeam, 2000). Mental health literacy (MHL), a component of health literacy, can be expected to have similar attributes (Kutcher, Wei, Costa, et al., 2016). Adolescents constitute a target group for MHL interventions (Bröder et al., 2017), and school health services have emerged as a sensible setting for promoting MHL. Health education and health promotion,

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including mental health, are core elements for school nurses working with adolescents (American Nurses Association & National Association of School Nurses, 2015). It is well established that the foundation for mental health and well-being is laid in the early years (Braddick, Carral, Jenkins, & Jané-Llopis, 2009). Promoting mental health in adolescents can benefit society as a whole and is important for ensuring a healthy and productive future adult population (World Health Organization, 2008, 2013, 2016).

Previous research has identified mental health as an area where adolescents themselves have expressed a need for health education (Smart, Parker, Lampert, & Sulo, 2012). Mental health includes mental well-being (World Health Organization, 2014), and mental well-being is defined as something more than the absence of mental illness; it is defined as a positive mental state that allows individuals and populations to thrive (Clarke et al., 2011). In adults, mental well-being has been regarded as comprising happiness, contentment, subjective well-being, self-realization, and positive functioning (Ryan & Deci, 2001). Mental well-being among adolescents has been less studied (Clarke et al., 2011).

MHL is an evolving concept that has been conceptualized in different ways since it was first coined by Jorm and colleagues in 1997 (Jorm, 2015; Jorm et al., 1997; Wei, McGrath, Hayden, & Kutcher, 2015). In past years, MHL has evolved from a focus of mental illness and risk factors to becoming an asset for health that can be strengthened through educational initiatives (Kutcher, Wei, & Coniglio, 2016). A recent definition of MHL outlined four key components:

> (1) Understanding how to obtain and maintain good mental health, (2) understanding mental disorders and their treatments, (3) decreasing stigma related to mental disorders, and (4) enhancing help-seeking efficacy (knowing when, where, and how to obtain good mental health care and developing competencies needed for self-care [Kutcher, Wei, Costa, et al., 2016]).

MHL has been shown to be a significant determinant of mental health in the population (Bröder et al., 2017; Jorm, 2012; Kutcher, Wei, & Coniglio, 2016; Wei, Hayden, Kutcher, Zygmunt, & McGrath, 2013). Previous research on MHL has focused on mental illness (Chambers, Murphy, & Keeley, 2015) and suggests that adolescents' MHL is associated with their mental health status; specifically, low levels of MHL were found to be associated with depression (Lam, 2014). Additionally, education has been shown to influence MHL, with less education being associated with less knowledge of the prevalence and symptoms of mental disorders (Von Dem Knesebeck et al., 2013). Furthermore, gender differences in adolescent MHL have been observed, with males scoring lower and females scoring higher on MHL measures (Cotton, Wright, Harris, Jorm, & McGorry, 2006).

Aim

The purpose of this study was to investigate whether it is worthwhile to include education on how to obtain and maintain good mental health in the health education provided by school nurses working with adolescents. The specific aim of this study was to identify the positive component of MHL (positive mental health literacy [PMeHL]), namely, understanding how to obtain and maintain good mental health (Kutcher, Wei, Costa, et al., 2016), and its relations to mental well-being to discuss its implications in a school health context. To the authors' knowledge, the relationship between PMeHL and mental well-being has not been previously studied. Gender, age, family affluence, loneliness, stress, and physical health have been shown to influence adolescents' mental well-being (World Health Organization, 2016); accordingly, these variables were included as covariates in the current study. Furthermore, gender differences in mental well-being and PMeHL were investigated.

Method

Participants

The current study was based on a cross-sectional classroom survey of adolescents aged 15−21 years at five upper secondary schools in an urban area in mid-Norway. In Norway, the prevalence of mental health disorders among children and adolescents is 15–20% (Norwegian Institute of Public Health, 2014), which is comparable to other Western countries such as the United States, where a total of 13–20% of children experience a mental disorder in a given year (Centers for Disease Control and Prevention, 2013). The five schools are located in Sør-Trøndelag County and offer a broad variety of both vocational and general courses. The study was approved by the Regional Committee for Medical and Health Research Ethics (REK midt 2014/1996).

The schools in the current study include 5 of the 10 upper secondary schools (8 public and 2 private) in one of the largest cities in Norway. Four of the included schools are public and one private school, representing typical Norwegian upper secondary schools. The five schools are recruited from two of the four geographical districts in the city, where all districts are relatively similar in terms of sociodemographic factors. Each school has 260 to 1,087 students with an even distribution of boys and girls, where the majority of adolescents have parents with a higher education and a good financial situation in their family (Table 1). The questionnaire was administered to 2,145 (65.4%) of the 3,281 students, and 2,087 responded with usable information, with a response rate of 97.3%. Regarding exclusion criteria, 11 respondents were excluded for completing only the background information section of the questionnaire; 169 respondents, for lacking required parental consent, as they were 15 years old; 19 respondents, for being >21 years old; and 74 respondents, for missing information on age. The final

Table 1. Description of the Sample Included in the Analysis.

	N	%
Gender		
Female	957	51
Male	907	48
Missing	24	1
Age		
15	34	2
16	704	37
17	553	29
18	449	24
19	106	6
20	25	1
21	17	1
Education		
General studies	1,156	61
Vocational studies	711	38
Missing	21	1
Parents' education[a]		
Primary and lower secondary school	87	5
Upper secondary school	343	18
University, up to 4 years	393	21
University, more than 4 years	465	25
Don't know	518	27
Missing	83	4
Family finances		
Good	1,305	69
Neither good nor bad	424	23
Bad	115	6
Missing	44	2
Parents live together		
Yes	1,122	59
No	710	38
Missing	56	3
Born in Norway		
Yes	1,727	92
No	140	7
Missing	21	1

Note. $N = 1{,}888$.
[a]Assessed by asking about each parent; the mean score between the mother and father is presented.

sample size was thus $N = 1{,}814$.The mean age of the sample, 17.02 years ($SD = 1.04$), was input for the 74 respondents (3.9%) with missing age information given the small variation in sample age; therefore, $n = 1{,}888$ students were included in the analyses. Table 1 describes the current study sample.

Procedure

The survey was conducted in September 2016. Prior to the survey, principals and teachers received oral and written information from the research group, and the schools' principals gave informed consent for data collection at the designated schools. Questionnaires were available over a 3-week period, during which the teachers chose a convenient session for survey administration. Information was provided to students and parents through a written invitation letter and through an informational video available through the school's e-learning platform. Students aged 16 years and older gave consent for participation by completing the questionnaire, while students aged 15 years provided written parental consent according to the Norwegian Act on Medical and Health Research (Health Research Act, 2008). Prior to survey administration, the teachers read aloud an information letter from the research group that emphasized that participation was voluntary and anonymous.

Measures

The *background variables* used to describe the sample were gender, age, education, parents' living status, and whether the respondent was born in Norway.

Parents' education level was assessed by 1 item: "What is your parents' highest level of education?", with response options of *primary and lower secondary school* (1), *upper secondary school* (2), *university up to 4 years* (3), and *university, more than 4 years* (4).

Family finances were measured by 1 item: "How has your family's financial situation been during the past two years?" The students responded on a scale of *we have had a poor financial situation the whole time* (1), *we have more or less been in a poor financial situation* (2), *we have neither been in a poor nor good financial situation* (3), *we have more or less been in a good financial situation* (4), and *we have been in a good financial situation the whole time* (5).

Loneliness was assessed by 1 item that covered the frequency of feeling lonely: "Do you ever feel lonely?", with response options of *never or almost never* (1), *rarely* (2), *sometimes* (3), *regularly* (4), and *almost all the time* (5).

Stress was assessed using the Norwegian version of the Adolescent Stress Questionnaire (ASQ-N; Moksnes, Byrne, Mazanov, & Espnes, 2010). The ASQ-N consists of 30 items rated on a 5-point Likert-type scale, ranging from *not at all stressful or is irrelevant to me* (1) to *very stressful* (5); higher mean scores indicate higher stress levels (range 0–5). The internal consistency and construct validity of the ASQ-N have been tested among adolescents (Moksnes et al., 2010; Moksnes & Espnes, 2011). Cronbach's α in the present study was .95.

Self-rated health was assessed using 1 item: "How is your current health?" The students responded on a scale of *very poor* (1), *poor* (2), *neither poor or good* (3), *good* (4), and *excellent* (5). This item has been previously found to be satisfactory for use among adolescents (Breidablik, Meland, & Lydersen, 2009).

PMeHL was measured by the 10-item Mental Health Promoting Knowledge (MHPK-10) scale. The MHPK-10 measures the component of MHL that addresses an individual's understanding of how to obtain and maintain good mental health or PMeHL (Bjornsen, Espnes, Eilertsen, Ringdal, & Moksnes, in press). The MHPK-10 is a one-

Table 2. Descriptive Statistics of the Scales Included in Study: Mean (*SD*), *t* Test by Gender, and Number of Observations (*N*).

		Girls	Boys		
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	*t* Test	*N*
Positive mental health literacy	4.51 (0.54)	4.55 (0.55)	4.47 (0.52)	3.03**	1,813
Mental well-being	3.59 (0.71)	3.41 (0.67)	3.78 (0.70)	−11.02**	1,696
Stress	2.43 (0.91)	2.69 (0.88)	2.13 (0.85)	12.01**	1,396
Loneliness	2.5 (1.1)	2.77 (1.07)	2.20 (1.07)	11.24**	1,845
Self-rated health	3.94 (0.95)	3.82 (0.94)	4.07 (0.93)	−5.69**	1,837

**$p \leq .01$.

dimensional instrument consisting of statements of factors important for good mental health within the dimensions of autonomy, relatedness, and competence. Respondents are asked to rate each item on a 6-point scale that starts at *do not know* (0), and then ranges from *completely wrong* (1) to *completely correct* (5); higher mean scores indicate a higher level of knowledge (range 0–5). The MHPK-10 was recently found to be a valid and reliable measure of PMeHL among Norwegian adolescents (Bjornsen et al., in press) and had a McDonald's ω of .84 and Cronbach's α of .86 in the present study.

Mental well-being was measured by the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). The WEMWBS measures subjective well-being and psychological functioning through 14 items assessed on a 5-point Likert-type scale, ranging from *not at all* (1) to *all the time* (5); higher mean scores indicate greater well-being (range 1–5; Putz, O'Hara, Taggart, & Stewart-Brown, 2012). The WEMWBS enables monitoring of the mental well-being of the general population and is validated for use among young people (Clarke et al., 2011; Taggart, Stewart-Brown, & Parkinson, 2015); in this study, Cronbach's α of the WEMWBS was .93.

Statistical Analysis

STATA version 14.2 (StataCorp, 2015, Stata Statistical Software: Release 14. College Station, TX: StataCorp LP) was used for the statistical analysis. Mean scores and standard deviations were examined for the main measures in the current study, and *t* tests were conducted to assess mean differences by gender and place of birth. Cohen's *d* was used to interpret the effect sizes (Cohen, 1998). Pearson's bivariate correlations were calculated to examine the relationships between the main measures in the study. Multiple linear regression analyses with ordinary least squares (OLS) were conducted to determine the unique variance in mental well-being due to PMeHL, while controlling for gender, age, education, parents' education, family finances, loneliness, stress, and self-rated health. An interaction effect was modeled by adding an interaction term between gender and PMeHL. Age, family finances, and education were dummy coded, using the largest response category as the reference group. The significance level was set to $p \leq .05$. Assumptions for OLS were tested using the following parameters: Breusch-Pagan test for heteroscedasticity >0.05, variance inflation factor (VIF) testing for multicollinearity problems <5.00, Shapiro-Wilk's *W*-test for normality of residuals >0.01, Linktest for specification of the model >0.05, test for appropriate functional form >0.05, and Cook's *D* for influential observations <1.00 (Mehmetoglu & Jakobsen, 2017).

Results

The results of the *t* tests investigating gender mean differences in the main variables showed that boys scored higher on mental well-being and self-rated health, whereas girls scored higher on PMeHL, stress, and loneliness (Table 2). Based on Cohen's *d* (Cohen, 1998), the effect size was considered small for gender differences in PMeHL (.15) and self-rated health (.26) and medium for gender differences in mental well-being (.54), stress (.65), and loneliness (.53; Cohen, 1998).

The results of the *t* tests investigating place-of-birth mean differences in the main variables showed that adolescents not born in Norway report significantly more stress and poorer family financial situation than adolescents born in Norway; the former are also slightly older than adolescents born in Norway in the current study sample (Table 3). No other differences were found based on adolescents' place of birth in this study.

Bivariate correlations of the study measures were calculated (Table 4). Age showed a significant, negative, and weak correlation with parents' education, family finances, and self-rated health. Adolescents who perceived their family's financial situation to be good scored significantly lower on loneliness and stress and significantly higher on self-rated health, PMeHL, and mental well-being. Higher parental education was significantly associated with lower mental well-being among adolescents. Loneliness correlated significantly with higher levels of stress and with lower levels of PMeHL, mental well-being, and self-rated health. Stress was significantly correlated with lower levels of physical health and lower mental well-being. PMeHL correlated significantly and positively with mental well-being and higher levels of physical health (Table 4).

Table 3. Mean (SD), *t* Test, Number of Observations (*N*), and Cohen's *d* for Differences Between Adolescents by Place of Birth.

	Born in Norway	Not Born in Norway			
	Mean (*SD*)	Mean (*SD*)	*t* Test	*N*	Cohen's *d*
Age	17 (0.03)	17.24 (0.11)	−2.55**	1,867	−0.22
Education mom	2.55 (0.03)	2.41 (0.13)	1.30	1,809	0.12
Education dad	2.53 (0.03)	2.69 (0.12)	−1.35	1,779	−0.12
Family finances	3.04 (0.02)	2.55 (0.10)	4.31**	1,832	0.39
Loneliness	2.49 (0.03)	2.59 (0.09)	−.86	1,826	−0.08
Stress	2.41 (0.03)	2.69 (0.11)	−2.65**	1,385	−0.31
Self-rated health	3.94 (0.02)	3.97 (0.08)	−.37	1,819	−0.03
PMeHL	4.51 (0.01)	4.60 (0.05)	−1.99	1,799	−0.18
Mental well-being	3.59 (0.02)	3.53 (0.07)	0.77	1,682	0.08

Note. PMeHL = Positive Mental Health Literacy.
**$p < .01$.

Table 4. Correlations Between the Study Variables.

	Age	EM	ED	FF	LO	ST	PH	PMeHL	MW
Age	1								
Education mom (EM)	−0.12**	1							
Education dad (ED)	−0.07**	0.62**	1						
Family finances (FF)	−0.08**	0.07**	0.05*	1					
Loneliness (LO)	0.06	0.01	0.01	−0.21**	1				
Stress (ST)	0.04	−0.05	−0.03	−0.14**	0.39**	1			
Physical health (PH)	−0.05*	−0.03	−0.02	0.28**	−0.38**	−0.27**	1		
Positive mental health literacy (PMeHL)	0.01	0.003	0.03	0.09**	−0.12**	−0.03	0.17**	1	
Mental well-being (MW)	−0.01	−0.06*	−0.07**	0.23**	−0.54**	−0.36**	0.44**	0.17**	1

*$p \leq .05$. **$p < .010$.

Regression Analysis

The assumptions for OLS were met; the predetermined criteria for accepting OLS were met by all tests except Shapiro-Wilk's *W*-test, which indicated a problem with nonnormal distribution of residuals ($p \leq .001$). However, after calculating the summary statistics for skewness (−.5373) and kurtosis (4.1998) and inspecting the histogram of the residuals, we concluded that the residuals were approximately normally distributed and that there were no problems with nonnormally distributed errors (Mehmetoglu & Jakobsen, 2017).

A significant regression equation was found, $F(18, 1208) = 48.68$, $p < .0001$), with the model explaining 41% of the variance in mental well-being (Table 5). Loneliness had the strongest negative association with mental well-being, followed by stress and father's education. Self-rated health, followed by male gender and PMeHL, had the strongest positive effect on mental well-being. Having a good family financial situation was associated with higher mental well-being. Mental well-being was stable and approximately equal throughout the different ages of adolescence (15–21 years), except for the age of 18 years, with 18-year-olds reporting significantly higher mental well-being than the reference group of those aged 16 years. Adolescents' education and mother's level of education were nonsignificantly related to mental well-being (Table 5). An interaction effect between gender and PMeHL was tested and found to be nonsignificant (results not shown in the table).

Discussion

In this study of Norwegian adolescents, PMeHL was significantly and positively associated with mental well-being. This finding indicates that adolescents with higher levels of PMeHL reported significantly higher levels of mental well-being than adolescents with lower PMeHL scores. This trend is in line with those observed in several previous studies, which found that focusing on mental health promotion instead of mental illness prevention is an effective approach in adolescent mental health education (O'Mara & Lind, 2013; Weare & Nind, 2011).

PMeHL and Mental Well-Being

MHL and its measures have traditionally focused on knowledge and beliefs about mental *disorders* rather than on mental *health* (Chambers et al., 2015). In recent years, the

Table 5. Summary of Regression Analysis Results.

Mental Well-Being (WEMWBS)	*B*	β	SEB	*T*	Sig. *t*
Gender (*female* = 0, *male* = 1)	.141	.099	.0342	4.11	<.001**
Age (16 years old as reference category)					
15 years old	.012	.025	.030	1.09	.778
17 years old	.017	.011	.039	0.43	.664
18 years old	.089	.054	.041	2.15	.032*
19 years old	.027	.009	.071	0.39	.698
20 years old	.086	.013	.149	0.58	.563
21 years old	−.067	−.008	.186	−0.36	.717
Line of study (general studies as reference category)					
Vocational studies	−.042	−.026	.038	−1.11	.269
Mother's education (years of education)	−.013	−.022	.017	−0.78	.438
Father's education (years of education)	−.042	−.073	.016	−2.60	.009**
Family finances (good family financials as the reference category)					
Poor family financials the whole time	.278	.051	.125	2.22	.026*
More or less poor family financials	−.203	−.057	.083	−2.44	.015*
Neither poor nor good family financials	−.096	−.056	.043	−2.20	.028*
More or less good family financials	−.047	−.031	.038	−1.25	.213
Loneliness	−.241	−.371	.017	−14.22	<.001**
Stress	−.102	−.130	.019	−5.26	<.001**
Self-rated health	.161	.218	.019	8.62	<.001**
Positive mental health literacy (PMeHL)	.126	.094	.030	4.16	<.001**
Constant	3.435		.180	19.09	<.001
N	1,227				
R^2 (adjusted)	.41				

*Significant at the 5% level, $p \leq .05$. **Significant at the 1% level, $p \leq .01$.

conceptualizations and measures of MHL have included a component on achieving and maintaining good mental health (Bjornsen et al., in press; Kutcher, Wei, Costa, et al., 2016). Studying the relationship between PMeHL and mental well-being is consistent with the past decade's advances in mental health promotion, in which there has been increasing awareness of the effects of strengthening mental well-being on mental health (Maheswaran, Weich, Powell, & Stewart-Brown, 2012; World Health Organization, 2008). In adults, mental well-being has been considered to comprise happiness, contentment, subjective well-being, self-realization, and positive functioning (Ryan & Deci, 2001). However, mental well-being has been studied less among adolescents (Clarke et al., 2011).

Interestingly, this study showed that parental education level, especially father's education level, was negatively associated with mental well-being; adolescents' mental well-being decreased as fathers' education increased. Parental education is an important index of socioeconomic status and is thought to predict behavioral outcomes and academic achievements (Dubow, Boxer, & Huesmann, 2009). However, it is important to note that achievements and absence of mental illness do not necessarily translate into mental wellness (Rose et al., 2017). Previous studies have established that parental education is a unique positive predictor of children's achievements (Dubow et al., 2009), and there is a link between parents' expectations and children's achievements (Shute, Hansen, Underwood, & Razzouk, 2011). As both parents' education and parents' expectations predict children's academic achievements, we may assume that parents with higher education have higher expectations for their children's academic achievements. While expectations can certainly be helpful, expectations that are set too high can cause stress (Pickhardt, 2010). In the current study, stress was negatively correlated with mental well-being, which is consistent with previous findings (Sigfusdottir, Kristjansson, Thorlindsson, & Allegrante, 2016). Future research should examine high parental expectations as a possible explanation for why adolescents of higher educated parents report lower mental well-being.

Gender Differences in PMeHL and Mental Well-Being

The lifetime onset of mental health disorders is similar in both genders (Wilhelm, 2014). However, there are important differences to note; girls seem to internalize problems and report more negative self-esteem, whereas boys report more externalizing styles and more school problems, often known as "bad behavior" (Wilhelm, 2014).

Gender differences in mental well-being found in this study conform to previous findings in which there were clear gender differences in mental well-being among adolescents; namely, girls reported lower levels of mental well-being, perceived health and life satisfaction compared to boys (World Health Organization, 2016). Our study clearly showed that gender is a predictor of mental well-being

during adolescence, with girls reporting lower mental well-being compared to boys. Gender differences were also found in PMeHL; however, these differences were small. Additionally, after adding an interaction term to the regression equation, gender did not moderate the effect of PMeHL on mental well-being. Thus, our findings are consistent with previous studies of MHL, indicating that there are fewer gender differences in MHL than previously thought (Furnham, Annis, & Cleridou, 2014).

Differences Between Adolescents born and not born in Norway

Place of birth is an important variable in light of global migration patterns; thus, we assessed whether place of birth was significantly associated with any of the outcome variables. In the current study, significant differences were found only in stress and family finances; being born outside of Norway was significantly associated with reporting higher stress levels and poorer family finances. A small proportion of the sample (7%) was not born in Norway. This is less than in the general population in Norway (13.8%; Statistics Norway, 2017). Our sample is hence probably not representative of the immigrant population in Norway, and the results should be interpreted with this in mind. Further research in a representative sample is needed to investigate how being an immigrant associates with PMeHL and mental well-being. Furthermore, our data do not allow us to differentiate between immigrants from other Western countries and, for example, asylum seekers who will have very different histories and backgrounds that affect mental health.

Implications

In the past two and a half decades, schools have been identified as an important setting for health promotion; numerous studies, evaluations, books, and reports have examined the effects of initiatives promoting health in schools (Leger, Young, Blanchard, & Perry, n.d.). The current analyses provide insight into and guidance on important issues for school health services regarding mental health promotion in the adolescent population. The results indicate that a focus on good mental health can be beneficial for adolescents' mental well-being. The findings may have implications for future educational initiatives targeted toward the adolescent population. This study found that 41% of the variance within the adolescents' mental well-being is explained by gender, age, line of study, parents' education level, family finances, loneliness, stress, self-rated physical health, and knowledge of how to obtain and maintain good mental health (PMeHL). This also means that further study is needed to identify what accounts for the other 59% of the variance. It is reasonable, based on the results, to suggest that school nurses can provide mental health education that focuses on promoting PMeHL. Such education on how to obtain and maintain good mental health can be found in the dimensions of PMeHL: autonomy, relatedness, and competence (Deci & Ryan, 2000). Every item in the PMeHL scale is considered applicable and translatable into public health practice; thus, the items in the PMeHL scale can be utilized for developing mental health education initiatives for improving PMeHL. To teach PMeHL, school nurses may offer open seminars, classroom seminars, and smaller group discussions with adolescents focusing on, for example, stress management, relaxation techniques, normal emotional variations, sleep hygiene, body image, self-esteem, and autonomy, as well as how to say no, making decisions based on one's own will, and recognizing personal limits.

Factors such as parents' education, family finances, age, and gender are difficult to alter; however, it is useful to know that these factors influence mental well-being when working with adolescents. To promote adolescents' mental health, this study showed that public health education initiatives should address stress, loneliness, and physical health in addition to PMeHL. Although knowledge from education or being mental health literate does not necessarily lead to mental-health-promoting behavior, knowledge is a necessary foundation for making purposeful health-promoting decisions.

The findings of the current study support a progression in mental health education among adolescents to include teaching the adolescents knowledge of factors important to obtaining and maintaining good mental health, versus the traditional focus on mental disorders. The findings suggest that a focus on good mental health has effects on adolescents' mental well-being and should therefore play a role in shaping future health policy to include a focus on good mental health.

Strengths and Limitations

Major strengths of this study include the high response rate and large sample size. Validated instruments and recognized single items were used, although the main independent variable, PMeHL, was measured by a newly developed measure that has not previously been applied. However, the measure was validated among Norwegian adolescents and has been shown to be a valid and reliable instrument for assessing PMeHL. The results should be interpreted while considering some limitations. The data were from a cross-sectional study, and thus we were unable to make any conclusions regarding causality. Our sample consists of a relatively homogenous population of suburban Norwegian adolescents; thus, the results may not necessarily be transferable across cultures and nations. The study was based solely on self-report and was thus subject to potential self-reporting bias. The adolescents may have been prone to social desirability bias when responding to the questionnaire. Furthermore, the questionnaire consisted of closed questions, and if the fixed responses did not reflect their true feelings, the respondents were unable to provide an

alternative response. However, they were able to leave comments on the last question.

Conclusion

Finding new approaches to improving mental health among adolescents is an important responsibility of the school health services. This study found that PMeHL is a significant explanatory variable of adolescent mental well-being. We believe the school nurse is the preferred profession to provide PMeHL education in schools because school nurses are health-care professionals available at schools that provide health education and health promotion. If school health services can be successfully implemented and applied at schools to increase PMeHL in the general adolescent population, these initiatives may positively influence adolescents' mental well-being. Weak gender differences were found, and we therefore suggest increasing PMeHL as a universal approach for adolescents instead of targeting PMeHL education toward one gender in particular. Further research is needed to evaluate PMeHL education provided by school nurses to assess the effect of such education initiatives.

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Supplemental Material

Supplementary material for this article is available online.

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Paper III

Bjornsen H, Ringdal R, Espnes G A, Eilertsen M E & Moksnes U K (2018)

Exploring MEST: a new universal teaching strategy for school health services to promote positive mental health literacy and mental wellbeing among Norwegian adolescents

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RESEARCH ARTICLE Open Access

Exploring MEST: a new universal teaching strategy for school health services to promote positive mental health literacy and mental wellbeing among Norwegian adolescents

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Abstract

Background: Mental health among adolescents is an important public health challenge. School health services perform central public health functions in Norwegian municipalities, where school nurses are uniquely positioned to educate and promote mental health among adolescents. MEST (MEST is not an acronym; MEST is a short version of the Norwegian word for coping) is a newly developed universal working strategy for school health services that aims to promote positive mental health literacy (MHL) and mental wellbeing in the adolescent population. The aim of this study was to investigate the potential outcome mean differences in positive MHL and mental wellbeing between adolescents who participated and those who did not participate in MEST over a school year.

Methods: This study is based on cohort data collected from 357 adolescents (aged 15–21 years) in five Norwegian upper secondary schools at the beginning and end of the 2016/2017 school year. The data were analyzed by describing mean scores and estimating the average treatment effect (ATE) of MEST on positive MHL and mental wellbeing.

Results: Positive MHL increased significantly more among the MEST participants compared to the non-MEST participants ($p = .02$). No significant change in mental wellbeing was found between MEST and non-MEST participants ($p = .98$). Estimating the ATE of MEST on positive MHL, the MEST participants showed a significant 2.1% increase ($p = .04$) in the potential outcome mean of positive MHL compared to the nonparticipants. Estimating the ATE of MEST on mental wellbeing, the girls who attended MEST exhibited a significant 9.7% increase ($p = .03$) in the potential outcome mean of mental wellbeing compared with the girls who did not attend MEST, while no significant change ($p = .99$) was detected among boys or the entire sample of both genders combined ($p = .12$).

Conclusion: This study found a significant ATE of MEST on positive MHL and on mental wellbeing among girls. The results support further investments in studying MEST as a promising work strategy for school health services to promote adolescent mental health. This initial study of MEST may be used as a foundation for investing in future evaluations of MEST.

Keywords: Mental health literacy, Adolescence, Mental health promotion, School nursing, School health services, Mental wellbeing

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Background

In recent years, mental health among adolescents has received considerable attention as a public health concern that is important to address both internationally and in Norway [1–4]. Since the 1986 Ottawa Charter for Health Promotion [5], the focus of public health has shifted from disease prevention only to including health promotion. Scholars advocate for the importance of appropriate attention to mental health within the field of health promotion [6]. Like health promotion, mental health promotion involves the process of enabling people to increase control over, and improve their mental health; supporting people in adopting and maintaining healthy lifestyles. It seeks to foster and support individual and social resources, competencies and psychological strengths to benefit mental health and wellbeing, complementary to a focus on preventing mental disorders [7]. What mental wellbeing is or involves is often considered a highly individual matter; it can be argued to be an individual preference. However, there are known commonalities that are important for mental wellbeing. In the current study, Clarke et al.'s definition is the basis for the understanding of mental wellbeing: "a positive and sustainable mental state that allows individuals to thrive and flourish" ([2, 8], p.).

Adolescents constitute an important population from a public health perspective. Adolescents are expected to acquire knowledge and abilities that will be important for their eventual development into a healthy adult population that can assume adult roles in society. Adolescence is considered a vital transitional period in life that is associated with challenges as well as opportunities for growth, development and health promotion [9]. Furthermore, adolescence is a critical phase for building a foundation for a future healthy population [10, 11]. Because approximately 20% of adolescents report that mental health problems affect their daily life [1, 2], adolescence is an important period in the life course for public health strategies addressing mental health. Public health work strategies and programs that promote good mental health also help to prevent mental illness [12]. Hence, the promotion of good mental health and the prevention of mental illness are considered complementary strategies.

Health literacy is emphasized as an important social determinant for equity in health and is considered necessary for participation in health promotion activities. Broadly speaking, health literacy involves the ability to make sound health decisions [13] and is often studied as an outcome of health education [14]. Mental health literacy (MHL) originates in health literacy and is an emergent area of research in the field of health promotion. It has been identified as an important determinant of both individual and public mental health [15–19]. MHL refers to an individual's knowledge and ability required to make sound mental health decisions in everyday life [16]. MHL is a relatively new concept in health promotion research, and multiple definitions and models have been identified [20]. Recently, MHL has been defined by Kutcher et al. as consisting of the following four components:

> "(1) Understanding how to obtain and maintain good mental health; (2) understanding mental disorders and their treatments; (3) decreasing stigma related to mental disorders; and (4) enhancing help-seeking efficacy (knowing when, where and how to obtain good mental health care and developing competencies needed for self-care)" [17].

The first component of MHL in Kutcher et al.'s definition is referred to in this study as positive MHL (1), understanding how to obtain and maintain good mental health. This component (1) is essential from a health promotion perspective in which the focus is on knowledge of good mental health rather than on mental disorders. Previous research investigating MHL has mainly focused on the three latter components in Kutcher et al.'s definition: the recognition of mental disorders; help-seeking efficacy and help-seeking strategies (e.g., [16, 18, 21–24]). Among adolescents, positive associations have been found between low MHL and mental illness, particularly anxiety and depression [25]. To the best of the authors' knowledge, only one study has investigated the relationship between MHL and mental wellbeing. In that study, positive MHL demonstrated a significant and positive relationship with mental wellbeing [26].

Adolescents spend a large amount of their time at school, and universal mental health promotion in the school setting using a whole school approach is recognized as particularly effective for mental health promotion in this population [27, 28]. School health services represent an essential part of the whole school approach and play an important role in the field of public health by providing easy access and universal healthcare services to the adolescent population [29, 30]. School nurses within school health services are uniquely positioned and are expected to promote good mental health at the population level, provide mental health education, and address diverse health problems in the adolescent population [29, 30].

Several school-based programs aimed at mental health promotion are available internationally [28] and in Norway [31]. On behalf of the Norwegian Directory of Health, the Regional Centre for Child and Youth Mental Health and Child Welfare (RKBU North) identified and described six interventions available for Norwegian schools that target mental health promotion and have

"sufficient documentation of an effect" ("Respekt", "VIP", "Venn1", "Alfa", "Zippys venner", "Olweus", and "PALS") [31]. None of these identified programs have been found to address the role of school health services or school nurses in mental health promotion. Furthermore, the intervention "Mental health for everyone" is designed to promote MHL among Norwegian adolescents; however, it is only labeled "probably effective" according to RKBU's systematic reviews [31]. In one study, "Mental health for everyone" had a positive impact on adolescents' MHL by increasing recognition of mental disorders, prejudice and knowledge regarding where to seek help [21]. Positive MHL was not included in the study and has not been identified in any studies addressing MHL. There is an explicit need for research that investigates the effectiveness of school-based MHL programs [18].

MEST – a school-based MHL working strategy for school health services

Consistent with national regulations and professional guidelines [29, 32], and with financial support from the Norwegian Directory of Health, school health services in Trondheim, Norway, have developed and implemented a universal health education working strategy in upper secondary schools named MEST. MEST has a salutogenic foundation. It was developed in 2014 and has not been previously described or evaluated. The core aim of MEST is to increase adolescents' positive MHL and to provide resources for mental wellbeing by focusing on adolescents' assets and the promotion of personal and contextual factors for *good* mental health. MEST offers open school seminars, classroom seminars and smaller group discussions with adolescents and is based on voluntary student participation. Thus not all students at a school offering MEST will have participated in MEST. School health services deliver targeted seminars and discussion groups throughout the school year based on the results of an anonymous digital survey that is completed by students at the beginning of each school year. The seminar topics may include, but are not limited to, normal emotional variations, sleep hygiene, stress management, relaxation techniques, body image, self-esteem, and aspects related to autonomy (e.g., making decisions based on one's own will and recognizing personal limits).

Although the seminars provided at each school may differ, these seminars are based on a common framework that includes the following: 1) a theoretical understanding of the seminar topic, 2) practical age-appropriate examples, and 3) providing adolescents with at least one specific and useful tool related to the subject of the seminar (Holmen N. Description of MEST: a work strategy for school nurses in mental health promotion among adolescents. 2016. Personal written and oral communication, recipient: HN Bjørnsen, 2016 document). MEST differs from previous interventions that aim to promote mental health in schools, such as "Mental health for everyone" [21], because MEST is a systematic work strategy that focuses on promoting *good* mental health and coping with normative stressors and emotional variations instead of preventing mental disorders.

Given the increase in mental health problems in the adolescent population and the importance of mental health promotion initiatives at school, the identification, implementation and evaluation of effective mental health interventions are essential [33]. The recognition of school health services as an important component in a whole school approach highlights the importance of evaluating mental health-promoting actions initiated by school health services. An initial assessment of MEST is important to determine whether further investment in more rigorous studies of this work strategy is worthwhile. Moreover, further appraisal of whether MEST has the potential for continued evolvement and implementation as a preferred way of systematizing school health services' mental health-promoting work is important, both for advancing evidence-based practices and for documenting the outcomes of new mental health promotion initiatives.

Aim

The aim of this study was to investigate the potential outcome mean (POM) differences in positive MHL and mental wellbeing between adolescents who participated in MEST and adolescents who did not participate in MEST.

Methods

Participants and procedure

The study participants included a cohort of 357 adolescents aged 15–21 years in mid-Norway. The adolescents were sampled from five upper secondary schools where school health services used the MEST working strategy during the 2016/2017 school year. The schools also offer various activities for health promotion throughout the school year, such as a public health day, an adolescent health day and a "VIP" program (see introduction) as part of the regular operations of Norwegian upper secondary schools. The schools offer a broad variety of vocational and general courses and represent typical Norwegian upper secondary schools. The size of the schools varies from 260 to 1087 students, and the gender distribution is even. Most of the adolescent participants were born in Norway and self-reported that they had parents with higher education and perceived their family had a good financial situation (Table 1). Table 1 further describes the study population by MEST participation.

The principals of the designated schools provided informed consent for data collection. The schools were asked to participate in the study because the school nurses at these schools used the MEST working strategy

Table 1 Descriptive statistics of the baseline (T1) cohort and distribution of the MEST and non-MEST participants

	Entire Cohort		MEST Participants		Non-MEST Participants	
	N	Percent (%)	N	Percent (%)	N	Percent (%)
	357		109		248	
Gender[a]						
Female	188	53	78	72	110	44
Male	166	46	30	27	136	55
Missing	3	< 0.1	1	< 0.1	2	< 0.1
Age (years)						
15	2	< 0.1	–	–	2	< 0.1
16	151	42	44	40	107	43
17	104	29	36	33	68	27
18	72	20	27	25	45	18
19	23	6	1	1	22	9
20	1	< 0.1	1	1	1	< 0.1
21	1	< 0.1	–	–	1	< 0.1
Missing	3	< 0.1	–	–	2	< 0.1
Education						
General studies	226	63	63	58	163	66
Vocational studies	128	36	45	41	83	33
Missing	3	< 0.1	1	1	2	< 0.1
Parental education[b]						
Primary or lower secondary school	19	5	4	4	15	6
Upper secondary school	81	23	26	24	55	22
University up to 4 years	116	32	32	29	84	34
University more than 4 years	83	23	33	30	50	20
Unknown	47	13	12	11	35	14
Missing	11	3	2	2	9	4
Family finances[c]						
Good	268	75	82	75	181	73
Neither good nor bad	64	18	22	20	51	21
Bad	19	5	2	2	13	5
Missing	6	2	3	3	3	1
Parents live together						
Yes	230	64	67	61	162	65
No	124	35	41	38	84	34
Missing	3	1	1	1	2	< 0.1
Born in Norway						
Yes	336	94	104	95	232	94
No	16	4	3	3	13	5
Missing	5	1	2	2	3	1

[a]Significant difference between MEST and non-MEST participants
[b] Student report of parents' highest education. Assessed by asking about each parent; the mean score of the mother and father is presented
[c] Student perception of family finances

for mental health promotion throughout the 2016/2017 school year. A study-specific questionnaire was administered by the teachers at the beginning and end of the 2016/2017 school year (T1: September 2017 and T2: April–June 2017). MEST was offered at the schools between the data collection time points (T1 and T2). Five

schools originally agreed to participate in the study, but one school withdrew before the T2 assessment. At baseline T1, by the teachers' decisions, the questionnaire was administered to 2145 of the 3281 (65.4%) students at the five schools, and 2087 students responded with usable information (T1 response rate was 97.3%). At T2, again by the teachers' decisions, the questionnaire was administered to 1127 of the 2811 (40.1%) students at the four schools, and 1054 students responded with usable information (T2 response rate was 93.5%). The teachers were encouraged to administer the questionnaire by their principal; however, each teacher decided whether to administer the questionnaire. Students of teachers who decided not to administer the questionnaire were thus not given the opportunity to participate in the study. To match the adolescents from baseline T1 to T2, three questions were asked in which the first two letters of each answer created a six-letter code used to anonymously follow the student cohort. The six-letter code allowed for 34.2% (361) of the students to be matched from T1 to T2. The main reason for the low matching rate was that teachers might not have administered the questionnaire to the same students at T1 and T2, resulting in some students only having the opportunity to answer at baseline T1 or at T2. Of the 361 students who were matched, 357 (33.8%) students were aged 15–21 years and constituted the net sample. Of these 357 students, 248 (69%) students reported that they did not attend or did not know whether they had attended MEST over the last school year, whereas 109 (31%) students reported that they had attended MEST. Of the MEST participants, 79 (72%) students were females and 30 (27%) students were males (Table 1).

Informed consent forms were used for participants aged ≤15 years (parental consent is required by law), whereas participants aged > 15 years consented by completing the questionnaire [34]. Regardless of age, all students received the same information. An informational video was available on the schools' e-learning platforms (e.g., "it's learning") to inform students about participation in the study and to emphasize that participation was voluntary and anonymous. The same information was provided on the survey's first page and read aloud by the teachers prior to survey administration. This study was approved by the Regional Committee for Medical and Health Research Ethics (REK midt 2014/1996).

Measures

The two outcome variables (i.e., positive MHL and mental wellbeing) were predetermined because MEST explicitly aims to promote positive MHL and mental wellbeing.

Positive MHL was measured by the 10-item Mental Health Promoting Knowledge (MHPK-10) scale [35]. The MHPK-10 scale is a one-dimensional instrument consisting of statements related to factors important for good mental health [35]. The respondents are asked to rate each item on a six-point scale ranging from 0 ("don't know") and 1 ("completely wrong") to 5 ("completely correct"). Higher mean scores indicate a higher level of knowledge (range 0–5). The MHPK-10 scale was recently determined to be a valid and reliable measure of positive MHL among Norwegian adolescents [35] and had a Cronbach's α of .81 at T1 and .83 at T2.

Covariates of positive MHL

The parents' education level and student grade level were included as covariates in the analysis of MEST's ATE on positive MHL. Positive MHL may be influenced by the parental education level because positive MHL is considered an outcome of mental health education, and parental education level is a well-known predictor of children's educational outcomes [36]. Furthermore, the students' grade level was assumed to potentially influence positive MHL because the grade level may indicate the general level of knowledge; the longer adolescents have studied, the more knowledge they are expected to possess.

Parental education level was assessed by one item, i.e., "What is your parents' highest level of education?" The response options included (1) primary or lower secondary school, (2) upper secondary school, (3) university for up to 4 years, and (4) university for more than 4 years.

Mental wellbeing was assessed by the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS). The SWEMWBS is a short version of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) that measures subjective wellbeing and psychological functioning using seven items scored on a five-point Likert scale ranging from 1 ("not at all") to 5 ("all the time"). Higher mean scores indicate greater wellbeing (range 1–5) [37]. The SWEMWBS allows for the monitoring of the mental wellbeing of the general population and is validated for use among young people [38]. In this study, the Cronbach's α of the SWEMWBS was .88 in the T1 sample and .91 in the T2 sample.

Covariates of mental wellbeing

Mental wellbeing can be considered a highly individual matter that may be influenced by a number of factors. However, some variables are known to commonly affect mental wellbeing. The following variables were adjusted for in the model assessing mental wellbeing: gender [39], symptoms of anxiety and depression [40], self-rated health [41], loneliness [42], school-related stress [43], health literacy (only assessed at T2) [44, 45], and social inequalities, which were best represented by the variable of family finances [46].

Anxiety and depression were assessed using the 10-item Hopkins Symptom Checklist (HSCL-10) [47, 48]. Six of the 10 items on the scale are related to depression, whereas four items are indicators of anxiety [49]. The response scale ranges from 1 (not at all) to 4 (extremely), and higher mean scores indicate higher severity of anxiety and depression symptoms. The Cronbach's α of the HSLC-10 was .92 in the T1 sample and .93 in the T2 sample. The HSCL-10 is a validated and frequently used scale that measures anxiety and depression symptoms among adolescents [48].

Self-rated health was assessed using the following item: "How is your current health?" The students responded on the following scale: (1) very poor, (2) poor, (3) neither poor or good, (4) good, and (5) excellent. This item has been previously found to be satisfactory for use among adolescents [41].

Loneliness was assessed by one item covering the frequency of feeling lonely, i.e., "Do you ever feel lonely?" The response options included (1) never or almost never, (2) rarely, (3) sometimes, (4) regularly, and (5) almost all the time.

Stress was assessed using the school-related stress dimensions of the Norwegian version of the Adolescent Stress Questionnaire (ASQ-N) [50, 51]. Each of the four dimensions in the ASQ-N assessing school-related stress included four items. The 16-item scale is rated on a five-point Likert-type scale ranging from 1 (not at all stressful or irrelevant to me) to 5 (very stressful). Higher mean scores indicate higher stress levels (range 0–5). The internal consistency and construct validity of the ASQ-N have been tested among adolescents [50, 51]. The Cronbach's α in the present study was .93 at T1 and .92 at T2.

Health literacy (HL) was measured with the Health Literacy for School-Aged Children (HLSAC) scale. The HLSAC is based on the conceptualization of health literacy proposed by Paakkari and Paakkari [52]. The HLSAC scale consists of 10 items, and respondents are asked to rate the degree to which each item represents their opinion on a scale ranging from 1 ("not at all true") to 4 ("absolutely true") [53]. The HLSAC scale has been shown to be a valid measure of adolescent health literacy in a Nordic country [52]. The Cronbach's α of the HLSAC was .88 at T2. The HLSAC was added before the second data collection.

The *background variables* used in this study included gender, student grade level, field of study (grouped into general and vocational studies), parents' living status (grouped into living together or not), whether the respondent was born in Norway, years living in Norway, parental education and family finances.

Family finances were measured by the following item: "How has your family's financial situation been during the past two years?" The students responded on the following scale: (1) we have had a poor financial situation the whole time, (2) we have more or less been in a poor financial situation, (3) we have been in neither a poor nor a good financial situation, (4) we have more or less been in a good financial situation, and (5) we have been in a good financial situation the whole time.

Participation in MEST was measured by a single question ("Did you participate in MEST seminars, lectures or groups over the last school year?"). The response options included (1) "no", (2) "yes" and (3) "don't know". Participants who responded (3) "don't know" were coded as not participating and assigned the value 1 for "no".

Statistical methods

STATA version 14.2 (StataCorp. 2015, Stata Statistical Software: Release 14, College Station, TX: StataCorp LP [54]) was used to perform the descriptive statistics and statistical analyses. T-tests and Chi-square tests of independence were performed to evaluate the baseline differences between the MEST and non-MEST participants in terms of the background variables (Table 1). Independent t-tests with equal variances were conducted to assess the mean group differences (MEST participants vs. non-MEST participants) in age, family finances and years living in Norway. Cohen's *d* was used to interpret the effect sizes [55]. Chi-square tests of independence were performed to assess the group differences (MEST participants vs. non-MEST participants) in gender, line of study, parental education level and parents' marital status. Furthermore, in addition to the included covariate scales of anxiety and depression, self-rated health and HL, the mean scores and confidence intervals (CI) of the outcome measures of positive MHL and mental wellbeing were examined. Paired samples t-tests with equal variances were conducted to assess the mean group differences between the baseline and T2 scores of the outcome variables positive MHL and mental wellbeing. The data were stratified by gender to examine potential gender differences.

Treatment effect modeling

Linear treatment effect modeling with augmented inverse probability weighting (AIPW) and double robust estimators were used to estimate the average treatment effect (ATE) of MEST based on MEST participation (i.e., treatment). Treatment effect modeling is used to describe the observed statistical relationship using observational data based on potential treated and untreated responses [56, 57]. AIPW models both the treatment and outcome and maintains consistency even if one of the models is mis-specified [58]. Doubly robust estimators are recommended as the preferred estimators for estimating the ATE in non-normally distributed data

[59] and are used because of the potential ceiling effects observed in the outcome variables positive MHL and mental wellbeing. The conditional independence of MEST on the outcomes is assumed after adjusting for potential confounders. The percentage effects were calculated to display the ATEs relative to the baseline POMs (non-MEST participants). In all analyses, we adjusted for the baseline measure (T1) of the analyzed outcome and the predetermined covariates. The data were analyzed for both genders separately and combined to explore potential gender differences in the impact of MEST. The significance level was set at $p \leq .05$.

Missing data

The data were assessed for patterns of missing values. For the main variable positive MHL (measured by the MHPK-10), 1.65% (item 1) to 3.1% (item 4 and 10) of the values were missing. Little's [60] missing completely at random (MCAR) test was used to test the hypothesis that the values were missing completely at random ($p \geq .05$) [60]. Little's MCAR test supported the hypothesis that the values were missing completely at random for MHPK-10 ($p = .36$) and SWEMWBS ($p = .70$) [38]. Cases were deleted listwise.

Results

Baseline differences between MEST and non-MEST participants

The results of the Chi-square test of independence showed a significant interaction (χ^2 (1) = 20.77, $p = \leq .01$) between gender and MEST participation; significantly more girls than boys chose to participate in MEST. No significant interaction (χ^2 (1) = 2.15, $p = .14$) was observed between the line of study and MEST participation. Furthermore, no other significant differences were found between the group that participated in MEST and the group that did not participate with respect to family finances, years lived in Norway and age (Table 2).

Descriptives and differences in the mean scores of the main variables from baseline (T1) and T2

Mean scores and CIs of the primary measures of positive MHL and mental wellbeing and the covariate scales of anxiety and depression, self-rated health and HL are presented by MEST participation in Table 3. The results showed an overall increase in positive MHL among both MEST and non-MEST participants between assessment points and that the MEST participants had a significantly larger increase in positive MHL than the non-MEST participants (M = 4.56, SD = 0.04) to T2 (M = 4.65, SD = 0.03) scores (t (105) = − 2.15, $p = 0.02$). Girls' baseline scores on positive MHL was higher than boys' baseline scores on positive MHL. The positive MHL of the boys who participated in MEST increased, whereas the positive MHL of the boys who did not participate in MEST slightly decreased. For the girls, positive MHL increased among MEST participants and was stable among non-MEST participating girls (Table 3). In mental wellbeing, no significant change in mental wellbeing was found between MEST and non-MEST participants; a non-significant decrease in scores were observed over the school year from T1 (M = 3.53, SD = 0.07) to T2 (M = 3.40, SD = 0.08) conditions (t (100) = 2.04, $p = 0.98$); and the scores decreased less among the girls who participated in MEST than among the girls who did not participate (t (172) = − 1.2, $p = 0.12$). In the boy cohort, mental wellbeing decreased less if the students did not participate in MEST. However, the difference in boys' mental wellbeing means between baseline T1 and T2 was not statistically significant when comparing boys' mental wellbeing scores at T1 (M = 3.8, SD = 0.06) to boys' mental wellbeing at T2 (M = 3.69, SD = 0.07) (t (230) = 13.1, $p = 0.95$). The boys reported higher baseline mean scores of mental wellbeing than the girls did (Table 3). The anxiety and depression scores increased over the school year and increased slightly more among the MEST participants than among the non-MEST participants. The self-rated health scores decreased between assessment points, with similar scores observed in both MEST and non-MEST participants (Table 3). The mean score differences were statistically tested for the main variables of positive MHL and mental wellbeing.

Average treatment effect (ATE) of MEST

A significant ATE of MEST was found on positive MHL (Table 4) when both genders were combined, indicating that on average and after adjusting for the baseline T1 scores of positive MHL and including potential confounders (parental education level, grade level and years living in Norway), all participants in this sample who

Table 2 Mean group differences in background variables between the MEST and non-MEST participants

		MEST Participants	Non-MEST Participants			
	N	M (SD)	M (SD)	t-test	*p*-value	Cohen's *d*
Family finances[a]	351	3.69 (0.07)	3.62 (0.33)	−0.75	0.77	0.29
Years lived in Norway	321	17.0 (0.23)	17.3 (0.12)	0.66	0.25	1.6
Age	357	17.6 (0.76)	17.6 (0.47)	−0.02	0.51	0

[a] Student perception of family finances. Poor = 1, Good = 5

Table 3 Mean scores (CI) of included scales at baseline T1 and T2. Outcome variables are distributed by gender and MEST participation

	Baseline T1				T2			
	MEST participants		Non-MEST participants		MEST participants		Non-MEST participants	
Outcome	N	Mean score (CI)	N	Mean score (CI)	N	Mean score (CI)	N	Mean score (CI)
Positive MHL[a]	106	4.56 (4.48–4.64)	245	4.47 (4.43–4.55)	107	4.65 (4.58–4.71)	222	4.53 (4.45–4-60)
Positive MHL (girls)	76	4.57 (4.47–4.67)	106	4.64 (4.57–4.71)	79	4.65 (4.58–4.73)	102	4.63 (4.56–4.71)
Positive MHL (boys)	29	4.52 (4.36–4.68)	126	4.45 (4.33–4.56)	30	4.62 (4.49–4.76)	119	4.43 (4.31–4.55)
Mental wellbeing[b]	106	3.53 (3.39–3.66)	229	3.59 (3.49–3.69)	104	3.40 (3.24–3.56)	219	3.47 (3.36–3.57)
Mental wellbeing (girls)	78	3.43 (3.28–3.58)	103	3.35 (3.15–3.56)	74	3.33 (3.16–3.51)	100	3.20 (3.07–3.33)
Mental wellbeing (boys)	27	3.84 (3.55–4.13)	124	3.80 (3.67–3.92)	30	3.55 (3.20–3.91)	118	3.69 (3.54–3.83)
Covariates								
Anxiety and depression[c]	102	1.82 (1.68–1.95)	228	1.70 (1.60–1.79)	198	1.97 (1.82–2.13)	219	1.75 (1.65–1.84)
Self-rated health[d]	108	3.95 (3.79–4.12)	244	4.05 (3.95–4.16)	109	3.83 (3.66–3.99)	225	3.82 (3.70–3.95)
HL[e]	–	Not measured T1	–	Not measured T1	101	3.25 (3.16–3.34)	210	3.11 (3.25–3.37)

Cases were deleted listwise
[a]Positive MHL was measured by the MHPK-10
[b]Mental wellbeing was measured by the SWEMWBS
[c]Anxiety and depression were measured by the HCSL-10
[d]Self-rated health was measured by a single item
[e]HL was measured by the HLSAC

participated in MEST scored 2.1% higher on positive MHL than all adolescents in the sample who did not participate in MEST. This finding represents a statistically significant increase in positive MHL in both genders. However, after stratifying by gender, no significant ATE of MEST was found in either gender separately (results not shown). A non-significant ATE of MEST on mental wellbeing was found. However, after stratifying by gender, a significant ATE of MEST on mental wellbeing was found in the girls, and a non-significant and negative ATE of MEST on mental wellbeing was found in the boys (Table 4). The percentage change reflects the change in the ATE between the participating and non-participating adolescents' POM, indicating that if none of the adolescents in the current sample had participated in MEST, they would have had a mean score of 4.54 on positive MHL (POM of those who did not participate). If all adolescents in the sample had participated in MEST, they would have had a mean score of 4.63 on positive MHL (POM of those who participated), resulting in an ATE of .10 and a percentage increase of 2.1%. Both the ATE and percentage increase were statistically significant. The mental wellbeing POM of the participating girls was 3.48, while that of the nonparticipating girls was 3.17, resulting in a statistically significant ATE of 0.31 and a percentage increase of 9.7%.

Discussion

This study compared positive MHL and mental wellbeing between two groups of adolescents, MEST and non-MEST participants. The average treatment effect (ATE) was applied to start the process of understanding MEST and to guide future potential investment in more rigorous and resource-intensive evaluations of MEST.

Table 4 Estimates of the ATEs of MEST on positive MHL and mental wellbeing. Mental wellbeing is stratified by gender

Outcome	POM[¥] of participants (N)	POM[¥] of nonparticipants (N)	ATE[+]	ATE[+] 95% CI	*p* of ATE[+]	% change	% change CI	*p* of %
Positive MHL[a,1]	4.63 (99)	4.54 (205)	0.10	0.01–0.20	0.04*	2.1	0.2-4.4	0.03*
Mental wellbeing[b,2]	3.60 (78)	3.40 (167)	0.20	−0.05-0.46	0.120	6.0	−1.6-13.5	0.123
Mental wellbeing (girls)	3.48 (63)	3.17 (81)	0.31	0.03–0.58	0.028*	9.7	0.8-18.5	0.031*
Mental wellbeing (boys)	3.70 (15)	3.71 (101)	−0.005	−0.61-0.6	0.988	0.01	−16.5-16.2	0.988

*Significant at $p \leq 0.050$
Total $N = 340$; participated $n = 109$; did not participate $n = 229$. Cases deleted listwise
[a]Positive MHL = Positive mental health literacy measured by the MHPK-10
[b]Mental wellbeing was measured by the SWEMWBS
[+]ATE = average treatment effect
[¥]POM = potential outcome mean
[1]Values were adjusted for baseline positive MHL, parental education level, grade level and years living in Norway
[2]Values were adjusted for baseline mental wellbeing, anxiety and depression, gender, physical health, HL, loneliness, family finances and school-related stress

This initial evaluation of MEST shows a tendency toward a small but significant increase in positive MHL among MEST participants compared to non-MEST participants. The results showed an increase in positive MHL and a decrease in mental wellbeing in both MEST and non-MEST participants between assessment points. However, when modeling the treatment effect of MEST on mental wellbeing, there was an estimated and significant positive treatment effect of MEST on girls' mental wellbeing and a significant positive treatment effect of MEST on positive MHL for both genders combined.

Methodological considerations

The assessment of mental health promotion initiatives and interventions is challenging because attributing outcomes to the initiatives is difficult and because choosing evaluation methods and outcome measures always involves balancing conceptual, ethical and clinical considerations [61]. The non-standardized nature of the work strategy is a strength of MEST, making it adaptable to the current needs of a particular population based on annual local surveys. However, due to this non-standardization, MEST is challenging to evaluate. The current study applied treatment effect modeling to compare the observed statistical relationship and scores of positive MHL and mental wellbeing between MEST participants and non-MEST participants. The analyses were intended to investigate whether pursuing more rigorous evaluations of MEST is reasonable and to establish a foundation for future evaluations, such as a randomized controlled trial.

Over a school year, one would expect students to mature and possibly increase their knowledge base in general. Therefore, one may expect that positive MHL might increase for both groups as the adolescents grow older, mature and learn over a school year. This may serve as one explanation for both groups' increase in positive MHL, in which the MEST group's scores on positive MHL increased more than the non-MEST group's scores (Table 3). Because MEST aims to increase adolescents' positive MHL, it is sensible that the MEST group's positive MHL increases more than that of the non-MEST group if MEST succeeds at impacting adolescent positive MHL. Mental wellbeing decreased over a school year for both groups, and among boys, mental wellbeing decreased less if the students did not participate in MEST. This finding raises the question of whether MEST has a negative impact on boys' mental wellbeing. The difference was not statistically significant. Thus, this decrease may be related to normal variations and explained by a number of factors that the current study is not able to detect. The descriptive statistics showed that there was an overall decrease in both groups in mental wellbeing and self-rated health and an increase in anxiety and depression symptoms over a school year (Table 3). One explanation in relation to the descriptive statistics results is that baseline T1 data were collected during the fall semester after the adolescents returned from their summer break, while the T2 data were collected during the spring when adolescents were approaching their final exams. This might potentially affect the adolescents' reporting on variables such as mental wellbeing, self-rated health and anxiety and depression symptoms. However, this does not explain why anxiety and depression symptoms were reported to be higher among MEST participants than among non-MEST participants.

Gender differences

A potential explanation for finding higher mean scores on anxiety and depression among MEST participants than among non-MEST participants might be related to gender differences: There is found a predominance of depression among girls compared to boys in adolescence [62], and there are more girls (72%) in the MEST group than in the non-MEST group (44% girls). For some time, evidence has highlighted a greater predominance also of the development of depression in girls than in boys in adolescence [62]. Research has also demonstrated that girls' mental wellbeing scores are lower than boys' scores but appear to increase during adolescence, whereas boys are found to have higher and more stable scores on mental wellbeing measures throughout adolescence [39], suggesting that girls' mental wellbeing might be more prone to internal and external developmental factors throughout adolescence. This finding may serve as a possible explanation for the ability of MEST to influence girls' mental wellbeing more than boys' mental wellbeing. The significant improvement in the ATE of MEST on mental wellbeing found among the girls in the current sample was not reflected by a significant difference in the ATE by gender on positive MHL, indicating that factors other than positive MHL could explain the differences in mental wellbeing between boys and girls. Previous studies investigating gender differences in MHL focusing on recognizing disorders have demonstrated that gender differences in MHL are not as prominent as previously thought [25]. The results of the present study are consistent with these previous findings. The gender differences in the ATE of MEST on mental wellbeing was not reflected in the levels of positive MHL. Another explanation for the gender differences in this sample might be that MEST is more appealing to girls. This explanation is evident considering the attendance rates based on gender; in this sample, significantly more girls than boys chose to attend MEST. However, considering the plain mean scores, compared with the boys who did not attend MEST, the boys who attended MEST were found to have an

increase in positive MHL (Table 3). This finding indicates that the boys who attended MEST developed higher positive MHL throughout the school year than boys who did not attend MEST. However, these changes cannot be attributed to MEST based on the plain mean scores, and further research is needed to understand these differences.

Statistical and clinical significance

The 2.1% increase found in positive MHL among adolescents who attended MEST compared to those who did not attend MEST is statistically significant but small. From a public health perspective, a small increase might have a large public health impact and, thus, may have clinical significance. If we successfully move populations in a positive direction, there might be a greater overall public health impact than the impact that can be detected at the individual level. In addition, there is a possible ceiling effect in the MHPK-10 measure of positive MHL [35], indicating the possibility that we cannot distinguish among higher levels of positive MHL using this measure and resulting in the potential underestimation of the impact of MEST on positive MHL. Thus, the impact may be even larger than the impact that this study can detect. Furthermore, a 6.0% statistically non-significant ATE of MEST on mental wellbeing for both genders combined and a 9.7% statistically significant ATE of MEST on girls' mental wellbeing may be clinically interesting for practitioners and researchers who aim to promote mental wellbeing in the adolescent population.

Implications

Schools are considered crucial settings for promoting mental health, and school health services (i.e., health services specializing in health promotion for individuals aged 0–20 years located at schools) are well positioned to promote good mental health in the adolescent population. This study adds to the evidence regarding the use of universal mental health-promoting strategies, such as MEST, focusing on assets for positive mental health in the adolescent population. Investing in adolescents' mental health using evaluated and documented approaches to promote mental health may yield short- and long-term benefits on positive development for adolescents that may extend throughout the life course [63]. This study may serve as a foundation for the further process of evaluating a reorientation of school healthcare services to include a focus on universal mental health promotion in schools by concentrating on positive MHL and mental wellbeing. Using universal strategies, such as MEST, that focus on positive mental health as a part of the whole school approach is consistent with evidence that clearly indicates that a positive school ethos in which school health services are naturally embedded is associated with students' health [64]. Universal strategies are also supported by adolescents' overall expression of the need for more knowledge about mental health [65].

Traditionally, school health services and school nurses in Norway have provided individual-focused care to adolescents in upper secondary schools. This practice may serve as a barrier to implementing universal strategies in a school health setting. Individual-focused care is familiar and easy to manage, probably because system barriers are not as apparent during student encounters [66] as they might be when integrating universal mental health-promoting initiatives in schools that target the entire student population, such as MEST. Moreover, there is an embedded resource and priority question; individual care traditionally is (and, to some extent, should be) a priority among school nurses. This study adds to the discussion of the responsibilities of school health services and school nurses with respect to public health and health promotion in schools. However, based on the methods used, the results of this study should not be used to recommend MEST but should rather be used to recommend further investments in more rigorous and resource-intensive evaluations of MEST. Thus, this study can be considered an important foundation for further evaluations of MEST.

Strengths and limitations

The major strengths of the current study are the use of longitudinal data and the high response rate for both baseline T1 and T2. The longitudinal data enabled the adjustment of the baseline values of the outcome variables for each individual participant. Validated instruments and recognized single items were used, although positive MHL was measured by a newly developed measure that has been reported to have potential ceiling effects [26]. Nevertheless, the MHPK-10 has been shown to be a valid and reliable instrument for assessing positive MHL in the Norwegian adolescent population [35]. The results should be interpreted with caution considering some limitations. The subsample of adolescents who were matched in the cohort was small. This smaller size might be due to the teachers handing out the questionnaire to different adolescents at baseline T1 and T2. Furthermore, the six-letter code questions might not have performed optimally, resulting in difficulties matching adolescents from baseline T1 to T2. The lack of the possibility to randomize the adolescents participating in MEST is a limitation of the study. MEST participation was assessed by self-report; thus, assignment to the group that received MEST or the group that did not receive MEST in the average treatment effect models was based on recall of intervention (MEST), which may be subject to recall bias. Further, all variables in the current study were self-reported; family finances were represented by students' perception of family finances, and

parents' level of education was reported by students. School nurses did not report procedural fidelity to MEST. The flexible nature of MEST as a working strategy rather than a procedure can be considered a strength of MEST, but it also makes it more challenging to evaluate and, as such, is a limitation of the current study. Furthermore, schools are complex settings; thus, other mental health-promoting activities occurred as part of the daily operations of the schools over the school year, making it difficult to attribute changes to MEST. However, these activities and programs were offered to both students who participated in MEST and those who did not participate. Another limitation is the lack of measurement of the dose of MEST (i.e., how many seminars the participating adolescents attended). Thus, there may be differences in outcome between students who completed several sessions of MEST compared to students participating in only one session, that this study was not able to detect. Furthermore, HL was only measured at T2; thus, baseline T1 HL was not controlled for, although baseline MHL was measured and controlled for. Furthermore, there may be confounders that were not accounted for with respect to mental wellbeing and positive MHL. However, the included covariates were based on factors that are known to affect the outcome variables. The current study may serve as a foundation for further evaluations of MEST, although no causal relationship can be established at this point. As we confront challenges with mental health problems in the adolescent population, utilizing well-performing and evaluated interventions and work strategies is vital for promoting mental health in this population. This study indicates that further investment in the evaluation of the newly developed work strategy MEST is warranted. Although positive results were found in this initial study of MEST, this working strategy must be further evaluated to establish its effect and feasibility. Important next steps include conducting a thorough evaluation of MEST and its implementation. Furthermore, additional investigations of gender differences in MEST attendance, evaluations of the effect of MEST separately by gender, and potentially developing MEST to be equally appealing to both genders are needed.

Conclusions

Overall, the results of the descriptive statistics and ATE models of MEST expand our knowledge of MEST and how it affects positive MHL and mental wellbeing among adolescents. Modeling the ATE of MEST showed that MEST participants had a higher level of positive MHL compared to the non-MEST participants and that girls who participated in MEST had higher levels of mental wellbeing compared to non-participating girls. No differences in the ATE of MEST on boys' mental wellbeing were identified. Although this study cannot be used as evidence to recommend MEST, the current results provide a foundation for recommending further investments in more rigorous and resource-intensive evaluations of MEST as a work strategy for school health services addressing adolescent mental health. The results from the study may contribute in the comprehensive picture of mental health promotion work and the evidence base for school health services. Further studies should include evaluating the effect of MEST on positive MHL and mental wellbeing in a randomized controlled trial as well as investigating gender differences and the implementation and feasibility of MEST.

Abbreviations

AIPW: Augmented Inverse Probability Weighting; ATE: Average treatment effect; MHL: Mental health literacy; MHPK: Mental health-promoting knowledge; POM: Potential outcome mean; SWEMWBS: Short Warwick-Edinburgh Mental Wellbeing Scale

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Availability of data and materials

The raw data supporting the findings in this manuscript can be found at the NTNU Norwegian University of Science and Technology, Department of Public Health and Nursing, Trondheim, Norway and are available from the corresponding author upon reasonable request.

Authors' contributions

HNB and RR performed the data collection and prepared the data for analysis. UKM, MEBE and GAE obtained the funding and supervised the project. HNB performed the data analysis and drafted the manuscript. All authors provided input regarding the manuscript and read and approved the final version.

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Ethics approval and consent to participate

This study was approved by the Regional Committee for Medical and Health Research Ethics (REK midt 2014/1996). All participants were informed that participation was voluntary and anonymous through written letters, a video created by the research group that was available on the school's e-learning platform, and oral information provided by the teachers in each class prior to distributing the questionnaires. Students aged 16 years or older gave consent for participation by completing the questionnaire, and written parental consent was obtained for students aged 15 years or less.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Appendices A-E

A. Questionnaire
B. Interview guide
C. Information letter students
D. Information for teachers to read out aloud
E. The MHPK-10 instrument in English and Norwegian

Appendix A

Questionnaire T1
HLSAC scale for measuring health literacy included in T2

SKOLEHELSETJENESTEN OG PSYKISK HELSE HOS UNGDOM

SPØRREUNDERSØKELSE

Bakgrunn: Med dette spør vi deg om å delta i en spørreundersøkelse om psykisk helse hos ungdom. Undersøkelsen gjennomføres ved NTNU Senter for helsefremmende forskning og Institutt for sykepleievitenskap, i samarbeid med Trondheim kommune og Sør-Trøndelag fylkeskommune. Kunnskapen fra prosjektet kan brukes for å styrke skolehelsetjenestens helsefremmende og forebyggende arbeid når det gjelder psykisk helse hos ungdom.

Hva innebærer studien? Du som elev forespørres om å delta i en datainnsamling med bruk av spørreskjema som besvares individuelt i løpet av en skoletime. Spørreskjemaet deles ut i to omganger, første runde høsten 2016 og andre runde våren 2017. Spørsmålene handler om skolehelsetjenesten, psykisk helse, familie, venner, mestring og opplevelse av stress. De som ikke ønsker å delta kan jobbe med skolearbeid og levere et blankt spørreskjema.

Mulige fordeler og ulemper: Besvarelse av spørreskjema innebærer ingen kjente negative konsekvenser for deg som deltager og ditt bidrag kan gi viktig kunnskap om ungdoms helse og mestringsressurser. Hvis besvarelse av spørreskjema oppleves ubehagelig er det mulig å ta kontakt med helsesøster ved din skole.

Frivillig deltagelse: Besvarelse av spørreskjemaet er frivillig og er ikke del av undervisningen på skolen. Dersom du ikke vil delta, har det ingen konsekvenser for deg. Elever over 16 år sier ja til å være med i spørreundersøkelsen ved å svare på spørreskjemaet. Elever under 16 år må ha skriftlig tillatelse fra foreldre for å være med. Ettersom spørreundersøkelsen er anonym er det ikke mulig å trekke seg etter at du har levert fra deg spørreskjemaet, fordi vi ikke kan spore svaret tilbake til deg. Resultatene vil bli presentert slik at ingen enkeltpersoner kan gjenkjennes.

Prosjektet er godkjent av Regional komité for medisinsk og helsefaglig forskningsetikk, Midt-Norge (REK). Prosjektet er del av et større studie finansiert av Norges Forskningsråd og NTNU. Av kontrollhensyn vil prosjektdata oppbevares i 5 år etter at sluttmelding er sendt REK.

Takk for at du er villig til å delta i undersøkelsen!

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Kunnskap for en bedre verden
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LES DETTE FØR DU STARTER!	Skjemaet skal leses maskinelt. Vennligst følg disse reglene: • *Bruk svart/blå kulepenn. Skriv tydelig, og ikke utenfor feltene.* ***Kryss av slik:*** ☒. • *Feilkryssinger kan strykes ved å fylle hele feltet. Kryss så i rett felt.* • *Sett bare ett kryss på hvert spørsmål om ikke annet er oppgitt.*

Les spørsmålene i tur og orden. Det er ingen «riktige» eller «gale» svar – det er dine egne oppfatninger og meninger vi er interessert i. Er det spørsmål som du synes er for vanskelige, eller som du ikke vil svare på, kan du hoppe over dem, men husk at det er viktig for kvaliteten til undersøkelsen at alle spørsmålene blir besvart. Ikke bruk for lang tid på noen av spørsmålene.

Denne undersøkelsen vil bli gjennomført i to omganger. For å kunne sette sammen dine svar fra de to omgangene, trenger vi en «kode» som gjør dette mulig, samtidig som du forblir anonym. Til dette bruker vi informasjonen som vi ber deg skrive i feltene til høyre: ⇨

STORE, TYDELIGE BLOKKBOKSTAVER, *ett tegn pr. felt*.

De to første bokstavene i *din mors første fornavn:* ⇨ ☐☐

De to første bokstavene i *navnet på gata der du bor* (din folkeregistrerte gateadresse)*:* ⇨ ☐☐

De to første bokstavene i *fornavnet ditt:* ⇨ ☐☐

A. BAKGRUNNSINFORMASJON

1. Kjønn: ⇨ Kvinne .. ☐1 Mann .... ☐2

2. Din alder (antall år): ⇨ ☐☐

3. Din studieretning:

Bygg- og anleggsteknikk..... ☐1
Design og håndverk..... ☐2
Elektro ..... ☐3
Helse- og oppvekstfag..... ☐4
Idrettsfag..... ☐5
IKT servicefag..... ☐6
Media og kommunikasjon ..... ☐7
Musikk, dans og drama..... ☐8
Naturbruk..... ☐9
Påbygging til generell studiekompetanse..... ☐10
Service og samferdsel..... ☐11
Studiespesialisering ..... ☐12
Teknikk og industriell produksjon..... ☐13
Toppidrett fotball ..... ☐14
Annet..... ☐15

4. Din klasse: Vennligst skriv hvilken klasse du går i (*maks. 6 tegn*): ⇨ ☐☐☐☐☐☐

5. Hva beskriver best dine foreldres sivilstatus?

NB: Kryss av for alt som stemmer!

1. Gift/samboere med hverandre..... ☐
2. Separert/skilt..... ☐
3. Enke/enkemann..... ☐

Mor:

4. Mor er enslig..... ☐
5. Mor er gift på nytt eller har ny samboer..... ☐

Far:

6. Far er enslig..... ☐
7. Far er gift på nytt eller har ny samboer..... ☐

6. I hvilket land er du og foreldrene dine født?

	Norge	*Annet land*
1. Du:	☐1	☐2
2. Mor:	☐1	☐2
3. Far:	☐1	☐2

7. Hvor mange år har du bodd i Norge? *NB: Avrund til nærmeste antall hele år.* ⇨ ☐☐

8. Hva er dine foreldres/foresattes *høyeste* fullførte utdanning? ⇨

NB: Sett ett kryss for mor / kvinnelig foresatt, og ett for far / mannlig foresatt.

	Mor ⇩	*Far* ⇩
Grunnskole.....	☐1	☐1
Videregående skole	☐2	☐2
Høgskole/universitet, opptil 4 år.....	☐3	☐3
Høgskole/universitet, mer enn 4 år	☐4	☐4
Vet ikke	☐5	☐5

9. Hva er dine foreldres/foresattes yrkesmessige status? ⇨

NB: Sett ett kryss for mor / kvinnelig foresatt, og ett for far / mannlig foresatt.

	Mor ⇩	*Far* ⇩
I arbeid på heltid	☐1	☐1
I arbeid på deltid	☐2	☐2
Permittert/arbeidsløs.....	☐3	☐3
Hjemmeværende	☐4	☐4
Annet.....	☐5	☐5

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

10. Hvordan har familiens økonomi vært *de siste to årene*? ⇨

NB: Her setter du bare ett kryss.

- Vi har hatt dårlig råd hele tida ☐ 1
- Vi har stort sett hatt dårlig råd ☐ 2
- Vi har verken hatt dårlig råd eller god råd ☐ 3
- Vi har stort sett hatt god råd ☐ 4
- Vi har hatt god råd hele tida ☐ 5

B. INFORMASJON OG KUNNSKAP OM HELSE

1. På skalaen fra 1 til 5, synes du at du har nok kunnskap til å kunne ta vare på … ⇨

	Nei, i liten grad 1	2	3	4	*Ja, i stor grad* 5	*Vet ikke* ⇩
1. … egen fysisk helse?	☐	☐	☐	☐	☐	☐
2. … egen psykisk helse?	☐	☐	☐	☐	☐	☐

2. Her er 15 utsagn om ting som kan være viktige for god psykisk helse. På skalaen fra 1 til 5, hvor riktig er hvert utsagn?

	Helt feil 1	*Litt feil* 2	*Verken /eller* 3	*Litt riktig* 4	*Helt riktig* 5	*Vet ikke* ⇩
1. Å ha minst én god venn	☐	☐	☐	☐	☐	☐
2. Å håndtere stressende situasjoner på en god måte	☐	☐	☐	☐	☐	☐
3. Å ha innflytelse på egen hverdag	☐	☐	☐	☐	☐	☐
4. Å handle ut fra egne ønsker	☐	☐	☐	☐	☐	☐
5. Å ha tro på seg selv	☐	☐	☐	☐	☐	☐
6. Å ha gode søvnrutiner	☐	☐	☐	☐	☐	☐
7. Å ta valg basert på egen vilje	☐	☐	☐	☐	☐	☐
8. Å sette grenser for egne handlinger	☐	☐	☐	☐	☐	☐
9. Å være en god venn	☐	☐	☐	☐	☐	☐
10. Å ha det trygt hjemme	☐	☐	☐	☐	☐	☐
11. Å kjenne at man hører til i et fellesskap	☐	☐	☐	☐	☐	☐
12. Å mestre sine egne negative tanker	☐	☐	☐	☐	☐	☐
13. Å sette grenser for hva som er OK for meg	☐	☐	☐	☐	☐	☐
14. Å føle seg verdifull uavhengig av egne prestasjoner	☐	☐	☐	☐	☐	☐
15. Å oppleve skolemestring	☐	☐	☐	☐	☐	☐

C. HELSESØSTER/SKOLEHELSETJENESTEN

1. Hvor ofte har du oppsøkt helsesøster/skolehelse-tjenesten *de siste 12 månedene*? ⇨

Ingen ganger 1	*1 - 3 ganger* 2	*Mer enn 3 ganger* 3
☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

2. *Hvis du har vært hos helsesøster/skolehelsetjenesten det siste året*: Hva var grunnen(e) til dette?
NB: Kryss av for alt som stemmer!

1. Fysisk helse (f.eks. kropp, kosthold, skader, hodepine, ryggsmerter, menssmerter) ☐
2. Psykisk helse (f.eks. stress, bekymring, eksamenspress, depresjon, angst) ☐
3. Seksuell helse (f.eks. prevensjon, kjønnssykdommer, graviditet) ☐
4. Familiesituasjon ☐
5. Trivsel og vennskap ☐
6. Mobbing ☐
7. Rus ☐
8. Annet ☐

3. Har du i løpet av det siste året *ønsket* å gå til helsesøster, men *ikke gjort det*? ⇨

Nei 1	*Ja* 2
☐	☐

4. Hvordan synes du helsesøster/skolehelsetjenesten fungerer på din skole? ⇨

Svært dårlig 1	*Dårlig* 2	*Verken /eller* 3	*Bra* 4	*Svært bra* 5	*Vet ikke* ⇩
☐	☐	☐	☐	☐	☐

5. Hvor enig eller uenig er du i disse utsagnene?

	Svært uenig 1	*Litt uenig* 2	*Verken /eller* 3	*Litt enig* 4	*Svært enig* 5	*Uaktuelt* ⇩
1. Jeg synes helsesøster/skolehelsetjenesten i tilstrekkelig grad er tilgjengelig på skolen	☐	☐	☐	☐	☐	☐
2. Jeg har tillitt til helsesøster/skolehelsetjenesten	☐	☐	☐	☐	☐	☐
3. Det er nyttig at helsesøster/skolehelsetjenesten kommer til klassen og har undervisning/seminar med oss	☐	☐	☐	☐	☐	☐
4. Det er nyttig å snakke med helsesøster/skolehelsetjenesten individuelt	☐	☐	☐	☐	☐	☐

6. Hva ønsker du av helsesøster/skolehelsetjenesten?

	I liten grad 1	2	3	4	*I stor grad* 5
1. Åpen dør og individuelle samtaler	☐	☐	☐	☐	☐
2. Prevensjonsveiledning	☐	☐	☐	☐	☐
3. Resept på prevensjon	☐	☐	☐	☐	☐
4. Undervisning om fysisk helse (f.eks. kropp, kosthold, skader, hodepine, ryggsmerter, menssmerter)	☐	☐	☐	☐	☐
5. Undervisning om psykisk helse (f.eks. stress, bekymring, eksamenspress, depresjon, angst)	☐	☐	☐	☐	☐
6. Undervisning om seksuell helse (f.eks. prevensjon, kjønnssykdommer, graviditet)	☐	☐	☐	☐	☐

7. *Hvis du ønsker at helsesøster/skolehelsetjenesten skal drive undervisning*: Hvordan mener du at denne undervisningen *fortrinnsvis* bør gis? *NB: Bare ett kryss på hver linje!*

	I klassen 1	*I mindre grupper* 2	*Individuelt* 3	*Ønsker ikke* 4
1. Undervisning om fysisk helse (f.eks. kropp, kosthold, skader, hodepine, ryggsmerter, menssmerter)	☐	☐	☐	☐
2. Undervisning om psykisk helse (f.eks. stress, bekymring, eksamenspress, depresjon, angst)	☐	☐	☐	☐
3. Undervisning om seksuell helse (f.eks. prevensjon, kjønnssykdommer, graviditet)	☐	☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

D. FAMILIE, VENNER OG SKOLE

1. Hvor godt forhold synes du at du har til din nære familie og omgangskrets? ⇨

NB: Hvis det er noen av disse du ikke har eller ikke har kontakt med, krysser du av for «Ikke aktuelt».

Hvis flere personer tilhører samme kategori, vennligst tenk på den personen du har best forhold til.

	Svært dårlig 1	*Dårlig* 2	*Verken /eller* 3	*Godt* 4	*Svært godt* 5	*Ikke aktuelt* ⇩
1. Mor	☐	☐	☐	☐	☐	☐
2. Far	☐	☐	☐	☐	☐	☐
3. Søsken	☐	☐	☐	☐	☐	☐
4. Stesøsken/halvsøsken	☐	☐	☐	☐	☐	☐
5. Stemor	☐	☐	☐	☐	☐	☐
6. Stefar	☐	☐	☐	☐	☐	☐
7. Besteforeldre	☐	☐	☐	☐	☐	☐
8. Kjæreste	☐	☐	☐	☐	☐	☐
9. Venner	☐	☐	☐	☐	☐	☐
10. Lærer	☐	☐	☐	☐	☐	☐
11. Nabo	☐	☐	☐	☐	☐	☐

2. Hender det at du føler du deg ensom? ⇨

Svært sjelden el. aldri 1	*Sjelden* 2	*Av og til* 3	*Ofte* 4	*Svært ofte* 5
☐	☐	☐	☐	☐

3. Hvor mange nære venner har du? *Regn bare med de du kan snakke fortrolig med, og som kan gi deg god hjelp når du trenger det.* ⇨

Ingen 1	*Én* 2	*To* 3	*3 - 5* 4	*6 el. flere* 5
☐	☐	☐	☐	☐

4. Hvor ofte er du sammen med venner som du ikke bor sammen med? ⇨

Aldri 1	*Under én gang i året* 2	*1 - 2 ganger i året* 3	*Ca. hver måned* 4	*Ca. hver uke* 5	*Flere ganger i uka* 6
☐	☐	☐	☐	☐	☐

5. Tenk på en gjennomsnittlig dag. Hvor lang tid bruker du på sosiale medier (Facebook, Snapchat, Instagram e.l.)? ⇨

Ikke noe tid 1	*Under 30 min.* 2	*30 - 60 min.* 3	*1 - 2 timer* 4	*2 - 3 timer* 5	*Over 3 timer* 6
☐	☐	☐	☐	☐	☐

6. Hvor godt stemmer følgende for deg?

	Stemmer svært dårlig 1	*Stemmer ganske dårlig* 2	*Stemmer ganske godt* 3	*Stemmer svært godt* 4
1. Å ha kontakt med venner på sosiale medier er svært viktig for meg	☐	☐	☐	☐
2. Jeg hadde følt meg utenfor hvis jeg ikke var på de samme sosiale mediene som vennene mine	☐	☐	☐	☐
3. Personene jeg har kontakt med på sosiale medier, er de samme som jeg har kontakt med utenom nettet	☐	☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

7. Hvor enig eller uenig er du i hvert av disse utsagnene?

	Sterkt uenig 1	*Litt uenig* 2	*Verken /eller* 3	*Litt enig* 4	*Sterkt enig* 5
1. Jeg har noen som er der når jeg trenger dem	☐	☐	☐	☐	☐
2. Jeg har noen jeg kan dele mine gleder og sorger med	☐	☐	☐	☐	☐
3. Familien min prøver virkelig å hjelpe meg	☐	☐	☐	☐	☐
4. Jeg får den følelsesmessige hjelpen og støtten jeg trenger fra familien min	☐	☐	☐	☐	☐
5. Jeg har noen som virkelig kan trøste meg	☐	☐	☐	☐	☐
6. Vennene mine prøver virkelig å hjelpe meg	☐	☐	☐	☐	☐
7. Jeg kan stole på at vennene mine vil støtte meg når ting går galt	☐	☐	☐	☐	☐
8. Jeg kan snakke om mine problemer med familien min	☐	☐	☐	☐	☐
9. Jeg har venner som jeg kan dele mine gleder og sorger med	☐	☐	☐	☐	☐
10. Det er noen i livet mitt som bryr seg om mine følelser	☐	☐	☐	☐	☐
11. Familien min er villig til å hjelpe meg med å ta avgjørelser	☐	☐	☐	☐	☐
12. Jeg kan snakke om mine problemer med mine venner	☐	☐	☐	☐	☐

8. Hvor ofte opplever du følgende?

	Aldri 1	*Av og til* 2	*Minst 1 gang pr. mnd.* 3	*Minst 1 gang i uka* 4	*Nesten hver dag* 5
1. Jevnaldrende anklager deg for ting du ikke har gjort eller ikke kan noe for	☐	☐	☐	☐	☐
2. Jevnaldrende viser at de ikke liker deg, f.eks. ved å erte, hviske eller gjøre narr av deg	☐	☐	☐	☐	☐
3. Én eller flere jevnaldrende slår deg, eller gjør deg vondt på andre måter	☐	☐	☐	☐	☐
4. Du blir plaget av jevnaldrende på sosiale medier	☐	☐	☐	☐	☐
5. Du er med på å plage jevnaldrende	☐	☐	☐	☐	☐
6. Du er med på å plage jevnaldrende på sosiale medier	☐	☐	☐	☐	☐

9. Trivsel på skolen: ⇨

	Svært dårlig 1	*Dårlig* 2	*Verken /eller* 3	*Godt* 4	*Svært godt* 5
1. Trives du på skolen din?	☐	☐	☐	☐	☐
2. Trives du sammen med de andre elevene i klassen din?	☐	☐	☐	☐	☐
3. Trives du med lærerne dine?	☐	☐	☐	☐	☐

10. Hvor mange heler dager er du *vanligvis* borte fra skolen *i løpet av en måned*? ⇨

Ingen dager 1	*Én dag* 2	*To dager* 3	*3 - 4 dager* 4	*5 - 6 dager* 5	*7 dager el. mer* 6
☐	☐	☐	☐	☐	☐

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C 6

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

E. DU OG HELSEN DIN

1. Hvordan er helsen din nå? ⇨

Svært dårlig 1	*Dårlig* 2	*Verken god eller dårlig* 3	*God* 4	*Svært god* 5
☐	☐	☐	☐	☐

2. Hvor ofte deltar du i idrett/sport eller fysisk aktivitet hardt nok til at du *puster fort*, *svetter* eller at *hjertet banker fort i 20 minutter*? ⇨

Hver dag 1	*4 - 6 dager i uka* 2	*2 - 3 dager i uka* 3	*Én dag i uka* 4	*Under én dag i uka* 5	*Under én dag pr. mnd.* 6	*Aldri* 7
☐	☐	☐	☐	☐	☐	☐

3. Hvor mange timer sover du vanligvis pr. natt på ukedagene (ikke i helgen)? ⇨

Under 6 timer 1	*6 - 7 timer* 2	*7 - 8 timer* 3	*Over 8 timer* 4
☐	☐	☐	☐

4. Hvor mange timer sover du om ettermiddagen etter en skoledag? ⇨

Sover ikke om ettermiddagen 1	*0 - 1 timer* 2	*1 - 2 timer* 3	*Over 2 timer* 4
☐	☐	☐	☐

5. Hvor ofte gjør du følgende? ⇨

	Aldri 1	*Sjelden* 2	*1 dag i uka* 3	*2 – 4 dager i uka* 4	*5 – 7 dager i uka* 5
1. Røyker	☐	☐	☐	☐	☐
2. Snuser	☐	☐	☐	☐	☐
3. Drikker alkohol	☐	☐	☐	☐	☐
4. Spiser frokost	☐	☐	☐	☐	☐
5. Spiser skolemåltid	☐	☐	☐	☐	☐
6. Spiser middag	☐	☐	☐	☐	☐

6. Hvor ofte har du hatt noen av disse plagene i løpet av *de tre siste månedene*? ⇨

NB: Uten at du har skadet deg eller har en kjent sykdom som er årsak til smertene.

	Aldri/ sjelden 1	*Ca. én gang i måneden* 2	*Ca. én gang i uka* 3	*Flere ganger i uka* 4	*Nesten hver dag* 5
1. Hodepine/migrene	☐	☐	☐	☐	☐
2. Nakke-/skuldersmerter	☐	☐	☐	☐	☐
3. Smerter i øvre del av ryggen	☐	☐	☐	☐	☐
4. Smerter i nedre del av ryggen / setet	☐	☐	☐	☐	☐
5. Smerter i brystkassen	☐	☐	☐	☐	☐
6. Magesmerter	☐	☐	☐	☐	☐
7. Smerter i venstre arm	☐	☐	☐	☐	☐
8. Smerter i høyre arm	☐	☐	☐	☐	☐
9. Smerter i venstre bein	☐	☐	☐	☐	☐
10. Smerter i høyre bein	☐	☐	☐	☐	☐
11. Andre smerter	☐	☐	☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

7. Her er en liste med plager og problemer som man av og til har. Hvor mye har hvert enkelt problem plaget deg i løpet av *de siste 2 ukene* (*til og med i dag*)? ⇨

	Ikke i det hele tatt 1	*Litt* 2	*En god del* 3	*Svært mye* 4
1. Svimmel eller kraftløs	☐	☐	☐	☐
2. Plutselig redd uten grunn	☐	☐	☐	☐
3. Følt deg redd eller engstelig	☐	☐	☐	☐
4. Følt deg anspent eller urolig	☐	☐	☐	☐
5. Anklaget deg selv for ting	☐	☐	☐	☐
6. Søvnproblemer	☐	☐	☐	☐
7. Følelse av håpløshet når du tenker på fremtiden	☐	☐	☐	☐
8. Følt deg nedfor eller trist	☐	☐	☐	☐
9. Følelse av at alt er et slit	☐	☐	☐	☐
10. Følelse av å være lite verdt	☐	☐	☐	☐

8. Her er en del utsagn om følelser og tanker. Vennligst kryss av for det som best beskriver din opplevelse *de siste 2 ukene*: ⇨

	Ikke i det hele tatt 1	*Sjelden* 2	*En del av tiden* 3	*Ofte* 4	*Hele tiden* 5
1. Jeg har vært optimistisk med hensyn til fremtiden	☐	☐	☐	☐	☐
2. Jeg har følt meg nyttig	☐	☐	☐	☐	☐
3. Jeg har følt meg avslappet	☐	☐	☐	☐	☐
4. Jeg har følt interesse for andre mennesker	☐	☐	☐	☐	☐
5. Jeg har hatt masse energi	☐	☐	☐	☐	☐
6. Jeg har håndtert problemer godt	☐	☐	☐	☐	☐
7. Jeg har tenkt klart	☐	☐	☐	☐	☐
8. Jeg har vært fornøyd med meg selv	☐	☐	☐	☐	☐
9. Jeg har følt nærhet til andre mennesker	☐	☐	☐	☐	☐
10. Jeg har følt meg selvsikker	☐	☐	☐	☐	☐
11. Jeg har vært i stand til å ta beslutninger	☐	☐	☐	☐	☐
12. Jeg har følt meg elsket	☐	☐	☐	☐	☐
13. Jeg har vært interessert i nye ting	☐	☐	☐	☐	☐
14. Jeg har vært i godt humør	☐	☐	☐	☐	☐

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Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

F. MESTRING

1. Tenk på hvordan du har hatt det *den siste måneden* – hvordan du har tenkt og følt om deg selv, og om personer rundt deg som er viktige for deg.

	Svært enig 1	*Litt enig* 2	*Verken /eller* 3	*Litt uenig* 4	*Svært uenig* 5
1. Jeg kommer i mål dersom jeg står på	☐	☐	☐	☐	☐
2. Jeg fungerer best når jeg lager meg klare mål	☐	☐	☐	☐	☐
3. Jeg har noen venner/familiemedlemmer som pleier å oppmuntre meg	☐	☐	☐	☐	☐
4. Jeg er fornøyd med livet mitt til nå	☐	☐	☐	☐	☐
5. I familien min er vi enige om hva som er viktig i livet	☐	☐	☐	☐	☐
6. Jeg får lett andre til å trives sammen med meg	☐	☐	☐	☐	☐
7. Jeg vet hvordan jeg skal nå målene mine	☐	☐	☐	☐	☐
8. Jeg legger alltid en plan før jeg begynner med noe nytt	☐	☐	☐	☐	☐
9. Vennene mine holder alltid sammen	☐	☐	☐	☐	☐
10. Jeg trives godt i familien min	☐	☐	☐	☐	☐
11. Jeg har lett for å finne nye venner	☐	☐	☐	☐	☐
12. Når det er umulig for meg å forandre på ting slutter jeg å gruble på dem	☐	☐	☐	☐	☐
13. Jeg er flink til å organisere tiden min	☐	☐	☐	☐	☐
14. Jeg har noen nære venner/familiemedlemmer som virkelig bryr seg om meg	☐	☐	☐	☐	☐
15. I familien min er vi enig om det meste	☐	☐	☐	☐	☐
16. Jeg er flink til å snakke med nye folk	☐	☐	☐	☐	☐
17. Jeg føler jeg er dyktig	☐	☐	☐	☐	☐
18. I familien min har vi regler som forenkler hverdagen	☐	☐	☐	☐	☐
19. Jeg har alltid noen som kan hjelpe meg når jeg trenger det	☐	☐	☐	☐	☐
20. Når jeg skal velge noe vet jeg oftest hva som blir riktig for meg	☐	☐	☐	☐	☐
21. Familien min ser positivt på tiden framover selv om det skjer noe veldig leit	☐	☐	☐	☐	☐
22. Jeg finner alltid noe artig å snakke om	☐	☐	☐	☐	☐
23. Min tro på meg selv får meg gjennom vanskelige perioder	☐	☐	☐	☐	☐
24. I familien min støtter vi opp om hverandre	☐	☐	☐	☐	☐
25. Jeg finner alltid på noe trøstende å si til andre som er lei seg	☐	☐	☐	☐	☐
26. I motgang har jeg en tendens til å finne noe bra jeg kan vokse på	☐	☐	☐	☐	☐
27. I familien min liker vi å finne på ting sammen	☐	☐	☐	☐	☐
28. Jeg har noen nære venner/familiemedlemmer som setter pris på egenskapene mine	☐	☐	☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

2. Her er en liste med ting eller situasjoner du kanskje opplever som stressende. Hvor stressende har hver av disse tingene eller situasjonene vært for deg i løpet av det siste året?
NB: Hvis det er noe du ikke har opplevd, krysser du i rute nr. 1 (Ikke stressende).

Hvor stressende er (det)…	*Ikke stressende* 1	*Litt stressende* 2	*Moderat stressende* 3	*Ganske stressende* 4	*Svært stressende* 5
1. … uenigheter mellom deg og faren din?	☐	☐	☐	☐	☐
2. … å stå opp tidlig om morgenen?	☐	☐	☐	☐	☐
3. … å være nødt til å lære ting du ikke forstår?	☐	☐	☐	☐	☐
4. … å ha lærere som forventer for mye av deg?	☐	☐	☐	☐	☐
5. … å bli ertet?	☐	☐	☐	☐	☐
6. … å ha vanskeligheter med noen skolefag?	☐	☐	☐	☐	☐
7. … å følge regler du er uenig i hjemme?	☐	☐	☐	☐	☐
8. … å måtte lese ting du ikke er interessert i?	☐	☐	☐	☐	☐
9. … å bli oversett eller avvist av en person du er interessert i?	☐	☐	☐	☐	☐
10. … å ikke ha nok tid til å ha det gøy?	☐	☐	☐	☐	☐
11. … uenigheter med søsknene dine?	☐	☐	☐	☐	☐
12. … å ikke ha nok tid til å drive med fritidsaktiviteter?	☐	☐	☐	☐	☐
13. … å ha for mye hjemmelekser?	☐	☐	☐	☐	☐
14. … å ikke få nok tilbakemelding på skolearbeidet tidsnok til at det er hjelp i det?	☐	☐	☐	☐	☐
15. … å få forholdet til kjæresten til å fungere?	☐	☐	☐	☐	☐
16. … å bli nedvurdert av vennene dine?	☐	☐	☐	☐	☐
17. … uenigheter mellom foreldrene dine?	☐	☐	☐	☐	☐
18. … å ha for mye fravær fra skolen?	☐	☐	☐	☐	☐
19. … hvordan du ser ut?	☐	☐	☐	☐	☐
20. … uenigheter mellom deg og mora di?	☐	☐	☐	☐	☐
21. … å gå på skolen?	☐	☐	☐	☐	☐
22. … å ikke ha nok tid til kjæresten din?	☐	☐	☐	☐	☐
23. … lærere som erter deg?	☐	☐	☐	☐	☐
24. … å adlyde regler du er uenig i på skolen?	☐	☐	☐	☐	☐
25. … å ikke bli hørt på av lærere?	☐	☐	☐	☐	☐
26. … å ikke komme overens med kjæresten din?	☐	☐	☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

Hvor stressende er (det)…	*Ikke stressende* 1	*Litt stressende* 2	*Moderat stressende* 3	*Ganske stressende* 4	*Svært stressende* 5
27. … mangel på respekt fra lærere?	☐	☐	☐	☐	☐
28. … uenigheter mellom deg og dine venner?	☐	☐	☐	☐	☐
29. … å ikke komme overens med lærerne dine?	☐	☐	☐	☐	☐
30. … å slå opp med kjæresten?	☐	☐	☐	☐	☐

3. Her er fem utsagn om tilfredshet med livet som helhet. Hvor godt eller dårlig stemmer hvert utsagn for deg og ditt liv?

	Stemmer dårlig 1	2	3	4	5	6	*Stemmer perfekt* 7
1. På de fleste måter er livet mitt nær idealet mitt	☐	☐	☐	☐	☐	☐	☐
2. Forholdene i livet mitt er utmerket	☐	☐	☐	☐	☐	☐	☐
3. Jeg er fornøyd med livet mitt	☐	☐	☐	☐	☐	☐	☐
4. Så langt har jeg oppnådd de viktige tingene jeg ønsker i livet	☐	☐	☐	☐	☐	☐	☐
5. Hvis jeg kunne leve livet på nytt, ville jeg nesten ikke forandret noe	☐	☐	☐	☐	☐	☐	☐

4. Nå kommer tre spørsmål om opplevelse av sammenheng i livet.

	Veldig sjelden el. aldri 1	2	3	4	5	6	*Veldig ofte el. alltid* 7
1. Opplever du at ting som skjer i ditt daglige liv er vanskelige å forstå?	☐	☐	☐	☐	☐	☐	☐
2. Pleier du å se løsningen på problemer og utfordringer som andre opplever som håpløse?	☐	☐	☐	☐	☐	☐	☐
3. Er du tilfreds med ditt daglige liv?	☐	☐	☐	☐	☐	☐	☐

5. Hvor enig eller uenig er du i hvert av disse utsagnene om selvfølelse?

	Sterkt uenig 1	*Uenig* 2	*Enig* 3	*Sterkt enig* 4
1. I det store og hele er jeg fornøyd med meg selv	☐	☐	☐	☐
2. Av og til synes jeg ikke at jeg er god i noe i det hele tatt	☐	☐	☐	☐
3. Jeg føler jeg har flere gode egenskaper	☐	☐	☐	☐
4. Jeg er i stand til å gjøre ting like bra som de fleste andre folk	☐	☐	☐	☐
5. Jeg føler at jeg ikke har mye å være stolt av	☐	☐	☐	☐
6. Til tider føler jeg med absolutt ubrukelig	☐	☐	☐	☐
7. Jeg føler at jeg er en person som er verdt noe, i alle fall på lik linje med andre	☐	☐	☐	☐
8. Jeg skulle ønske jeg hadde mer selvrespekt	☐	☐	☐	☐
9. Alt i alt har jeg en tendens til å føle meg mislykket	☐	☐	☐	☐
10. Jeg har en positiv holdning til meg selv	☐	☐	☐	☐

Før du fortsetter: Kontroller at du ikke har glemt noe på denne sida.

Husk: Bare ett kryss på hvert spørsmål.

6. Hvor riktige eller gale er disse utsagnene for deg?

	Helt galt 1	*Nokså galt* 2	*Nokså riktig* 3	*Helt riktig* 4
1. Jeg klarer alltid å løse vanskelige problemer hvis jeg prøver hardt nok	☐	☐	☐	☐
2. Hvis noen motarbeider meg, så kan jeg finne måter og veier for å få det som jeg vil	☐	☐	☐	☐
3. Det er lett for meg å holde fast på planene mine og nå målene mine	☐	☐	☐	☐
4. Jeg føler meg trygg på at jeg ville kunne takle uventede hendelser på en effektiv måte	☐	☐	☐	☐
5. Takker være ressursene mine så vet jeg hvordan jeg skal takle uventede situasjoner	☐	☐	☐	☐
6. Jeg kan løse de fleste problemer hvis jeg går tilstrekkelig inn for det	☐	☐	☐	☐
7. Jeg beholder roen når jeg møter vanskeligheter fordi jeg stoler på mestringsevnen min	☐	☐	☐	☐
8. Når jeg møter et problem, så finner jeg vanligvis flere løsninger på det	☐	☐	☐	☐
9. Hvis jeg er i knipe, så finner jeg vanligvis en vei ut	☐	☐	☐	☐
10. Samme hva som hender så er jeg vanligvis i stand til å takle det.	☐	☐	☐	☐

Har du en kommentar til temaene som tas opp i dette spørreskjemaet, kan du skrive her⇩.
NB: Ikke skriv noe som kan identifisere enkeltpersoner, verken deg selv eller andre.

Takk for at du ville svare på spørsmålene!

3. Jeg er sikker på at jeg …	*Helt feil* 1	*Litt feil* 2	*Litt riktig* 3	*Helt riktig* 4
1. … har god kunnskap om helse	☐	☐	☐	☐
2. … ved behov kan komme med forslag til hvordan helsesituasjonen i mine nære omgivelser kan forbedres (f.eks. i nærmiljøet, familie, venner)	☐	☐	☐	☐
3. … kan vurdere helserelatert informasjon fra ulike kilder	☐	☐	☐	☐
4. … kan følge instruksjoner gitt av helsepersonell (f.eks. sykepleier, lege)	☐	☐	☐	☐
5. … enkelt kan gi eksempler på ting som er viktig for god helse	☐	☐	☐	☐
6. … kan vurdere hvordan mine handlinger påvirker miljøet	☐	☐	☐	☐
7. … kan finne forståelig informasjon om helse når jeg trenger det	☐	☐	☐	☐
8. … kan vurdere hvordan mine handlinger påvirker helsen min	☐	☐	☐	☐
9. … vanligvis kan avgjøre om helserelatert informasjon er rett eller feil	☐	☐	☐	☐
10. … kan begrunne valg jeg tar når det gjelder helsen min	☐	☐	☐	☐

Appendix B

Interview guide focus group discussions

Intervjuguide: Ungdommers opplevelse av skolehelsetjenesten
Mars 2016

1. Introduksjon

Hei, hjertelig velkommen til gruppeintervju om skolehelsetjenesten, og tusen takk for at dere stiller opp på dette. Vi setter veldig pris på at dere tar dere tid til oss i en travel hverdag, derfor har vi med litt lunsj/middag, så det er bare å forsyne seg med bagetter/pizza og drikke. Dere vil også få gavekort på en kinobillett når vi er ferdig som takk for hjelpa.

- Småprate med alle ungdommene mens de forsyner seg med mat og spiser, prøve å få alle til å si noe:
    - Fortell hva du heter/hils på alle.
    - Hva skjer på skolen for tiden?
    - Hva liker dere å gjøre på fritiden?
    - Ta opp noe aktuelt fra media.
    - Begynne på 1.1 Tema og 1.2 Info mens de spiser.

1.1 Tema:

Bakgrunnen for intervjuet er at skolehelsetjenesten på Tiller/Heimdal/Skjetlein (deres skole) dette året har jobbet på en annerledes måte enn det skolehelsetjenesten vanligvis har gjort i videregående skole. Dere har fått besøk av helsesøster og enkelte ganger fysioterapeut i klassen og hatt tilbud om å delta på mestringsseminar og mestringsgrupper med tema som søvn, stress, tankevirus, kroppspress, selvbilde (fyll inn etter liste fra helsesøstre) i regi av skolehelsetjenesten. (Ha MEST logo synlig, liste over ulike seminar og grupper som har vært tilbudt). Har alle dere deltatt? Husker dere klasseromseminar, seminar og grupper?

1.2 Info:

Først litt praktisk informasjon før vi setter i gang med intervjuet. Vi begynner med en liten presentasjon av oss selv: Regine og Hanne, begge jobber som doktorgrads stipendiater, altså forskere, ved institutt for sykepleievitenskap/senter for helsefremmende forskning ved NTNU. Hanne har bakgrunn som sykepleier og helsesøster, mens Regine har en bakgrunn i psykologi.

Vi er interessert i å se på hvordan dere opplever skolehelsetjenesten, hvordan dere synes det fungerer at skolehelsetjenesten har kommet ut i klassene og holdt undervisning om ulike tema, samt at dere har fått tilbud om å delta på ulike mestringsseminar og

mestringsgrupper. Vi er veldig interesserte i å høre deres meninger om skolehelsetjenesten og hva dere ønsker fra skolehelsetjenesten. Vi vil presisere at vi er helt uavhengig av skolehelsetjenesten, så for oss spiller det ingen rolle om dere liker eller ikke liker måten skolehelsetjenesten jobber på. Det er helt greit, og veldig bra å være uenig og ha ulike opplevelser av hvordan dere synes det har vært at helsesøster og noen ganger fysioterapeut har vært ute i klassene med undervisningen og tilbudt seminar om ulike tema. Vi er kun ute etter hvordan dere har opplevd undervisningen og seminarene/gruppene, og ikke de personlige samtalene med helsesøster/skolehelsetjenesten. Det er ingen riktige eller feil svar, det viktigste for oss er at dere forteller fritt. Til slutt ber vi dere gå gjennom noen spørsmål om kunnskap om positiv psykisk helse for å teste ut spørsmål som vi vil bruke i et spørreskjema neste skoleår.

Fokusgruppeintervju som dere er med på nå er en fokusert diskusjon, det vil si at spørsmålene er planlagt slik at vi håper å få kunnskap om deres erfaringer. Ved hjelp av (Hanne/Regine) kommer jeg til å intervjue dere og det er viktig at dere kommer fram med de erfaringene, tankene og opplevelsen den enkelte av dere sitter inne med. Vi kommer til å styre samtalen med spørsmål og det kan hende vi avbryter dere noen ganger. Det skyldes at vi har en del spørsmål som vi vil komme igjennom i løpet av den tiden som er oppsatt. Det vi ønsker er at når dere svarer på spørsmål og hører hverandres svar, er at dere kan bygge på hverandres kommentarer og sammenligne hvordan dere opplever skolehelsetjenesten, og slik snakke dere imellom, vi ønsker at dere skal diskutere med hverandre. Kommenter og suppler gjerne hverandre, slik at det blir en samtale mellom dere.

1.3 Tid:

- 1 time.
- Hvis dere vil ha en pause er det bare å si ifra.

1.4 Etiske regler:

Vi kommer til å bruke en lydopptaker under intervjuet. Opptaket fra intervjuet vil bli behandlet konfidensielt, det vil si at ingen får vite hva dere har svart. Vi avtaler også en taushetsplikt innad i gruppa, slik at dere ikke går rundt og snakker med andre om det andre her i gruppa har sagt under intervjuet. Det er helt frivillig å delta på intervjuet. Dere svarer på det dere har lyst til å svare på, og dere har lov til å avslutte intervjuet når dere vil. Men jeg håper at dere sitter til vi er ferdig.

- Høres dette greit ut?

- Sett på båndopptaker. Start med at alle sier navnet sitt.

2. Førsteinntrykk av skolehelsetjenesten

For å komme i gang med tankeprosessen rundt skolehelsetjenesten så kan vi starte med at dere forteller det første dere tenker på når jeg sier skolehelsetjenesten?

- Kan dere utdype dette?
- Hvorfor er dette det første dere tenkere på?
- Hvem er mest sentrale personer for dere?
- Hvorfor er disse personene de mest sentrale?
- Positive/negative tanker/opplevelser om skolehelsetjenesten?

3. Helsesøsters rolle i skolehelsetjenesten

Nå skal vi gå litt nærmere inn på helsesøster sin rolle i skolehelsetjenesten og skolen generelt. Hvilken rolle/funksjon tenker dere at helsesøster har på skolen?

- Hvilken rolle har helsesøster for dere? Hva betyr helsesøster for dere?
- Hva ønsker dere av helsesøster?
  - Hvorfor?

- Hvordan synes dere det har vært at helsesøster kommer ut i klassene og tilbyr undervisning?
  - Hva er det som er positivt/negativt med at helsesøster kommer ut i klassene?
- Hvordan var det å delta på klasseromsundervisning, seminar og/eller grupper?
- Hva sitter dere igjen med etter at helsesøster har hatt undervisning?
  - Positive/negative erfaringer?
  - Noe som dere synes mangler i helsesøster og skolehelsetjenestens tilbud?
  - Hva tenker dere om tidsbruk og tidspunkt for undervisningen?
    - Andre tidspunkt som kan være aktuelle?
  - Kortere/lengre tid til hver enkelt del av undervisningen/seminar/gruppe?
  - Økt kunnskap om temaene (for eksempel stressmestring, selvbilde, kroppspress, tankevirus, kosthold og søvn)?
- Hvordan synes dere det er at helsesøster har åpen dør på kontoret sitt?
  - Positivt/negativt?
  - Tilgjengelighet?
- Hva tenker dere om det å lære om psykisk helse på skolen?

    - Ønsker dere å lære om psykisk helse i skolen? Er det nyttig for dere?
        - Fra hvem i så fall?
            - Helsesøster?
            - Lærer?
            - Andre?
            - Alle?
- Hva tenker dere om helsesøster i forhold til klassemiljø?
- Hvilken betydning tror dere eventuelt at helsesøster kan ha for dere og de i klassen/klassemiljøet? Hva tenker dere om helsesøster og klassemiljø? Kan helsesøster spille en rolle for klassemiljøet? Hvordan, eller hvorfor ikke?
    - Positiv/negativ/ingen betydning?
    - Hvis ja (positiv betydning); På hvilken måte kan helsesøster ha betydning for deg og de i klassen eller klassemiljøet? Hva med skolemiljøet?
    - Hvis nei; Hvorfor?
    - Hva tror dere helsesøster kan være med på å påvirke når det gjelder klasse/skolemiljøet?
    - Hvilken funksjon kan helsesøster ha for klasse/skolemiljøet?
    - Hvorfor tror dere helsesøster kan ha en mulighet til å påvirke klasse/skolemiljøet?

5. Fremtidig utvikling av skolehelsetjenesten

Nå skal vi snakke litt om hvordan skolehelsetjenesten kan videreutvikles.

- Har dere noen tips/råd til mulige forbedringer? Noe som kan forandres?
- Hva tror dere vi burde spørre ungdom om når det gjelder skolehelsetjenesten?
- Hvis du fikk sjansen til å gi et godt råd til de som leder og utvikler skolehelsetjenesten, hva ville det være?
- Når vi nå har diskutert deres opplevelse av skolehelsetjenesten, er det noe vi har glemt å spørre om? Noe dere mener er viktig å få frem som vi ikke har snakket om?

6. Sosial støtte

Nå tenkte vi å snakke om sosial støtte. Hva er det første dere tenker på når jeg sier sosial støtte? Hva opplever dere som viktig når det gjelder sosial støtte?

- Kvalitet: Dybden på forholdet til andre?

- Kvantitet: Hyppighet og antall personer?
- Informasjon, bekreftelse, emosjonell eller instrumentell støtte?
- Hvem er de viktigste personene i deres liv?
    - Venner
    - Familie
    - Kjæreste
    - Naboer
    - Klassen/skolen
    - Lærere
    - Idrett/fritidsaktiviteter
- Hvordan opplever dere den ideelle støtten versus faktisk opplevd støtte?
- Hvordan opplever deres ev ne til å gi og motta sosial støtte?
- Kunnskap om sosial støtte?

7. Utprøving av skala om kunnskap om positiv psykisk helse

Til slutt ber vi gå gjennom noen spørsmål som gjelder kunnskap om positiv psykisk helse. Dette skal brukes når vi skal dele ut spørreskjema ungdom og psykisk helse neste år. Fint om dere fyller ut og lever inn til meg når dere er ferdige, også går vi gjennom spørsmål for spørsmål etterpå, der dere kommenterer spørsmålene, om de er lett å forstå og relevante for dere. Kom også gjerne med forslag dersom det er andre spørsmål dere mener det er viktig å spørre om når det gjelder kunnskap om positiv psykisk helse.

Da gjenstår det bare å si tusen takk for deltagelsen! Del ut gavekort til kino.

Appendix C

Information letter

Senter for helsefremmende forskning

NTNU
Kunnskap for en bedre verden

Forespørsel til elever om deltagelse i et forskningsprosjekt om skolehelsetjenesten og psykisk helse hos ungdom

Bakgrunn

Vi vil med dette forespørre deg om å delta i en spørreundersøkelse om skolehelsetjenesten og psykisk helse hos ungdom. Undersøkelsen gjennomføres av Institutt for sykepleievitenskap/Senter for helsefremmende forskning ved NTNU, i samarbeid med Trondheim kommune og Sør-Trøndelag fylkeskommune. Kunnskapen fra prosjektet vil brukes for å styrke skolehelsetjenestens helsefremmende og forebyggende arbeid når det gjelder psykisk helse hos ungdom.

Hva innebærer studien?

Du som elev forespørres om å delta i en datainnsamling med bruk av spørreskjema som besvares individuelt i løpet av en skoletime. Spørsmålene handler om skolehelsetjenesten, psykisk helse, familie, venner, mestring og opplevelse av stress. Hver besvarelse er anonym, og navn eller andre direkte gjenkjennende opplysninger vil ikke identifiseres. Dersom du ikke ønsker å delta kan du levere blankt spørreskjema.

Mulige fordeler og ulemper

Besvarelse av spørreskjema innebærer ingen kjente negative konsekvenser for deg som deltager og ditt bidrag kan gi viktig kunnskap om ungdoms helse og mestringsressurser. Hvis besvarelse av spørreskjema oppleves ubehagelig er det mulig å ta kontakt med helsesøster ved din skole.

Frivillig deltagelse

Besvarelse av spørreskjemaet er frivillig og er ikke del av undervisningen på skolen. Hvis du ikke vil delta har det ingen konsekvenser for deg. Det innhentes passivt samtykke fra elever mellom 16-19 år, det vil si at utfylling av spørreskjema er et samtykke i seg selv. Ettersom undersøkelsen er anonym er det ikke mulig å reservere seg etter at du har levert fra deg spørreskjemaet.

Prosjektet er godkjent av Regional komité for medisinsk og helsefaglig forskningsetikk, Midt-Norge (REK). Prosjektet er del av et større studie finansiert av Norges Forskningsråd og NTNU. Av kontrollhensyn vil prosjektdata oppbevares i 5 år etter at sluttmelding er sendt REK.

Kontaktpersoner for undersøkelsen er:

Doktorgradsstipendiat Regine Ringdal
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Prosjektleder Unni Karin Moksnes
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Appendix D

Information read out a load by teachers prior to administration of questionnaire

Senter for helsefremmende forskning

NTNU
Kunnskap for en bedre verden

Spørreundersøkelse om skolehelsetjenesten og psykisk helse hos ungdom 2016-2017

Instruksjon for lærer/administrator FØR spørreundersøkelsen deles ut i klassen leses dette høyt for alle elevene:

«Dette spørreskjemaet går til ungdommer i videregående skole i Trondheim i forbindelse med et forskningsprosjekt ved NTNU om skolehelsetjenesten og psykisk helse hos ungdom. Institutt for sykepleievitenskap (ISV)/Senter for helsefremmende forskning ved NTNU er ansvarlig for undersøkelsen.

Hensikten med prosjektet er å undersøke ungdoms opplevelse av skolehelsetjenesten og psykisk helse. Resultatene kan brukes til å videreutvikle skolehelsetjenesten for ungdom i årene som kommer. Spørsmålene handler om hvordan du har det, skolehelsetjenesten, sosial støtte og din kunnskap om hva som er viktig for psykisk helse.

Vi håper du har sett informasjonen som har blitt lagt ut på it's learning. Det er frivillig å delta i undersøkelsen. Det har ingen konsekvenser for deg om du ikke deltar. Alle vil først få utdelt spørreskjema og konvolutt. Dersom du velger å delta fyller du ut spørreskjemaet ved å krysse av i rutene som passer best for deg. Du kan hoppe over spørsmål som du ikke ønsker å svare på. Svaret ditt kan ikke trekkes tilbake når det er levert, ettersom vi ikke har mulighet til å spore svaret tilbake til deg.

Når du har fylt ut spørreskjemaet legger du det i konvolutten, klistrer igjen og legger det i en boks som lærer vil ta med tilbake til oss. De som ikke ønsker å delta kan jobbe med skolearbeid, og leverer et blankt spørreskjema.

Undersøkelsen er anonym og det er ikke mulig å finne ut hvem som har svart hva. Når resultatene fra undersøkelsen er ferdig, vil de bli presentert i rapporter og publikasjoner som kan brukes til videreutvikling av skolehelsetjenesten. Dersom du har behov for å snakke med en voksen etterpå, ta gjerne kontakt med helsesøster på skolen eller helsestasjon for ungdom.

Vi håper at så mange som mulig vil delta, slik at vi får fram ungdoms tanker om psykisk helse og skolehelsetjenesten.
Lykke til!

Hilsen stipendiat Regine Ringdal, stipendiat Hanne Bjørnsen og prosjektleder Unni Karin Moksnes ved Institutt for sykepleievitenskap/Senter for helsefremmende forskning, NTNU.»

Nå kan du dele ut spørreskjema og konvolutter. Lykke til med datainnsamlingen! Og tusen takk for hjelpen!

Med vennlig hilsen

Regine Ringdal Stipendiat, ISV/Senter for helsefremmende forskning, NTNU	Hanne Bjørnsen Stipendiat, ISV/Senter for helsefremmende forskning, NTNU	Unni Karin Moksnes Førsteamanuensis, ISV/Senter for helsefremmende forskning, NTNU

Appendix E

The instrument MHPK-10 in English and Norwegian

WHAT IS IMPORTANT FOR GOOD MENTAL HEALTH?

Here are 10 statements about things that can be important for good mental health.
On the scale from 1 to 5, how correct is each statement?

		Completely wrong 1	*Slightly wrong* 2	*Neither /nor* 3	*Slightly correct* 4	*Completely correct* 5	*Don't know* ⇩
1.	Handling stressful situations in a good manner	☐	☐	☐	☐	☐	☐
2.	Believing in yourself	☐	☐	☐	☐	☐	☐
3.	Having good sleep routines	☐	☐	☐	☐	☐	☐
4.	Making decisions based on your own will	☐	☐	☐	☐	☐	☐
5.	Setting limits for your own actions	☐	☐	☐	☐	☐	☐
6.	Feeling that you belong in a community	☐	☐	☐	☐	☐	☐
7.	Mastering your own negative thoughts	☐	☐	☐	☐	☐	☐
8.	Setting limits for what is OK for you	☐	☐	☐	☐	☐	☐
9.	Feeling valuable regardless of your own accomplishments	☐	☐	☐	☐	☐	☐
10.	Experiencing school mastery	☐	☐	☐	☐	☐	☐

MHPK scoring instructions:

MHPK is scored by using the mean score of the individual items. The score value for each item range from 1-5 in addition to don't know, which is scored as 0. The mean score range is from 0-5.

Bjornsen, H. N., Eilertsen, M. E. B., Ringdal, R., Espnes, G. A., & Moksnes, U. K. (2017). Positive mental health literacy: development and validation of a measure among Norwegian adolescents. BMC Public Health, 17(1), 717. doi:10.1186/s12889-017-4733-6

Her er 10 utsagn om ting som kan være viktige for god psykisk helse. På skalaen fra 1 til 5, hvor riktig er hvert utsagn?

	Helt feil 1	*Litt feil* 2	*Verken /eller* 3	*Litt riktig* 4	*Helt riktig* 5	*Vet ikke* ⇩
1. Å håndtere stressende situasjoner på en god måte	☐	☐	☐	☐	☐	☐
2. Å ha tro på seg selv	☐	☐	☐	☐	☐	☐
3. Å ha gode søvnrutiner	☐	☐	☐	☐	☐	☐
4. Å ta valg basert på egen vilje	☐	☐	☐	☐	☐	☐
5. Å sette grenser for egne handlinger	☐	☐	☐	☐	☐	☐
6. Å kjenne at man hører til i et fellesskap	☐	☐	☐	☐	☐	☐
7. Å mestre sine egne negative tanker	☐	☐	☐	☐	☐	☐
8. Å sette grenser for hva som er OK for meg	☐	☐	☐	☐	☐	☐
9. Å føle seg verdifull uavhengig av egne prestasjoner	☐	☐	☐	☐	☐	☐
10. Å oppleve skolemestring.	☐	☐	☐	☐	☐	☐