

Anxious Adolescents:
Prevalence, Correlates, and
Preventive Cognitive Behavioural Interventions

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*“Any single scientific study is an exercise in trust.”
(Shadish, Cook, & Campbell, 2002)*

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Abstract

Objective

Anxiety is *the* health issue that is associated with the highest problem load in modern developed countries. However, anxiety prevention programs for adolescents are rare, and only a small proportion of anxious adolescents are offered any kind of systematized, evidence-based help to reduce their symptomatology. The scientific community cannot, at present, provide research-based information on potential benefits or drawbacks associated with the range of possible prevention strategies and interventions that have been proposed to reduce anxiety in adolescents. This leaves those who must make decisions in this field with very little evidence to inform their choices.

The main aim of the present thesis is to expand the empirical knowledge base of prevention strategies and interventions that target anxious adolescents. The three papers in the thesis focus on anxious adolescents that are 12–17 years old. Two of the papers are based on data from an epidemiological study, and the third paper is based on data from a pilot study of a cognitive behavioural (CB) low intensity intervention. Potential benefits, drawbacks, and risks associated with the use of CB self-help material as a universal, selective, and indicated prevention program are presented and discussed in these three papers.

The first paper demonstrates the association between anxiety symptoms across anxiety domains and Health Related Quality of Life (HRQoL) in a community sample of adolescents. To expand our knowledge about correlates of anxiety in adolescents, the second paper estimates prevalence of anxiety problems and investigates central characteristics of anxious adolescents. Knowledge from Papers 1 and 2 can be helpful when interventions are developed and when the scale of services targeting anxious adolescents is considered. The third paper explores the feasibility and potential benefits of an indicated preventive intervention for traumatized adolescents that includes the use of CB self-help material. New interventions and evidence on how they can be applied is needed in a world where so many adolescents struggle with anxiety.

Method

The first and second papers described above are based on *cross-sectional data* collected in a school survey about anxiety in a community sample of Norwegian adolescents aged 12–17 ($N = 1,719$). Anxiety symptoms and associated factors were assessed via self-report. Regression analyses were performed to determine relationships between the adolescents' levels of anxiety symptoms and HRQoL, and to identify characteristics of

anxious adolescents. An open trial pilot study ($N = 11$) of an early, brief intervention that included use of CB self-help material was conducted to investigate potential benefits for traumatized adolescents. Data are both quantitative and qualitative.

Results

The first paper demonstrates that across domains of anxiety, anxiety symptoms were inversely associated with overall HRQoL. However, adding depression into the model nearly doubles the variance explained in HRQoL. The associations between HRQoL and the anxiety domains physical injury fear, medium level, and social phobia, high level, remained significant. Other anxiety domains were not associated significantly with HRQoL when depression was included in the model.

The second paper finds that a total of 23% of the adolescents were categorized as anxious. Female gender, perceived family economy, reported negative life events, low social support, and low self-efficacy were significantly associated with anxiousness.

The third paper finds that the traumatized adolescents' levels of post-traumatic stress symptoms decreased from before to after the brief intervention, and that these results were sustained at one-year follow-up. The self-help material was considered to serve as a flexible and useful therapeutic tool, used to enhance coping in areas related to trauma, interpersonal relations, and school.

Conclusions

The association between elevated levels of anxiety and depression symptoms and decreased HRQoL indicates the importance of improved mental health prevention and interventions targeting anxious adolescents both with and without depression symptoms. To reduce the problem of anxiety as a public health concern, our findings support prevention strategies that *reach out* to anxious adolescents in schools and other adolescent-centred arenas, addressing both individual and environmental factors. Since anxiety is a common experience for adolescents at school as well as a highly prevalent health problem, health literacy, including basic principles for reducing anxiety, is suggested as a main universal preventive intervention strategy. Schools are central to the implementation of universal interventions. Brief interventions, including CB self-help material, seem promising as low threshold services for adolescents. However, our studies did not have the methodological rigor to draw firm conclusions about effects of the intervention. Further research should investigate the effects of brief and flexible CB interventions aiming to reduce adolescent anxiety and associated problems.

List of Papers

Paper 1. Raknes, S., Pallesen, S., Himle, J., Bjaastad, J. F., Wergeland, G. J., Hoffart, A., Dyregrov, K., Håland, Å. T., & Haugland, B. S. M. (2017). Quality of life in anxious adolescents. *Child and Adolescent Psychiatry and Mental Health, 11:33, 1-11*. doi: 10.1186/s13034-017-0173-4

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Paper 3. Raknes, S., Dyregrov, K., Pallesen, S., Hoffart, A., Stormyren, S., & Haugland, B. S. M. (2017). A pilot study of a low threshold, low intensity CBT intervention for traumatized adolescents. *Scandinavian Psychologist 4, e8*. doi: 10.15714/scandpsychol.4.e8

ABBREVIATIONS

CB	Cognitive Behavioural
CBT	Cognitive Behavioural Therapy
GAD	Generalized Anxiety Disorder
HBM	The Health Belief Model
HRQoL	Health Related Quality of Life
LI-CBT	Low Intensity Cognitive Behavioural Therapy
OCD	Obsessive Compulsive Disorder
PF	The Psychological First Aid Kit
PTS	Post-Traumatic Stress
PTSD	Post-Traumatic Stress Disorder
SPSS	Statistical Package for the Social Sciences
WHO	The World Health Association

MEASURES

C-GAS	The Children's Global Assessment Scale
CPTCI	The Child Post-Traumatic Cognitions Inventory
CRIES	The Children's Revised Impact of Event Scale
GSE	The Generalized Self Efficacy Scale
KINDL-	The Questionnaire for Measuring Health-Related Quality of Life in
R_C/P	Children and Adolescents, Revised Child Version and Parent Version
PERQ	The Parental Emotional Reaction Questionnaire
READ	The Resilience Scale
SCAS	The Spence Children's Anxiety Scale
SMFQ	The Short Mood and Feelings Questionnaire
SDQ	The Strengths and Difficulties Questionnaire

Introduction and theoretical framework

Background

Anxiety in adolescents is common, impairs everyday functioning and increases the risk of severe mental health disorders in adulthood (Essau, Lewinsohn, Olaya, & Seeley, 2014). Investigating how anxiety and associated problems can be reduced is important not only for the anxious adolescents and their families, but also for schools and society as a whole (WHO, 2014). The shift from considering anxiety as a health problem for the individual to considering it as a *public health problem* raises new questions (Johnson, Barnett, Elman, Forrest, & Kaslow, 2012; Major et al., 2011; Stiffman et al., 2010). Historically, large-scale public health problems have typically been addressed using prevention strategies rather than treatment (Herrman, Saxena, & Moodie, 2005). However, anxiety disorders in adolescents have traditionally been addressed by using cognitive behavioural treatments—not by preventive interventions (James, James, Cowdrey, Soler, & Choke, 2015; Rapee, Schniering, & Hudson, 2009). Can cognitive behavioural treatment interventions be modified to create cognitive behavioural preventive interventions? Whom should these anxiety prevention interventions aim to reach? Can cognitive behavioural self-help material be used to prevent mental health disorders? These questions are relevant for clinicians, low threshold service providers, and decision-makers involved with health, development, and education policy. To make informed decisions, these questions should be investigated and illuminated by research (Oliver, 2006; Salloum, Johnco, Lewin, McBride, & Storch, 2016; WHO, 2004). This thesis aims to contribute to the body of research that looks at the prevention of adolescent anxiety and associated problems.

Central concepts and definitions

The most central concepts in this thesis will be presented and defined in this section. The definitions of concepts used are in line with the World Health Organization's terminology on promotion and prevention (Herrman et al., 2005; Insitutute of Medicine, 1994) and the central Norwegian Public Health document on mental health prevention (Major et al., 2011). Cognitive behavioural theories represent the theoretical framework for other central concepts (Bandura, 1973, 2001; Beck, 2011; Tversky & Kahneman, 1981).

Mental health promotion, prevention, and treatment

The World Health Organization (WHO) definition of health is as follows: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or

infirmity” (WHO, 1946). This broad way to define health includes the development of feelings, thoughts, behaviour, and social skills, as well as skills to act independently, flexibly, and vitally, and to develop proper attachment (Herrman et al., 2005). Interventions described as health *promotions* aim to improve mental health, for example increasing the degree of well-being, optimism, social support, resilience, and self-efficacy (Herrman et al., 2005). *Treatments* denote interventions initiated after a disorder or high clinical symptom level is identified as being present. *Preventive interventions* are interventions administered before a mental health disorder or clinically high symptom level is present, whereby intervention administrators aim to decrease known risk factors within the individual and in the environment (Herrman et al., 2005).

An intervention is considered preventive if, over time, it contributes to reducing the incidence of new people with high symptom levels (Major et al., 2011); whereas an intervention has a treatment effect if it contributes to reducing the number of people who already have a disorder or a high clinical symptom level (Major et al., 2011). Sometimes an intervention can work as a treatment for some, and as preventive for others. For example, a school intervention targeted to reach all 13-year-old pupils with the goal of enhancing the adolescents’ anxiety coping skills might work as a preventive intervention for non-anxious adolescents and as treatment for those with a high level of anxiety. Also, because school interventions aim to give pupils skills for life, when adolescents reach adulthood and have children, they can teach their children anxiety coping skills they themselves learned as adolescents. Hence the same intervention can function as a treatment (or prevention) for anxiety in one generation and then also as a preventive intervention for the next generation (National Research Council and Institute of Medicine Committee, 2009).

Access to health services can affect public health (Major et al., 2011). *Low threshold* services endeavour to reduce documented barriers to service access. Low threshold mental health services for adolescents are typically placed at schools or other locations where adolescents frequent. These services typically include drop-in counselling and brief interventions, and do not demand referral from a doctor before an intervention can start. Such services can be contrasted with “specialized mental health services,” which require the adolescent to accept both a referral and a thorough diagnostic process before a treatment is initiated.

Universal, selective, and indicated preventive interventions

Universal preventive interventions aim to reach an entire population, e.g. all adolescents aged 13 in Norway. A universal intervention can, in principle, be beneficial to all individuals in that population. Universal preventive interventions usually have small effects on the individual, but since the intervention reaches many people, the effect is often large at the population level. The most successful mental health prevention strategies have typically been universal (WHO, 2004). One example of a successful universal prevention is age restriction on alcohol consumption, which has been documented to reduce the level of alcohol consumed in the population and to prevent alcohol abuse and addiction (Major et al., 2011).

Selective preventive interventions aim to reach subgroups of a population with risks significantly above average. Risk can be assessed by individual or environmental health determinants. One example of a selective preventive intervention is family support for young, poor, first pregnancy mothers (Major et al., 2011). Selective interventions can have significant effects on the individual as well as on the group of individuals who are targeted by the intervention. However, depending on the size of the at-risk group, these interventions will have somewhat less of an effect on the prevalence of the disorder at population level (Major et al., 2011; WHO, 2014).

Indicated preventive interventions aim to reach high-risk individuals with minimal but detectable symptoms. An example of an indicated preventive intervention is screening and early treatment for symptoms of anxiety. Individual interventions often have very good effects on the individual, but are typically of less significance for the public at large, since the intervention is specifically targeted at individuals who are at risk (WHO, 2014). Some people in the groups targeted for universal, selective, or indicated preventive interventions may already have mental disorders. However, if they are chosen to receive the intervention based on belonging to a high-risk group (selective), or having early symptoms (indicated), the intervention is considered preventive (Institute of Medicine, 1994).

Fear, anxiety disorders and anxious adolescents

Fear is normally a healthy reaction to danger. Experiencing fear typically involves a rapid heartbeat, shortness of breath, trembling, and a strong desire to escape from the situation. The word “anxious” stems from the Latin term “anxius”, which means “solicitous, uneasy, troubled in mind”. Anxius stems from “angere”, which means “to choke, squeeze, torment”, while the root of the word, “angh”, meaning “tight, painfully constricted”. In this

thesis, the word anxiety is used to represent fear responses that are disproportionate to the danger in the situation. Anxiousness, anxiety problems, and sub-threshold anxiety are concepts used in to describe individuals with elevated symptoms of anxiety. The concept of anxiety disorders is used in accordance with the most-used diagnostic manuals: *International Statistical Classification of Diseases, 10th Revision (ICD-10)* and *Diagnostic and Statistical Manual of Mental Disorders, 4th and 5th Editions (DSM-IV and V)*. Anxiety symptoms are central in the description of all types of anxiety problems and disorders, and are usually measured by self-report (e.g. in response to items like “I worry about things,” “When I have a problem, I get a funny feeling in my stomach,” “I feel scared if I have to sleep on my own”), where the individual reports the frequency of experiencing what is described by the given item. The ICD-10 and DSM-IV and V diagnostic manuals are categorical; hence, they use anxiety symptoms to identify adolescents who fulfil criteria for clinically significant anxiety disorders. A categorical approach helps us to accumulate knowledge about and describe the prevalence and incidence of anxiety disorders. In line with this, identifying individuals with anxiety *problems* can help us determine at-risk groups and calculate targets for preventive interventions aiming to reduce anxiety in a given population.

The prevalence of mental health problems such as anxiety problems and sub-threshold anxiety is typically defined by the proportion of individuals within a population who score above a certain cut-off on a symptom scale. As long as no procedure is used to exclude individuals with anxiety diagnoses as identified by scores above a given cut-off on an anxiety scale, a sub-threshold group will typically consist of a mix of individuals with elevated anxiety symptoms who *do* or *do not* fulfil formal diagnostic criteria required for one or more anxiety diagnoses. In this thesis, a wide definition of anxiety is used and includes all individuals who report elevated anxiety symptoms, unless otherwise specified. The concepts “anxious” and “anxiousness” are used as broad terms and refers to all adolescents who report elevated anxiety symptoms.

To understand and help anxious adolescents, merely quantifying anxiety symptoms is not enough. Studies in the domains where anxiety appears are central to treating their anxiety problems. Specific anxiety domains (e.g. obsessions/compulsions, social anxiety, panic disorder, agoraphobia, separation anxiety, physical injury fears, generalized anxiety, and posttraumatic stress) are associated with different types of problems. While an adolescent with social phobia is typically troubled by anxiety in a situation where he or she is expected to talk with a teacher or classmates, the same adolescent may experience a decrease in anxiety symptoms when the task is to read and work individually. On the other hand, an adolescent

with separation anxiety is more troubled by the latter situation than the former. In the diagnostic manual ICD-10, anxiety disorders relevant for adolescents are described under the codes F40–F43 and F93. F40 defines phobic anxiety disorders (e.g. agoraphobia; social phobia; specific phobias like fear of animals, blood, bridges, or flying); F41 defines panic disorder and generalized anxiety disorder (GAD); F42 defines obsessive-compulsive disorder (OCD); F43 defines posttraumatic stress disorder (PTSD); and F93.0 defines separation anxiety. In the DSM-5, the term “anxiety disorders” is more narrowly described, and does not include OCD and PTSD. In this thesis however, a wide definition of “anxious” and “anxiety” is used, where all types of anxiety domains are included.

Trauma and traumatized adolescents

When the term "traumatized adolescents" is used in this thesis, it refers to young people who show mental health problems after they have been exposed to sexual and/or physical violence. Their problem is deemed associated to the negative event(s) to which the adolescent has been exposed. Trauma-related difficulties are related to three main domains of difficulties: Intrusion, avoidance, and arousal. Thus, the difficulties may manifest themselves in adolescence in a number of ways, including acute stress, post-traumatic stress disorder (PTSD), anxiety, low self-esteem, low mood, hyperactivity, school-problems, relational difficulties, and self-injurious behavior. Progress or illness course depends on the type of critical event, conditions in the adolescent him/herself and conditions in the environment around the adolescent. Importantly however, many victims of violence do *not* develop health-problems as a consequence of the trauma(s) they have been exposed to. It should also be noted that spontaneous recovery occurs for a number of those with high post-traumatic stress level in the first period after the critical event(s).

Health related quality of life

Health related quality of life (HRQoL) has been described in many different ways (Hornquist, 1990; Post, 2014; Ravens-Sieberer & Bullinger, 1998; WHOQOL, 1995), with most definitions highlighting the individual’s subjective evaluations of life (Post, 2014; WHOQOL, 1995). Four broad health dimensions are frequently incorporated into HRQoL definitions: physical health, mental health, social health, and functional health (Post, 2014). Improvement in health status is normally associated with increases in HRQoL, whereas the worsening of health is a risk factor for poorer HRQoL (Rajmil et al., 2009). The adverse effects of a vast array of medical conditions, anxiety disorders included, on HRQoL have

been well-documented among adolescents (Freeman et al., 2009; Weidle, Jozefiak, Ivarsson, & Thomsen, 2014).

Health determinants

The term “health determinant” is used to describe factors that can affect health either by enhancing or threatening an individual’s or a community’s health status, or by increasing (risk-factors) or reducing (protective factors) the prevalence of disorders or mental health problems (Herrman et al., 2005; Sawyer et al., 2012). Health determinants can be divided into individual and environmental factors (Bronfenbrenner, 1977). Examples of individual mental health determinants are intelligence, temperament, gender, age, physical activity, and use of psycho-pharmaceuticals. Examples of environmental mental health determinants are family socio-economic status, risk of violence, access to education, family climate, and school climate. Mental health determinants also include negative life events like war, violence in close relationships, and sexual assaults. According to WHO, in order to positively impact health and improve health equity on a broad scale, health-promoting policies are needed not only in the healthcare sector, but also in the economic, environmental, and social sectors as well (Herrman et al., 2005; WHO, 2014).

Theoretical Framework

Theories of human behaviour help explain the pathways that lead to or predict behaviour and, in doing so, provide guidance on how to influence or change behaviour (Bandura, 2001; Ehlers et al., 2010; Rogers, 1959). Interventions that clearly articulate their use of theories can contribute to a greater understanding of not just if and which interventions work, but *why* they work (Tebb et al., 2016). To reach the main aim of this thesis, which is to expand the empirical knowledge base for prevention strategies and interventions for decreasing anxiety in adolescents, two main theoretical frameworks have been emphasized. First, recognizing the need to use epidemiologic information as a basis when preventive mental health interventions are considered, a public health model was used as a frame to interpret the findings of the three papers and suggest implications. Interpretations of and suggestions for mental health strategies are made in accordance with the ambitious goals of the World Health Organization to prevent mental health disorders (WHO, 2004, 2014), and the ongoing Care Coordination Reform in Norway ("Stortingsmelding 47. Samhandlingsreformen [White Paper 47. The Care Coordination Reform]," 2008-2009). Second, cognitive models were used to interpret findings about adolescent anxiety in Papers 1 and 2, and were utilized as a base for the intervention piloted in Paper 3.

The Public Health Model

Policies are an important part of public health interventions, including the area of anxiety prevention (WHO, 2004). Sound public health policy is based on relevant and timely information. Perceptions regarding the severity of the problem, responsibility for the problem, and affected populations all influence governmental responses (Oliver, 2006). A brief history of mental health problems illustrates the central role that epidemiology plays in informing policy choices and evaluating their consequences (Lovell & Susser, 2014). Anxiety, depression, and drug and substance abuse are increasingly becoming health burdens in high-income countries, putting pressure on public health efforts to scale up interventions (Institute for Health Metrics and Evaluation [IHME], 2017; McKenna & Zohrabian, 2009).

Both population-level and individual-level interventions should be considered in public health decisions (WHO, 2014). Population-level (universal) interventions for adolescents have included efforts to increase community health literacy about anxiety, strategies for increasing teachers' education about mental health problems, and universal mental health prevention programs for adolescents that are delivered through schools (Lau & Rapee, 2011; Raknes, Hansen, Cederkvist, & Nordgaard, 2017). Individual-level interventions have targeted anxious adolescents through selective and indicated preventive interventions by (1) identifying adolescents or adolescents at risk (e.g. through screening for anxiety levels or predictors for anxiety), and (2) implementing interventions that target anxious adolescents (e.g. group interventions for adolescents, or individual brief interventions for anxious adolescents and/or their parents) (Bienvenu & Ginsburg, 2007; Haugland et al., 2017; Lau & Rapee, 2011). Also, cost-effect analyses of interventions targeting adolescent anxiety could be useful for improving public health policy (Bodden, Dirksen, & Bögels, 2008). Such analyses are not possible, however, without systematic collection and analysis of descriptive epidemiologic data.

The Social Ecological Model.

Lessons learned from the public health achievements of the twentieth century include the need for evidence-based practices and interventions that are ecologically comprehensive (Gielen & Green, 2015). The social ecological model (Bronfenbrenner, 1977) is widely used as a theoretical frame for prevention work (Atilola, 2014). The social ecological model (SEM) specifies four system levels at which the environment should be analysed to understand human development. It has been suggested as a framework that captures proximal, intermediate, and distal factors that influence the environment of adolescents (Atilola, 2014).

SEM can be used to identify anxiety risk factors and interventions at all the levels. At the *microsystem* level, the model includes immediate settings containing that person (e.g. home, school, friendships). At the *mesosystem* level, the interactions between the person's immediate settings are the focus. For Norwegian 13–16-year-old anxious adolescents, these interactions would typically be between family, school, friends, school health services, and sports clubs. The *exosystem* level is an extension of the mesosystem which embraces specific social structures, both formal and informal, that impinge upon and encompass the setting in which the person is found. For anxious adolescents, this would include how the school, health, and social care work and the policy in these arenas are functioning to provide a healthy development, as well as how the mass media, agencies of government (local and national), distribution of goods, and informal social networks deal with anxiety and associated factors. The final level, the *macrosystem*, refers to the overarching institutional patterns of the culture or subculture, such as economic, social, educational, legal, and political systems, of which micro-, meso- and exosystems are the concrete manifestations. Macrosystems are examined as carriers of information and ideology endowing particular agencies with meaning and motivation; like the way safety and risk ideologies contribute to the social inequalities that frame the mental health problems in adolescents (Atilola, 2014; Bronfenbrenner, 1977; Herrman, 2009).

To improve efficiency and solve the present health service challenges, Norway's healthcare coordination reform was initiated ("Stortingsmelding 47. Samhandlingsreformen [White Paper 47. The Care Coordination Reform]," 2008-2009) and implemented on January 1, 2012. The reform is based on traditional hierarchical mechanisms that were implemented by the Act on Health and Care Services in Municipalities (Act 2011-06-24 no. 30) and the Public Health Act (Act 2013-06-19-65). These acts, with detailed regulations, provide a clear signal that the municipalities are to shift towards the provision of more activity-based, preventive, and health-promoting services (Hanssen, Helgesen, & Holmen, 2015). The primary purpose of the healthcare coordination reform is to ensure more holistic services for members of the public. Among the central instruments in the reform are better coordination between national and local healthcare services and increased access to low threshold services for children and adolescents (Hanssen et al., 2015).

Cognitive Models

All cognitive behavioural (CB) theories and interventions are based on learning theory (Teigen, 2015). A central, guiding principle in all CB approaches is that there are inherent

relationships among our thoughts, behaviours and emotions. What we think affects how we act and feel. In modern psychology, CB interventions are widespread, and significant evidence supports their efficacy (Bennett-Levy et al., 2010; James et al., 2015). According to the cognitive models, psychological difficulties are maintained through dysfunctional thought and behavioural patterns (Beck, 2011). CB techniques include identifying and challenging what are referred to in the CB literature as “negative automatic thoughts”, “distorted thoughts”, “irrational beliefs”, or “red thoughts” (Barrett, 2004; Beck, 2011; Raknes, 2010b). Negative automatic thoughts are inconsistent with reality and are experienced by everyone, particularly in response to stressors (Beck, 2011). Challenging negative automatic thoughts, and discovering and exploring alternative thoughts, also referred to as “green thoughts” in literature for adolescents (Barrett, 2004; Raknes, 2010b) may reduce the influence of negative automatic thoughts and are claimed to be an essential mechanism of change in CB approaches (Beck, 2011).

Prospect Theory. Cognitive theories can be used to explain people’s decisions (Tversky & Kahneman, 1981). Decision-making is relevant for preventing adolescent anxiety at many levels, e.g. for the adolescent to choose whether to challenge herself to answer a question in class, for the teacher to choose whether to use time at school to reduce adolescent anxiety, and for decision-makers to choose whether to prioritize preventing it. The concept “decision frame,” which comes from Prospect Theory, is used to refer to the decision-maker’s conception of the acts, outcomes, and contingencies associated with a particular choice (Tversky & Kahneman, 1981). The *frame* is controlled partly by the formulation of the problem and partly by the norms, habits, and personal characteristics of the decision-maker. It is usually possible to frame a given decision problem in several ways. For example, anxiety can be framed as an individual health problem, or as a public health problem. Importantly, choices involving gains are often risk averse, whereas choices involving losses are often risk-taking (Tversky & Kahneman, 1981). Framing outcomes in terms of overall wealth and welfare, rather than in terms of specific gains and losses, may affect one’s emotional response to an occasional loss. The framing of acts and outcomes can also reflect the acceptance or rejection of responsibility for particular consequences.

Social Learning Theory. A cognitive theory that has had a major impact on the development of adolescent health promotion and prevention interventions is the Social Learning Theory (Bandura, 1973, 1993, 2001; Petosa, 1986). According to the Social Learning Theory, learning is acquired and shaped by positive and negative reinforcements, as well as by observation of other people’s behaviour (Bandura, 1973, 2001). Thus, people can

anticipate consequences and shape their own behaviour to earn rewards or punishments, based on their own direct experiences. If this anticipation is based on observation of others' behaviours and their consequences, it is called vicarious learning. The human capacity for self-directedness, which adds to our understanding of how people exercise influence over their own motivation and behaviour through self-regulative mechanisms, is a key element of the theory. So are also the individual's beliefs in his or her efficacy to exercise control over events that will affect his or her life. These elements all contribute to people's attainments, psychological well-being, and resilience in the face of adversity. The Social Learning Theory describes how behaviour is learned and modified by experience, and social behaviour is viewed as a continuous interaction among cognitive, behavioural, and environmental factors (Bandura, 1997). The Social Learning Theory claims that people's beliefs in their efficacy can be developed and modified in four ways: (1) through mastery experiences, (2) through social modelling, (3) through social persuasion and (4) through construal of physical and emotional states: reducing or increasing people's anxiety or mood, building their physical strength, and changing misinterpretations of their physical states. Furthermore, the theory postulates that the most effective way of instilling a strong sense of efficacy is through mastery experiences. Resilience is built by experiences of overcoming obstacles through effort, and learning to manage failure so it becomes informative rather than demoralizing (Bandura, 2001). Bandura's work has also inspired prevention efforts using the team or buddy approach: teaming up individuals, small groups, and even communities in which new health-related behaviours can be modelled and reinforced, ultimately helping to set new norms. Through the broad use of the social learning theory, concepts like "social modelling", "self-reinforcement", and "self-efficacy" have become mainstream psychology. Self-efficacy refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997). General self-efficacy (GSE) is defined as "the belief in one's competence to tackle difficult or novel tasks and to cope with adversity in specific demanding situations" (Cross et al., 2006; Luszczynska et al., 2005; Scholz et al., 2002). The construct of general self-efficacy reflects an optimistic self-belief and refers to a global confidence in coping ability across a wide range of demanding situations (Schwarzer, 1994). A high level of self-efficacy is related to positive emotions and effective problem solving (Bandura, 1997). High general self-efficacy beliefs are also related to life satisfaction (Danielsen et al., 2009; Gilman and Huebner, 2003). Anxious adolescents have been shown to report lower scores on general self-efficacy than do their peers (Wichmann et al., 2004).

Low Intensity CB interventions. From clinical experiences, it is evident that there is great variation in how much time therapists have to invest in a client. A central question for improving access to psychological interventions is how much face-to-face therapy is optimal, depending on the problem area and timing of the intervention (Bennett-Levy et al., 2010). Consequently, attempts to increase access to evidence-based interventions have resulted in a shift away from high intensity treatments provided by specialist mental health care professionals. Instead, highly scalable, low-intensity CB (LI-CB) interventions are the new target for research and development (Bennett-Levy et al., 2010). “Intensity” refers to how demanding the intervention is based on how much time the therapist must spend with each client. Compared to standard CB therapy, LI-CB interventions typically include briefer and fewer sessions with a therapist, and are often supplemented with the use of self-help material (e.g. books, films, apps). Furthermore, these interventions can often be delivered by less specialized healthcare professionals (Bennett-Levy et al., 2010). Together, these factors can make LI-CB interventions easier to upscale, since therapist time is typically an expensive and scarce resource, and cost is identified as a central barrier for implementation of standard psychotherapeutic interventions (Bennett-Levy et al., 2010; Singla et al., 2014).

In attempts to improve access to evidence-based treatments, stepped care models have been investigated and implemented, with LI-CBTs offered as first steps (Bennett-Levy et al., 2010). Instead of relying solely on face-to-face contact with a therapist for learning the CB principles, CB self-help material can be a source from which the individual can learn principles important for health behaviour. *Self-help material* is defined as texts, illustrations, films, sounds, and toys on analogue or digital interfaces, systematically used for change in psychotherapy (Den Boer, Viersma, & Van Den Bosch, 2004). Self-help material can be used as (1) “pure self-help”, a term that refers to the use of self-help material without any therapist contact at all, such as when an adolescent together with her/his parents reads a self-help book and uses it to reduce his/her anxiety problems; (2) “guided self-help”, a term that refers to the use of self-help material supported by some therapist contact, typically through telephone and/or mail contact; and (3) part of (brief) CB therapies (Bennett-Levy et al., 2010; Nordgreen & Havik, 2011).

The Health Belief Model. Finally, in the description of cognitive models used as a research frame in this thesis, The Health Belief Model (HBM) must be mentioned. HBM is one of the most widely used conceptual frameworks for explaining, predicting, and influencing health-related behaviour and has received empirical support from both retrospective and prospective studies (Janz, Champion, & Strecher, 2002). It was developed

by a group of social psychologists in the early 1950s to understand “the widespread failure of people to accept disease preventives or screening tests for early detection of asymptomatic disease” (Janz & Becker, 1984), and classified as a cognitive behavioural model (Rosenstock, 1974). HBM emphasizes the following five dimensions: perceived susceptibility, severity, benefits, barriers, and self-efficacy. According to HBM, individuals are most likely to participate in preventive programs if they feel vulnerable to developing the given problem in the future (perceived susceptibility), believe that the problem will have a highly undesirable impact (perceived severity), perceive that the intervention will be effective in reducing the risk of the problem and associated issues in the future (perceived benefits), do not find the program too demanding (perceived barriers), and feel confident that they will be able to utilize what they learn in these programs (perceived self-efficacy) (Janz et al., 2002). However, factors such as demographic and socio-psychological variables may also affect individual’s participation in interventions indirectly by influencing their perception of susceptibility, severity, benefits, and barriers (Rosenstock, 1974).

Dysfunctional cognitions at individual and community level

Accordingly, given from a conglomerate of the public health model, SEM, and the cognitive models mentioned above, as individuals develop their health beliefs and behaviours within communities, beliefs at both individual and community levels can increase, decrease and maintain anxiety. Communities with functional beliefs and high competence in dealing with adolescent anxiety can make it easier for the individual anxious adolescent and her/his parents to deal competently with anxiety problems when they appear. Hence, preventive strategies targeted at decreasing anxiety can address cognitions and behaviour at either or both community and individual levels. When the goal is to reduce adolescent anxiety, preventive public health interventions can be strategically targeted at changing cognitions and behaviour in all agents that contribute to adolescent anxiety, e.g. mass media, teachers, health professionals, adolescents themselves, and parents.

Explanations of adolescent anxiety

A large number of adolescents are living in potentially traumatic life situations, experiencing traumas like sexual assault, domestic violence, war, and bullying (Benjet et al., 2016; Finkelhor, Turner, Shattuck, & Hamby, 2015; Solberg & Olweus, 2003). Therefore, preventing traumatic experiences (Kassam-Adams, 2014; Kessler et al., 2010) and identifying adolescents who are in danger and at high risk of experiencing recurrent potentially traumatizing experiences are crucial to preventing and reducing the prevalence of adolescent

anxiety problems (Cohen, Mannarino, & Murray, 2011). However, many adolescents live in secure environments, but exaggerate the perceived danger in their daily lives. These adolescents should also be identified as having anxiety problems and helped to reduce them (Andrade et al., 2014; Kendall, Settapani, & Cummings, 2012; WHO, 2014).

Anxiety can be described as an exaggerated fear response (Beck, 2011); therefore, according to cognitive behavioural theories, anxiety motivates the individual to *avoid* objects and situations that trigger fear and to focus on safety. Even if safety has increased in modern society, *the focus on risk*, hazard, danger, and uncertainty has also increased (Skolbekken, 2010). Hence, it is reasonable to argue that an excessive culturally driven focus on safety can be one of several reasons contributing to high adolescent anxiety. Both adolescents and adults in modern society must make many choices (Bauman 2000). All choices, or decisions as they often are called when made by adults, might be affected by anxiety and other emotions (Tversky & Kahneman, 1981). Not only adolescents, but also many adult decision-makers find an extensive array of choice options to be aversive, often leading to negative emotional states and poor behavioural outcomes (Reed, Kaplan, & Brewer, 2012). In modern schools and families, the adolescent's freedom to choose often includes the choice of avoiding feared situations and objects. The CB model and social learning theory claims that *avoidance* is central to maintaining anxiety. Hence, for modern adolescents, the increased choice of avoiding everyday situations they fear, such as a school day, a school test, or a gym class, can increase anxiety in the long run. In accordance with this, level of anxiety and school absences have been reported to be highly associated (Havik, Bru, & Ertesvåg, 2015). Together, the increased focus on risks, and the increased amount of choices for the modern adolescent, can explain the increased prevalence of adolescent anxiety within the very basis of the CB models.

In addition to the potential contributors to increased anxiety among adolescence described above, the school system has recently received attention for its contribution to increased levels of anxiety among youth (Havik et al., 2015). School tests for adolescents have increased in recent decades in Norway (Pettersvold & Østrem, 2012; Statistisk Sentralbyrå, 2013), and the consequences of failing at school tests are claimed to be more serious than they used to be a generation ago (Falch & Nyhus, 2011; Hegna et al., 2013; Soest & Hyggen, 2013; Standing, 2011). Another explanation of anxiety in the modern society has been presented by the sociologists Anthony Giddens (1991) and Zygmunt Bauman (2000); they argue that adolescent anxiety can be a consequence of the rapid fragmentation and high-

speed changes in the society in late modernity (Bauman, 2000; Giddens, 1991). Further, a widely publicized hypothesis on adolescent anxiety is that we live in a time when the focus on individual performance, self-presentation, and happiness, especially personal happiness, has increased (Twenge, Campbell, & Freeman, 2012). Finally, we live in a time when the media exposure to terror attacks and war is frequent, and several studies have found a positive association between such media exposure and psychological outcomes such as acute stress, PTS-symptoms, and anxiety (Holman, Garfin, & Silver, 2013).

In the preceding paragraph, environmental and situational factors that possibly affect adolescent anxiety were presented. Although situations and circumstances are considered essential as anxiety triggers, such factors cannot fully predict why some adolescents develop anxiety problems and others do not. Cognitive theories about how we structure information, including the media's coverage of death and terror and the discourse around individualized happiness, focus on *attributions* of situations as a source of anxiety. Factors such as increased school tests and more dire consequences of failing underscore *situational* explanations more than attributional style as a reason for anxiety. The loading of attributions versus situations is crucial for the focus of the intervention. If adolescent anxiety is mainly explained by *situational factors*, solutions should focus on reducing factors that lead to adolescent difficulties. If adolescent anxiety is mainly explained by *attribution*, then solutions should help adolescents to cope with anxiety through skill development.

After extremely stressful events such as interpersonal violence, a significant proportion of victims develop mental health problems. Distressing memories of such events may haunt the victim for years, dominating the adolescent's life to the extent that his or her ability to learn and to have satisfying relationships are severely compromised. According to the cognitive models, a basic problem for anxious individuals (including adolescents with post traumatic problems and disorders) is to perceive trigger situations as more dangerous than they objectively are. Importantly, adolescents with anxiety problems continue to perceive that threat despite the fact that they have had much disconfirming evidence. For example, adolescents with social anxiety who have had lots of very good presentations may still believe that they are going to make a fool of themselves during the next presentation. Similarly, adolescents with post-traumatic stress problems may still believe long time after the trauma (e.g. rape) that they are very likely to be attacked again even if nobody has attacked them in the meantime. Others who have experienced trauma(s) may continue to believe that they are inferior because the way they acted in the assault, although many people have told them in the meantime that they value them. Thus, cognitive models of anxiety problems focus on

changing the cognitive processes that maintain the perception of threat. Yet, the personal meaning of the traumatic event varies greatly from person to person. According to cognitive behavioral models, reevaluating dysfunctional personal meanings of traumas is central when post traumatic stress problems are triggered by trauma experiences (A Ehlers & Clark, 2000).

Anxiety in Adolescents: Previous Research

The last chapter described the theoretical framework for our studies. In the following, knowledge on adolescent anxiety will be presented. First phenomenological and biological aspects of anxiety are described, then research on how anxiety affects development that normally takes place during adolescence is introduced. Finally more specific research on anxious adolescents is presented, including prevalence, predictors, explanations (of anxiety), and treatment barriers.

Anxiety is experience

Phenomenology considers the individual as unified people who form intentions and act in the world because our bodies work in certain ways (Ratcliffe, 2008). Also, it considers subjectivity as essential constitutive of the phenomenon to be explained. Accordingly, phenomenology represents an attitude to research and to promote a contextual re-consideration of the experience of anxiety and a deeper understanding of how it actually feels to be an anxious adolescent (Storch et al., 2015).

Anxious adolescents develop not only a cognitive understanding of (challenging/threatening) situations, but also an embedded corporeal, “fleshy” knowledge and memory. Emotional states take on a meaning. We are “thrown into” the world, and a feeling assails us. For this reason, a particular emotional situation (e.g. anxiety) influences the way we perceive ourselves, and our action possibilities (Ratcliffe, 2008). Hence, experience of anxiety can colour the everyday thoughts and actions, and generates most of the behaviour of anxious adolescents. Anxious adolescents report high danger expectancies, elevated certainty that the events they feared would “really” occur, and low expectancies for dealing with the phobic situations or events should they occur (Ollendick, Raishevich, Davis, Sirbu, & Öst, 2010). Thus, anxious adolescents report faulty and exaggerated cognitions, as well as low self-efficacy expectancies, as suggested by Beck (1976), Bandura (1977), and others (Ollendick et al., 2010).

Anxiety is biology

A biological approach to emotions can provide a useful basis for knowledge about anxious adolescents (McNaughton, 1989). In this perspective, anxiety is a reaction to stress

that has both psychological and physical features. The feeling is thought to rise in the amygdala, a brain region that governs many intense emotional responses. As neurotransmitters carry the impulse to the sympathetic nervous system, heart rate increases. Breathing rate also increases, muscles tense, and blood flow is diverted from the abdominal organs to the brain. Anxiety prepares us to confront crises by putting the body on alert.

Anxiety in adolescents is not a new phenomenon in the history of humankind (Bateson, Brilot, & Nettle, 2011; Harari, 2011). In 1872, Charles Darwin published “The expression of Emotion in Man and animal”. This work contended that emotion was primarily an instinctive mechanism that was adaptive in its functioning. From an evolutionary point of view, each emotion enables the individual to function within their environment by motivating certain behaviors. The biological approach shows the innate basis for a variety of emotional reactions, anxiety included, and that anxiety can be seen as useful (McNaughton, 1989). When danger is near, and time is of the essence, fear non-consciously initiates a bodily chain reaction that guides us towards safety. Fear is our emergency defensive reaction. Fear is a normal reaction to threatening stimuli and occurs in daily life. Throughout childhood, many fears and worries are developmentally appropriate: young children are typically afraid of separating from their caregivers. As the child matures, concerns about fitting in and being evaluated are more common.

Likewise, studies on the etiology of anxiety disorders has its origins in a hard-wired, species-typical fear-response that is in its essence healthy and life saving. The fear response developed before language in the evolution of the phyla. Thus the tendency to freeze, fight or flight is automatically initiated literally before the extent and reality of a potential danger is consciously perceived and articulated. This ability to react upon possible dangers automatically, helped ensure survival, and facilitated a bodily system that favors speed and false positives over accuracy (Bateson et al., 2011; Pynoos, Steinberg, & Piacentini, 1999). Emotionally, anxiety motivates avoidance and results in fight, flight or freeze responses (Bateson et al., 2011). All of these may be triggered in risky situations, but also in safe situations where anxious individuals perceive danger (Beck, 2011).

Anxiety affects development

Adolescence is normally associated with freedom, wilderness, being out with friends, risk taking, making new friends, and expanding territory (Yeager, Bundick, & Johnson, 2012). Naturally, individuals whose anxiety responses are frequently triggered might find risk-taking problematic (Raphael & Paul, 2014; Wells, 1997). Thus, when anxiety becomes a

main ingredient in the life of an adolescent, developmental and learning processes that normally occur during this period of life might be negatively influenced and disturbed (Crocetti, Klimstra, Keijsers, Hale, & Meeus, 2009). Since anxiety motivates avoidance, anxious adolescents more often miss out on experiencing a number of normal, fun activities which their less anxious peers can participate in, enjoy, and learn from (Bal, Van Oost, De Bourdeaudhuij, & Crombez, 2003).

Challenging situations like stage performances, sport competitions, and school presentations offer the potential rewards of intense exhilaration (Carson & Collins, 2016). The joy of mastering new and challenging tasks, often at the edge of control, is both a driving force and a rewarding experience in risk-taking activities. Through participating in risky play, it has been hypothesized that children can learn to handle risk and gain a more realistic risk perception, which in turn makes them less anxious about the stimuli and prevents them from developing more anxiety (Sandseter & Kennair, 2011). Moreover, there exist indications that risky play has an anti-phobic effect on fears and phobias in small kids (Sandseter & Kennair, 2011). In line with this hypothesis, it is possible that engaging adolescents in potential thrilling activities, like school presentations or sport competitions, might have an anti-phobic effect in adolescents.

Problems associated with anxiety

Anxiety symptoms and anxiety disorders are associated with impaired school functioning and school drop-out, poor coping skills, and difficulties in relationships (Copeland, Angold, Shanahan, & Costello, 2014; Ravens-Sieberer, Freeman, Kokonyei, Thomas, & Erhart, 2009; Salerno, 2016; Theunissen, Bosma, Verdonk, & Feron, 2015). Anxiety in adolescence also predicts subsequent depression, substance and alcohol abuse, and anxiety disorders in adulthood (Essau et al., 2014). Hence, anxiety disorders are disabling for the individual (Copeland et al., 2014; Kanwar et al., 2013) and costly to society (Gadermann, Alonso, Vilagut, Zaslavsky, & Kessler, 2012; Jorg et al., 2012). Globally, anxiety disorders are among the leading causes of disability in adolescents (Erskine et al., 2015; IHME, 2017).

The comorbidity of sub-threshold anxiety and depression, and clinical anxiety and depression, in adolescents is high (Balazs et al., 2013; Cummings, Caporino, & Kendall, 2014; Jacobson & Newman, 2017). A recent meta-analysis of 66 studies (N = 88,336) examined the prospective relationships between anxiety and depression at both symptom and clinical depression levels. The results suggested that all types of anxiety predicted later depressive symptoms, ($r= 0.34$), and all types of depressive symptoms predicted later anxiety

symptoms ($r = 0.31$) (Jacobson & Newman, 2017). Stressful life events often precede anxiety disorders (Beesdo, Knappe, & Pine, 2009; Chavira, Stein, Bailey, & Stein, 2004) and depression (Kinderman, Schwannauer, Pontin, & Tai, 2013). The concept "stress" is often used to describe a broad fan of reactions in which symptoms of both anxiety and depression are included (Schneiderman, Ironson, & Siegel, 2005). In the literature, anxiety and depression are also often referred to as "internalization disorders" (Montgomery, 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Reyes-Portillo et al., 2014). The lack of clarity in the use of these concepts and the use of a variety of different questionnaires makes it difficult to draw conclusions when the research literature on mental health in adolescents, and program implementation is reviewed (Lillejord, Børte, Ruud & Morgan, 2017; WHO, 2017).

Many models of the anxiety-depression comorbidity have been suggested (Cummings et al., 2014; Greca, Ehrenreich-May, Mufson, & Chan, 2016; Hasting, 2015; Jacobson & Newman, 2017; Rector, Man, & Lerman, 2014; Stein, Scott, Jonge, & Kessler, 2017). Differentiating between prodromal and bidirectional relates to the importance of the longitudinal relationship between anxiety and depression. Prodromal theories suggest that anxiety and depression essentially represent one underlying construct. Bidirectional theories suggest that anxiety and depression are bidirectional risk factors for one another, and suggest either a) anxiety and depression arise from a single disease process predicting aspects of itself over time, or b) anxiety and depression have distinctions from one another and can be meaningfully interrelated over time (Jacobson & Newman, 2017). If anxiety is a prodrome for depression, it would suggest that prevention efforts should attempt to monitor and treat early manifestations of anxiety, rather than waiting for depression to develop. Further, efforts to prevent early manifestations of anxiety might effectively also prevent manifestations of depression. Research appears to support the view that anxiety plays a role in the development of depression; yet, the nature of that role remains unclear.

The significant associations between adolescent traumas with concurrent and adult mental health disorders, anxiety included, are widely documented (Kessler et al., 2010). Childhood traumas and maltreatment can lead to both PTSD, anxiety, depression and other psychological problems (Dovran, 2013). Recent evidence supports such traumas to represent a non-specific pattern of risks for specific psychiatric disorders (Kessler et al., 2010).

The adverse effects of an array of medical conditions on Health Related Quality of Life (HRQoL) among adolescents have been well documented (Becker, Rossner, Breuer, Döpfner, & Trothenberger, 2011; Freeman et al., 2009; Neuner et al., 2011; Weidle, Jozefiak, Ivarsson, & Thomsen, 2014). HRQoL measures are used to supplement clinical measures of

diseases and mental health problems to assess the quality of service, the need for health care, the effectiveness of interventions, and in cost utility analyses. Not surprisingly, anxiety disorders have also been found to be associated with decreased quality of life in adolescents (Michel, Bisegger, Fuhr, Abel, & group, 2009). HRQoL has been described in many different ways (Hornquist, 1990; Ravens-Sieberer & Biullinger, 1998; WHOQOL, 1995), with most definitions highlighting the individual's *subjective* evaluations of life across a range of important domains (Post, 2014). Four broad health dimensions are frequently incorporated in HRQoL-definitions: physical health, mental health, social health, and functional health (Post, 2014). Improvement in any of these health dimensions is associated with increases in HRQoL, whereas worsening health is a risk factor for poorer HRQoL (Rajmil et al., 2009). Age, female gender, ethnic minority and lower socio-economic status have been reported as predictors of both HRQoL (Hjern et al., 2013; Michel et al., 2009) and anxiety (Bøe et al., 2014; Holly, Little, Pina, & Caterino, 2015; Loh, Moy, Zaharan, & Mohamed, 2015) in adolescents. Nevertheless, only two community-based studies have investigated the associations between anxiety symptoms and HRQoL in adolescents, and both studies were based on small samples ($N = 119$, and $N = 153$, respectively). These studies reported that anxiety symptoms were negatively associated with HRQoL (Raphael & Paul, 2014; Stevanovic, 2013). However, neither study investigated HRQoL across specific anxiety domains, and, as mentioned, both studies were based on small samples. Furthermore, neither of these studies investigated levels of anxiety symptoms; that is, they did not categorically separate non-anxious adolescents from adolescents with moderate and high levels of anxiety symptoms. Since the associations between anxiety symptoms and HRQoL might affect how adolescents deal with challenges such as developing a coherent and organized sense of identity, developing friendships, and achieving at school (Crocetti et al., 2009; Sawyer et al., 2012), these associations should receive attention. Knowledge about how various dimensions of HRQoL are related to anxiety symptoms could lead to ideas valuable for improving mental health interventions. Furthermore, expanded knowledge about the associations between HRQoL and anxiety symptom levels can be valuable for decision makers responsible for prioritizing health research and interventions in the face of limited resources (WHO, 2014). Hence, more research on the associations between anxiety symptom levels and HRQoL is needed.

Prevalence

A review that looked into the prevalence of anxiety disorders in many countries reported that the 12-month prevalence estimates of anxiety disorders ranged from 5.6–18.1% in the included studies (Fisak, Richard, & Mann, 2011). When assessed in UK primary care, the prevalence of anxiety disorders was 7.2%, and the incidence 9.7 per 1000 persons-per-year (Martin-Merino, Ruigómez, Wallander, Johansson, & García-Rodríguez, 2009). In Norway, the lifetime prevalence for any anxiety disorder is assumed to be between one in five and one of four people (Mykletun, Knudsen, & Mathiesen, 2009). The range in prevalence reported is at least partially due to the assessment method used and how anxiety disorders are defined in the given study (Aune, 2016). Anxiety disorders often start in adolescence, and although often mild and transient, they can also be severe and persistent (Copeland et al., 2014; Crocetti et al., 2009). Anxiety disorders are among the most frequent mental health problems in adolescence (Kessler et al., 2005; Merikangas et al., 2010). The high frequency, early debut, and associated impairment of function makes anxiety disorders *the* health problem that is associated with the highest overall problem load in many modern developed countries (Gadernann et al., 2012).

Knowledge about the prevalence of anxiety problems in adolescents is important because low threshold services are supposed to be available and offer help to all those who could benefit from preventive interventions. In a Norwegian study of adolescents in upper secondary schools (called “Ungdata”), 33% of adolescents reported being too worried during the past week, and 18% reported feeling stiff and tense during the past week (Bakken, 2016). The “Ungdata” 2016 is considered representative data for adolescents (13–16 years old) attending Norwegian secondary schools (ungdomsskole). The response rate was high (84%); schools from rural, sub-rural and urban districts all participated, and the number of participants was high ($N = 43,700$) (Bakken, 2016). However, there is uncertainty related to the way anxiety problems were assessed in “Ungdata”. As one of many themes in the survey, anxiety was measured by two questions, and not by comprehensive, validated anxiety symptom scales or clinical interviews with professionals (Balazs et al., 2013; Karsten, Nolen, Penninx, & Hartman, 2011). In “Ungdata”, the adolescents were asked “Did worries bother you much?” and “Did you feel stiff and tense?”. The response categories were “not at all”, “sometimes”, “many times”, and “daily”. However, in order to obtain a better basis for estimating the prevalence of anxiety problems, anxiety should have been measured with validated anxiety symptom scales, or by trained professionals using structured interviews.

Hence, more studies on the prevalence of anxiety in Norwegian adolescents in upper secondary schools are warranted.

Predictors

Genetics, ethnicity, socio-economic status, negative life events, and cognitive factors have all been associated with the development and maintenance of anxiety in adolescents (Grover, Ginsburg, & LaLongo, 2005; Rapee et al., 2009). Girls consistently report higher prevalence of anxiety symptoms than boys (Copeland et al., 2014; Holly et al., 2015; Leikanger, Ingul, & Larsson, 2012). Moreover, within the age-span 11–16 years, whereas boys report decreasing levels of anxiety, girls report increasing levels (Copeland et al., 2014; Merikangas et al., 2010). Studies have found that ethnic minorities report elevated levels of anxiety more often than ethnic majorities (Holly et al., 2015; Kinderman et al., 2013). In addition, some studies have found poor family economy to be a predictor of anxiety in adolescents (Bøe, Øverland, Lundervold, & Hysing, 2012), while other studies have reported no relation between anxiety and family economy (Merikangas et al., 2010). Adolescents whose parents have an anxiety disorder (Micco et al., 2009), or other chronic illnesses (Pai et al., 2007) more often report anxiety. Furthermore, the experience of negative life events, such as bullying, personal losses (e.g. death of family member), parents' divorce, living in exile, single traumas (e.g. major accident and rape), and multiple traumas (e.g. family violence and sexual abuse) are all associated with increased anxiety (Bhasin, Sharma, & Saini, 2010; C. Carr, Martins, Stingel, Lemgruber, & Juruena, 2013; Kinderman et al., 2013; Merikangas et al., 2010; Montgomery, 2011; Reijntjes et al., 2010).

Barriers to treatment for anxious adolescents

Empirical research supporting the effectiveness of cognitive behavioural therapeutic interventions—those that are aimed at reducing anxiety symptoms for adolescents with disorders such as PTSD, social anxiety, separation anxiety, OCD, and GAD—is considerable (James et al., 2015). However, only a minority of children with these disorders is offered treatment (Chavira et al., 2004; Heiervang et al., 2007). There are several reasons why anxious adolescents do not receive help they could benefit from, including:

- Anxiety is not recognized as a mental health issue that could be reduced (Paulus, Wadsworth, & Hayes-Skelton, 2015);
- Anxious adolescents do not want to seek help in the way it is provided (Tharaldsen, Stallard, Cuijpers, Bru, & Bjaastad, 2016);

- The capacity within the mental health care system is low compared to the number of anxious adolescents (Bennett-Levy et al., 2010; Waldum-Grevbo & Haugland, 2015; Zanville & Cattaneo, 2009).

Parents also influence whether anxious adolescents receive help. The reasons why parents may not access mental health treatment for their child can be described as tangible (e.g. logistical, cost, difficulty identifying a suitable service) and intangible (e.g. attitudes about treatment, urgency of the child's problem, stigma, and motivation) problems (Salloum et al., 2016).

From CB treatments to CB preventive interventions

The following section will discuss how CB preventive anxiety interventions differ from CB treatments. The aim is to illuminate how the differences between preventive and treatment interventions can provide a basis for innovative, preventive CB interventions for anxious adolescents. It can be argued that since CB interventions, when used as treatments, lead to symptom reduction, they will also be effective as preventive interventions. A premise in such an argument is that within the frame of cognitive behavioural theories, it is reasonable to describe prevention of anxiety as learning how to deal with anxiety symptoms and situations that cause fear. The ease with which new fear associations are learned or maintained (fear conditioning) is central in all cognitive behavioural theories of anxiety (Bandura, 2001; Beck, 2011; Waters & Craske, 2016). And since associations are learned more quickly if there is no need for extinction of established associations (McGuire et al., 2016), it stands to reason that learning healthy ways to cope with scary situations can be easier and faster than learning needed to eliminate an anxiety disorder once it is established. With the basis in prevention framework used here, with its central concepts “universal”, “selective” and “indicated” as mentioned in the introduction (Institute of Medicine, 1994), the generalization is smaller from anxiety treatment to indicated interventions, and largest from treatment to universal interventions. Next follows a discussion on the hypothesis that CB interventions can *prevent* anxiety, illuminated by intervention studies and cognitive theory (Bandura, 2001; Beck, 2011; Richter, 2014; Waters & Craske, 2016).

Indicated and selective preventive interventions

Both treatment and indicated prevention interventions aim to reduce elevated anxiety symptoms in individuals who report such symptoms. The main difference between indicated prevention and treatment is that the individuals in indicated prevention programs have not gone through procedures of diagnosis (National Research Council and Institute of Medicine

Committee, 2009). Scholars promoting CB-based indicated anxiety prevention interventions assume that the mechanisms for change central for adolescents with diagnose(s) such as PTSD, social anxiety, OCD and separation anxiety are the same for adolescents with elevated anxiety symptoms in these domains; even if the latter group does not necessarily fulfil all the diagnostic criteria. In the broader spectrum of anxiety domains, indicated intervention studies have reported reduction in anxiety level (Dadds et al., 1999); however, few studies have separated treatment effects (reduction of disorders) from pure prevention effects (reduction of number of participants who move from subclinical to clinical range) (Lau & Rapee, 2011).

Indicated preventive interventions have a number of relative strengths and weaknesses. When compared to a treatment intervention for anxiety, an advantage of an indicated preventive intervention is that it does not depend on complete diagnostic interviews before initiation of the intervention. To offer specialized treatments, a diagnostic interview might be crucial. But in an indicated preventive intervention targeting all anxious adolescents, diagnostic assessment is not a prerequisite. And for large scale, low threshold, preventive interventions, thorough initial diagnostic assessment procedures might become barriers to access. Further, since targeted programs focus on individuals at elevated risk for developing an anxiety disorder, these programs may be more cost effective and may yield larger effect sizes compared to universal interventions (Lau & Rapee, 2011; Simon, Dirksen, & Bögels, 2013). However, a potential disadvantage is that success of these interventions depends on the implementation of reliable, valid, and efficient selection strategies of adolescents offered the interventions. Selection of adolescents for indicated anxiety interventions typically includes screening instruments for anxiety symptoms. Screening for anxiety may be a challenge to administer and score in primary mental health settings (Simon et al., 2013). Such challenges include costs, time constraints and lack of appropriate referrals for follow-up care (Ramsawh et al., 2012). As described in the next paragraph, a central benefit of universal interventions is that they don't depend on efficient selection strategies. In universal interventions aiming to prevent adolescence anxiety, all adolescents are the target population.

Universal preventive interventions

While universal preventive interventions aim to reduce the frequency of new incidence of anxiety disorders in the target population, as well as to reduce the target group's mean level of anxiety symptoms, CB treatment aims to reduce the anxiety symptoms in patients who have asked for help. Reviews on universal preventive CB interventions delivered at schools have been shown to be promising (Lau & Rapee, 2011; Taylor, Oberle, Durlak, & P, 2017;

Weare & Nind, 2011). In a review of reviews of mental health promotion and problem prevention in schools, 19 studies investigated internalizing mental health problems, anxiety included (Weare & Nind, 2011), and reported positive impact, albeit with large variance in effect sizes (0.10–1.70). A Norwegian universal CB intervention study that focused only on social anxiety reported prevention effects by showing significantly fewer incidents of anxiety disorders at follow-up in the intervention group compared with the control group. The intervention also reduced the level of anxiety, especially in students who had elevated levels of anxiety before the intervention (Aune & Stiles, 2009; Dadds et al., 1999). Importantly, some studies of universal preventive CB interventions failed to show statistically significant effects (Lau & Rapee, 2011).

In general, universal preventive CB interventions have a high potential for being cost-effective at a public health level, also with low effect sizes (National Research Council and Institute of Medicine Committee, 2009). Accordingly, universal preventive CB interventions targeting adolescents might have high potential to reduce adolescent anxiety at a public health level. The potential benefits associated with universal anxiety preventive interventions in schools include reduced stigma associated with mental health issues, improved teacher/adolescent relations, and increased self-efficacy and skills in adolescents to support each other (Dudley, Silove, & Gale, 2012; Weare & Nind, 2011). Universal anxiety preventive interventions should thus receive more attention in future research.

New interventions in new settings

Given the burden of disease associated with adolescent anxiety (Gadernann et al., 2012) and the gap between those who could benefit from treatment initiatives and those who actually are being offered treatment (Andrade et al., 2014; O’Dea, Calear, & Perry, 2015; Singla et al., 2014; Zanzville & Cattaneo, 2009), the potential of CB preventive interventions should be further explored. As mentioned, a core instrument in the Care Coordination Reform ("Stortingsmelding 47. Samhandlingsreformen [White Paper 47. The Care Coordination Reform]," 2008-2009) is to strengthen low threshold services for adolescents. Low threshold services, such as the Children’s Houses and the School Health Services in Norway, aim to promote health and to prevent illness. The health professionals in low threshold services typically include school health nurses, social workers, medical doctors, psychologists, and physical therapists (Major et al., 2011). A central idea is to offer basic psychological interventions when needed, without taking the adolescent and her/his family through a diagnostic interview beforehand. Hence, interventions suitable in low threshold services

should be possible to initiate without a specific (anxiety) diagnosis. Findings suggest that accessible, time-efficient, cost-effective service delivery methods that minimize stigma and maximize engagement for paediatric anxiety are needed (Salloum et al., 2016).

Time issues in low threshold services

There are two main time issues that make low threshold services different from standard, specialized care: (1) the starting point of the intervention in relation to the course of the illness, and (2) the number of sessions available for each client. The feasibility of preventive interventions in low threshold services should be evaluated based on the ability to be delivered in a time window when the service typically meets the adolescent. The starting point for low threshold services work with socially anxious adolescents is often related to problems with school presentations (Mifsud & Rapee, 2005). The starting point for the Children's Houses' involvement with adolescents and her/his family is often in temporal proximity to a potential traumatic episode or uncovering of such episodes. Generally, no intervention for youth with elevated post-traumatic stress in the early post-trauma window of 2–6 months has been well documented (Hiller et al., 2016; Meiser-Stedman et al., 2016). Hence, more studies on preventive interventions for adolescents with post-traumatic stress and/or other anxiety symptoms, which can be provided as part of low threshold services, are needed.

The low threshold services typically limit the number of sessions they offer to each client, since a central aim of the low threshold services is to be accessible to all who can benefit from the services (Haugland, Mauset, & Raknes, 2013). In the Children's House in Oslo, children are usually offered no more than 6 individual intervention sessions. Similarly, in school health services, the number of sessions offered to each client is typically limited to fewer than 6 sessions (Barneombudet, 2013; Waldum-Grevbo & Haugland, 2015). Standard, evidence-based CBT for individuals with anxiety symptoms typically consists of manualised treatments provided over 10–16 sessions (Beck, 2011). The best documented CBT for adolescents with PTSD, "Trauma Focused CBT", (TF-CBT) usually consists of 10–15 sessions lasting 90 minutes each (Kornør, 2013). Given this gap between time needed to deliver well-documented interventions and time offered to anxious adolescents in low threshold services, research on brief preventive interventions targeting anxious adolescents should be given high priority.

Health literacy, anxiety literacy

While universal interventions targeting anxiety in adolescents can increase awareness about the issue as a problem important to recognize and address, the actual access to selective and indicated interventions targeting anxious adolescents presupposes recognition of adolescent anxiety as an important problem. Health literacy can be defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (U.S. Department of Health and Human Services, 2010). Inspired by the concept health literacy, the term “anxiety literacy” is suggested: The degree to which individuals have the capacity to obtain, process, and understand basic information to recognize anxiety symptoms, to know the basics of what can be done in everyday life to reduce such problems, and to know how and where to find services needed to make an appropriate and relevant health decision when needed. To increase anxiety literacy in adolescents, their parents and teachers, universal anxiety preventive CB interventions could be implemented in the school curriculum (Weare & Nind, 2011).

Article 17 in the UN Convention on the Rights of the Child, adopted by UN 1989, calls for specifically written and widespread information to promote mental health: *“States Parties recognize the important function performed by the mass media and shall ensure that the child has access to information and material from a diversity of national and international sources, especially those aimed at the promotion of his or her social, spiritual and moral well-being and physical and mental health.”*

Highlighting mental health information, Article 17 is an important recognition of the child’s need for information on the child’s terms. There are a number of ways to increase anxiety literacy, for example by providing easy access to self-help material and universal interventions addressing adolescent anxiety and how it can be decreased (Fanner & Urquhart, 2008; Norcross, 2006; Nordgreen & Havik, 2011; Raknes et al., 2017).

The feasibility of preventive interventions

There are many prevention interventions that have been both successful and unsuccessful and which can serve as useful guides when developing anxiety prevention interventions for adolescents. The history of hand hygiene in healthcare, for instance, can serve as one example demonstrating that more than pure knowledge is needed when the goal is to change behaviour. Dr. Semmelweis established as long ago as 1847 that hospital-acquired diseases were transmitted via the hands of health care workers; however, it has taken

time and effort to implement proper hand hygiene in hospitals. Although dissemination of knowledge of the importance of hand hygiene led to some changes in practice, the most significant progress in hand hygiene occurred after 1980, more than 140 years after Semmelweis' discovery. The progress achieved was associated with the introduction and validation of the concept of "multimodal promotional strategies" (WHO, 2009). The successful and sustainable strategy components that created hand hygiene improvement, were the following: (1) system change: Ensuring that necessary infrastructure was in place to allow health-care workers to practice hand hygiene; (2) training/education: Providing regular training on the importance of hand hygiene; (3) Evaluation and feedback: Monitoring hand hygiene practices and infrastructure along with related perceptions and knowledge among health-care workers; (4) reminders in the workplace; (5) institutional safety climate: Creating an environment and the perceptions that facilitate awareness-raising about patient safety issues while guaranteeing considerations of hand hygiene improvement as high priority at all levels (WHO, 2009). The take-home message for preventive interventions was clear: more than knowledge is needed if the goal is to use a preventive intervention in all situations where it can be beneficial.

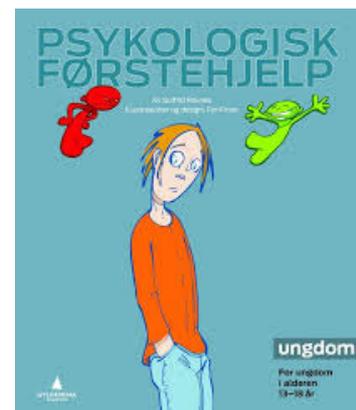
Further, in line with the issue of framing addressed in the prospect theory (Tversky & Kahneman, 1981), studies on the implementation of preventive interventions have found that the way problems and solutions are framed in a preventive intervention can affect the successfulness of the intervention (Storer & Strohl, 2016; Strekalova & Damiani, 2016). For instance, a study on how message framing influenced engagement in quitting smoking can serve as one example demonstrating that the way a problem is framed in media is important when the goal is to change behaviour. Posts from Tobacco Free Florida's Facebook page were framed as either dominant-submissive or affiliate-disaffiliate to an implied audience of either smokers, non-smokers, active quitters, or a mixed audience; the extent to which a direct call for engagement, in terms of a request to comment, like, or share the post, was used for audience engagement. The study found that framing played a role in audience engagement with smoking cessation posts on social media. Hence, research on self-help material framed in accordance with the primary tasks of low threshold services - health promotion and prevention - is needed.

Self-help resources for anxious adolescents

Ungsinn is a scientific journal aimed at providing school, health, and child welfare professionals an overview of and research base for preventive and treatment mental health

interventions in Norwegian for children and adolescents. The journal provides systematic knowledge summaries on interventions and aims to provide practical information about the interventions and detailed reviews of how well the effects of the interventions are documented. The journal is operated by the Regional Centre for Children and Adolescents, North, on behalf of the Norwegian Directorate of Health. The Psychological First Aid (PF) is the only self-help material described in the journal that targets anxious adolescents.

The PF contains a booklet with text and illustrations, a red and a green figurine, and worksheets. The PF kits are designed to guide children and adolescents through psychological challenges by teaching them the main principles in the cognitive behavioural model. The PF kits can be used as (1) pure self-help, (2) a psycho-developmental learning program in schools, and (3) an element included in a brief intervention offered, e.g. in low threshold services for adolescents. The PF was made by a group of psychotherapists including Solfrid Raknes (author of this thesis) in collaboration with an industrial designer. The colourful illustrations and plastic figurines make this self-help material stand out from other accessible cognitive behavioural material (BTO, 2017; Neumer, 2013). The PF is implemented nationally by the organization Voksne for Barn (Eng & Ulvund, 2016; Neumer, 2013). Bergen Teknologioverføring commercialized the concept through a license agreement with the publishing company Gyldendal in 2007. So far about 8,000 health/school professionals have obtained PF training (BTO, 2017).



When new interventions are used in new services they should be evaluated (Kazdin & Nock, 2003). Feasibility studies and pilot studies of new interventions should be conducted, and effect studies should be run (Kazdin & Nock, 2003). And currently, a multisite randomized and controlled trial where the PF is included and forms the basis for the brief CB intervention evaluated, is ongoing (Haugland et al., 2017). The main purpose of this effect-study, which is a part of the Low Intensity versus Standard Cognitive Therapy (LIST) project, is to investigate the effects of two interventions for anxious adolescents ($N = 323$); one briefer (the PF-based intervention) and one standard length intervention. Both interventions are CB-, group-, and school-based, and provided mainly by school health nurses. The current status of this effect study is that all participants ($N = 323$) have received their intervention, and data from pre-, halfway- and post-intervention have been collected. The one-year follow-up data collection will be completed January 2018 (Haugland et al., 2017). Another part of the LIST-project was to collect epidemiological data about anxiety in the community sample of

adolescents aged 12–17 years in the schools where this effect-study was conducted. These epidemiological data form the basis for Papers 1 and 2 in this thesis.

In December 2010, four years before the LIST study received funding from the Norwegian Research Council, the project “The Psychological First Aid Kit: Implementation and Evaluation” was initiated by the Norwegian Health Directory. The purpose was to implement and evaluate the PF in low threshold services for children and adolescents in Norway (Haugland et al., 2013). It consisted of (1) a feasibility study and (2) a pilot study. This feasibility study involved primary healthcare workers and teachers ($N = 511$ health/school professionals), and concluded that six months after a short training seminar, the majority of the school/health professionals continued to use the PF. The feasibility study also reported the materials as useful as a part of brief preventive early interventions (Haugland et al., 2013). The pilot study initiated by the same project included traumatized adolescents ($N = 11$) who received brief PF-based interventions from a low threshold service. This pilot study was the first to investigate the potential benefit of a brief intervention that includes the PF for adolescents. The study was conducted in a natural low threshold setting where the therapists have a high clinical workload. The aims of the study were (1) to investigate whether traumatized adolescents who received the PF as part of a brief intervention showed symptom relief post-intervention, (2) to ascertain whether results persisted through a one-year follow-up, and (3) to explore how the self-help kit was used in the brief intervention. This pilot study forms the basis for Paper 3 in this thesis.

Aims and Research Questions

This thesis addresses the current lack of knowledge sufficient to inform decisions related to strategies and CB interventions that can prevent adolescent anxiety. The main aim is to expand the knowledge base on preventive strategies and CB interventions targeting anxious adolescents. The following questions were investigated to gather empirical knowledge that can inform discussions, decisions, and further development in the field:

1. Is the level of anxiety symptoms associated with quality of life in adolescents?
2. What is the prevalence of anxiety problems in adolescents?
3. What are central characteristics of anxious adolescents?
4. Can a brief cognitive behavioural self-help based intervention be feasible in a low threshold service for traumatized adolescents?

5. Can increased health literacy based on CB interventions prevent adolescent anxiety and associated problems?

Methods and Materials

To achieve the main aim, which is to expand the empirical knowledge base for prevention strategies and interventions targeting anxious adolescents, the thesis consists of data from two projects. The LIST project formed the basis for Papers 1 and 2. The pilot study of adolescents ($n = 11$) initiated by the project “The Psychological First Aid Kit: Implementation and Evaluation” formed the basis for Paper 3. In Papers 1 and 2, a cross-sectional design was used, and quantitative methods were applied. In Paper 3 a controlled, one group intervention design was used, and mixed methods were applied.

Data Sets

The school-part of the LIST project: Papers 1 and 2

The target group included all pupils from 18 elementary schools with a total of 4,361 adolescents. The response rate in the study was 39% ($N = 1,719$).

The PF at the Children’s House study: Paper 3

Traumatized adolescents ($N = 11$) who received brief PF-based interventions from a low threshold service comprised the participants. There were no drop-outs from the intervention. Nine of the adolescents, their parents/other guardians, and their therapists provided data about the adolescents’ mental health before and after the intervention, as well as during a one-year follow-up period.

Study Populations and Recruitment Procedures

The study population in all three papers consisted of adolescents 12–17 years of age, all living in Norway.

Papers 1 and 2

The study population consisted of a community sample of adolescents. The target group of the study was all adolescents (8th to 10th graders, 12–16 years) at 17 public and 1 private elementary school, located in 9 municipalities in the West, East and South of Norway, with a total of 4,361 adolescents. All participating municipalities were rural or suburban; no big city schools participated. School size varied from 80 to 475 pupils ($M = 256$). The participating adolescents consisted of mostly ethnic Norwegian pupils (96%), with a small

group of Western Immigrants (2%) and Non-Western Immigrants (2%). In all, 47% of the participants were boys, and 53% were girls. The recruitment method used was not ideal to create a representative sample of Norwegians due to these specific features: (1) The study was conducted in three of five regions of Norway (East, South and West); the Middle and Northern regions were not included because of practical feasibility (travel distances, costs); (2) The ten counties in which the participating schools were situated had a good relation with the local research environment involved in the study; (3) The participating counties were situated in rural and sub-rural parts of Norway; no city schools were represented; (4) The schools in the study were chosen on the basis that they also agreed to participate in a school-based intervention study for anxious adolescents. Together with the relatively low response rate, probably due to our obligation for active, written consent from parents, this recruitment method limited generalizing our findings about prevalence of anxiety problems from our sample to the general population of Norwegian adolescents.

Paper 3

The study population ($N = 11$) was recruited from a targeted low threshold service for traumatized kids who were involved in police-reported cases either as victims and/or witnesses of violence and/or sexual abuse at the Children's House in Oslo, Norway. Participants were recruited on the basis of their behaviour during their witness statements in their forensic interview. The inclusion criteria for participating in the study were: (1) the adolescent showed stress responses during the forensic interview; (2) the adolescent and caregiver were able to speak and read Norwegian; (3) the adolescent and caregiver agreed to participate and sign an informed consent form, and (4) the adolescent would normally be offered a brief intervention at the Children's House. Potential participants were excluded if they had a previous, known diagnosis of mental retardation or had reading skills below normal at age eight.

All participants recruited were females, aged 12–16 years ($M = 13.7$, $SD = 1.30$). Nine participants were native Norwegians; two were immigrants. Seven participants lived with their mother as their primary caregiver, two lived every second week alternately with their mother and father, and two were in the care of child welfare services. All adolescents reported exposure to sexual or physical violence and exposure to more than one trauma episode; eight reported repeated multiple abuse histories, with the majority reporting that violence had occurred between close relations; and three reported having been neglected and having witnessed domestic violence.

The role of the Children's House staff in Oslo is to coordinate and facilitate the police interview with the children involved in reported incidents of violence and sexual abuse against children, to evaluate the child's need for psychosocial assistance, and to provide short-term interventions to those in need. In 2011, the Children's House in Oslo conducted 535 interviews with kids, 235 of whom received at least two sessions of psychosocial assistance (Stefansen, Gundersen, & Bakketeig, 2012). Different from the total group of kids who received assistance, our sample did not include children below 12 years of age, boys, or mentally retarded kids. However, regarding exposure to violence, psychological problems, needs and skills, and other demographic factors other than those mentioned, we have no information that suggests that the study participants were different from most kids who received assistance at the Children's House.

Data Collection

Papers 1 and 2 were solely based on data from adolescents, whereas Paper 3 used triangulating data from multiple informants (adolescents, parents or other caregivers, and therapists) and combined surveys with semi-structured interviews and observations.

Paper 1 and 2

Data were collected electronically, through the software "Quest Back". The participants completed the survey in the classroom during school hours. Data were collected from October 2014 to June 2015.

Paper 3

Quantitative data were collected through therapist-administered, paper-and-pencil questionnaires. Qualitative data were collected through therapist-administered, transcribed audiotapes from all intervention sessions, and the worksheets completed in these intervention sessions. Data were collected from December 2012 to September 2014.

Ethics

The LIST-study (Paper 1 and 2) and the PF at the Children's House study (Paper 3) were approved by the Regional Committee for Medical and Health Research Ethics (REK), region West, Norway (LIST: No: 2013/2331; REK Vest PF at the Children's House: No: 2011/2445 REK Vest). For the LIST study we first applied for permission from REK to conduct the study on the basis of passive informed parental consent, since active, written consent typically makes it harder to achieve a high response rate. But since our study included the use of full range questionnaires on anxiety, we were asked to apply for active parental

consent, and therefore complied with this in order to be able to conduct the survey with permission from REK. In the LIST-study the parents of students in the schools were contacted by school staff, in accordance with the way the schools normally communicate with parents/guardians (e.g. satchel mail, e-mail, SMS). Parents who wished to learn more about the study could check a box on the notice, requesting that someone from the study team contact them by phone, email or in person, to review the consent form and answer any questions. The study team did not contact any parent unless that parent had indicated that s/he would like to receive communication regarding the study. In the PF at the Children's House Study, the invitation to participate in the study was administered in accordance with administration of other information between the low threshold service to the parents/guardians of the adolescent clients. The invitation was first issued orally, as an open invitation, and with the possibility to review the consent form and ask any questions regarding study participation. The adolescents in all studies were informed that their responses would be treated anonymously and that there were no right or wrong answers. The information provided to the parents and adolescents described the aims of the study data collection procedures, and the fact that participation was voluntary. The information letters also assured participants that they could withdraw from participation at any time without consequences.

In the school-part of the LIST-study, a teacher was present to administer the surveys and respond to any questions or concerns. Student participants completed surveys only, and minimal risk was associated with participation. We assured the participants that answers would be kept strictly confidential and that no participant names would be used in publications. However, there was a possibility that school personnel could feel stressed if a student disclosed something to which the personnel were obligated to respond, such as ongoing negative life events or suicidal thoughts. The researchers tried to minimize these risks by providing as much support as possible. Study members, including a certified psychologist, were available by phone and email as needed. We were confident that any potential risks, such as possible embarrassment or difficulty with completion of the measures, were outweighed by the opportunity for significant benefit by learning about adolescent anxiety and associated factors.

Although the PF at the Children's House-study was designed to maximize benefit and minimize harm, participating in research can lead to emotional stress. The therapists were therefore available for the adolescents during the completion of surveys. The therapists were also available by phone, e-mail, or face-to-face as needed for parents/guardians after they had completed the questionnaires.

Scales and Measurements

All three papers were based on measures from instruments known to have high psychometric qualities. Data on anxiety symptoms, health related quality of life, demographics, and negative life events were collected in all studies. All papers used adolescent-completed questionnaires. Some instruments used in the LIST-study were not used in the PF at the Children's House-study, and vice versa. Likewise, some instruments analysed in Paper 1 were not analysed in Paper 2, and vice versa. Cronbach's alpha was calculated for all instruments in the LIST-study. Due to small sample size, Cronbach's alpha was not calculated in the PF at the Children's House-study.

Variables on anxiety and post-traumatic stress

“In Papers 1 and 2, the *Spence Children's Anxiety Scale* (SCAS; (Spence, 1998) was used to identify adolescents by level of anxiety, whereas in Paper 3, the SCAS was used as one of many secondary outcome measures. The SCAS consists of 38 questions (e.g. “I feel scared when I have to take a test”, or “I worry about being away from my parents”). All questions are scored on a four-point scale (composite score range 0–114, with lower scores indicating lower levels of anxiety symptoms). The scale covers the anxiety domains panic/agoraphobia, social phobia, separation anxiety, generalized anxiety (GAD), obsessions/compulsions (OCD), and fear of physical injury. By adding the subscale scores from these anxiety domains, a composite anxiety score was calculated and used as a measure for overall anxiety symptoms. Norwegian norms were not available for the SCAS. In Paper 1 the SCAS was applied to identify three groups of adolescents according to level of anxiety (low, medium and high), since a main aim was to examine the degree of HRQoL impairment at several levels of anxiety symptoms. In Paper 2, the SCAS was applied to dichotomously identify participants as not anxious or anxious, since the main aim in Paper 2 was to examine the prevalence of anxiety and to explore characteristics of anxious adolescents. Whereas Paper 1 applied Australian gender-based norms (<http://www.scaswebsite.com>), which is the richest dataset for norms available for the SCAS internationally, Paper 2 applied Swedish norms and used the same cut-off score for all participants independently of gender (Olofsdotter, Sonnby, Vadlin, Furmark, & Nilsson, 2016). Since Norwegian and Swedish cultures are similar, we used the established and validated Swedish norms instead of Australian, to investigate questions where culture is assumed to play a central role. A more detailed account of how this was conducted is described in the respective articles. Importantly, girls referred to in Paper 1 as “low-anxious” reported a SCAS-score ≤ 38 , and

boys reported ≤ 32 , whereas in Paper 2, “not anxious” referred to *all* adolescents who reported a SCAS-score ≤ 32 . In short, the criteria for “low-anxious” girls in Paper 1 were more restrictive than the criteria for “not-anxious” girls in Paper 2, while the criteria for boys were the same in both papers. In Papers 1 and 2, Cronbach’s α for the SCAS composite score was .92. Cronbach’s α for the SCAS-subscales, each comprising five to nine items, varied from .59 to .85.

In order to investigate the relations between degree of anxiety and Quality of Life, self-efficacy, social support and other factors, the way in which anxiety is measured must correspond to how the degree of anxiety is described. Degree of anxiety, here measured by the SCAS, is a continuous variable. We chose however to describe degree of anxiety categorically both Paper 1 and 2. In Paper 1 degree of anxiety was described as “low”, “medium” or “high”; in Paper 2 degree of anxiety was described binary, as “low” or “high”. A statistical problem with converting continuous to categorical variables like this, is that much of the variance in the factor can be lost (Thoresen, 2003). Alternatively, linear analyses and explanation models could have been chosen, and would have provided an even more statistically accurate description of the degree of anxiety associated with various factors with basis in our data. However, bearing in mind that health professionals and decision makers often distinguish binary categories between anxious / not anxious; diagnosis / no diagnosis; right to health care / not right to health care; implementing a prevention program / not implementing a prevention program, a categorical representation of degree of anxiety may be easier to communicate and use for decision-making than a more statistically nuanced presentation of data. Hence, using categories strengthens the clinical interpretation of the results.”

In Paper 3, the *Children’s Revised Impact of Event Scale (CRIES)* was used as the primary outcome measure, assessing PTS symptoms. The CRIES consists of 13 questions (e.g. “Do you try to remove it from your memory”, or “Are you alert and watchful even when there is no obvious need to be?”). All questions are scored on a four-point scale (range 0–65, with a lower score indicating a lower level of PTS symptoms) (Chen, Zhang, Liu, Liu, & Dyregrov, 2012). The CRIES consists of three subscales assessing intrusion, avoidance, and arousal. When used for screening purposes, as in the present paper, it is recommended to use only the intrusion and avoidance subscales of the CRIES. If the sum of the scores on these two scales is 17 or more, the probability is very high that that the child will meet the diagnostic criteria for having PTS disorder (Perrin, Meiser-Stedman, & Smith, 2005).

Variables on other predictors

Negative life events

In Papers 1 and 2, data on negative life events was collected with five questions. The first question, taken from the Olweus bully/victim questionnaire, addressed bullying: “How often have you been bullied at school in the past couple of months?” (Solberg & Olweus, 2003). The next four questions about negative life events were taken from the Bergen Child Study (Nordanger et al., 2014). The question “Have you experienced any of the following?” was followed by (1) a catastrophe or serious accident, (2) violence from an adult, (3) seen or heard anybody you care for be victim of violence from an adult, and (4) unwanted sexual acts.” Responding “no” or “never” to all five questions about negative life events was coded as “0 = no reported negative life events”, whereas responding “yes” to any of the items was coded as “1 = has experienced bullying or other negative life events”. In Paper 1, the primary purpose was to investigate the relation between degree of anxiety and Quality of Life. Other factors that could affect the relation, such as gender and reported negative life experiences were controlled for. In Paper 2, the primary purpose was to investigate the relation between degree of anxiety and variables that can be affected through psychosocial interventions (social support and self efficacy). To keep the analyses focused on the main purpose of our studies, binary reporting of negative life events was used in the regression analyses both in Paper 1 and 2. Alternatively, a more nuanced representation of types and degrees of reported negative life events could have been chosen. In Paper 2, the relationship between degree of anxiety and various types of negative life events was also investigated and reported in Table 2.

In Paper 3, data on negative life events was collected by the structured interview *Kartlegging av Traumeerfaringer*¹ (Nasjonalt kunnskapssenter om vold og traumatisk stress (NKVTS), 2011a, 2011b). *Kartlegging av Traumeerfaringer* (KATE) is recommended for disclosure of trauma experiences in Norway ((Nasjonalt kunnskapssenter om vold og traumatisk stress (NKVTS), 2015), and the feasibility of KATE for assessing trauma experiences in children has been carefully described in previous research (Ormhaug, Jensen, Hukkelberg, Holt, & Egeland, 2012). The KATE consists of 15 questions, such as “Have you ever experienced a serious accident (e.g. a car accident)?” and “Has anybody raped you, that means forced you to have anal, oral or vaginal intercourse?” The response options were “yes,” “no,” and “pass”. Hence, compared with data on negative life events collected in Papers 1 and 2, Paper 3 was more detailed with regard to data collected on negative life events.

¹ *Kartlegging av Traumeerfaringer* is Norwegian for “Assessment of Traumatic Experiences”.

Ethnicity

In Papers 1 and 2, ethnicity was measured by three questions addressing where the adolescent and his/her parents were born (e.g. “Where were you born?”). Response options were all countries in the world, sorted by continent. Ethnicity was defined as “Norwegian” if both parents, or at least one parent and the adolescent were born in Norway; “Western immigrant”, if both parents or at least one parent and the adolescent were born in another Western country; and “Non-Western immigrant” if both parents or at least one parent and the adolescent were born in a non-Western country. In Paper 3, ethnicity was collected as part of the forensic interview.

Indicators of socioeconomic status

Indicators of socioeconomic status were collected in Papers 1 and 2 by addressing family economy with a question previously used in The Bergen Child Study (Bøe et al., 2014; Bøe et al., 2012). Perceived family economy was measured by the question “How would you rate your family’s economic status?” The response options were “like most families”, “better than most families”, and “worse than most families”. Further, in Paper 2 the adolescent’s information about their parents’ education also was used as an indicator of socioeconomic status. Parents’ education was measured by the question “What education has your mother/father completed?” The answer options were “I don’t know”, “Lower Secondary School”, “Upper Secondary School”, and “Higher Education”. In Paper 3, data on parents’ education and family economy were not systematically collected.

Self-efficacy and social support

Self-efficacy and social support were analysed only in Paper 2. The *General Self-Efficacy Scale (GSE)* was used to measure general self-efficacy (Schwarzer & Jerusalem, 1995). The GSE consists of 10 statements (e.g. “I can always manage to solve difficult problems if I try hard enough”, and “I can usually handle whatever comes my way”). All items are scored on a four-point scale. The score of each item was added, and the average score from items answered was reported. Higher scores reflect a higher degree of self-efficacy. In Paper 2, Cronbach’s α of the GSE was 0.90.

The Social Resource subscale of the *Resilience Scale (READ)* was used to measure social support (Hjemdal, Friborg, Stiles, Martinussen, & Rosenvinge, 2006). The subscale consists of five questions (e.g. “I have some friends and relatives who frequently encourage me”, and “I always have somebody available when I need it”). All questions were answered on a five-point scale. The scores on the five items were added, and the average score was

reported. Higher scores reflect a higher degree of social resources. In Paper 2, Cronbach's α of the READ subscale support was 0.80.

Health Related Quality of Life (HRQoL) was measured by the *Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version* (KINDL-R; (Ravens-Sieberer & Biullinger, 1998) in Papers 1 and 3. The KINDL-R consists of 24 questions (e.g. "During the last week...I felt strong and full of energy", and "During the last week...I was proud of myself"). The scale consists of subscales measuring several specific dimensions of HRQoL: physical, emotional, self-esteem, family, friends, and school. All questions were answered on a five-point scale. Mean item scores were calculated for all subscales and for the composite HRQoL scale, and transformed to HRQoL subscales ranging from 0–100, with higher scores indicating better HRQoL. For screening purposes, a healthy cut-off score of 70 for the composite HRQoL score was used, as adolescents scoring above this cut-off have been identified with a moderate probability of being in good health (Serra-Sutton et al., 2009). In Paper 1, Cronbach's α for the KINDL-R total score was .92. Cronbach's α for the KINDL-R-subscale (all with four items) varied from .63 to .87. The correlations of anxiety as measured by the SCAS and depression as measured by the KINDL-R scales ($r = 0.67, p < 0.001$), are indicating that these are not quite measuring the same construct.

Depression symptoms

Depression symptoms were measured by The *Short Mood and Feelings Questionnaire* (SMFQ), (Costello, Benjamin, Angold, & Silver, 1991). The SMFQ consists of 13 statements (e.g. "I felt I was no good anymore", and "I thought nobody really loved me"). All items were ranked on a three-point scale (range 0–26, the lower score the lower depression symptoms). Anxiety and depression were significantly correlated. However, the correlation was not high enough to violate collinearity; neither in Paper 1 where Australian norms were used to categorize adolescents as low, medium or high anxious ($r = 0.63, p < 0.001$) nor in Paper 2 where Swedish norms were used and adolescents were categorized as low or high anxious ($r = 0.65, p < 0.001$).

Trauma appraisals

In Paper 3 *The Child Post-Traumatic Cognitions Inventory* (cPTCI) was used to measure negative post-traumatic appraisals (Meiser-Stedman et al., 2009). The cPTCI consists of 41 items (e.g. "I have to watch out for danger all the time", and "anyone could

hurt me”). All items were ranked on a four-point scale (range 0–123; the lower the score, the less dysfunctional the thoughts). cPTCI was only collected in Paper 3.

Level of functioning

The *Children’s Global Assessment Scale* (C-GAS) was used to measure each child’s level of functioning of a range of of aspects related to a child’s psychological and social functioning (Shaffer et al., 1983). The C-GAS is a clinician-rated, one-item scale (range 0–100, the higher score the better functioning). C-GAS was used and completed by the adolescent’s therapist in Paper 3, and not used in Paper 1 and 2.

General mental health

The *Strengths and Difficulties Questionnaire* (SDQ) (Goodman & Scott, 1999) was analysed to measure adolescents’ general mental health in Paper 3. The SDQ consists of 25 statements (e.g. “I try to be nice to other people. I care about their feelings”, and “I finish the work I’m doing. My attention is good”). All items were ranked on a three-point scale (range 0–50, the lower score the better mental health). In Paper 3 the parent version of SDQ was used, completed by parent or other caregiver.

Caregiver’s reaction

The *Parental Emotional Reaction Questionnaire* (PERQ), was used in Paper 3, completed by parent/other caregiver to measure the caregiver’s reaction to the child’s exposure to trauma (Cohen & Mannarino, 1996). The PERQ consists of 15 statements (e.g. “I have felt upset about my child being abused”, and “I have felt responsible for my child being abused”). All items were ranked on a five-point scale (range 15–75, the lower score the less parent reactions).

Intervention and Therapists

Data used in Papers 1 and 2 included neither interventions nor therapists. The PF at the Children’s House-study that formed the basis for Paper 3 was an intervention study. In the following section the participating therapists, therapist training, and the intervention used in the pilot study will be described.

Three therapists participated, all females ($M_{age} = 48$ years). One was a psychologist and two were social workers, and all were experienced therapists ($M = 18$ years). One had prior training in trauma-focused CBT, but none had formal education in CBT. The therapists

attended a two-day PF training workshop before the study started, and they participated in four, two-hour group-supervision sessions during the intervention phase.

The adolescent's forensic interviews were conducted at the Children's House by the police, and were simultaneously observed by the therapists through video transmission. The intervention started within two weeks after the adolescent's forensic interview. The intervention comprised of 2–6 sessions ($M = 3.55$, $SD = 1.21$). The caregiver was provided with the intervention rationale and was invited to joint sessions if the therapist thought that including the caregiver would be crucial for better outcomes. The duration of the intervention period varied from 11 to 105 days ($M = 45.89$, $SD = 30.35$). The adolescents who were in need of prolonged treatment were identified and encouraged to accept further referral.

The intervention was not supposed to follow a pre-defined schedule of activities according to a manual; instead, the therapists were encouraged to use the PF (Raknes, 2010a, 2010b) when expedient and in ways they found useful. All adolescent participants also received a toolkit to use during and between the sessions, and they kept it so that they also could use it after the face-to-face intervention had finished. The brief interventions offered to the 11 adolescents varied widely, as they were individually tailored. However, all therapies can be described as consisting of supportive, warm, and engaging brief psychotherapy. All of them included cognitive behavioural elements such as psycho-education and focus on the difference and connections between situations, thoughts, feelings and behaviour, and training in identifying feelings, “red thoughts”, and “green thoughts”. The therapists did their best to explore the adolescents' life situations, feelings and thoughts collaboratively with the adolescents. Some sessions were mainly solution-focused and supportive, while others were mainly problem-oriented. The level of structure in the interventions varied between therapists, between interventions given by the same therapist to different adolescents, and between sessions.

Data Analysis

While Papers 1 and 2 solely used quantitative methods, Paper 3 used mixed methods also involving qualitative data analyses. All quantitative data were analysed using SPSS 22. In the qualitative data, the NVivo 10.2.1 software was used to make notes and to create and organize themes for the worksheets.

Papers 1 and 2

Missing data varied from 2.2% to 7.1% depending on the question asked. After running the Little's Missing Completely at Random tests in SPSS, we assumed that data

were missing at random. Due to the large sample size, skewness and kurtosis were deemed to have no substantive impact on the analyses (Tabachnick & Fidell, 2013). Both papers used regression analyses to investigate the main research questions.

Paper 1

Hierarchical multiple linear regression analyses were conducted, first to determine the contribution of levels of anxiety symptoms in predicting levels of HRQoL-total scores, and then to determine the contribution of type of anxiety on HRQoL. Finally, and after the paper was published, we conducted the same analyses again, with depression included as a control in the model at Step 1 in the regression analyses. Each case was coded as low, medium, or high regarding anxiety across all anxiety domains (overall, obsessions/compulsions, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalized anxiety). In the preliminary analyses conducted for the linear regression analyses, no violation of the assumptions of normality, linearity, and homoscedasticity appeared.

Paper 2

Logistic regression analyses were performed to assess the impact of each factor on the likelihood that participants would report an elevated level of anxiety. The model contained eight predictors: gender, age, ethnicity, parents' education, family economic status, negative life events, social support, and self-efficacy. First, the predictors were entered in separate (crude) analyses. Then, an adjusted logistic regression analysis was conducted in which all the predictors were entered simultaneously. Finally, and after the paper was published, we also controlled for depression.

Paper 3: Mixed methods

Quantitative data

The quantitative data collected comprised data from before and after intervention, and at 3, 6, and 12 month follow-ups, respectively. For changes in outcomes, data was analysed using repeated measures ANOVA and was further explored by least significant difference post hoc tests. A p -value $<.05$ was considered statistically significant. To deal with missing data, the mean from the three follow-up measure points was used as a composite follow-up score. Only those adolescents ($N = 9$) who had valid data on the primary outcome measure (CRIES) from pre-intervention, post-intervention, and follow-up were included in the quantitative analysis.

Qualitative data

The qualitative data collected in this study comprised a total of 42 audiotaped sessions and 66 completed worksheets. The audiotapes were transcribed by the first author, and then read by the first, second and fifth author to gain an overall understanding of the content in order to identify various in-session uses of the PF material. Based on the transcribed audiotapes, author 1 explored whether the PF was used in each session and, if so, which part of the self-help kit was used (Paper 3, Table 2). Since the worksheet “the Helping Hand” (Paper 3, figure 1) is intended to be a central part of the PF, the first, second and fifth author analysed psychological themes discussed where this worksheet was used. A six-phase approach to thematic analysis (Braun & Clarke, 2008) was used to analyse the completed worksheets. The main themes and sub-themes reflecting the use of the worksheet were derived from the fixed categories given by the worksheet through a bottom-up analysis, first by generating initial codes, then searching for themes, and finally reviewing potential themes. Codes, sub-themes, and main themes, including the process of defining and naming the themes, were discussed to ensure that themes had singular focus, did not overlap, and addressed our research questions. The validity of the themes was strengthened by comparing the themes we identified with the originally completed worksheets to ensure that the meaning had not been altered during the analysis process and that the themes were grounded in the data (Berg, 2007). Based on our experiences as psychologists, sociologists, and cognitive behavioural therapists, our terminology and frames for understanding themes stemmed from psychological, trauma, and CBT perspectives. Thematic analyses were conducted in Norwegian, close to the source material, and in the mother tongue of the researchers to increase the validity of the research (Kvale, 1996).

Results

Paper 1

This paper adds to previous research by showing that medium and high levels of anxiety symptoms in all anxiety domains were associated with poorer overall HRQoL. However, when depression was controlled for after the paper was published, the variance in HRQoL nearly doubled. And importantly, even though the associations between HRQoL and the anxiety domains physical injury fear, medium level, and social phobia, high level, remained significant all other anxiety domains but these two, at medium and high levels of anxiety, were not significantly associated with HRQoL when depression was included in the model.

Level of HRQoL

Overall HRQoL was inversely associated with levels of anxiety, as indicated by mean KINDL-R total scores of 75 ($SD = 9.1$) in adolescents with low levels of overall anxiety symptoms, 63 ($SD = 9.2$) in adolescents with medium levels of anxiety symptoms, and 56 ($SD = 10.5$) in adolescents with high levels of anxiety symptoms, $F(731,630) = 13.9, p < 0.005$. Most adolescents in the sample were Norwegian ($n = 1553$), with a small group of Western Immigrants ($n = 39$) and Non Western Immigrants ($n = 30$). All dimensions of HRQoL were negatively associated with overall levels of anxiety symptoms, as shown in Appendix, Paper 1, Figure 1. The differences in HRQoL between adolescents with low and medium anxiety symptoms varied from small to large effect sizes ranging from $d = 0.54$ to $d = 1.08$ across HRQoL dimensions. The differences in overall HRQoL between adolescents with low and high anxiety symptoms varied from small to large effect sizes ranging from $d = 0.14$ to $d = 2.20$ across HRQoL dimensions. HRQoL in the family dimension was reported as high also in adolescents with overall elevated anxiety levels, as reflected in KINDL scores at the family dimension (mean KINDL-R family = 85; 76; 83) in adolescents with low, medium, and high levels of anxiety, respectively, $F(21,651) = 76.2, p < 0.005$. For results, see Appendix, Paper 1, Table 1 and 2.

Associations between HRQoL and anxiety

Two hierarchical multiple regressions were conducted to assess associations between HRQoL and anxiety. Gender, age, ethnicity, perceived family economic status and negative life events were entered as covariates on the first step in both regression models. All anxiety domains at medium level were added at the second step in the first model (Step 2a), and finally all anxiety domains at high anxiety level were added at the second step in the second model (Step 2b). Step 1 in both regression models explained 23% of the variance ($R^2 = 0.23$). All factors except for ethnicity were significantly related to the overall HRQoL, $F(12,1630) = 67.9, p < 0.005$. Poorer HRQoL was predicted by female gender, increased age, perceived low family economy, and reported negative life events. At Step 2a, all domains of medium anxiety level, except generalized anxiety, held significant main effects as associated with HRQoL. The main effects modelled at Step 2a accounted for 31% of the variance in HRQoL ($R^2 = 0.31$), and reached statistical significance, $F(12,1630) = 52.9, p < 0.005$. Model 2, Step 2b accounted for 39% of the variance in HRQoL, ($R^2 = 0.39$), $F(12,1630) = 80.2, p < 0.005$.

All domains of anxiety except separation anxiety and physical injury fear were inversely related to quality of life in Step 2 of the second analysis. For results, see Appendix, Paper 1, Table 3.

Then, and importantly, after the paper was published, depression was controlled for. The same regression analyses were conducted, but this time depression was included in the model, at the first step of the analyses. When depression was controlled for, Step 1 in both regressions explained 59% of the variance ($R^2 = 0.59$), more than double of what was the case before depression was added. Also this time all factors except for ethnicity were significantly related to the overall HRQoL, $F(7,1629) = 334.6, p < 0.005$. Poorer HRQoL was predicted by female gender, increased age, perceived low family economy, reported negative life events and depression. At Step 2a, after all anxiety domains at medium anxiety level were added, the model still accounted for 59% of the variance in HRQoL ($R^2 = 0.59$), but reached statistical significance, $F(13,1629) = 334.6, p < 0.005$. At Step 2a, physical injury fear still significantly associated with HRQoL, but no other anxiety domains were associated significantly with HRQoL in this model. At Step 2b, after all anxiety domains at high anxiety were added, the model accounted for 60% of the variance in HRQoL, ($R^2 = 0.59$), $F(13,1629) = 184.7, p < 0.005$. Social phobia was still significantly associated with HRQoL in this model, but no other anxiety domains at high level were significantly associated with HRQoL. For results, see Appendix, Added analyses, Paper 1, Table 4.

Paper 2

The aims of Paper 2 were to examine the prevalence of anxiety among adolescents in lower secondary schools and to explore characteristics of this group.

Prevalence

The estimated prevalence of anxiety was 23% (95% CI = 20.6%–24.6%). An elevated level of anxiety was significantly associated with female gender, reported negative life events, low social support, and low self-efficacy, which were in line with our hypotheses. Contrary to our hypotheses, age, ethnicity, parental education, and perceived family economy did not significantly predict anxiety status in adolescents.

Predictors of anxiety in adolescents

Logistic regression analysis showed that the full model containing all predictors was statistically significant, $\chi^2 (df = 14, N = 1,598) = 463.4, p < .001$, indicating that the model

was able to distinguish between anxious and non-anxious adolescents based on the predictors. The model as a whole explained between 25.2% (Cox and Snell R^2) and 38.4% (Nagelkerke R^2) of the variance, and correctly classified 77.5% of the cases. Gender, negative life events, social support, and self-efficacy made unique statistically significant contributions to the model. Adjusted logistic regression analyses found that female gender was a strong predictor of elevated levels of anxiety with an odds ratio of 5.93 (95% $CI = 4.20-8.37$). Adolescents who reported experiences of negative life situations or events had an odds ratio of 2.56 (95% $CI = 1.91-3.45$) for anxiety, compared to those who reported no such experiences. The odds ratios of 0.39 (95% $CI = 0.30-0.52$) for social support and 0.24 (95% $CI = 0.17-0.33$) for self-efficacy indicated that these two factors were independently and substantially inversely related to anxiety.

After the paper was published, an erratum was made, due to typos. For corrections, see Appendix, Added Analyses, Paper 2, Table 2. Further, also after the paper was published, we controlled the results for depression. Adding depression to the model did not change the main results significantly, as shown in Appendix, Added Analyses, Paper 2, Table 3b.

Paper 3

The aims of Paper 3 were to investigate whether traumatized adolescents who used a newly developed self-help kit as part of a low intensity cognitive behavioural intervention showed symptom relief, and to explore how the self-help kit was used in the intervention.

Symptom Relief

A significant decrease in post-traumatic stress level over time was found, as measured by the CRIES, $F(2,16) = 7.87, p < 0.05$. Post-hoc tests indicated significant reductions in post-traumatic stress symptoms indicated by the CRIES at group level, from 29.67 ($SD = 3.60$) before intervention to 18.89 ($SD = 3.36$) after intervention and 13.00 ($SD = 4.54$) at follow-up. The effect size in terms of Hedge's g was 0.98 from pre- to post-intervention, and 1.29 from pre-intervention to follow-up. The proportion of adolescents who scored above cut-off on the CRIES decreased from 80% at pre-intervention to 40% at post-intervention. All three therapists had clients who moved from above to under cut-off on the CRIES during the intervention period. The adolescents' function level, as measured by the CGAS, increased significantly over time, $F(2,16) = 15.06, p < 0.05$, from 71.63 ($SD = 7.95$) at pre-intervention to 79.38 ($SD = 6.68$) at post-intervention and 81.23 ($SD = 7.69$) at follow-up. Parents' reactions to their children's difficulties, as indicated by the PERQ score, decreased

significantly, $F(2,16) = 20.39, p < 0.05$, from 42.56 ($SD = 8.05$) to 34.56 ($SD = 11.36$) to 27.78 ($SD = 5.63$) at pre-intervention, post-intervention, and follow-up, respectively. The mean scores of other measures of symptom levels tended to decrease over time, while scores of Quality of life, as indicated by KINDL-R, tended to increase over time; however, none of these changes were statistically significant. For results, see Appendix, Paper 3, Table 1.

Use of the self-help material

The qualitative data indicated that all parts of the PF were used in all the interventions. The textbook was used in the sessions to explain the basic CBT principles and read as homework assignments. The red and green figurines were used for symbolizing thoughts, for fun in the sessions, and as reminders of helpful thoughts between sessions. And the work sheet, “the Helping Hand” was used in a variety of ways, described in further detail in the next paragraph.

Data from the 66 in-session, adolescent-completed Helping Hands worksheets were used to address the following themes: (1) situations, (2) feelings, (3) red thoughts, (4) green thoughts, (5) coping strategies, and (6) supporters. Related to the *situations* theme, three sub-themes were found: (a) trauma-related situations (safety planning, dealing with trauma triggers, working with the trauma narrative); (b) relational situations (challenges, problems, conflicts, bullying), and (c) situations involving activities (schoolwork, sports, sleep). Related to the *feelings* theme, the sub-themes of anxiety, courage, guilt, anger, happiness, pride, engagement, and affiliation were explored. Related to the themes of *red and green thoughts*, four sub-themes were identified: (a) internal–external attribution, (b) negative–positive thinking, (c) time (past, present, future), and (d) meta-thoughts (e.g. “stop thinking”, and “change thoughts”). Related to the *coping strategies* theme, two sub-themes were identified: (a) behaviour to regulate oneself or another person(s), and (b) behaviour to change the situation (escaping, talking, help-seeking, listening, thinking, and writing). Related to the *support* theme, grown-ups, peers, and oneself were main categories identified, with mothers and friends specifically mentioned most often as supporters. For details and examples, see Appendix, Paper 3, Table 3.

Discussion and Conclusion

The following discussion is divided into four parts: First, a general discussion of the main findings, second, possible implications of our findings are highlighted and reflected upon, third, methodological considerations are discussed, and fourth, central ethical

considerations are pointed out and discussed. Finally, conclusions and recommendations will be pointed out.

General Discussion about the Main Findings

Associations between anxiety symptoms and HRQoL

Paper 1 added to previous research by showing that both medium and high levels of anxiety symptoms are strongly associated with poor overall health related quality of life. When depression was not taken into account, Paper 1 demonstrated that most adolescents with low overall anxiety symptoms reported normal HRQoL, indicated by mean KINDL-R scores above the “healthy” cut-off of 70. Adolescents with medium and high anxiety symptoms reported significantly poorer HRQoL as compared to those with low overall anxiety symptoms. These results indicated that not only adolescents with anxiety disorders, but also adolescents with anxiety problems, experience anxiety symptoms as a burden. Further, although the adolescents in our sample were recruited from a community sample and not from a help-seeking sample, we found that elevated levels of anxiety symptoms were strongly associated with poorer HRQoL. The mean level of overall HRQoL reported by adolescents with *medium* anxiety symptoms in our sample (KINDL-R total score $M = 63$) was similar to overall HRQoL reported by OCD-diagnosed, treatment-seeking Scandinavian adolescents (B. Weidle et al., 2014). The HRQoL impairment in adolescents with *high* overall anxiety symptoms in our sample ($M = 56$) was similar to HRQoL impairment reported by youth with bipolar disorder ($M = 53$) (Freeman et al., 2009).

However, after adding depression into the model, nearly double of the variance in HRQoL was explained, and importantly: Most anxiety domains did not significantly contribute to explain the variance in HRQoL. Since the association between HRQoL and most anxiety domains disappeared when depression was taken into account, we can assume that for most anxious adolescents with depression, reduction of anxiety alone is not crucial for increase in HRQoL. The relations between anxiety, depression and HRQoL are complex. For interventions targeting anxious adolescents who are also depressed, a decrease of anxiety symptoms (e.g. related to avoiding school or sport activities) is not logically associated with reduced depression nor increased HRQoL. This finding underscores the importance of addressing both depression and anxiety for adolescents with comorbid anxiety and depression. Many models of the anxiety-depression comorbidity have been suggested (Cummings et al., 2014; Greca et al., 2016; Hasting, 2015; Jacobson & Newman, 2017; Rector et al., 2014; Stein et al., 2017). At the moment we conclude the same way as 30 years ago: More studies

are needed to increase our knowledge about the multiple pathways that may emerge from anxiety in adolescents (Jacobson & Newman, 2017; Wolk et al., 2016).

The level of disability associated with a certain health problem, in this case anxiety, can be used to compare the need for investments in health services and initiatives across problem areas (Rajmil et al., 2009). “Burden of disease-measurements” in developed countries report anxiety disorders among the problems that cause most disability (Erskine et al., 2015; IHME, 2017). The results from Paper 1 imply that adolescents with anxiety problems also report decreased HRQoL. These findings add to the existing literature on sub-threshold anxiety and HRQoL, which has previously been studied primarily in adolescents with anxiety disorders. And importantly, our results add to the picture based on adolescents’ subjective reports. Building on the public health approach underscoring preventions and early interventions (Major et al., 2011; Stiffman et al., 2010; WHO, 2004, 2014), we argue that addressing anxiety is not only the responsibility of individual adolescents and their families, but also of schools, school health services, and policy makers.

The prevalence of anxiety problems in adolescents in a community sample

Paper 2 estimated that 23% of the adolescents in the sample of adolescents aged 12–17 years reported elevated anxiety symptoms. Further, Paper 2 found that anxiety was associated with female gender, negative life events, low social support, and low self-efficacy. Due to the cross-sectional design of Papers 1 and 2, conclusions about the direction of associations cannot be drawn. The reasons for adolescent anxiety are complex, and it is beyond the scope of this discussion to provide an exhaustive discussion with all arguments and relevant factors. However, a discussion of the high frequency of adolescent anxiety estimated is important, since attribution of the problem can be helpful to find improved anxiety prevention solutions. The discussion that follows illuminates relevant explanations including reflections on the environment and time in which these adolescents live their lives and continuing with reflections from the social learning theory and CB models.

The estimated rate of adolescents with anxiety problems (23%) is surprisingly high, given that this is a community sample of adolescents who live their lives in overall “healthy and good” environments. Our findings are in line with other national estimates of anxiety problems in adolescents (Bakken, 2016). The adolescents who participated in the study all had access to education and health services for free; they live in a country where the social welfare system is well developed, where the laws are supposed to protect children better than ever before, where there is no ongoing war, and where poverty is rare (Bakken, 2016; IHME,

2017). They also live in a country that scores “good” on objective characteristics like gross domestic product (GDP) per capita; earns high scores on housing, education, and safety (OECD, 2017). Our findings highlight that in a rich and safe society, anxiety in adolescents might blossom.

However, even in this community sample, Paper 2 found that reporting experienced negative life events was strongly associated with level of anxiety. Since anxiety symptoms in adolescents can be their reaction to difficult life situations such as violence, sexual assaults, neglect, and bullying, all of which can be challenging to talk about; anxious adolescents can benefit from adults possessing the courage and patience to explore the adolescent’s life circumstances and anxiety-triggering situations (Thorkilsen, 2015; Zajac, Ruggiero, Smith, Saunders, & Kilpatrick, 2011; Zanville & Cattaneo, 2009). Given the high proportion of anxious adolescents reporting experiences of negative life events, we would like to underline the importance of inviting anxious adolescents to talk about their current life situation with professionals before eventually being offered an indicated intervention. For adolescents who live their lives in circumstances that are unhealthy, efforts to change his or her life situation might be crucial. To get help to escape from an unsafe or in other way unhealthy life situation might be more urgent and important for the adolescent’s health than learning new ways to deal with anxiety reactions.

Paper 2 found that 14% (n = 139) of the adolescents who reported “no experienced negative life event” were anxious, while 36% (n = 226) of anxious adolescents reported experiences of negative life events (Appendix, Added Analyses, Paper 2, Table 2). However, anxiety might be related to negative life events or life circumstances other than those measured in our study. Among the reasons discussed for adolescent anxiety are the school system (Havik et al., 2015). In line with this, our results in Paper 1 demonstrated that anxious adolescents particularly reported low HRQoL at school. School tests for adolescents have increased the last decades in Norway and the consequences of failing at school tests are claimed to be more serious than they used to be one generation ago (Falch & Nyhus, 2011; Hegna et al., 2013; Soest & Hyggen, 2013; Standing, 2011). Another explanation of anxiety in the modern society is the rapid fragmentation and the high speed changes in the late modern society (Bauman, 2000; Giddens, 1991). For adolescents, modern life-associated changes such as relocations of homes, moving to new neighbourhoods and countries, starting at new schools, and family changes are all associated with anxiety (Milburn & Lightfoot, 2013). In line with this, the changes in adolescence, combined with constant access to new technology and social media, can be associated with adolescent anxiety (Anderson & Rainie,

2012). In addition to the situational factors that have so far been pointed out, *perceptions* of situations can maintain anxiety problems (Bandura, 2001; Beck, 2011; Wells, 1997).

Cognitive models highlight the importance of how situations are interpreted as a source of anxiety problems. Addressing problem-maintaining factors, situational or attributional, is what CB interventions are about, and which will be discussed in the following paragraphs.

CB self-help material in a brief preventive intervention

The study described in Paper 3 was conducted in a natural setting where the therapists/data-collectors had a high clinical workload. The intervention aimed to help traumatized adolescents with post-traumatic stress symptoms. In accordance with standard procedures at the Children's House, therapists observed the adolescents' witness statements and offered brief intervention to those they thought would benefit. Hence, the intervention can be described as indicated and preventive. The CB self-help material used, namely the PF, was included in brief, flexible interventions actively offered to the traumatized adolescents, and tailored individually. Promisingly, Paper 3 found that at group level, the post-traumatic symptoms decreased during the intervention period, and remained low in the one-year follow-up period. The proportion of adolescents who scored above cut-off on the CRIES decreased from 80% at pre-intervention to 40% at post-intervention. This decrease in PTS symptoms can be interpreted as a move from being at high risk to being at low risk for developing PTSD (Perrin et al., 2005). However, considerable natural recovery from PTSD symptoms can occur up to 6 months post-trauma (Hiller et al., 2016). Consequently our study design was not suitable to draw causal inferences in terms of effects of the treatment provided. In this regard it should be noted that several of the qualitative data show that some informants regarded specific interventions as helpful.

In the qualitative analyses of in-session completed worksheets, we found that the traumatized adolescents, together with their therapists, used the self-help material to enhance coping in areas related to trauma, interpersonal relations, and school activities. Since these participants were particularly at risk for PTSD, we found it promising that the PF-material was often used to address maladaptive trauma responses: developing safety plans, encouraging exposure to non-dangerous trauma reminders, and empowering reattribution work. At the same time, and with background in the plurality of dilemmas, situations, symptoms, feelings, and thoughts for which the worksheet "the Helping Hand" was used in the sessions, we emphasize the value and necessity of a flexible and context-oriented approach in a low threshold service for traumatized adolescents.

Our findings in Paper 3 support the value of brief interventions that help the adolescent to cope with symptoms and everyday difficulties in the first months after trauma to prevent the increase of post-traumatic symptoms and other mental health problems. Our findings are in line with previous studies on trauma interventions that have suggested that *brief* interventions provided *early* in the course of PTSD might be as effective at reducing PTS symptoms as interventions offered later in the course of PTSD (Meiser-Stedman et al., 2016). In the brief and early intervention, the adolescents were challenged to explore feelings, thoughts, and themes they automatically seemed to try to avoid (e.g. trauma triggers like taking the bus or going to school). In a vulnerable phase after trauma, clearly communicating trust in the adolescent's ability to cope by providing self-help material and working together on how to use it in the adolescent's actual problem situation might be empowering. A more protective approach could alternatively, even if accidentally, strengthen the adolescent's appraisals about the world as unsafe and uncontrollable, and the individual as weak and incapable (Landau et al., 2004).

Health literacy to prevent adolescent anxiety

Although causal effects cannot be drawn from Paper 3 due to the research design of the study, the findings may indicate that self-help material can promote the healing process of traumatized adolescents. In this regard it should be noted that several of the qualitative data show that some informants regarded specific interventions/modules as helpful. And, drawing the line from Paper 3 to Papers 1 and 2 addressing adolescent anxiety, it can be argued that health literacy on coping with anxiety may also be a viable universal anxiety prevention strategy. Since the basic CB principles appeared possible to learn and use through the PF when administered to traumatized adolescents in very difficult life situations, it is reasonable to expect that the same skills could be learnt in life situations where learning is usually easier. Through combining written CB material with oral psycho-education the CB principles could be communicated, and probably learnt, e.g. as part of a school curriculum for adolescents.

Paper 3 supports an adolescent anxiety reduction strategy that underscores the importance of offering adolescents opportunities to be aware of, understand, gain insight into, and face their fears instead of avoiding them. If facing fears is as important in prevention of anxiety disorders as it is in treatment of anxiety, this means that focusing on safety is not enough to prevent anxiety. Papers 1 and 2 pointed out that elevated levels of anxiety symptoms were associated with poorer quality of life, and the high frequency of anxiety problems in adolescents. Hence, based on these findings from Papers 1, 2 and 3, a focus on

raising courage to face fears and developing skills to deal with anxiety seem to be important for a high proportion of adolescents. For anxious adolescents who have experienced negative life events and have low social support and self-efficacy, such skill development seems particularly important. In the following, this and other possible implications of our studies will be discussed.

Implications

In Papers 1, 2 and 3 we argued that initiatives and improved strategies to reduce adolescent anxiety are important. Health research and ideas for new interventions should work hand-in-hand. Innovation is needed to develop health services in general (Innovasjon Norge, 2016), and in prevention of mental health in particular (McGorry, 2013). In a report drawing on different forms of economic analysis, the World Economic Forum recently identified poor mental health as being at least equal to cardiovascular disease as the principal threat to gross domestic product (GDP) over the next two decades (Bloom et al., 2011). Innovation is a vital ingredient and a pressing need if we are to shift focus from traditional treatment in mental health care to a proactive effort to limit the corrosive havoc that mental disorders can have on individuals (McGorry, 2013). As scholars from various fields of study have noted, developing and disseminating effective prevention programs is not the same as simply modifying or “downsizing” existing treatments for clinical conditions (Mrazek & Haggerty, 1994). Our findings support the idea of CB preventive interventions to reduce anxiety, but not through copying CB treatment.

Flexible tools and brief interventions

In Paper 1 and additional analyses, we documented associations between anxiety, depression and HRQoL, findings that support preventive and early interventions targeting anxious adolescents. In Paper 2, we estimated the prevalence of anxiety problems to be 23% among the adolescents studied. The high frequency of anxiety problems underscores the need for and potential of preventive initiatives for adolescent anxiety. Paper 3 indicated that a brief, preventive cognitive behavioral intervention was accepted and helpful when offered in a place the adolescents had to be anyway and from therapists they already had met and talked with and showed promise for reducing PTS symptoms.

In the qualitative analyses in Paper 3, we found that the self-help material PF was used to enhance coping in areas related to trauma, interpersonal relations, and school in a wide variety of situations: (1) trauma-related situations (safety planning, dealing with trauma triggers, working with the trauma narrative), (2) relational situations (challenges, problems,

conflicts, bullying), and (3) situations involving activities (schoolwork, sports, sleep). These findings underscore that the nature of low threshold work is broad, and that anxiety reduction skills are typically only one of the competencies needed by school and health professionals who are working in low threshold health services for adolescents. The results also show that flexible interventions, which can be used within a broad spectrum of problem areas, are needed in a low threshold service aiming to prevent mental health disorders in adolescents. Tools that are flexible enough to be used for both exploring the problems and simultaneously reducing them can be time saving. A specific strength of the PF toolkit seemed to be the possibility of using it to explore problem situations, to help adolescents cope with them better, and to address a broad spectrum of problem situations.

Paper 3 suggested that a brief, early intervention that includes CB self-help material was helpful for adolescents at risk of developing post traumatic stress disorder. Given the high frequency of anxiety problems in adolescents, and the capacity of the health service, it matters how much time the therapist spends on each anxious adolescent (Bennett-Levy et al., 2010). If brief and early anxiety preventive CB interventions are as effective as longer interventions offered later in the sequelae of a mental health disorders, such interventions could reduce pain, costs, and other problems associated with adolescent anxiety. But the current knowledge base documenting the effect of preventive interventions targeted at anxious adolescents is still sparse. To increase access to evidence-based preventive anxiety interventions, their potential to target anxious adolescents should be further investigated (Lau & Rapee, 2011; Meiser-Stedman et al., 2016; Weare & Nind, 2011). In the following, the goals and content of CB preventive interventions will be discussed. We hope the discussion can stimulate the invention of improved preventive anxiety interventions.

Goals and content of anxiety preventive interventions

While adolescents with anxiety disorders have typically been thoroughly examined, anxious adolescents who participate in universal, targeted, or indicated prevention initiatives have typically not been through such an examination. Given the association between former and ongoing negative life events and anxiety, a central goal of interventions that aim to reduce adolescent anxiety could be to *identify adolescents in difficult life situations*. This could be crucial in terms of helping adolescents to change the situations in which they live their life, not solely their attributions and coping styles.

As previously mentioned, *Ungsinn* is a scientific journal aimed at providing school, health, and child welfare professionals an overview of and research base for preventive and

treatment mental health interventions in Norwegian for children and adolescents. The interventions that Ungsinn has reported to promote health, prevent anxiety, and reduce anxiety in adolescents were “VIP” (Neumer, 2012); “Psykologisk førstehjelp” (Neumer, 2013); “Smarte foreldre” (Reedtz & Eng, 2013b); “Smart” (Reedtz & Eng, 2013a); “Alle har en psykisk helse” (Eng, 2012) and “Mestringskatten” (Bratt, 2010) (web-search done 01.03.2017). In the goals specified for these interventions, increasing knowledge about mental health issues and services and developing the adolescents’ coping strategies were common, but none of the interventions explicitly stated identifying adolescents in difficult life situations as a goal of the intervention. In preventive interventions, it is important to help adolescents to change the situations in which they live their life, not solely their attributions and coping styles (Cohen et al., 2011; WHO, 2014). The message “you’ll be more happy if you treat yourself as a friend” can be experienced as a belittling of problems, and moralizing over one’s own inner dialogue (Madsen, 2014). If preventive interventions are turned against the adolescent, either by the adolescent him/herself, or by her/his parents or by other adults using the intervention to show the adolescent how she/he should think and behave, the adolescent’s situation can go from bad to worse (Brinkmann, 2015). If interventions are potent, they logically can also harm. If in the hand of adults who do not see the adolescent, or do not truly care, potent interventions might be harmful.

The high proportion of anxious adolescents reporting negative life events demonstrated in Paper 2 also can be used to consider the examples used in standard cognitive behavioural interventions for anxious adolescents. Well-established treatment manuals like the FRIENDS (Barrett, 2004), the Coping Cat (Kendall, Choudhury, Hudson, & Webb, 2002), and also the PF, most often use “sweet and soft” examples as trigger situations to explain basic principles of the CB model (e.g. “a person did not greet me”). Negative life events like bullying, death, war and divorce are avoided in the examples given to explain associations between trigger-situations, feelings, and thought. It is possible that the CB model avoids central themes, in its eagerness to explain to adolescents that it’s not only the situation but also your thoughts and behaviours that contribute to anxiety. It feels riskier to write about emotional themes like sexual abuse and family violence to children, than about e.g. difficulties with school presentations. Hence, it might be that the writers of psychopedagogical material use examples that are too soft. If the manuals do not explain in relevant and understandable ways why anxiety appears, central attributions like “it was something about me that triggered the bullying” might not be touched or worked on. And without help to develop explanations of why anxiety became a problem in their lives, the anxious adolescents

probably will make up their own meaning of why they are anxious. Further research should explore the effects of including appraisals of negative life events in standard interventions for anxious adolescents.

Functional design and framing

In the last paragraph, the content and goals of the CB material were highlighted. In the following, the form of CB material will be the focus point. Paper 3 found that the self-help material PF was used in all sessions by all therapists in the study, suggesting that it was feasible in this low threshold setting. If we reflect on aspects of the self-help material that made it feasible, the design should be mentioned. Strategic communication and tailored message design can be important in facilitating educational efforts and supporting stakeholder engagement in public policy debates on health prevention (Innovasjon Norge, 2016; Strekalova & Damiani, 2016). The PF was made by a group of psychotherapists in collaboration with an industrial designer. Industrial designers are trained to develop aspects of a product that create emotional connections with the user (Oviatt, 2006). They are trained to integrate all aspects of form, fit and function, optimizing them to create the best possible user experience. Further, industrial designers are trained to create visually appealing designs that can stand the test of time and ensure that the product is ergonomically suited to fit the user, including how they will functionally relate, interface or live with the product. How successfully they are able to do this can often determine the success of a product in the market (Oviatt, 2006). The fact that anxiety problems and disorders, in line with other mental health disorders, are associated with stigma, makes the *form* of tools used particularly important for anxiety literacy (Dudley et al., 2012; Parette & Scherer, 2004; Salloum et al., 2016). Future research should illuminate how design could be used strategically to improve the success of preventive anxiety interventions for far reaching public health effects.

The form-aspects of a preventive intervention might also be important in the implementation process. In the implementation process of universal CB preventive interventions targeting adolescents, decisions made can contribute to well-being both for each adolescent who is directly affected, her/his family, and the community as a whole. In Norway, the decisions made about implementation of preventive mental health interventions for adolescents are taken at different levels and in different ways in each municipality. For example, a common decision about implementing a universal or indicated intervention for all schools and school health services in the municipality can be made by the council or the leader(s) of the school and health department, or as a local decision made by one teacher or

school health nurse. Decisions made depend on the decision makers' knowledge and engagement in mental health (Hofgaard, 2016). In addition to competing priorities for curriculum, preparing for testing, one of the identified barriers to universal anxiety prevention interventions in school settings is teachers' lack of motivation to deliver such interventions (Andrade et al., 2014). Additionally, in indicated and selective interventions, taboo and low motivation to participate in an intervention targeting anxious adolescents have been identified as central barriers for anxious adolescents and their parents (Salloum et al., 2016; Tharaldsen et al., 2016). The issue of *framing* as described in the Prospect Theory (Tversky & Kahneman, 1981) describes the importance of how ideas and messages are formulated. Anxiety interventions developed for a treatment within the health system, will typically frame the motivational part of the intervention around the possibility of gains: When an adolescent with one or more anxiety disorders decides to participate in a treatment, s/he and her/his parents typically have already recognized and accepted anxiety as a problem. Treatment-seeking adolescents and their parents are typically motivated to actively reduce the identified anxiety problem, and they typically have a lot to gain and little to lose by participating in treatment. For adolescents with anxiety disorders, cognitive behavioural treatment that includes exposure therapy is well documented and suggested for use in treatment of anxiety disorders. If a psychotherapist does not offer such therapy for an adolescent, the therapist might risk failing to fulfil the expectations of their client and/or health service standards. However, for a teacher with an anxious adolescent, the position is very different from that of the therapist. If the situation (supporting an anxious adolescent to challenge herself) is framed by the teacher or school system as a health issue, a logical solution would be to refer the pupil to the health system. Alternatively, if the same situation is framed as a school-related barrier to learning, a logical solution would be to collaborate with the pupil and her/his parents to reduce the problem at school. Diagnostic terms like "social anxiety", and medical terms like "treatment", "therapy" and "exposure", can according to the framing theory decrease the teacher's motivation to give the problem a high priority. Hence, a preventive anxiety intervention used at schools and provided via teachers will need a language different from what is typically used in cognitive behavioural therapy. In interventions used by health and school professionals whose roles require them to develop health promotion and prevention, the language used in the intervention should comprise terms and examples that reflect the uniqueness of preventive work, instead of using language developed for psychological interventions used in health settings. Preventive interventions whose language clearly signals that the main aims are to enhance courage, self-efficacy and/or

social support and quality of life might be more feasible in school settings than interventions initiated to prevent mental health disorders (Yeager et al., 2012).

Should we choose universal, selective, or indicated interventions?

With insufficient resources to support all initiatives to reduce anxiety in adolescents, a discussion on what kinds of interventions should be given priority is essential (Major et al., 2011). As mentioned in the introduction to this thesis, universal, selective, and indicated interventions for adolescent anxiety have different strengths and weaknesses (National Research Council and Institute of Medicine Committee, 2009). In summary, our findings support a balance between universal, selective, and indicated prevention interventions.

The association between low HRQoL and anxiety symptoms demonstrated in Paper 1, and the frequency of anxiety problems demonstrated in Paper 2, suggest that preventive initiatives that target anxiety in adolescence, have a high potential for enhancing adolescents' HRQoL and reducing number of people developing anxiety and associated disorders. Based on our findings, along with other evidence of effective CB interventions and the usefulness of the CB model in preventive interventions (Lau & Rapee, 2011), we argue that decision makers should seriously consider universal preventive anxiety CB interventions, if a public health goal is to reduce adolescent anxiety (Theunissen et al., 2015). If preventive anxiety CB-based coping skills were included in school curriculum for adolescents, research should explore whether the intervention has led to a decrease in anxiety problems in adolescents, as well as improved anxiety literacy in adolescents, teachers, and parents. To gain more knowledge about factors that affect the effects of the intervention implementation, research focusing on anxiety preventive CB-based school interventions is needed.

Methodological Issues

The work in this thesis was conducted using both a quantitative approach, including standardized and well-validated questionnaires, and a qualitative approach with a focus on textual analyses of worksheets from intervention sessions. A community sample of adolescents and quantitative methodology were used to fulfil the aims of Papers 1 and 2, while mixed methods in a sample of traumatized adolescents was used in Paper 3. Assets of Papers 1 and 2 were the relatively high number of participants and the high number of included schools and municipalities. Assets of Paper 3 were the mixed methods design, theory-based evaluation, and triangulation of data, as well as the fact that information about changes came from the adolescents, their parents/guardians, and therapists. The use of standardized instruments with good psychometric qualities was a particular strength in all

papers. We believe that Papers 1, 2, and 3 contribute valuable knowledge to a field (prevention of anxiety), and about a population (adolescents), where the current knowledge base is scarce and data collection burdensome (NSCAW Research Group, 2002). However, these papers also have several limitations, and in the following sections, these limitations and associated methodological concerns are discussed.

Observation, correlation, and causation

Systematic observation is a central feature of science (Kvale, 1996; Shadish et al., 2002), and is a key component for the methods used in all three papers. To obtain knowledge about relationships between anxiety and other psychological variables and individual characteristics, in accordance with the aims in Papers 1 and 2, the cross-sectional design of Study 1 was deemed appropriate. The aims of Paper 3 were to investigate whether traumatized adolescents who received the PF as part of a brief LI-CB intervention showed symptom relief after the intervention, and to explore how the self-help kit was used in the intervention. An exploratory mixed-methods one-group study design was chosen.

Paradigmatic considerations targeting mixed methods have pointed out the benefits and drawbacks when methods from two paradigms are used in the same paper, generating questions about the ability to hold “multiple realities.” Paradigms can be defined as “world-views” (Johnson, 2004). In mixed methods studies, one world-view is “positivistic”, and another is “interpretionistic”, each with distinctive methodologies. In the mixed method discussion, one perspective to emerge has been the pragmatic or pragmatist paradigm, or “what works” (Carr, 2008). Pragmatism embraces the use of mixed methods and mixed models because they provide a very practical and applied research philosophy (Tashakkori & Creswell, 2007). Pragmatism is a school of philosophy which originated in the US in the late 1800s and is characterized by consequences, usage, and practicality as vital components of truth (Sardar & Loon, 2011). The pragmatists reject positivism and anti-positivism and reorient to a third criterion: the theory’s capacity to solve human problems (Carr, 2008). Thus, for a pragmatist, the purpose of science is not to find truth or reality, but to facilitate human problem solving (Sardar & Loon, 2011). Hence, the purpose of using mixed methods was to provide a greater understanding of the findings than any of these methods alone could generate (Carr, 2008; Creswell & Plano-Clark, 2006). Accordingly, reasons for choosing a mixed methods design were: (1) a pilot can inform feasibility and identify modifications needed in the design of a larger hypothesis-testing study (Leon, Davis, & Kraemer, 2010), and (2) a pilot study can be critical in research staff training and provide experiences that

strengthen and confirm competencies and skills required for the investigation to be conducted with accuracy and precision.

Reliability and validity

The main questions to be asked when assessing validity of research are: “Do we measure what we intend to measure?” and “To what extent can evidence support the inferences as true or correct?” Following is a discussion of the methodological issues connected to the studies. In any instance of research, reliability and four issues of validity matter: (1) construct validity, (2) statistical-conclusion validity, (3) internal validity, and (4) external validity (Kiehl & Bloomquist, 1985).

Reliability. Reliability in statistics and psychometrics is the overall consistency of a measure (Kiehl & Bloomquist, 1985). A measure is said to have high reliability if it produces similar results under consistent conditions. This dissertation is mainly based on data from questionnaires completed by adolescents. Importantly, other factors than those we intended to assess in the questionnaires could contribute to our results. Such include characteristics of the individual participant, such as lack of motivation for completing questionnaires, emotional strain and fatigue, aspects of the testing situation, as well as errors in the measurement due to the scales used. Aspects of the testing situation were to a high degree under our control during the data collection in our studies, and are reported to be particularly important when adolescents’ self-report data are collected (Alexander, Lopes, Ricchetti, & Yeatts, 2017). To reduce systematic errors in measures due to test-situation problems, adults were available for support in testing areas in data collection for all three papers. The purpose was to decrease distractions and clarify instructions, and to help the participant to pay attention to the task. A teacher was available in the classroom when data was collected for Papers 1 and 2. A therapist was together with the adolescent while she was completing questionnaires during data collection for Paper 3.

The questionnaires used in our studies have been reported to demonstrate high test-retest reliability in previous studies. And further, the questionnaires used have been reported to demonstrate good internal consistency, as measured by Cronbach’s alpha in previous studies. In the next paragraph this is described in more detail, since this kind of reliability is central in considering the validity of the studies.

Construct validity. Construct validity refers to the degree to which inferences can legitimately be made from the operationalization in the study to the theoretical constructs on which these operationalizations were based. Hence, the construct validity can be threatened

by the possibility that inferences from the particular units, observations, and settings in which data are collected are not aligned with the higher order constructs used. Central constructs in this dissertation include “anxiety symptoms”, “HRQoL”, “general self-efficacy”, “social support”, “post-traumatic stress symptoms” and “LI-CB intervention”. While the first concepts were defined by using standardized scales, the concept “LI-CB intervention” was defined by describing the intervention provided.

In the standardized tests used in Papers 1 and 2, Cronbach’s alpha was investigated to assess internal consistency of the scales used. First, the SCAS questionnaire (Spence, 2017) was chosen to measure anxiety symptoms. In Study 1, the Cronbach’s α on the SCAS ranged from 0.59 to 0.85 for the subscales and 0.92 for the total scale. The lowest α was found for the subscale physical injury fears (0.59). Such a low alpha value threatens the internal consistency of the subscale (Tavakol & Dennick, 2011). In the other SCAS-subscales, the Cronbach’s α was above 0.65, levels which can be considered as acceptable (Tavakol & Dennick, 2011). Our findings are in line with a meta-analysis of the SCAS, that reported a mean alpha value of 0.92 for the SCAS total score; the mean alpha values for most of the subscales were reported in the range good–excellent, while the physical injury fears subscale was the lowest (0.64) (Orgiles, Fernandez-Martinez, Guillen-Riquelme, Espada, & Essau, 2016).

Second, to measure health related quality of life, the KINDL questionnaire was chosen. In Paper 1, Cronbach’s α for the subscales ranged from 0.63 to 0.87 and was 0.92 for the total score, which can be considered as acceptable as a measure of the internal consistency of all subscales (Tavakol & Dennick, 2011). The KINDL is found to be easy to administer and score, and when the scale is compared with other measures of HRQoL, it has been noted that the KINDL mainly represents psychosocial aspects of HRQoL (Helseth, Lund, & Christophersen, 2006). For the purpose of Paper 1, this was considered in line with the health related quality of life concept used and was relevant in our study.

Third, the GSE questionnaire was chosen (Schwarzer & Jerusalem, 1995) to measure perceived self-efficacy. In Study 1, Cronbach’s α of the GSE was 0.90, a coefficient level indicating the internal consistency of the scale as high (Tavakol & Dennick, 2011). Self-efficacy is commonly understood as being domain-specific, in line with Bandura’s definition of the concept (Bandura, 1993). That is, one can have more or less firm self-beliefs in different domains or particular situations of functioning. However, the way we have used the concept of perceived self-efficacy in this thesis is as a generalized sense of self-efficacy that

refers to global confidence in one's coping abilities across a wide range of demanding or novel situations (Scholz, Gutiérrez-Dona, Sud, & Schwarzer, 2002; Schwarzer & Jerusalem, 1995). Previous studies support the idea that general perceived self-efficacy is a unidimensional and universal construct (Scholz et al., 2002).

Fourth, social support was measured by the subscale "social resources" from the Resilience Scale (READ; (Hjemdal et al., 2006). In Study 1, Cronbach's α of the READ subscale support was 0.80, which can be considered acceptable as a measure of the internal consistency (Tavakol & Dennick, 2011). Since this subscale consisted of only five items, we considered this level of consistency to be good. A multitude of standardized social support scales for adolescents exists (Blumenthal et al., 1987; Cullum & Mayo, 2015; Cunxian & Zhang, 2010), and our main reason for choosing the READ subscale support was its shortness. The objective when selecting questionnaires to assess social support is to control the quality, dynamics, and processes that are essential to assess whether the social support is good for the individual. Convergent validity determines whether an instrument is measuring the construct it is intended to measure by correlating results with another, established instrument administered at the same time.

The standardized instruments for measuring anxiety symptoms, health related quality of life, perceived self-efficacy, and social support used in Papers 1, 2 and 3 have been thoroughly described in previous studies (Askeland & Reedtz, 2015; Jozefiak & Reinfjell, 2012; Romppel et al., 2013; Spence, 2017). As part of demonstrating the construct validity of the SCAS, the KINDL, the GSE and the social support subscale of the READ, the divergent consistency of the scales has previously been demonstrated via between-group tests. And also, for all these scales the correlation with scores on other well-established instruments to measure equivalent and/or closely associated constructs, such as depression, has been demonstrated. Indeed, the additional analyses done after the papers were published, clearly showed that associations between anxiety and HRQoL are complex.

Although the use of standardized, validated instruments was a strength in our studies, measuring anxiety symptoms and related factors among adolescents aged 12–17 years through self-reports only, as was done in Papers 1 and 2, can and should be discussed. Information about anxiety and related factors could alternatively be measured by parent-reports, teacher-reports, peer-reports, or by triangulated informants. Research that has compared adolescent and parent surveys of adolescent anxiety have reported a high correspondence between child and parent reports, with a tendency of self-reports from adolescents to show higher levels of anxiety symptoms than reports from their parents

(Arendt, Hougaard, & Thastum, 2014; Nauta et al., 2004; Whiteside & Brown, 2008). Triangulation of methods (e.g. combining surveys with observation and/or interviews) can also be used to increase some parts of the construct validity, though with their own associated methodological problems. Self-reported data rely on the honesty, introspective ability, and understanding of the participants (Fan et al., 2006). Recall bias is a hazard to the construct validity, and this bias is relevant for all three papers. When people remember past events, they don't usually have a complete or accurate picture of what happened. In Papers 1 and 2, the adolescents were told in advance that the purpose of the study was to investigate anxiety and related factors. The information, and also the process of completing questionnaires about anxiety and related issues might have led to increased memory for anxiety symptoms (Kiehl & Bloomquist, 1985). It has been questioned whether adolescents can provide useful subjective evaluation about their life conditions (Kvarme, 2010). Adolescents, due to age, typically have limited exposure to varying life conditions, compared with adults. They may evaluate poor conditions more favourably, or better conditions more unfavourably, because they do not have other experiences on which to base their evaluation. On the other hand, the subjective perspective may be an advantage (Wrobel, Lachar, & Wrobel, 2005). Also, a subjective perspective is a central part of the definitions of anxiety, HRQoL, self-efficacy, and social support. In addition, children may be more likely than their parents/teachers to identify problems in accord with their own social adjustment (John, Gammon, Prusoff, & Warner, 1987), and may be better informants with regard to problems that are not readily known to parents/teachers, such as internal symptoms, disturbances of thought, or delinquent behaviours (Wrobel & Lachar, 1998).

In Paper 3, the exploration of what was done in the intervention sessions, including how the PF was used, was central to demonstrate what the construct "the LI-CB intervention" consisted of. A potential problem in the descriptions of the intervention provided, was that the interventions were not analysed systematically in terms of which cognitive elements or other therapeutic elements were used, or how competently the therapies were carried out. Scales such as The Cognitive Therapy Competence and Adherence Scale (Barber, Liese, & Abrams, 2003), or an equivalent scale developed for assessing therapy with youths particularly (Bjaastad et al., 2016), should be used in future research to investigate therapeutic adherence and competence.

The degree of reliability and validity in qualitative research is largely a function of the degree of transparency achieved regarding the methods used to produce, analyse, and interpret data so that the quality of the research can be evaluated (Kvale, 1996). Transcribing the

audiotapes of the intervention sessions during which parts of the PF were used, as well as textually analysing completed worksheets, were efforts to systematically and transparently observe, describe, interpret, and communicate our results. Further, another approach that we took to achieve reliability and construct validity in Paper 3 was to critically discuss methods, findings, and data interpretation with co-authors of the study (i.e., researcher triangulation). This approach aimed to obtain interpretive insight and to assure the trustworthiness of the descriptions and interpretations (Kvale, 1996). “Construct validity” in this paragraph, corresponds with the way Kvale uses this concept (1986), such that “a construct and its measurement are validated when the discourse about their relationships is persuasive to the community of researchers” (p. 240).

Statistical-conclusion validity. Statistical-conclusion validity refers to whether the decisions made about the null and alternative hypotheses from the statistical test are correct or not. For example, in Paper 3, we did not find any difference between the post measurement and the one year follow-up. This indicated that the decrease of PTS symptoms was sustained in the period. However, our finding does not necessarily imply that a potential difference in PTS symptoms from post-intervention to the one-year follow up did not exist. A competing interpretation could be that the statistical power due to the low N was not able to identify an effect. Likewise, in Papers 1 and 2, we did not find any statistically significant effects of the factor ethnicity on anxiety symptoms. This indicated that ethnicity was not a predictive factor for anxiety symptoms. A competing interpretation could be that the statistical power due to the low N was not able to identify it. We have tried to minimize this hazard by using appropriate alpha levels. Future research should investigate this in bigger samples with higher statistical power, and tell about Type I and II errors made in our studies.

Another hazard for Paper 3 particularly, is regression toward the mean. This is a statistical phenomenon that occurs whenever there is a non-random sample from a population and two measures that are imperfectly correlated. The decrease of PTS-symptoms from pre- to post-intervention, can partially be explained by this statistical phenomenon.

Internal validity. Internal validity refers to whether there is a causal relationship from one variable to another in the form of which the variables were manipulated or measured (Kiess & Bloomquist, 1985). For Papers 1 and 2 it should be noted that a cross-sectional design does not prove causation (Alexander et al., 2017; Shadish et al., 2002). Correlations also do little to rule out alternative explanations for relationships between variables and do not say anything about the direction of relationships between variables (Shadish et al., 2002). And for Paper 3, importantly, a one-group, non-randomized design is not appropriate for

generalization or causality (Shadish et al., 2002). Other factors than the intervention, and also other parts of the brief intervention than the use of the self-help material, could affect the dependent variable. Although the findings are suggestive, inferences about causality cannot be made.

Threats to the internal validity particularly important in Paper 3 that involved repeated measurements are among other things history; events outside the experimental situation that occurred in the intervention and follow-up period could have affected the outcome of the participants. Other factors than the treatment could have led to all or parts of the changes observed, e.g. maturational processes could have affected the phenomena measured, as aging in itself might have influenced the results. And further: Instrumentation is another hazard to internal validity; the possibility that the characteristics of the measuring instrument for the dependent variable systematically change over the time the study was conducted. Researchers and/or participants could have been affected by maturational processes in terms of, for example, motivation and fatigue. And in line with this, the social desirability bias could possibly also have affected the results systematically. The social desirability bias refers to the tendency of research subjects to provide socially desirable responses instead of choosing responses that are reflective of their true feelings. Both the instrumentation bias and the social desirability bias are particularly threats for the internal validity of Paper 3. In Paper 3, the participating adolescents, their parents, and their therapists want the situation to change for the better. The fact that the therapists also were data collectors, could possibly lead to more of this problem than if a blinded, neutral, independent researcher had done the data collection. The pilot study design is open to the *post hoc, ergo propter hoc* fallacy, a Latin phrase that means “after this, therefore because of this”. The fallacy here is in believing that any changes observed after the treatment is administered are due to the treatment. From an open trial, pre – post design with no control group, causal inferences cannot be drawn. A controlled and randomized design with proper a priori power analysis would have been the best choice if the main goal was to investigate the potential effect of the intervention. Alternatively, a case study design with multiple baselines and multiple measurement points during and after the treatment period would have been a design that would have been better suited if the main goal was to investigate potential intervention effects. Also, qualitative in-depth interviews with both the adolescents, their parents/caretakers and the therapists would be a valuable supplement to an RCT to explore the respondents’ views and experiences of why the intervention worked or not.

External validity. External validity is the extent to which generalizing results to other contexts is warranted (Rubin & Babbie, 2008). Most studies are highly local, but have general aspirations (Shadish et al., 2002). To generalize the findings from a study to a broader population than the study sample, a representative sample of the broader population should be recruited (Sullivan, 2011).

From Papers 1 and 2, we would like to generalize the results to adolescents in general, or Western – or at least Norwegian adolescents. But even for the less ambitious of these goals, our sample was not representative. First, the recruitment method was not ideal, as mentioned in the method section. Second, the response rate of students participating in Papers 1 and 2 was relatively low (38%), which is also a threat for the external validity of the findings. Schools and individuals who volunteer for a study may possess different characteristics than the average school or individual in the target population, a bias named self-selection bias (Rubin & Babbie, 2008). The reasons for the low response rate may be scepticism on the part of the parents and low priority of mental health surveys for their adolescents, in addition to technical challenges with the electronic system for collecting informed consent. Previous research has reported that active parental consent led to parental permission and response rates in the range of 30%–60% for students, biased toward excluding minorities, students having problems in school, or students engaged in or at risk of problem behaviours (Tigges, 2003). Especially in Paper 2, these methodological issues are important. The non-representative sample in our study may have affected our estimates of prevalence of anxiety problems, and it's hard to know in what direction the results eventually are affected. For inferences about the associations between phenomena, potential selection biases are of less concern.

In designing psychological intervention research in paediatric clinical settings, the trade-offs between feasibility versus preservation of internal and external validity must be considered. As Paper 3 aimed to explore the feasibility of an intervention in a low threshold service, it was desirable to be able to provide the intervention to adolescents who were naturally in contact with such a low threshold service. Key aspects of feasibility include level of burden of participation in research for participating adolescents and families, and the time required from the therapists who deliver the intervention. A high level of burden related to study procedures can reduce participation and limit internal and external validity (Drotar et al., 2014). Provider burden is another important feasibility issue: Interventions conducted in clinical care settings that require providers to spend much more time than is typical for their practice will be more difficult to implement in the context of clinical demands such as

productivity requirements. The facts that a flexible intervention manual was used and that the duration of the intervention period also was flexible increased the external validity of our findings, but was simultaneously a threat to the internal validity of the intervention.

The recruited adolescents and therapists in Paper 3 were considered appropriate to investigate the research questions posed. In a pilot study of an intervention, the sample size of participating therapists and clients should be based on the pragmatics of recruitment and the necessities for examining feasibility (Leon et al., 2010). Importantly, however, the low number of participants and the recruitment procedure in Paper 3 clearly limit the ability to generalize results from this study to a broader population of children and therapists. In contrast with the total population who use the Children's House (Stefansen et al., 2012), none of the adolescents in our sample were boys, none were below the age of 12, and none were mentally retarded. Further, all participating therapists were women, and they had a mean of 18 years of therapeutic experience with adolescents.

It has been said that pilot studies are likely to be under-discussed, under-used, and under-reported, and that full reports of pilot studies are rare in the research literature (Teijlingen & Hundley, 2002). However, from a non-randomized trial with a small sample size and a research group with a clear allegiance to the intervention given, the chance that the results seem more promising than they will be found to be in the longer run, is considerable (Cuijpers & Cristea, 2016). Publication bias may occur because of a tendency for researchers to write and journals to accept only papers that have statistically significant results and to skip reporting non-significant effects (Franco, Malhotra, & Simonvits, 2014; Teijlingen & Hundley, 2002). Such a systematic tendency in publications can create a misleading impression of the effect of psychotherapeutic interventions (Cuijpers & Cristea, 2016; Cuijpers, Straten, Bohlmeijer, & Hollon, 2010). The problem of publication bias illuminates that in the long run and bigger picture, also unpublished studies are a threat to the external validity of social sciences (Franco et al., 2014).

Ethical considerations

Ethical principles in research on human subjects include the principles of respect for people, justice, and beneficence (Rothman, 1993; U.S. Department of Health & Human Services, 1978). In Papers 1, 2 and 3, we assessed potential harms and benefits to the research participants, in accordance with ethical standards for research that involve human beings (Rothman, 1993; The Norwegian National Research Ethics Committees, 2014; U.S. Department of Health & Human Services, 1978). Assessing potential harms and benefits is

not straightforward, and is considered particularly challenging and important when the research involves children (Graham, Powell, Taylor, Anderson, & Fitzgerald, 2013). Risks in all studies included the burden of and potential discomfort associated with completing surveys, as well as possible embarrassment or difficulties with completing the measures. Completing surveys can trigger post-traumatic symptoms for traumatized adolescents, and increase self-focus and negative automatic thoughts in anxious adolescents. There was also a small risk involving breach of confidentiality of assessment responses if someone were to gain access to the stored data material.

Participation in research should have benefits for those who participate, and these gains tend to be future-oriented (Graham et al., 2013). Incentive payment to the participating adolescents was used in Papers 1 and 2 as a way to ensure the principle of beneficence through reciprocity: the idea that in addition to making a contribution, children should also gain something from their participation in research (U.S. Department of Health & Human Services, 1978). In Paper 3, participating adolescents were not offered any payment. Any financial dealings change relationships and impact the power dynamics already at play. In Papers 1 and 2, the incentive payment (participating adolescents could win iPads) was used to encourage participation in research. In retrospect, learning that the low participating rate mainly was explained by the lack of parents active written consent, it is worth considering if incentives should have been offered also to caregivers for answering the proposal for written informed consent.

However, the use of such persuasion is contentious, and some researchers consider that material incentive purporting to encourage participation contravenes the Nuremberg standards that no persuasion of any kind should be put on participants (Alderson & Morrow, 2011). Incentives can coerce or pressure children to participate in research, or parents to consent to children's participation (Graham et al., 2013).

This compromises the ethical principle of respect, impacting an individual's ability to act freely in making reasoned decisions about research participation and to provide voluntary, informed consent. We argued that small incentives to adolescents, to improve recruitment levels were ethically acceptable, since Papers 1 and 2 solely involved answering surveys, an activity which was assessed as involving low risk. In Paper 3, the risk involved was also assessed to be low, but we did not want to do anything that could increase the pressure to participate in research, and hence did not offer any incentive payments to the participants. On the other hand, it could be argued that the participating adolescents should have received appreciation payment after their participation, to acknowledge their contribution to the

research and to thank them (Graham et al., 2013). It could also have been argued that the participating parents/guardians should have received compensation payment to recompense them for their time, work, and effort, and for any inconvenience caused by participation (for example, loss of income). The ethical principle of justice requires that participants' contributions be recognized. The principle of non-maleficence underlies researchers' obligation to ensure that potential harms from research, such as lost income, are assessed and minimized or eliminated (Graham et al., 2013). In all studies, we assessed the potential value of knowledge gains about adolescent anxiety and prevention of mental health problems, and overall, we were confident that any potential risks were outweighed by the opportunity for significant benefit.

Ethical issues in preventive mental health care are relevant for Papers 1, 2 and 3. When resources in healthcare are limited, deciding which tasks to prioritize involves ethical considerations. Fundamental principles for health professionalism are the individual's welfare, autonomy, and social justice. Norms for professional health workers include fair distribution of finite resources and improving access to and quality of care (DeAngelis, 2015). Whether to prioritize systemic work with the potential to prevent mental health disorders for a higher number of people in the longer run, or urgent clinical work with adolescents identified as being in need, is an ethical dilemma frequently raised in low threshold services (Waldum-Grevbo & Haugland, 2015). In Norwegian mental health low threshold services for adolescents, the vast majority of the health workers' time is spent on individual work (Heggland, Gärtner, & Mykletun, 2013; Landsgruppen av Helsesøstre, 2015). Individual treatment is typically given higher priority than outreaching, universal, preventive work. This way of prioritizing favours those who ask for help, and can be understood based on the background of the ethical principles of health professionals (Den Norske Legeforening, 1961; Norsk Psykologforening, 1998; The American Psychological Association, 2010; The International Council of Nurses, 2006). The ethical principles hold the individual psychologist/nurse/physician exclusively responsible for ensuring competence to practice professionally. The best interests of the individual patient frequently stand in conflict with societal interests in just distribution of healthcare resources (Tilburt, 2014). The concept "dual agency" helps to illuminate this ethical dilemma (Tilburt, 2014). "Dual agency" means an avowed requirement to act simultaneously on behalf of two different parties with competing interests. Tilburt (Tilburt, 2014) has argued that changes in the roles of health professionals in modern healthcare should lead to changes in moral standards of the health profession. Clarified moral standards could help the individual health professional to prioritize a dilemma

that involves conflicting interests between the individual patient and societal interests. A reorientation toward professional ethics that incorporate both competent individuals and competent communities has been proposed (Johnson et al., 2012).

In all three studies, we argued that addressing anxiety is not only the responsibility of individual adolescents and their families, but also of schools, school health services, and policy makers. Relevant actors for mental health promotion and prevention policies include politicians, civil servants, health professionals, nongovernmental agencies, social movements, communities, and the media. All relevant actors are needed to realize WHO's aim "health in all policies" (Leppo, Olila, Pena, Wismar, & Cook, 2013). To address competence issues in all relevant actors for adolescent health, Bronfenbrenner's (Bronfenbrenner, 1977) ecological model has been suggested (Johnson et al., 2012). Such an ecological perspective initiates a conceptual shift from focusing on individual trainees to a systemic, interactive perspective for understanding and intervening with competence problems. This perspective values reciprocal involvement in both universal and indicated prevention interventions, an approach compatible with the communitarian approach we advocated in all three papers. However, a transition to a more communitarian approach to professional competence for health workers is challenging, both because the culture of individualism runs deep, and because communitarian practice requires considerable moral maturity and trust in one's colleagues (Johnson et al., 2012).

Psychological intervention research conducted in paediatric settings should be published and presented so that lessons learned can be shared (Drotar et al., 2014; Graham et al., 2013). Research involving children deserves a reflexive approach in attending to the complex ethical issues that can emerge (Graham et al., 2013). In Paper 3, we found it particularly important to assess all ethical aspects to minimize risk and to prevent any participant from experiencing any harm or overload (Drotar et al., 2014). A central ethical issue concerned who should conduct the recruitment, consent, and assent process. Obtaining consent from parents/guardians and children is a cornerstone of the research relationship and reflects important underlying ethical considerations, including demonstrating respect for the individual participant's dignity and their capability and right to make decisions about matters that affect them (Graham et al., 2013). In Paper 3, we argued that the therapists who provided the interventions should also conduct the consent/assent process. In doing so, we avoided burdening the participating children and their parents/guardians with having to deal with more people. The intention was to minimize risk of harm for the participating subjects. On the other hand, it can be argued that data collected by therapists can be potentially coercive to the participants, because of their ongoing relationships. Enlisting an independent researcher to

collect data could reduce this ethical problem of coerciveness (U.S. Department of Health & Human Services, 1978).

Another ethical issue is the hierarchical power relationship between adults and children. The nature of this relationship means that it can be difficult to ascertain whether children have a genuine choice regarding participation, and if their consent is given freely (Graham et al., 2013). However, in Paper 3 we assumed that children in this low threshold setting were likely to view the researcher as a collaborator with the therapist and were therefore not convinced that an independent researcher would be able to successfully ascertain whether the children actually felt they had a genuine choice regarding participation. Therefore, it was of great importance to state that their participation in the program would not depend on research participation. When discussing possible problems with violations, persuasion, coercion concerning recruitment, we should also bear in mind several studies that document vulnerable populations wanting to participate, to shed light on their difficult situations. Participation in qualitative studies in particular has been reported to have a therapeutic effect on participants (Pope & Mays, 2008).

Particularly relevant to Paper 3 is the conflict of interest that occurs when a psychologist/researcher has commercial interests in the intervention that is the focus of the research (Association of American Medical Colleges, 2001; The American Psychological Association, 2010). Conflict of interest is defined as “conflict between the private interests and the official responsibilities of a person in a position of trust” (Merriam-Webster, 2003). Researchers should be led by their data, not by other interests that might undermine the scientific integrity of their work. Objectivity of researchers is an essential value in scientific research and the basis for public trust (The Norwegian National Research Ethics Committees, 2014; U.S. Department of Health & Human Services, 1978). Competing interests, particularly those engendered by a desire to advance scientific knowledge or to achieve professional recognition, are an inescapable fact of academic life (Angell, 2000). However, financial interests in human subjects research are distinct from other interests inherent in academic life that might impart bias or induce improper behaviour, because financial interests are discretionary, and because the perception is widespread that financial interests may entail special risks which can be avoided (Ross et al., 2000).

The concern is that a researcher’s financial interest might create a bias in scientific decisions (Association of American Medical Colleges, 2001). Therefore, given the essential role of psychologists and other health professionals in developing psychotherapeutic innovations, it is important to evaluate carefully the way in which corporate financial

incentives influence scientific validity (Angell, 2000). Physicians' roles in entrepreneurship have been debated (Relman & Reinhardt, 1986), and other health professionals' (e.g. psychologists') role in entrepreneurship, in principle, raise the same set of ethical issues: the real and apparent risks posed by financial interests have the potential to threaten public trust and support for the research mission of academic institutions (Angell, 2000; Ross et al., 2000; The Norwegian National Research Ethics Committees, 2014). On the other hand, principled partnership between inventors, ownership of inventions, and academia is essential if we are to continue to improve the health of our citizenry (Relman & Reinhardt, 1986; Ross et al., 2000). The driving force of inventors and collaboration between private initiatives and academia can lead to positive changes for the society (Innovasjon Norge, 2016). The facts] that I, Solfrid Raknes, was collaborating with a team of more experienced researchers, was under supervision for my PhD while writing Paper 3, and not in the lead of the project "The Psychological First Aid Kit: Implementation and evaluation" during the planning and data-collection period, are recognized as factors that could reduce inventor biases in Paper 3. Additionally, the following disclosure was made within the paper:

The first author discloses the following commercial relationship: "The Psychological First Aid Kit" is a self-help material that I, Solfrid Raknes, have developed, and I receive royalties related to sales in accordance with the standard sharing rules for innovation in the public sector in Norway.

Conclusions and Recommendations

Our findings elaborate the importance of improving interventions and initiatives targeting anxious adolescents. Based on subjective experiences reported by adolescents themselves, we found that there was a high frequency of anxiety problems in the community sample of adolescents in our study. Multiple factors contribute to anxiety in adolescents, both situational factors such as exposure to negative life events, and attributional factors such as self efficacy. To reduce the impact of adolescent anxiety on the individual and society, an integrated, comprehensive systems approach that involves the entire community is recommended: Adolescents, parents, educators, health and social service professionals, religious organizations, government agencies, recreation and service groups, and businesses can contribute in preventive anxiety intervention. Building on public health approaches that underscore preventions and early interventions (Major et al., 2011; Stiffman et al., 2010; WHO, 2004, 2014), we have argued that addressing anxiety is not only the responsibility of

individual adolescents and their families, but also of schools, school health services, and policy makers.

Schools play a central role when universal interventions are considered. The basic CB principles of anxiety coping can be learned in school. Increasing the mental health literacy in the community by making basic skills in coping with anxiety a part of the basic, mainstream knowledge is suggested as a main strategy to reduce adolescent anxiety. Low threshold services for adolescents that include CB self-help material in brief interventions are promising. If a goal in the Norwegian Health Care System is to provide all anxious adolescents easy access to a mental health low threshold service, upscaling of such services is needed.

Research should explore the potential of CB interventions where the specific goals, content, and form of the intervention are adapted to reduce adolescent anxiety in various settings. Qualitative research will be particularly helpful to gain knowledge important in the developmental phases of interventions. Research is also needed to gain increased knowledge about the efficiency and effects of initiatives implemented. If anxiety prevention strategies and interventions are improved and implemented, it is my belief that a higher proportion of adolescents will dare to raise their voices, contribute their ideas, and support each other to grow from real life challenges.

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APPENDIX

Added analyses

Paper 1, Table 4²

Hierarchical multiple regression analyses examining effects of sociodemographic variables, reported negative life events, and levels of anxiety on quality of life in a community sample of adolescents (N=1,719), when controlled for depression.

Step 1; Background, negative life events and depression

Predictor variables	B	SE B	β	R ²	ΔF
Gender				0.59*	334.6*
Female	Ref.				
Male	0.77	0.37	0.04*		
Age (12-17)	-0.69	0.20	-0.06*		
Ethnicity					
Norwegian	Ref.				
Western immigrant	0.60	1.12	0.01		
Non-Western immigrant	1.97	1.29	0.02		
Perceived family economy					
Like most families	Ref.				
Better than most families	1.05	0.45	0.04		
Lower than most families	-2.54	0.83	-0.05*		
Reported negative life events	-1.67	0.38	-0.08*		
Depression	-1.38	0.04	-0.71*		

² *Note.* The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version (KINDL-R) (Ravens-Sieberer & Biullinger, 1998) was used to measure quality of life (HRQoL). The Spence Children's Anxiety Scale was used to measure anxiety symptoms in various anxiety domains (obsessive compulsive, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety). Australian gender-specific norms used to categorize adolescents as low, medium, or high in anxiety-symptom level at each domain of anxiety. The low-anxiety group in the corresponding anxiety domain was used as the reference group in Step 2 and 3. Ref., reference category; β , beta estimate; * $p < .005$. Depression was measured by the *Short Mood and Feelings Questionnaire* (SMFQ) (Costello et al., 1991).

Paper 1, Table 4 (continued)
Step 2a; Medium anxiety level, controlled for depression

Predictor variables	B	SE B	β	R ²	ΔF
				0.59*	334.6*
Female	Ref.				
Male	0.51	0.38	0.23*		
Age (12-17)	-0.72	0.20	-0.06*		
Ethnicity					
Norwegian	Ref.				
Western immigrant	0.56	1.11	0.01		
Non-Western immigrant	1.89	1.29	0.02		
Perceived family economy					
Like most families	Ref.				
Better than most families	1.12	0.45	0.04		
Lower than most families	-2.71	0.82	-0.05*		
Reported negative life events	-1.61	0.38	-0.07*		
Depression	-1.35	0.04	-0.69*		
Obsessive compulsive, medium anxiety symptoms	.098	0.72	0.02		
Social phobia, medium anxiety symptoms	-0.83	0.62	-0.02		
Panic/agora fear, medium anxiety symptoms	-0.97	0.55	-0.03		
Separation anxiety, medium anxiety symptoms	-0.47	0.68	-0.01		
Physical injury fear, medium anxiety symptoms	-1.71	0.47	-0.06*		
Generalised anxiety, medium anxiety symptoms	-1.15	0.52	-0.04		

Step 2b; High anxiety level, when controlled for depression

Predictor variables	B	SE B	β	R ²	ΔF
				0.60*	184.7*
Female	Ref.				
Male	0.81	0.38	0.04*		
Age (12-17)	-0.69	0.20	-0.06*		
Ethnicity					
Norwegian	Ref.				
Western immigrant	0.56	1.12	0.00		
Non-Western immigrant	2.20	1.29	0.03		
Perceived family economy					
Like most families	Ref.				
Better than most families	1.09	0.45	0.04		
Lower than most families	-2.39	0.83	-0.05*		
Reported negative life events	-1.67	0.38	-0.07*		
Depression	-1.29	0.05	-0.66*		
Obsessive compulsive, high anxiety symptoms	-0.31	0.90	0.00		
Social phobia, high anxiety symptoms	-2.22	0.73	-0.05*		
Panic/agora fear, high anxiety symptoms	-1.37	0.54	0.04		
Separation anxiety, high anxiety symptoms	.0-18	0.93	0.00		
Physical injury fear, high anxiety symptoms	-0.81	0.63	0.02		
Generalised anxiety, high anxiety symptoms	-0.14	0.62	0.01		

Paper 2, Table 2

Associations between socio-demographic profiles, negative life events and status of anxiety in a community sample of adolescents.

	<u>Non-anxious</u>	<u>Anxious</u>	<u>SCAS</u>	<u>Chi square value</u>	<u>df</u>	<u>p-value</u>
<u>All (N = 1699)</u>	n (%)	n (%)	<i>M</i>	.		
1292 (77)	377 (23)	23.2				
<u>Gender*</u>				159.7	1	.000
Male	717 (91)	70 (9)	16.6			
Female	575 (65)	307 (35)	29.1			
<u>Age</u>				4.3	5	.501
12	14 (74)	5 (26)	21.4			
13	493 (87)	130 (13)	22.2			
14	422 (77)	126 (23)	23.5			
15	347 (76)	109 (24)	24.0			
16	13 (65)	7 (35)	30.7			
17	3 (100)	0 (0)	11.7			
<u>Ethnicity</u>				6.2	2	.045
Norwegian	1232 (78)	352 (22)	23.0			
Western immigrant	35 (80)	9 (20)	23.5			
Non-western immigrant	19 (59)	13 (41)	29.6			
<u>Mother's education</u>				1.1	3	.773
Lower Sec. School	21(79)	8 (21)	28.2			
Upper Sec. School	247 (79)	65 (21)	22.5			
Higher education	583 (77)	176 (23)	23.4			
I don't know	426 (77)	125 (23)	23.2			
<u>Father education</u>				4.6	3	.203
Lower Sec. School	37 (73)	14 (27)	25.6			
Upper Sec. School	326 (81)	78 (19)	22.2			
Higher education	406 (78)	117 (22)	22.7			
I don't know	508 (75)	165 (25)	24.0			
<u>Family economic status*</u>				38.5	2	.000
Like most families	1014 (79)	271 (21)	22.6			
Better than most	236 (75)	63 (25)	22.5			
Worse than most	40 (49)	41 (51)	35.4			
<u>Bullying *</u>				115.3	4	.000
Not bullied	1125 (82)	252 (18)	21.4			
Some few times	81 (51)	79 (49)	34.7			
2 or 3 times a month	17(55)	14 (45)	34.7			
About once a week	6 (33)	12 (77)	40.6			
Several times a week	8 (72)	3 (28)	26.6			
<u>Single trauma*</u>				53.9	2	.000
No, never	999 (81)	229 (19)	21.4			
Yes, one time	217 (68)	101 (32)	27.9			
Yes, more than once	39 (52)	36 (48)	31.9			
<u>Violence from adult*</u>				64.2	3	.000
Never	1197 (80)	304 (20)	22.3			
One episode	30 (50)	30 (50)	33.5			
Yes, some few times	19 (49)	20 (51)	37.1			
Yes, number of times	7 (39)	11 (61)	37.2			
<u>Observing violence*</u>				91.2	3	.000
Not observed	1152 (81)	278 (19)	21.9			
Yes, one time	74 (64)	41 (36)	28.5			
Yes, some few times	17 (34)	33 (66)	38.0			
Often observed	7 (36)	12 (64)	49.6			
<u>Unwanted sex*</u>			1616	39.1	3	.000
Never	1231 (79)	337 (21)	22.7			
Yes, one time	11 (34)	21 (66)	42.1			

Yes, some few times	5 (56)	4 (44)	28.2			
Yes, number of times	4 (50)	4 (50)	39.6			
<u>Negative life events*</u>				102.2	1	.000
No negative life event	845 (86)	139 (14)	19.6			
Negative life event	408 (64)	226 (36)	28.7			
<u>Anxiety interference*</u>				173.5	1	.000
Not at all	485 (98)	9 (2)	24.4			
Only a little	438 (92)	37 (8)	29.3			
Sometimes	329 (72)	131 (28)	36.9			
Quite a lot	35 (22)	127 (78)	61.6			
A great deal	5 (7)	67 (93)	44.0			

Note. * $p < .005$. The Spence Children's Anxiety Scale (SCAS) (Spence, 1998), child version, was used to measure anxiety symptoms and to categorize each adolescent as "Non Anxious" or "Anxious". "No negative life event" was defined by responding "no" or "never" to all questions about negative life events. Anxiety interference was measured by the Child Anxiety Life Interference Scale (CALIS) (Lynham et al., 2013).

Paper 2, Table 3b

Logistic regression analysis of predictors of anxiety in a community sample of adolescents

Variables	Odds ratios (95 % confidence interval)		
	Crude	Adjusted ^a	Adjusted ^b
Gender			
Male	Ref.	Ref.	Ref.
Female	5.47 (4.13 – 7.25)	5.93 (4.20 – 8.37)*	3.36 (2.21 - 4.80)*
Age (12 – 17)	1.09 (0.95 – 1.24)	0.98 (.81 - 1.17)	0.80 (0.65 - 0.99)
Ethnicity			
Norwegian	Ref.	Ref.	Ref.
Western immigrant	0.90 (0.42 – 1.89)	0.57 (0.22 - 1.47)	0.36 (0.13 - 1.07)
Not-western imm.	2.40 (1.17 – 4.90)*	2.49 (0.97- 6.37)	1.32 (1.28 - 1.39)
Mother’s education			
I don’t know	Ref.	Ref.	Ref.
Lower Sec. School	1.28 (0.56 – 3.00)	0.58 (0.19 – 1.82)	0.54 (0.14 - 2.14)
Upper Sec. School	0.90 (0.63 – 1.26)	1.09 (0.65 – 1.82)	1.32 (0.73 - 2.37)
Higher education	1.03 (0.79 – 1.24)	1.21 (0.79 – 1.85)	1.16 (0.72 - 1.87)
Father’s education			
I don’t know	Ref.	Ref.	Ref.
Lower Sec. School	1.17 (0.62 – 2.21)	1.21 (0.52 – 2.83)	0.68 (0.22 - 2.09)
Upper Sec. School	0.74 (0.54 – 0.99)	0.88 (0.55 – 1.40)	0.67 (0.39 - 1.15)
Higher education	0.89 (0.68 – 1.16)	1.00 (0.65 – 1.54)	0.89 (0.55 - 1.43)
Family eco. status			
Like most fam.	Ref.	Ref.	Ref.
Better than most	0.99 (0.73 – 1.36)	1.39 (0.94 – 2.04)	0.96 (0.44 - 2. 74)
Worse than most	3.84 (2.43 – 6.05)*	1.86 (0.99 – 3.49)	1.17 (0.49 – 2.75)
Neg. life events	3.37 (2.64 – 4.29)*	2.56 (1.91 – 3.45)*	1.42 (1.01 - 2.02)*
Social support	0.24 (0.20 – 0.30)*	0.39 (0.30 – 0.52)*	0.76 (0.56 - 1.03)*
Self-efficacy	0.13 (0.10 – 0.17)*	0.24 (0.17 – 0.33)*	0.42 (0.28 - 0.62)*
Depression			1.33 (1.28 - 1.39)*

Notes: * $p < .05$ ^a Odds ratios adjusted for all predictors in the model when depression is not included; Ref. = Reference class, ^b Odds ratios adjusted for all predictors when depression was added in the model. The Spence Children’s Anxiety Scale (SCAS) (Spence, 1998) was used to classify each adolescent as “Anxious” or “Not Anxious”. “No negative life events” was defined by responding “no” or “never” to all questions about negative life events. “Negative life event” was defined as responding yes to at least one of these. Social Support was measured by the subscale “social resources” from the Resilience Scale (READ) (Hjemdal et al., 2006). Self-efficacy was measured by the General Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995). Depression was measured by the *Short Mood and Feelings Questionnaire* (SMFQ) (Costello et al., 1991).

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Quality of life in anxious adolescents

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Abstract

Purpose: To examine associations between health-related quality of life (HRQoL) and anxiety symptoms across anxiety domains (obsessions/compulsions, social anxiety, panic disorder, agoraphobia, separation anxiety, physical injury fears, generalised anxiety, and posttraumatic stress) in a general adolescent population. Expanded knowledge about these associations can provide valuable information for improving interventions and prevention strategies for adolescent anxiety.

Methods: Cross-sectional data about anxiety were collected via a school survey from a community sample of Norwegian adolescents aged 12–17 ($N = 1719$). Based on scores from the Spence Children's Anxiety Scale (SCAS), each adolescent was categorized as reporting a low, medium, or high level of anxiety. Each adolescent's HRQoL was then measured using the Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version (KINDL-R). Hierarchical regression analyses were performed to determine any relationship between anxiety symptoms and HRQoL.

Results: Across domains of anxiety, anxiety symptoms were inversely associated with overall HRQoL. All HRQoL-dimensions were inversely associated with overall level of anxiety symptoms. In adolescents with medium and high anxiety symptoms, poor HRQoL was documented in all HRQoL dimensions with the exception of the family dimension.

Conclusions: The strong association between elevated levels of anxiety symptoms and poor HRQoL demonstrate the importance of improved mental health interventions and prevention initiatives targeting anxious adolescents.

Keywords: Anxiety, Quality of life, Adolescent at risk, Prevention, Health policy

Background

Elevated anxiety symptoms are common in youth [1, 2]. Anxiety symptoms can manifest in a broad array of situations, ranging from life-threatening situations to school presentations and sports competitions. Anxiety symptoms can enhance the individual's ability to cope, both in dangerous situations and in situations where the individual is facing a positive, yet challenging situation [3]. In these types of situations anxiety symptoms should not be regarded as problems, but rather as resources [4]. However, anxiety symptoms are hallmarks and predictors of anxiety disorders [5]. Anxiety disorders are disabling for the individual [6, 7] and costly to society [8, 9]. Globally

in 2010, anxiety disorders were among the three leading causes for disability in adolescents [10, 11]. Further, anxiety symptoms and anxiety disorders in adolescents are associated with impaired school functioning and school absenteeism, negative school environment, poor coping skills, and difficulties in relationships [6, 12, 13]. Elevated levels of anxiety symptoms during adolescence also predict subsequent depression, substance and alcohol abuse, and anxiety disorders in adulthood [5].

Preventing the onset of youth anxiety disorders is critical to avoid or at least reduce the adverse effects of anxiety on development, social functioning, and school performance. One population for whom prevention would be most beneficial is adolescents with elevated anxiety symptoms who do not yet meet diagnostic criteria for an anxiety disorder. These adolescents are regarded as having sub-threshold anxiety disorders [14]

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and are important to identify and intervene with in order to minimize the burden of disease [2, 10, 11]. Further, to understand and help anxious adolescents, merely summing anxiety symptoms is not enough; studies into what triggers anxiety are warranted. Consequently, the domain in which the adolescents' anxiety appears is central to treating their anxiety problems. Specific anxiety domains (e.g. obsessions/compulsions, social anxiety, panic disorder, agoraphobia, separation anxiety, physical injury fears, generalised anxiety, and posttraumatic stress) are associated with different types of problems. An adolescent with problems in the social anxiety domain typically is troubled by situations that include social exposure, e.g. to talk with a teacher or classmates, whereas an adolescent with problems in the separation anxiety domain typically finds it difficult to be alone without anybody to talk with.

The adverse effects of an array of medical conditions on health related quality of life among adolescents (HRQoL) have been well documented [15–18]. HRQoL has been described in many different ways [19–21], with most definitions highlighting the individual's *subjective* evaluations of life across a range of important domains [22]. Four broad health dimensions are frequently incorporated in HRQoL-definitions: physical health, mental health, social health, and functional health [22]. Improvement in any of these health dimensions is associated with increases in HRQoL, whereas worsening health is a risk factor for poorer HRQoL [23].

During adolescence, studies have reported that HRQoL decreases [24] when anxiety symptoms increase [6, 25]. In addition, female gender, ethnic minority and lower socio-economic status are factors reported as predictors of both impaired HRQoL [24, 26–29] and higher anxiety symptoms [30, 31] in adolescents. Nevertheless, only two *community-based* studies have investigated the associations between anxiety symptoms and HRQoL in adolescents, and both studies were based on small samples ($N = 119$, and $N = 153$, respectively). These studies reported that anxiety symptoms were negatively associated with HRQoL [32, 33]. However, neither study investigated HRQoL across specific anxiety domains (e.g. obsessions/compulsions, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety). Furthermore, neither of these studies investigated *levels* of anxiety symptoms; that is, they did not separate non-anxious adolescents from adolescents with moderate and high levels of anxiety symptoms. Further, three additional studies have investigated the association between HRQoL and anxiety symptoms among adolescents with anxiety *disorders*. One of these reported that HRQoL increased as anxiety symptoms decreased in adolescents in treatment for obsessive compulsive

disorder [15]. The second study reported that as parental involvement decreased and school became more demanding during adolescence, adolescents with social anxiety reported poorer HRQoL as well as higher and more impairing anxiety symptoms [34]. And interestingly, the last study found that the associations between anxiety symptoms and HRQoL were age-specific [35]. Adolescents with social anxiety often overlook positive statements from highly valued peers, feedback that could have affected them positively. This bias was neither found in socially anxious adults, nor in healthy participants. Thus, the impaired integration of social feedback, which may be an underlying mechanism that affect the relationship between anxiety and HRQoL, can be viewed as an anxiety and age specific mechanism [35].

Detailed information about the associations between various dimensions of HRQoL and anxiety domains in adolescents can be valuable for intervention improvement targeting this age group specifically.

To reduce the impact of adolescent anxiety, expanded knowledge of anxiety problems and associated problems are needed. Building on public health approaches that underscore prevention and early interventions [36–39], addressing anxiety is not only a challenge for the individual anxious adolescent, but also a challenge for schools, school health services, and policy makers. If decision makers in these systems had solid knowledge about anxiety prevention possibilities, the communities may potentially offer better prevention services, particularly important for anxious adolescents. Since the associations between anxiety symptoms and HRQoL might affect how adolescents deal with challenges such as developing a coherent and organized sense of identity, developing friendships and achieving at school [40, 41], these associations should receive attention. Knowledge about how various dimensions of HRQoL are related to anxiety symptoms could give ideas valuable for improving anxiety interventions. Furthermore, expanded knowledge about the associations between HRQoL and anxiety symptom levels can be valuable for national governments and local councils who must determine priorities for health research and make decisions about investment in health systems and interventions in the face of limited resources [39]. Public mental health prevention policies need to be based on systematic assessments of health needs [38]. Importantly, HRQoL impairment can be compared across problem types and disorders, as well as over time and communities, and are based on *subjective* information from these who experience the problem. Thus, for policy makers the HRQoL impairment associated with certain health problems can be used, together with burden of disease measurement [10, 11], to make priorities. As most anxious adolescents are struggling on

their own [42], better identification and early interventions can be particularly valuable for anxious adolescents who today do not receive professional help [43].

The present study is assessing the associations between HRQoL and levels of anxiety symptoms across specific domains of anxiety within a community sample of adolescents. The aims of our study are twofold. First, we examine the degree of overall and dimension-specific HRQoL impairment in adolescents according to levels of anxiety symptoms. The assessment will add to previous research by demonstrating whether anxiety problems, indicated by level of anxiety symptoms, are associated with HRQoL in adolescents. To gain this knowledge is especially important when prioritizing between different health problems. Second, we examine the associations between HRQoL and anxiety symptoms across anxiety domains in adolescents. The knowledge gained by this investigation can be particularly valuable in the development and improvement of interventions targeting anxious adolescents.

Methods

Ethical approval

The study was approved by the Regional Committee for Medical and Health Research Ethics, Region West, Norway (Ethics approval No: 2013/2331 REK Vest).

Sample and procedure

The study is based on a survey battery investigating anxiety symptoms in a community sample of adolescents aged 12–17 years. A convenience sample of ten municipalities in Norway, containing 18 lower secondary schools (grades 8–10) with a total of 4361 adolescents attending, comprised the target group. These adolescents' parents or their other caregivers were asked to provide written informed consent for the adolescents to participate. Information about the survey was conveyed to parents through each school's communication system and included recruitment letters via satchel mail, e-mails, SMS, and presentations by the study staff at parent meetings. The adolescents whose caregivers provided permission were invited to complete the survey in the classroom during school hours. A total of 1795 (41%) adolescents were given informed consent from caregivers to participate. Among these, 1719 adolescents (96%) completed the survey battery. Data were collected school-wise from October 2014 to June 2015. All presented data are based on the adolescents' self-reports.

Measures

Anxiety symptoms

Anxiety symptoms were assessed across several domains of anxiety and HRQoL dimensions. The Spence

Children's Anxiety Scale (SCAS) [44], child version, was used to measure adolescents' levels of anxiety. The SCAS is a 38-item, four-point scale (range 0–114), with higher scores indicating higher levels of anxiety symptoms. The scale covers several anxiety domains including obsessions/compulsions, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety. A composite anxiety score is formed by adding the subscale scores. In the present study Australian norms [45] were used, as Norwegian norms were not available. Cronbach α for the SCAS composite score was 0.92. Cronbach α for the SCAS-subcales, each comprising five to nine items, varied from 0.59 to 0.85.

HRQoL

The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version (KINDL-R) [19] was used to measure HRQoL dimensions. KINDL-R has 24 items, each answered on a five-point scale. The KINDL-R has been validated in a wide range of languages, including Norwegian [46]. The scale consists of subscales measuring dimensions of HRQoL, specifically physic (e.g. "During the last week I felt ill"), emotion (e.g. "During the past week I was bored"), self-esteem (e.g. "During the past week I felt on the top of the world"), family (e.g. "During the past week I got on well with my parents"), friends (e.g. "During the past week I got along well with my friends") and school (e.g. "During the past week I found school interesting"). A composite HRQoL score is formed by adding the subscale scores. Mean item scores were calculated for all subscales and for the composite HRQoL scale and transformed to HRQoL subscales ranging from 0 to 100. Higher scores indicated better HRQoL. For screening purposes, a composite HRQoL score of 70 is suggested as the "healthy" cut-off. Adolescents scoring above this cut-off have been identified with a moderate probability of being in good health [47]. In this study, Cronbach α for the KINDL-R total score was 0.92. Cronbach α for the KINDL-R-sub-scales (all with four items) varied from 0.63 to 0.87.

Sociodemographics and negative life events

Participants' ethnicity was determined by asking each adolescent, "Where were you and your parents born?" Ethnicity was defined as "Norwegian" if both parents or at least one parent and the adolescent were born in Norway, "Western immigrant" if both parents or at least one parent and the adolescent were born in another Western country, and "Non-western immigrant" if both parents or at least one parent and the adolescent were born in a non-western country. Perceived family economy was assessed by the question, "How would you rate your family's economy?" The response categories were "like most

families,” “better off than most families,” and “worse off than most families.” Information about experienced negative life events was collected in the form of responses to five questions. First, a question about bullying from the Olweus questionnaire [48] was administered with a definition of bullying presented first, followed by the question, “How often have you been bullied at school in the past couple of months?” Response categories were coded on a five-point scale (1 = I have not been bullied; 2 = a few times; 3 = two or three times a month; 4 = about once a week; 5 = several times a week). Then youth were assessed regarding other negative life events by answering “Have you experienced any of the following: (1) a catastrophe or serious accident? (2) violence from an adult? (3) seen or heard anybody you care for be victim of violence from an adult? (4) unwanted sexual acts?” Responding “no” or “never” to all five questions about negative life events was coded as “0 = no negative life events” whereas responding “yes” to at least one of the items was coded “1 = reported negative life events”. These questions have previously been used in Norwegian surveys [49].

Anxiety level scoring

The participants were categorized as low, medium, or highly anxious, based on the overall level of anxiety symptoms indicated by the SCAS composite score. The same categorization was used separately across all anxiety domains measured by the SCAS (obsessions/compulsions, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety). The term “elevated anxiety level” refers to medium and high levels of anxiety. The cut-offs were based on the Australian gender-based T-scores for adolescents. Scores that corresponded to T-scores above 65 in the Australian reference community sample were defined as high levels of anxiety symptoms; scores that corresponded to T-scores from 60 to 64 in the Australian sample were defined as medium; and scores that corresponded to T-scores below 60 in the Australian sample were defined as low levels of anxiety symptoms [45]. Hence, the cut-offs for girls on overall level of anxiety corresponded to a total SCAS-score of 38 or under = low anxiety; 39–50 = medium anxiety; 51 or above = high anxiety. And the corresponding cut offs for boys were: 32 or under = low anxiety; 33–41 = medium anxiety; 42 or above = high anxiety.

Statistical analysis

Data were analysed using SPSS 22. Missing data varied from 2.1 to 5.9%. Due to the large sample size, skewness and kurtosis were assumed not to make a substantive impact on the analyses [50]. All participants were between 12 and 17 years old, with a majority between 13

and 15 years old. Effect sizes ‘*d*’ were calculated employing the difference of means in adolescents with low anxiety level with adolescents with medium or high anxiety levels, divided by the square of $(SD_1^2 + SD_2^2)/2$ and were interpreted as small (0.20–0.50), moderate (0.51–0.80), or large (>0.80) [51]. Hierarchical multiple linear regression analyses were conducted, first to determine the contribution of levels of anxiety symptoms in predicting levels of HRQoL-total scores, and then to determine the contribution of type of anxiety on HRQoL. Each case was coded as low, medium, or high with regard to anxiety in all anxiety domains (overall, obsessions/compulsions, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety). In the preliminary analyses conducted for the linear regression analyses, no violation of the assumptions of normality, linearity, and homoscedasticity appeared in the factors that were included in the analyses.

Results

Overall HRQoL was inversely associated with levels of anxiety, as indicated by mean KINDL-R total scores of 75 ($SD = 9.1$) in adolescents with low levels of overall anxiety symptoms, 63 ($SD = 9.2$) in adolescents with medium levels of anxiety symptoms, and 56 ($SD = 10.5$) in adolescents with high levels of anxiety symptoms [$F(731,630) = 13.9, p < 0.005$]. Overall HRQoL across anxiety levels and according to socio-demographic factors, negative life events, and anxiety domains are shown in Table 1. Most adolescents in the sample were Norwegian ($n = 1553$), with a small group of Western Immigrants ($n = 39$) and Non Western Immigrants ($n = 30$). All dimensions of HRQoL were negatively associated with overall levels of anxiety symptoms, as shown in Fig. 1 and Table 2. The differences in HRQoL between adolescents with low and medium anxiety symptoms varied from small to large effect sizes ranging from $d = 0.54$ to $d = 1.08$ across HRQoL dimensions. The differences in overall HRQoL between adolescents with low and high anxiety symptoms varied from small to large effect sizes ranging from $d = 0.14$ to $d = 2.20$ across HRQoL dimensions. HRQoL in the family dimension was reported as high also in adolescents with overall elevated anxiety levels, as reflected in KINDL scores at the family dimension (mean KINDL-R family = 85; 76; 83) in adolescents with low, medium, and high levels of anxiety, respectively [$F(21,651) = 76.2, p < 0.005$].

Multivariate correlates of children’s mental health difficulties

Two hierarchical multiple regressions were conducted assessing correlates of HRQoL. In these regressions, gender, age, ethnicity, perceived family economic status

Table 1 Quality of life (HRQoL) in a community sample of adolescents

	HRQoL and high anxiety level			HRQoL and medium anxiety level			HRQoL and low anxiety level		
	N	%	M (SD)	N	%	M (SD)	N	%	M (SD)
Overall anxiety									
Total (N = 1719)	115	7.1	56.4 (10.5)	161	9.9	62.8 (9.2)	1355	83.1	75.4 (9.0)
Gender									
Girls	91	10.4	55.8 (11.5)	120	13.8	62.1 (9.1)	655	75.6	73.3 (9.4)
Boys	24	3.4	58.8 (9.6)	41	5.5	64.7 (9.3)	705	91.2	77.3 (8.2)
Age									
12–13	40	6.2	59.7 (11.3)	55	8.6	64.1 (9.4)	547	85.2	78.7 (9.4)
14	39	7.1	55.4 (10.5)	62	11.3	62.4 (10.1)	447	81.6	76.9 (10.7)
15–17	40	8.4	50.8 (10.8)	47	9.8	61.2 (8.7)	393	81.8	74.8 (10.4)
Perceived family economy									
Normal	76	6.2	57.5 (10.5)	113	8.9	62.3 (8.9)	1063	84.8	75.4 (8.9)
Higher	20	6.7	58.8 (9.5)	33	11.4	66.6 (9.5)	242	81.9	76.7 (8.6)
Lower	17	21.0	47.8 (8.7)	15	18.5	57.8 (7.4)	48	60.5	67.6 (10.0)
Ethnicity									
Norwegian	109	7.1	56.2 (10.3)	149	9.5	62.9 (9.1)	1295	80.4	75.4 (9.0)
Western immi	3	6.8	59.2 (7.2)	3	9.1	62.8 (11.8)	33	84.1	73.6 (9.7)
Non-western immi	2	9.3	72.1 (10.0)	7	21.9	62.3 (4.5)	21	68.8	76.2 (8.7)
Negative life events									
No	30	3.1	61.9 (7.9)	60	6.2	67.1 (9.4)	883	90.7	76.6 (8.2)
Reported	81	12.9	54.4 (10.7)	98	15.7	60.1 (8.0)	445	71.3	72.8 (9.8)
Anxiety domains									
OCD	78	4.8	58.5 (10.7)	113	6.9	64.2 (10.8)	1440	88.2	74.3 (9.9)
Social	142	8.7	59.5 (11.4)	149	9.1	65.9 (9.6)	1340	82.2	74.9 (9.5)
Panic/agora	150	9.2	58.1 (10.4)	214	13.1	66.2 (9.5)	1267	77.7	75.7 (9.1)
Separation	72	4.4	60.1 (11.6)	125	7.7	65.8 (10.7)	1434	87.9	74.0 (10.2)
Physical/inj	154	9.4	65.6 (12.6)	276	16.9	68.4 (10.5)	1201	73.6	74.8 (9.9)
GAD	267	16.3	61.1 (10.7)	225	13.8	69.4 (8.9)	1139	69.8	76.2 (8.9)

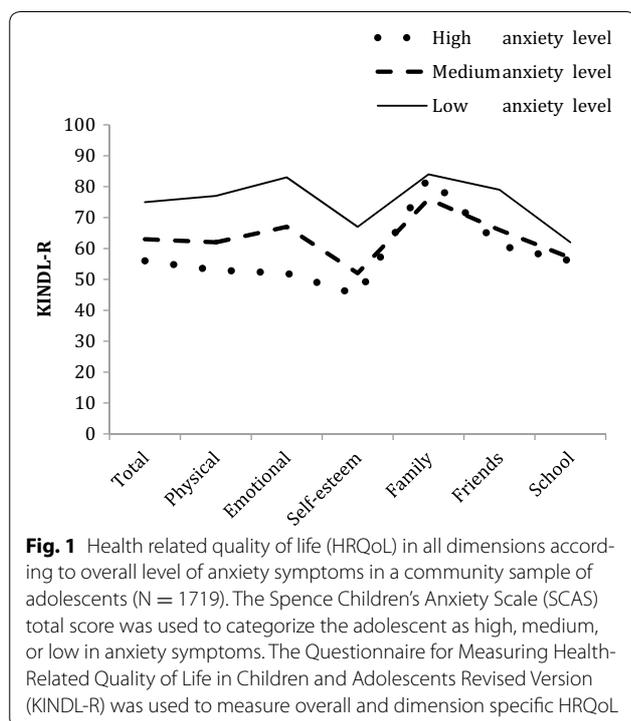
The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version (KINDL-R) [19] was used to measure overall health related quality of life. The Spence Children's Anxiety Scale (SCAS) [44], child version, was used to measure overall anxiety symptoms as well as all domains of anxiety. Australian gender-specific norms were used to categorize adolescents as low, medium, or high in anxiety symptoms. Socio-demographics are reported according to the overall anxiety level, as indicated by the SCAS total score. *Immi* immigrant. Anxiety domains: Obsessive compulsive (OCD), social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety (GAD)

and negative life events were entered as covariates at Step 1, followed by medium level of all anxiety domains at Step 2, and high anxiety level of all anxiety domains at Step 2 in the second analysis. Table 3 shows the results for the hierarchical regression analyses performed. Step 1 in both regression explained 23% of the variance ($R^2 = 0.23$). All factors except for ethnicity were significant related to the overall HRQoL, $F(71,589) = 67.9$, $p < 0.005$. Poor HRQoL was predicted by female gender, increased age, perceived low family economy, and reported negative life events. At Step 2, all domains of medium anxiety level, except generalized anxiety, held significant main effects as correlates of HRQoL. The main effects model at Step 2 accounted for 31% of the variance in HRQoL, and reached statistical significance,

$F(141,582) = 52.9$, $p < 0.005$. The main and significant effects model at Step 2 in the second analysis accounted for 39% of the variance in HRQoL, $F(131,583) = 80.2$, $p < 0.005$. All domains of anxiety except separation anxiety were inversely related to quality of life in step 2 of the second analysis.

Discussion

This study adds to previous research by showing that both medium and high levels of anxiety symptoms are strongly associated with poor overall HRQoL. While most adolescents with low overall anxiety symptoms reported normal HRQoL, indicated by mean KINDL-R scores above the "healthy" cut-off of 70, adolescents with medium and high anxiety symptoms reported



significantly poorer HRQoL. Our findings are in line with previous studies that investigated the association between HRQoL and anxiety symptoms among adolescents in community samples [32, 33] and in adolescents with anxiety disorders [15, 34, 35]. Also in line with previous studies, we found that female gender, higher age, lower perceived family economic status and reported negative life events were significantly associated with lower HRQoL and elevated levels of anxiety symptoms [24, 26]. Contrary to previous studies, ethnicity was not significantly associated with elevated anxiety symptoms or HRQoL impairment, probably due to of the small number of Non-Western immigrants participating in our sample.

Importantly, although the adolescents in our sample were recruited from a community sample and not from a help-seeking sample, elevated levels of anxiety symptoms were strongly associated with poor HRQoL. The mean level of overall HRQoL reported by adolescents with *medium* anxiety symptoms in our sample (KINDL-R total score $M = 63$) was similar to overall HRQoL reported by OCD-diagnosed, treatment-seeking Scandinavian adolescents [15]. The HRQoL impairment in adolescents with *high* overall anxiety symptoms in our sample ($M = 56$) was similar to HRQoL impairment reported by youth with bipolar disorder ($M = 53$) [16].

In health policies, the level of disability associated with a certain health problem, in this case anxiety, can be

used to compare the need for investments in health services and initiatives across problem areas [23]. "Burden of disease-measurements" in developed countries report anxiety disorders as number four among the problems that cause disability [10, 11]. The results from the current study imply that adolescents with anxiety problems also report decreased HRQoL, and add to the existing literature on anxiety and HRQoL which previously primarily have been studied in adolescents with anxiety disorders. And importantly, our results add to the picture based on adolescents' subjective reports.

Overall elevated anxiety symptom levels were associated with impairment in all HRQoL dimensions. Surprisingly however, highly anxious adolescents reported relatively high scores in the family HRQoL dimension. The finding that anxious adolescents report poor HRQoL in the school and friend dimensions and not so much in the family dimension, is in line with a previous study [15] and could have practical implications for identifying anxious adolescents. Parents are usually central in identifying problems and seeking appropriate mental health interventions for adolescents [52]. However, if the parent doesn't witness situations in which the adolescent is impaired by anxiety symptoms, recognizing anxiety as problematic for the adolescent might be difficult. Instead, teachers are more likely to be present in these situations, suggesting that teachers are key to identifying the adolescent's anxiety and facilitating appropriate interventions. Furthermore, since the main concern for anxious adolescents seems to be school more than family-related, early interventions targeted at anxious adolescents should consider including standard sessions for teachers and not sessions for adolescents and parents exclusively.

In health policies, the level of disability associated with a certain health problem, HRQoL impairment can be used to compare the need for investments in health services and initiatives across problem areas. "Burden of disease-measurement" in developed countries, report anxiety disorders as number four among the problems that cause disability in adolescence [11, 53]. Our findings elaborate the importance of interventions and initiatives targeting anxious adolescents on the basis of *subjective* experiences reported by adolescents themselves. Further studies should investigate the benefits and potential side effects of programs designed to increase identification and improve early interventions for anxious adolescents [54–56]. Building on public health approach underscoring preventions and early interventions [36–39], we argue that addressing anxiety is not only the responsibility of the individual adolescents and their families, but also of schools, school health services and policy makers.

Table 2 Health related quality of life in adolescents across levels of anxiety symptoms

	Total HRQoL			Physical HRQoL			Emotional HRQoL			Self-esteem HRQoL			Family HRQoL			Friends HRQoL			School HRQoL		
	M/SD			M/SD			M/SD			M/SD			M/SD			M/SD			M/SD		
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High									
OCD	74.2	64.2	58.5	75.6	64.2	55.5	80.8	65.4	56.4	65.5	54.2	48.1	84.1	76.7	69.9	77.6	67.9	62.9	61.4	56.7	58.0
	9.9	10.8	10.7	14.8	15.7	18.2	12.9	17.3	15.8	18.2	18.8	18.1	13.7	15.2	16.9	13.6	15.4	15.3	9.4	8.4	8.4
Social	74.9	65.9	59.5	76.4	65.8	58.5	81.8	69.6	58.1	66.5	55.0	48.0	84.4	78.3	73.7	78.6	68.9	62.1	61.8	57.4	56.0
	9.5	9.6	11.4	14.5	15.1	17.5	12.0	14.5	17.9	17.9	17.8	18.1	13.6	14.7	16.3	12.9	15.4	15.6	9.2	8.2	9.1
Panic/Agora	75.7	66.2	58.1	77.6	64.8	55.1	82.6	69.9	56.9	67.3	56.6	44.8	85.1	77.5	71.9	78.8	69.3	64.6	61.9	58.6	55.8
	9.1	9.5	10.4	13.8	14.3	16.3	11.4	14.9	16.4	17.5	16.9	17.6	12.9	15.2	17.7	13.0	14.3	15.9	9.2	8.8	8.6
Separation	74.0	65.8	60.1	75.5	64.8	57.2	80.4	69.2	57.1	65.1	56.9	51.4	83.7	77.7	75.6	77.6	68.8	63.4	61.4	57.4	56.4
	10.2	10.7	11.6	15.0	16.5	16.8	13.3	17.2	16.2	18.5	17.9	20.3	14.1	14.9	15.7	13.6	15.8	16.2	9.3	8.5	9.1
Physical/Inj	74.8	68.3	65.6	76.7	66.9	64.1	81.0	72.7	69.9	65.8	59.7	55.5	84.4	79.0	77.9	77.9	72.6	69.7	61.9	59.1	56.4
	9.9	10.5	12.6	14.7	15.2	18.5	13.2	15.3	18.9	18.3	18.5	19.8	13.3	15.6	17.6	13.8	14.1	16.0	9.2	8.9	9.1
GAD	76.2	69.4	61.1	78.4	68.8	58.8	83.4	75.3	60.6	68.6	57.6	48.8	85.1	81.0	74.9	79.2	73.7	66.1	62	59.5	57.3
	8.9	8.9	10.7	13.6	13.7	16.2	10.9	12.6	16.5	17.3	16.6	17.3	12.9	13.7	14.4	13.2	13.5	14.6	9.2	9.4	8.9
Overall anxiety	75.4	62.8	56.4	77.1	61.8	52.9	82.5	66.8	52.4	66.8	52.4	44.5	84.8	75.7	82.9	78.8	66.0	60.6	61.8	56.9	56.2
	9.1	9.2	10.5	13.9	14.3	16.5	11.1	17.5	15.8	17.5	17.8	17.2	13.3	14.8	14.4	12.8	14.7	15.3	9.2	8.7	8.9
Effect size	1.37 1.93			1.08 1.59			1.07 2.20			0.82 1.29			0.65 0.14			0.93 1.29			0.54 0.62		
ANOVA	F(21,630) = 334.6*			F(21,654) = 223.4*			F(21,653) = 471.7*			F(21,654) = 125.3*			F(21,651) = 76.1*			F(21,636) = 157.1*			F(21,652) = 36.9*		

The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version (KINDL-R) [19] was used to measure health related quality of life (HRQoL). The Spence Children's Anxiety Scale, child version, was used to measure anxiety symptoms in various anxiety domains (obsessive compulsive (OCD), social phobia, panic/agoraphobia, separation anxiety, physical injury fears, generalised anxiety (GAD), and the composite overall anxiety). Australian gender-specific norms used to categorize adolescents as low, medium, or high in anxiety-symptom level at each domain of anxiety. The differences in overall HRQoL between adolescents with low and medium anxiety levels, and between low and high anxiety levels are reported in Cohen's *d*. * *p* < 0.005

Table 3 Hierarchical multiple regression analyses examining effects of sociodemographic variables, reported negative life events, and levels of anxiety on quality of life in a community sample of adolescents (N = 1719)

Predictor variables	B	SE B	β	R ²	ΔF	
<i>Step 1 Background and negative life events</i>					0.23*	67.9*
Gender						
Female	Ref.					
Male	33.3	2.9	0.26*			
Age (12–17)	−9.9	1.7	−0.13*			
Ethnicity						
Norwegian	Ref.					
Western immigrant	2.2	9.3	0.01			
Non-Western immigrant	11.7	10.7	0.02			
Perceived family economy						
Like most families	Ref.					
Better than most families	5.1	3.8	0.03			
Lower than most families	−49.3	6.7	−0.16*			
Reported negative life events	−39.2	2.9	−0.29*			
<i>Step 2; Medium anxiety level (analysis 1)</i>					0.31*	52.9*
Gender						
Female	Ref.					
Male	28.1	5.6	0.22*			
Age (12–17)	−9.9	1.6	−0.13*			
Ethnicity						
Norwegian	Ref.					
Western immigrant	−1.5	8.8	0.00			
Non-Western immigrant	12.2	10.2	0.03			
Perceived family economy						
Like most families	Ref.					
Better than most families	6.8	3.6	0.04			
Lower than most families	−44.9	6.4	−0.15*			
Reported negative life events	−32.8	2.9	−0.25*			
Obsessive compulsive, medium anxiety symptoms	−25.7	5.6	−0.09*			
Social phobia, medium anxiety symptoms	−22.7	4.9	−0.10*			
Panic/agora fear, medium anxiety symptoms	−20.7	4.3	−0.10*			
Separation anxiety, medium anxiety symptoms	−24.8	5.3	−0.10*			
Physical injury fear, medium anxiety symptoms	−15.9	3.7	−0.09*			
Generalised anxiety, medium anxiety symptoms	−5.6	4.2	−0.03			
<i>Step 2; High anxiety level (analysis 2)</i>					0.39*	80.2*
Gender						
Female	Ref.					
Male	18.9	2.8	0.15*			
Age (12–17)	−7.6	1.5	−0.10*			
Ethnicity						
Norwegian	Ref.					

Table 3 continued

Predictor variables	B	SE B	β	R ²	ΔF
Western immigrant	−0.5	8.3	0.00		
Non-Western immigrant	14.6	9.6	0.03		
Perceived family economy					
Like most families	Ref.				
Better than most families	8.1	3.3	0.05*		
Lower than most families	−33.6	6.0	−0.11*		
Reported negative life events	−25.9	2.7	−0.19*		
Obsessive compulsive, high anxiety symptoms	−24.7	6.6	−0.08*		
Social phobia, high anxiety symptoms	−33.8	5.3	−0.14*		
Panic/agora fear, high anxiety symptoms	−35.4	5.4	−0.16*		
Separation anxiety, high anxiety symptoms	−9.9	6.9	−0.03		
Physical injury fear, high anxiety symptoms	−11.4	4.6	−0.05*		
Generalised anxiety, high anxiety symptoms	−30.4	4.5	−0.17*		

The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents Revised Version (KINDL-R) [19] was used to measure quality of life (HRQoL). The Spence Children's Anxiety Scale was used to measure anxiety symptoms in various anxiety domains (obsessive compulsive, social phobia, panic/agoraphobia, separation anxiety, physical injury fears, and generalised anxiety. Australian gender-specific norms used to categorize adolescents as low, medium, or high in anxiety-symptom level at each domain of anxiety. The low-anxiety group in the corresponding anxiety domain was used as the reference group in Step 2 and 3. Ref reference category, β beta estimate; * p < 0.005

Limitations and strengths

This study has several limitations. The cross-sectional study design did not allow for conclusions about the directionality of the associations between study variables. Also the one measure point design is not ideal for conclusions about the duration of anxiety problems. Hence, the proportion of the anxious adolescents that has anxiety as a state, e.g. as a 1 day problem, is unknown. The sole use of self-report measures might also have led to a common method bias [57]. Further, family economy should be measured by other indicators than by the adolescent's perceptions [58]. Also, in lack of Norwegian norms for the SCAS, Australian norms were applied. The mean total SCAS score for adolescent girls and boys in another Scandinavian culture (Denmark) has been found to be lower than in the Australian norm sample [59]. If the Danish norms had been used instead for Australian, more adolescents had been categorized with elevated anxiety level. Since the Danish norms were still not available on the official website for the SCAS when our analyses were run, we decided to use the Australian norms. However, for conclusions about the associations between variables and not primarily for estimating prevalence, the chosen cut-offs were not considered as a

major concern. Further, the analysis was limited to anxiety problems and quality of life, and other problems that could influence the relationship between these variables were not included. There are some concerns regarding the representativeness of the study sample. Participants were recruited from three of five regions of Norway (East, South and West). The Midst and Northern regions were not included, due to practical considerations (travel distances, costs). The participating counties were situated in rural and sub-rural parts of Norway; none of them were big cities. Also, the schools were chosen on the basis that they agreed to participate in a school-based intervention study for anxious adolescents. Schools and individuals who volunteered may possess different characteristics than the population as whole, and the problem of self-selection bias may be present [60]. The reasons for the low response rate may be scepticism on the part of the parents and low priority of mental health surveys for their adolescents, in addition to technical challenges with the electronic system for collecting informed consent. Previous research has found that active parental consent lead to parental permission and response rates in the range of 30–60% for students, biased toward excluding minorities, students having problems in school, or students at risk of mental health problems [61]. However, despite these concerns, findings from our sample parallel those obtained from other epidemiological studies in adolescents attending lower secondary schools in Norway [62].

The specific strengths of the study are the high number of adolescents included and the use of well-established measures of anxiety and quality of life. The measures used in this study could be administered as screening instruments in schools to identify and help anxious adolescents. Furthermore, the study has provided knowledge on topic sparsely investigated, by documenting how medium and high levels of anxiety symptoms are associated with poor HRQoL across anxiety domains in a community sample of adolescents.

Abbreviations

HRQoL: health related quality of life; KINDL-R: The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents, Revised; QoL: quality of life; SCAS: The Spence Children's Anxiety Scale.

Authors' contributions

BH, SR, AH, ÅH, GW and JB made substantial contributions to conception, design and acquisition of data; SR, SP and AH made substantial contributions to the data analyses; SR drafted the manuscript, all authors have been involved in revising it critically for important intellectual content. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Availability of data and materials

The datasets used during the current study available from the corresponding author on reasonable request.

Compliance with ethical standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study was approved by the Regional Committee for Medical and Health Research Ethics, Region West, Norway (Ethics approval No: 2013/2331 REK Vest); and registered in Clinical Trials gov. NCT02279251.

Consent for publication

This article is original, has not already been published in a journal, and is not currently under consideration by another journal.

All authors of the manuscript have read and agreed to its content and are accountable for all aspects of the accuracy and integrity of the manuscript in accordance with ICMJE criteria.

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Abstract

Purpose: To examine the prevalence and correlates of anxiety in a community sample of adolescents. Knowing the prevalence and characteristics of anxious adolescents is valuable to improve anxiety prevention strategies and interventions.

Design: Cross-sectional data about anxiety were collected via a school survey from a community sample of Norwegian adolescents aged 12–17 ($N = 1719$).

Methods: Based on scores from the Spence Children's Anxiety Scale, the adolescents were categorized as not anxious or anxious. Logistic regression analysis was performed to assess the impact of each factor on the likelihood that participants would report an elevated level of anxiety.

Results: A total of 22% of the adolescents were categorized as anxious. Female gender, experienced negative life events, low social support, and low self-efficacy were associated with elevated level of anxiety.

Conclusions: The high prevalence of anxiety in adolescents demonstrates the importance of improved prevention interventions targeting anxious adolescents. We argue that addressing is the responsibility of not only the individual adolescents and their families but also schools, school health services, and policy makers. School-based interventions that increase social support and self-efficacy would probably be particularly beneficial for anxious adolescents.

Keywords

Anxiety, adolescent, negative life events, self-efficacy, social support

Introduction

Anxiety disorders are among the most frequent mental health problems in adolescence (Merikangas et al., 2010). These disorders are disabling for the individual (Copeland, Angold, Shanahan, & Costello, 2014) and costly to society (Gadernann, Alonso, Vilagut, Zaslavsky, & Kessler, 2012). To develop anxiety prevention strategies and interventions, high emphasis should be placed on investigation of prevalence rates and identification of characteristics of anxious adolescents. Preventing the onset of youth anxiety disorders is critical to avoid or at least reduce the adverse effects of anxiety on development, social functioning, and school performance (Beesdo, Knappe, & Pine, 2009). In addition to adolescents with anxiety disorders, a population for whom prevention would be beneficial is adolescents with elevated anxiety symptoms who do not yet meet diagnostic criteria for an anxiety disorder. These adolescents are regarded as having subthreshold anxiety disorders (Judd, Rapaport, Paulus, & Brown, 1994) and are important to identify and intervene with in order to minimize the burden of disease associated with anxiety in adolescents (Balazs et al., 2013; Institute for Health Metrics and Evaluation, 2016).

Genetics, ethnicity, socioeconomic status, negative life events, and cognitive factors have all been associated with the development and maintenance of

anxiety in adolescents (Rapee, Schniering, & Hudson, 2009). Girls consistently report higher prevalence of anxiety symptoms than boys do (Copeland et al., 2014; Holly, Little, Pina, & Caterino, 2015; Leikanger, Ingul, & Larsson, 2012). Age is also found to be related to level of anxiety (Kinderman, Schwannauer, Pontin, & Tai, 2013). In the age-span 11–16 years, boys report decreasing levels of anxiety, whereas girls report increasing levels (Copeland et al., 2014; Merikangas et al., 2010). Studies have found that ethnic minorities report elevated levels of anxiety more often than ethnic majorities (Holly et al., 2015; Kinderman et al., 2013). In addition, poor family economic status has further been found to be a predictor of anxiety in adolescents (Bøe, Øverland, Lundervold, & Hysing, 2012), while other studies have reported no relation between anxiety and family economic status (Merikangas et al., 2010).

Adolescents whose parents have an anxiety disorder, more often report elevated level of anxiety (Micco et al., 2009) as well as adolescents whose parents have other chronic illnesses (Pai et al., 2007). Furthermore, the experience of negative life events, such as bullying, personal losses (e.g., death of family member), parent's divorce, living in exile, single traumas (e.g., major accident and rape), and multiple traumas (e.g., family violence and sexual abuse), are all associated with anxiety (Kinderman et al., 2013; Merikangas et al., 2010; Montgomery, 2011).

Cognitive models on the development and maintenance of anxiety disorders emphasize social support and self-efficacy as important (Beck, 2011). Social support might influence the adolescent's appraisals of situations, and improve problem-solving skills and promote adaptive behaviour (Cohen & Wills, 1985). Meta-analyses have accordingly reported that social support seems to be an important protective factor with regard to developing anxiety disorders in adults (Ehlers & Clark, 2000) as well as internalizing problems in adolescents (Buchanan & Bowen, 2008). The adolescent's amount and type of social support can be affected by their own efforts and efforts made by others in the adolescent's environment and are therefore particularly interesting in consideration of anxiety prevention strategies. At any rate, as far as we know, no study has investigated the role of social support in relation to anxiety in adolescents when other central psychological factors associated with anxiety are taken into account.

Self-efficacy represents the individuals' perceptions that he or she will be able to execute the actions necessary to achieve desired outcomes (Bandura, 1993). According to social cognitive theory, perceived self-efficacy to exercise control over potential threats plays a central role in anxiety arousal. As a result, individuals with lower perceived self-efficacy more often develop and maintain higher levels of anxiety than individuals with higher perceived self-efficacy. Studies on the relationship between levels of anxiety and self-efficacy have reported associations between low self-efficacy and self-reported level of anxiety in adolescent community-samples (Dupere, Leventhal, & Vitaro, 2012;

Fitzpatrick & Bussey, 2014; Landon, Ehrenreich, & Pincus, 2007; Mancini, Bowen, O'Neal, & Arnold, 2015; Muris, 2002; Rudy, Davis, & Matthews, 2012; Warner, Gutierrez-Dona, Villegas Angulo, & Schwarzer, 2015). Self-efficacy as a mediator of anxiety has been reported in a study of adults with panic disorder (Fentz et al., 2013). Self-efficacy has also been found to have a greater impact on changes in anxiety symptom later than earlier in treatment, which is consistent with the notion that exposure tasks predominantly occur towards the end of treatment (Gallagher et al., 2013). The finding is consistent with self-efficacy theory as mastery experiences are assumed to be the most effective way to increase self-efficacy (Bandura, 2001).

Purpose of the study

The aims of this article were to examine the prevalence of anxiety among adolescents in lower secondary schools and to explore characteristics of this group. Based on previous research, we hypothesized that elevated level of anxiety would be associated with female gender, higher age, ethnic minorities, lower parental education, poor family economic status, negative life events, lower social support, and lower self-efficacy.

Methods

Sample and procedure

The present study is based on a survey investigating anxiety symptoms in adolescents aged 12–17 years. Ten municipalities in different parts of Norway participated, comprising 18 lower secondary schools. A total of 4361 adolescents attending 8th to 10th grade comprised the target group of this study. Caregivers were asked to provide written informed consent for the adolescents to participate in the survey. The adolescents, whose caregiver provided permission, were invited to complete the survey in the classroom during school hours. Information about the survey was conveyed through the school's communication system with parents in terms of letters through satchel mails, e-mails, SMS, and meetings for parents and several reminders. A total of 1795 (41%) of the adolescents were given informed consent from parents to participate. Among these, 1719 adolescents (96%) participated. Data were collected school-wise from October 2014 to June 2015. All presented data are based on the adolescents' self-reports.

Measures

Level of anxiety was measured by the Spence Children's Anxiety Scale (SCAS) (Spence, 1998), child version. The participants were categorized as "not

anxious” or “anxious” based on the overall level of anxiety symptoms indicated by the SCAS composite score. SCAS is a 38-item scale covering symptoms of panic/agoraphobia, social phobia, separation anxiety, generalized anxiety, obsessions/compulsions, and fear of physical injury (e.g., “I feel scared when I have to take a test” or “I worry about being away from my parents”). Each item is scored on a four-point scale (0=“never”; 1=“sometimes”; 2=“often”; 3=“always”). Spence (1998) reported a six-month test–retest reliability of 0.60 for the total SCAS score, and significant correlations of 0.71–0.75 have been found between SCAS total scores and the scores on the Revised Children’s Manifest Anxiety Scale (Reynolds & Richmond, 1979; Spence, 1998; Spence, Barrett, & Turner, 2003), reported to be reliable cross-culturally (Orgiles, Fernandez-Martinez, Guillen-Riquelme, Espada, & Essau, 2016). Norwegian norms for SCAS are not available. However, since Norwegian and Swedish cultures are similar, we used the established and validated Swedish norms and the suggested clinical cut-off point for elevated level of anxiety (Olofsdotter, Sonnbly, Vadlin, Furmark, & Nilsson, 2016). “Anxious” was accordingly defined by a SCAS score of 33 or higher. In this study, Cronbach α for the SCAS was 0.93.

To measure life interference and impairment associated with anxiety, the Child Anxiety Life Interference Scale (CALIS) (Lyneham et al., 2013) was administered. The scale for youth consists of nine items (e.g., “Do fears and worries upset you?”). All items are rated on a five-point scale from 0 (not at all) to 4 (a great deal). The score on each item was added and a composite score was reported. Higher scores reflect a higher degree of overall interference with life. The scale has shown adequate psychometric properties (Lyneham et al., 2013). In this study, Cronbach α was 0.89.

To measure ethnicity, the adolescent was asked, “Where were you born?” Identical questions were asked about the parents. Ethnicity was defined as “Norwegian” if both parents or at least one parent and the adolescent were born in Norway, “Western immigrant” if both parents or at least one parent and the adolescent were born in another Western country, and “Non-western immigrant” if both parents or at least one parent and the adolescent were born in a non-western country. Parents’ education was measured by the question “What education has your mother/father completed?” The response categories comprised “lower secondary school,” “upper secondary school,” “higher education,” and “I don’t know.” Family economic status was assessed by the question “How would you rate your family’s economic status?” The response categories were “like most families,” “better off than most families,” and “worse off than most families.”

Information about experienced negative life events was collected in the form of responses to five questions. One question about bullying from the Olweus bully/victim questionnaire (Solberg & Olweus, 2003) was administered with a definition of bullying presented first, followed by the question “How often have

you been bullied at school in the past couple of months?" Response categories were coded on a five-point scale (1 = I have not been bullied"; 2 = a few times; 3 = two or three times a month; 4 = about once a week; 5 = several times a week). The next four questions about negative life events have previously been used in The Bergen Child Study (Nordanger et al., 2014). The question "Have you experienced any of the following?" were continued by "(1) a catastrophe or serious accident? (2) violence from an adult? (3) seen or heard anybody you care for be victim of violence from an adult?" (4) unwanted sexual acts?" The first question was coded on a three-point scale (1 = no, never; 2 = yes, once; 3 = yes, more than once). The questions about violence and sexual abuse were coded on a four-point scale (1 = no, never; 2 = yes, one time; 3 = yes, a few times; 4 = yes, number of times). Responding "no" or "never" to all five questions about negative life events was coded as "0 = no reported negative life events" whereas responding at least "yes" to any of the items was coded "1 = experienced bullying or other negative life events."

Social support was measured by the subscale "social resources" from the Resilience Scale (READ) (Hjemdal, Friborg, Stiles, Martinussen, & Rosenvinge, 2006). The social resources subscale consists of five questions (e.g., "I have some friends and relatives who frequently encourage me" and "I always have somebody available when I need it"). The response alternatives are ranked on a five-point scale, from "1 = totally disagree" to "5 = totally agree." The score on the five items were added and the average score from the items is reported. Higher scores reflect a higher degree of social resources. The subscale has shown adequate psychometric properties (Askeland & Reedtz, 2015). In this study, Cronbach α of the subscale was 0.80.

Self-efficacy was assessed by the General Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995). The scale consists of 10-items (e.g., "I can always manage to solve difficult problems if I try hard enough" and "I can usually handle whatever comes my way"). The response alternatives range from "1 = not at all true" to "4 = exactly true." The score of each item was added and the average score from items answered is reported. Higher scores reflect a higher degree of self-efficacy. The scale has shown adequate psychometric properties (Scholz, Gutiérrez-Dona, Sud, & Schwarzer, 2002). In this study, Cronbach α of the GSE was 0.90.

Statistical analysis

Data were analyzed using SPSS 22. Missing data varied from 2.2% to 7.1% depending on question asked. Descriptive statistics for the continuous variables are shown in Table 1. Due to the large sample size, skewness and kurtosis were deemed to have no substantive impact on the analyses (Tabachnick & Fidell, 2013). Preliminary analyses were conducted and revealed no violation of the assumptions of normality, linearity, and homoscedasticity, and absence of

high multicollinearity. Based on the total scores on the SCAS, each case was dummy coded as “0 = not anxious” ($SCAS \leq 32$) or “1 = anxious” ($SCAS \geq 33$). Chi-square tests were conducted to examine whether sociodemographics, interference of anxiety, and negative life experiences were significantly associated with the status of being anxious. Logistic regression analysis was performed to access the impact of each factor on the likelihood that participants would report an elevated level of anxiety. The model contained eight predictors (gender, age, ethnicity, parents’ education, family economic status, negative life events, social support, and self-efficacy). First, the predictors were entered in separate analyses. Then, an adjusted logistic regression analysis was conducted in which all the predictors were entered simultaneously.

Results

Prevalence of anxiety

The estimated prevalence of anxiety was 22.6% (95% confidence interval (CI) = 20.6%–24.6%).

Anxiety status, sociodemographics, and negative life events

The mean score on SCAS for the total sample was 23.19 ($SD = 15.60$). Cross-tab analyses and revealed that the presence of anxiety was associated with the interference of the anxiety, female gender, low family economic status, and various types of negative life experiences, see Tables 1 and 2 for details.

Predictors of anxiety

Table 3 shows the results from logistic regression analysis for elevated level of anxiety. The full model containing all predictors was statistically significant,

Table 1. Descriptive statistics for the continuous variables.

	M	SD	Range	Skewness	Kurtosis
Spence Children’s Anxiety	23.2	15.6	0 98	1.34	2.35
Social support	4.58	0.59	1 5	−2.23	6.05
Self-efficacy	2.95	0.52	1 4	−0.44	1.14

Note. The Spence Children’s Anxiety Scale (Spence, 1998), child version, was used to measure anxiety symptoms, Swedish norms were used to categorize adolescents as anxious or not anxious. Social support was measured by the subscale *social resources* from the Resilience Scale (Hjemdal et al., 2006). Self-efficacy was measured by the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995).

Table 2. Associations Between Sociodemographic Profiles, Negative Life Events, and Status of Anxiety in a Community Sample of Adolescents.

	Not anxious	Anxious	SCAS	Chi-square value	df	p-value
	<i>n</i> (%)	<i>n</i> (%)	<i>M</i>			
All (<i>N</i> = 1699)	1292 (77)	377 (23)	23.2	.		
Gender*				159.7	1	.000
Male	717 (56)	70 (19)	16.6			
Female	575 (45)	307 (81)	29.1			
Age				4.3	5	.501
12	14 (1)	5 (1)	21.4			
13	493 (38)	130 (35)	22.2			
14	422 (33)	126 (33)	23.5			
15	347 (27)	109 (27)	24.0			
16	13 (1)	7 (1)	30.7			
17	3 (0)	0 (0)	11.7			
Ethnicity				6.2	2	.045
Norwegian	1232 (96)	352 (94)	23.0			
Western immigrant	35 (3)	9 (2)	23.5			
Non-western immigrant	19 (2)	13 (4)	29.6			
Mother's education				1.1	3	.773
Lower secondary school	21 (2)	8 (2)	28.2			
Upper secondary school	247 (19)	65 (17)	22.5			
Higher education	583 (46)	176 (47)	23.4			
I don't know	426 (33)	125 (33)	23.2			
Father education				4.6	3	.203
Lower secondary school	37 (3)	14 (4)	25.6			
Upper secondary school	326 (26)	78 (21)	22.2			
Higher education	406 (32)	117 (31)	22.7			
I don't know	508 (40)	165 (44)	24.0			
Family economic status*				38.5	2	.000
Like most families	1014 (79)	271 (72)	22.6			
Better than most	236 (18)	63 (17)	22.5			
Worse than most	40 (3)	41 (11)	35.4			
Bullying*				115.3	4	.000
Not bullied	1125 (91)	252 (70)	21.4			
Some few times	81 (6)	79 (22)	34.7			
2 or 3 times a month	17(1)	14 (4)	34.7			

(continued)

Table 2. Continued.

	Not anxious	Anxious	SCAS	Chi-square value	df	p-value
About once a week	6 (1)	12 (3)	40.6			
Several times a week	8 (1)	3 (1)	26.6			
Single trauma*				53.9	2	.000
No, never	999 (80)	229 (63)	21.4			
Yes, one time	217 (17)	101 (27)	27.9			
Yes, more than once	39 (3)	36 (10)	31.9			
Violence from adult*				64.2	3	.000
Never	1197 (96)	304 (83)	22.3			
One episode	30 (2)	30 (8)	33.5			
Yes, some few times	19 (2)	20 (6)	37.1			
Yes, number of times	7 (1)	11 (3)	37.2			
Observing violence*				91.2	3	.000
Not observed	1152 (92)	278 (77)	21.9			
Yes, one time	74 (6)	41 (11)	28.5			
Yes, some few times	17 (1)	33 (9)	38.0			
Often observed	7 (1)	12 (3)	49.6			
Unwanted sex*			1616	39.1	3	.000
Never	1231 (98)	337 (92)	22.7			
Yes, one time	11 (1)	21 (6)	42.1			
Yes, some few times	5 (1)	4 (1)	28.2			
Yes, number of times	4 (0)	4 (1)	39.6			
Negative life events*				102.2	1	.000
No negative life event	845 (67)	139 (38)	19.6			
Negative life event	408 (33)	226 (62)	28.7			
Anxiety interference*				173.5	1	.000
Not at all	485 (37)	9 (2)	24.4			
Only a little	438 (34)	37 (10)	29.3			
Sometimes	329 (25)	131 (36)	36.9			
Quite a lot	35 (3)	127 (34)	61.6			
A great deal	5 (1)	67 (18)	44.0			

Note. * $p < .005$. The Spence Children’s Anxiety Scale (Spence, 1998), child version, was used to measure anxiety symptoms and to categorize each adolescent as “Not Anxious” or “Anxious.” “No negative life event” was defined by responding “no” or “never” to all questions about negative life events. Anxiety interference was measured by the Child Anxiety Life Interference Scale (Lyneham et al., 2013).

Table 3. Logistic Regression Analysis of Predictors of Anxiety in a Community Sample of Adolescents.

Variables	Odds ratios (95 % confidence interval)	
	Crude	Adjusted ^a
Gender		
Male	1.00 ^b	1.00 ^b
Female	5.47 (4.13–7.25)	5.93 (4.20–8.37)*
Age (12–17)	1.09 (0.95–1.24)	0.98 (.81–1.17)
Ethnicity		
Norwegian	1.00 ^b	1.00 ^b
Western immigrant	0.90 (0.42–1.89)	0.57 (0.22–1.47)
Not-western immigrant	2.40 (1.17–4.90)*	2.49 (0.97–6.37)
Mother's education		
I don't know	1.00 ^b	1.00 ^b
Lower secondary school	1.28 (0.56–3.00)	0.58 (0.19–1.82)
Upper secondary school	0.90 (0.63–1.26)	1.09 (0.65–1.82)
Higher education	1.03 (0.79–1.24)	1.21 (0.79–1.85)
Father's education		
I don't know	1.00 ^b	1.00 ^b
Lower secondary school	1.17 (0.62–2.21)	1.21 (0.52–2.83)
Upper secondary school	0.74 (0.54–0.99)	0.88 (0.55–1.40)
Higher education	0.89 (0.68–1.16)	1.00 (0.65–1.54)
Family economic status		
Like most families	1.00 ^b	1.00 ^b
Better than most	0.99 (0.73–1.36)	1.39 (0.94–2.04)
Worse than most	3.84 (2.43–6.05)*	1.86 (0.99–3.49)
Negative life events	3.37 (2.64–4.29)*	2.56 (1.91–3.45)*
Social support	0.24 (0.20–0.30)*	0.39 (0.30–0.52)*
Self-efficacy	0.13 (0.10–0.17)*	0.24 (0.17–0.33)*

Note. * $p < .05$. The Spence Children's Anxiety Scale (Spence, 1998) was used to classify each adolescent as "Anxious" or "Not Anxious." "No negative life events" was defined by responding "no" or "never" to all questions about negative life events. "Negative life event" was defined as responding yes to at least one of these. Social support was measured by the subscale "social resources" from the Resilience Scale (Hjemdal et al., 2006). Self-efficacy was measured by the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995).

^aOdds ratios adjusted for all other variables in the table.

^bReference class.

$\chi^2(df = 14, N = 1598) = 463.4, p < .001$, indicating that the model was able to distinguish between anxious and not anxious adolescents based on the predictors. The model as a whole explained between 25.2% (Cox and Snell R square) and 38.4% (Nagelkerke R squared) of the variance, and correctly

classified 77.5% of the cases. Gender, negative life events, social support, and self-efficacy made unique statistically significant contributions to the model. Adjusted logistic regression analyses found that gender was a strong predictor of elevated level of anxiety with an odds ratio of 5.93 (95 % CI = 4.20–8.37). This indicated that girls were about six times more likely to report anxiety than boys when controlling for all other factors in the model. Negative life situations or events had an odds ratio of 2.56 (95% CI = 1.91–3.45) for anxiety. The odds ratio of 0.39 (95% CI = 0.30–0.52) for social support and 0.24 (95% CI = 0.17–0.33) for self-efficacy, indicated that these two factors independently and substantially contributed to anxiety.

Discussion

Elevated level of anxiety was significantly associated with female gender, negative life events, low social support, and low self-efficacy, which were in line with our hypotheses. Contrary to our hypotheses, age, ethnicity, parental education, and family economic status did not significantly predict anxiety status in adolescents. In the present study, we found that the prevalence of anxiety among adolescents in lower secondary schools was 22%. This estimate is similar to the normative Australian data for total SCAS scores for adolescents 12–15 years (Spence et al., 2003), and a little higher than found in Danish children 7–17 years (Arendt, Hougaard, & Thastum, 2014). Anyhow, compared to most studies of anxiety among adolescents, the prevalence of elevated anxiety in the present study is high (Copeland et al., 2014; Leikanger & Larsson, 2012). This can be partly explained by the fact that different self-report scales have been administered across studies. Furthermore, the present study was embedded in a school-based project related to a prevention programs for anxious adolescents. Hence, there might have been some self-selection of high anxious subjects to the present survey, which might have contributed to inflated prevalence rates. Another interpretation is that the cut-off point we used (Olofsdotter et al., 2016) was more liberal than those used in other studies (DeSousa et al., 2014; Nauta et al., 2004; Spence, 1998; Whiteside & Brown, 2008).

In the present study, girls were estimated to have about six times higher odds of having elevated status of anxiety than boys. This result is in line with previous studies both from Norway and other Western communities (Arendt et al., 2014; Aune & Stiles, 2009; Copeland et al., 2014; Leikanger et al., 2012; Merikangas et al., 2010), but the gender difference is larger than in the Australian normative sample (Spence et al., 2003). Adolescents who reported negative life events had 2.5 times higher odds of reporting anxiety than adolescents who did not report such experiences. The association between negative life events and level of anxiety has been demonstrated previously in several studies of adults (Kessler et al., 2010; Sareen et al., 2013). We also found that social support provides a unique contribution to level of anxiety among adolescents. This is consistent with

previous studies on the beneficial effects of social support on health in general (Berkman, Glass, Brissette, & Seeman, 2000), and with studies that suggest that social support is a buffer for the development of anxiety and other psychological problems (Cohen & Wills, 1985; Dyregrov & Dyregrov, 2008). Furthermore, we found that the adolescent's general self-efficacy was inversely related to anxiety among adolescents when controlling for other variables. Our results are in line with social cognitive perspectives that regard individuals as proactive social agents, who actively adapt to environmental stressors (Bandura, 2001). Bandura claims that self-efficacy is situational-specific (Bandura, 1993). Our findings, however, suggest that the adolescent's general self-efficacy, not only the adolescent's self-efficacy related to specific anxiety-provoking situations, is associated to anxiety.

Implications

Several implications and suggestions for prevention initiatives and interventions targeting anxious adolescents can be drawn from our findings. First, in public education about health, our findings can be used to disseminate knowledge about the high frequency of elevated level of anxiety symptoms in adolescence. This can be valuable for adolescents, parents, and teachers by lessening the stigma related to anxiety and could be beneficial for anxious adolescents, their families, and school environments (Dudley, Silove, & Gale, 2012). Furthermore, given the high proportion of anxious adolescents reporting negative life events, interventions for anxious adolescents should consider including examples, explanations, and suggestions on how to cope with challenging negative life events. Interventions for anxious adolescents could communicate clearly that after negative life experiences such as single traumas, bullying, and witnessing violence, dealing with anxiety triggers can be more challenging, instead of focusing on coping styles exclusively.

Also, enhancing the adolescent's self-efficacy and social support are school related as well as health-related tasks. If adolescents more often were offered to reflect upon helpful coping styles in difficult situations, and supported to face and master anxiety provoking challenges, the level of anxiety in adolescents would probably decrease. Since higher social support and self-efficacy are inversely related to level of anxiety, such initiatives would be particularly beneficial for anxious adolescents. And interventions for anxious adolescents should consider including standard sessions for teachers and not sessions for adolescents and parents exclusively. Given the high prevalence of elevated anxiety symptoms in adolescents, and building on a public health approach underscoring preventions and early interventions (Major et al., 2011; Neuner et al., 2011; Stiffman et al., 2010; WHO, 2014), we argue that addressing anxiety is a responsibility of not only the individual adolescents and their families but also schools, school health services, and policy makers.

Limitations and strengths

Due to the low response rate and the sampling method where our community-based survey was embedded in a treatment study of anxiety, generalization of the current findings to a more general population of adolescents must be exercised with caution. The reasons for the low response rate may be parental scepticism and low priority of mental health surveys for their adolescents, in addition to technical challenges with the electronic system for collecting informed consent. The cross-sectional study design makes conclusions about the directionality of the associations between study variables impossible to draw. The sole use of self-report measures might have led to a common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). It should also be noted that when comparing self-reports and parents reports of adolescents' anxiety, previous research has shown that adolescents often report more severe symptoms than their parents (Beesdo et al., 2009). Further, there are factors associated with anxiety that were not considered in the current study, such as temperament, parental style, and academic achievements that could change the results from the investigated model. Moreover, we did not include questions about early losses, death, or illness in the adolescent's family among our questions about negative life events. If questions of such negative life events had been included, the influence of negative life events on anxiety could have been even higher than we were able to demonstrate.

The particular strengths of the current study are the high number of adolescents included, and the use of well-established questionnaires. The study provides data on the associations between status of anxiety and central associated factors that can be targeted through school-based anxiety prevention strategies and initiatives.

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Compliance With Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study was approved by the Regional Committee for Medical and Health Research Ethics, Region West, Norway (Ethics approval No: 2013/2331 REK Vest).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Erratum, Paper 2

1. In the abstract, the result-part:

“A total of 23% of the adolescents were categorized as anxious.”

2. In the abstract, and in the conclusion part:

“We argue that addressing anxiety is the responsibility of not only the individual adolescents and their families but also schools, school health services, and policy makers.”

3. Page 7:

“Cross-tab analyses revealed that the presence of anxiety was associated with the interference from anxiety, female gender, low family economic status, and various types of negative life experiences, see Tables 1 and 2 for details.”

4. Due to typos, a new Table 2 is attached (Added Analyses, Paper 2, Table 2).

A pilot study of a low-threshold, low-intensity cognitive behavioral intervention for traumatized adolescents

 psykologisk.no /sp/2017/04/e8/

Our pilot study with 11 adolescents indicates that the self-help material The Psychological First Aid Kit may serve as a flexible and useful therapeutic tool in areas related to trauma, interpersonal relations, and school, write Solfrid Raknes and colleagues.

BY: Solfrid Raknes, Kari Dyregrov, Ståle Pallesen, Asle Hoffart, Shirley Stormyren and Bente Storm Mowatt Haugland

Traumas such as sexual and domestic violence affect a large number of young people worldwide ([Benjet et al., 2016](#); [Finkelhor, Turner, Shattuck, & Hamby, 2015](#)). Elevated levels of post-traumatic stress (PTS), manifested in symptoms of hyper-arousal, intrusion, and avoidance of trauma-associated situations and thoughts, are highly prevalent after trauma. These symptoms are also identified as risk factors for developing post-traumatic stress disorder ([Ehlers & Clark, 2000](#)). Living with high levels of PTS typically interferes with a child's development and capacity for learning ([Zilberstein, 2014](#)). Furthermore, traumatized adolescents are at increased risk for exposure to new episodes of violence, and early intervention might be crucial for the prevention of further traumatization ([Dardis, Dixon, Edwards, & Turchik, 2014](#)). Effective treatments of adolescents' post-traumatic stress symptoms typically address problems related to previous trauma. Such treatments attempt to revise maladaptive trauma responses once adolescents' are safe. Providing cognitive behavioral (CB) interventions to adolescents with high levels of PTS has shown promising results, in terms of both symptom relief and preventing the development of post-traumatic stress disorder ([Cohen, Mannarino, & Iyengar, 2011](#); [Dyregrov & Yule, 2006](#); [Macdonald et al., 2012](#)).

Traumatized adolescents do not seek help for psychological problems as often as needed, and the majority of adolescents who do seek help are not offered evidence-based interventions ([Major et al., 2011](#); [Stige, Træen, & Rosenvinge, 2013](#)). Barriers to adolescents receiving evidence-based psychological health interventions include a high threshold to seek assistance and the costs related to upscaling existing interventions ([Pityaratstian et al., 2015](#); [Singla et al., 2014](#)). To reduce the threshold for receiving health interventions after trauma, outreach services have been established, which are located in arenas where the traumatized adolescents must be, such as at schools or at forensic interviews. To increase access to evidence-based interventions, low-intensity cognitive behavioral (LI-CB) interventions have been developed ([Bennett-Levy et al., 2010](#)). Compared to standard CBT, LI-CB interventions try to achieve similar

outcomes with less costly and more easily accessible interventions. LI-CB interventions can be delivered by less-specialized therapists. Furthermore, LI-CB interventions are typically briefer, with fewer interventions, and use self-help material in and between sessions. These factors can make the LI-CB interventions easier to upscale, especially in countries where therapist time is expensive and resources are scarce.

The Psychological First Aid Kit (PF) ([Raknes, 2010a](#), [2010b](#)) is a package of new self-help materials and clinician training methods that has been widely disseminated in Norway. A feasibility study involving primary healthcare workers ($N = 511$) concluded that six months after a short training seminar, the majority of the healthcare workers continued to use the PF. Moreover, they reported the materials as a useful part of brief interventions ([Haugland, Mauser, & Raknes, 2013](#)).

When new interventions are developed and used in new health services, they should be evaluated. This pilot study is the first to investigate the potential benefit of a brief intervention that includes the self-help material from the PF. The study was conducted in a natural setting where the therapists had a high clinical workload. The aims of this study were a) to investigate whether traumatized adolescents who received the PF as part of a brief LI-CB intervention showed symptom relief post-intervention, b) to ascertain whether results persisted through a one-year follow-up, and c) to explore how the self-help kit was used in the intervention.

Method

Procedure and participants

The study was approved by the Regional Committee for Medical and Health Research Ethics, region West (2011/2445), and was registered in ClinicalTrials.gov (NCT01612104). Participants ($N = 11$) were recruited from the Children's House in Oslo, Norway, which is an active outreach, low-threshold service for adolescents who are involved in police-reported cases as victims and/or witnesses of violence and/or sexual abuse. Standard procedure at the Children's House is for therapists to observe the adolescents' witness statements and offer brief intervention to those they think will benefit from it. The inclusion criteria for participating in the study were a) the adolescent showed stress responses during the forensic interview, b) the adolescent and caregiver were able to speak and read Norwegian, c) the adolescent and caregiver agreed to participate and to sign an informed consent form, and d) the adolescent would normally be offered a brief intervention at the Children's House. Potential participants were excluded if they had a previous known diagnosis of mental retardation or had reading skills below normal at age eight. All participants recruited were female, aged 12–16 years ($M = 13.7$, $SD = 1.30$). Nine participants were native Norwegians; two were immigrants. Seven participants lived with their mother as the primary caregiver, two lived every second week alternately with their mother and father, and two were in the care of the child welfare services.

To assess trauma experiences, the therapists administered the child version of the structured interview *Assessment of Traumatic Experiences* (KATE; NKVTS, 2011a). The caregiver completed the questionnaire version of the same instrument (NKVTS, 2011b). KATE is recommended for disclosure of trauma experiences (NKVTS, 2015) and was among the instruments known and used in the Children's House previous to this study. The feasibility of KATE for assessing trauma experiences in children has been carefully described in previous research (Ormhaug, 2012). All adolescents reported exposure to sexual or physical violence and to more than one trauma episode. Eight reported repeated multiple abuse histories, with the majority reporting that violence had occurred between close relations. Three reported having been neglected and having witnessed domestic violence.

Therapists

Three therapists, all female, participated. Two of them provided intervention to four adolescents while one provided intervention to three adolescents. One of the therapists was a psychologist, and two were social workers (Mean age = 48 years). All of the therapists had significant experience working with adolescents (Mean age = 18 years). One had prior training in trauma-focused CBT, but none had formal education in CBT. The therapists attended a two-day PF training workshop before the study started, and they participated in four two-hour group supervision sessions during the intervention phase.

Design

To explore the feasibility and potential of the LI-CB intervention, an exploratory mixed-method design was applied in this pilot study. Therapist-administered, paper-and-pencil questionnaires provided the basis for the quantitative analyses, while audiotapes and worksheets used during the intervention provided data for the qualitative analyses. The adolescents, caregivers, and therapists completed standardized inventories measuring the adolescents' PTS symptom level, general mental health status, and quality of life before and after the intervention. The same measures were repeated at three-, six-, and 12-month follow-up. In cases where the adolescents and/or caregivers were not able to come back to the Children's House to complete the questionnaires during the follow-up period, they were given the opportunity to complete them at home.

Intervention

The LI-CB intervention was not supposed to follow a predefined schedule of activities according to a manual. Instead, the therapists were encouraged to use the PF when expedient and in ways they found meaningful. Otherwise, they were supposed to offer intervention as usual. All participants received a PF to work with during and between sessions. The PF contains a booklet with text and illustrations explaining basic principles in the CB model. Red and green figurines represent negative automatic (red) and alternative (green) thoughts. Worksheets called the Helping Hand (see Figure 1) accompany the booklet.

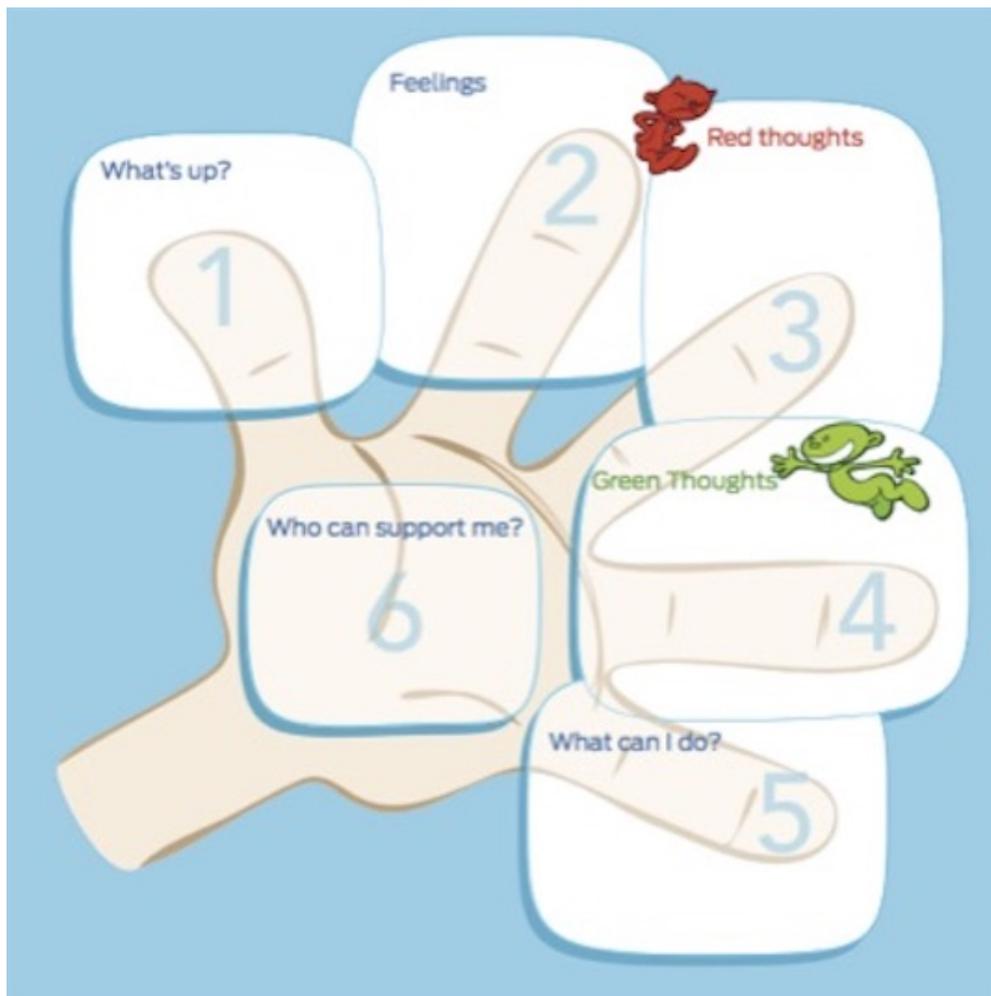


FIGURE 1: The worksheet from the PF kit.

The intervention started within two weeks of the forensic interview. It was comprised of two to six sessions ($M = 3.55$, $SD = 1.21$). The caregiver was provided with the intervention rationale and was invited to joint sessions if the therapist thought that including him or her would be crucial to the outcome. The duration of the intervention period varied from 11 to 105 days ($M = 45.89$, $SD = 30.35$). The adolescents who were in need of prolonged treatment were identified and motivated to accept further referral.

Quantitative material and analyses

The level of PTS symptoms was the primary outcome measure in this study. The *Children's Revised Impact of Event Scale (CRIES)* is a 13-item, four-point scale (range from 0–65, with the lower the score the better) that is used to measure PTS symptoms (Chen, Zhang, Liu, Liu, & Dyregrov, 2012). The CRIES consists of three subscales assessing intrusion, avoidance, and arousal. When used for screening purposes, as in the present study, it is recommended that only the intrusion and avoidance subscales of the CRIES be used. If the sum of the scores on these two scales is 17 or more, then the probability is very high that the child will meet the diagnostic criteria for having PTS disorder (Perrin, Meiser-Stedman, & Smith, 2005).

The secondary outcome benchmarks are intended to measure potential changes in a

broad array of mental health symptoms, as well as in function and quality of life, in the traumatized adolescents. *The Child Post-Traumatic Cognitions Inventory (cPTCI)* is a child-reported, 41-item, four-point scale (range from 0–123, with the lower the score the better) that is used to measure negative post-traumatic appraisals (Meiser-Stedman et al., 2009). The *Children's Global Assessment Scale (C-GAS)* is a clinician-rated, one-item scale (range from 0–100, with the higher the score the better) that is used to measure the child's level of functioning on a health-illness continuum (Shaffer et al., 1983). *The Parental Emotional Reaction Questionnaire (PERQ)* is a parent-reported, 15-item, five-point scale (range from 15–75, with the lower the score the better) that is used to measure the caregiver's reaction to the child's exposure to trauma (Cohen & Mannarino, 1996). *The Strengths and Difficulties Questionnaire (SDQ)* is a 25-item, three-point scale (range from 0–50, with the lower the score the better) that is used to measure adolescents' general mental health problems (Goodman & Scott, 1999), here completed by the caregiver. *The Spence Children's Anxiety Scale (SCAS)* is a 38-item, four-point scale (range from 0–114, with the lower the score the better) that is used to measure the severity of anxiety symptoms (Spence, 1998), here completed by the caregiver. *The Short Mood and Feelings Questionnaire (SMFQ)* is a 13-item, three-point scale (range from 0–26, with the lower the score the better) that is used to measure symptoms of depression in adolescents (Costello, Benjamin, Angold, & Silver, 1991), here completed by the caregiver. *The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents* is a 24-item, five-point scale (range from 0–120, with the higher the score the better) that is used to measure quality of life (Ravens-Sieberer & Biullinger, 1998), here completed independently by the adolescent (*KINDL-C*) and the caregiver (*KINDL-P*).

Data were analyzed using SPSS 22. Changes in primary and secondary outcomes were analyzed using repeated measures ANOVA and were further explored by least significant difference post-hoc tests. A p -value $< .05$ was considered statistically significant. The mean from the three follow-up measure points was used as a composite follow-up score in tests for significance. Only those adolescents who had valid data from pre-intervention, post-intervention, and follow-up were included in the analysis.

Qualitative data material and analysis

The qualitative data collected in this study were comprised of 42 audiotaped sessions with 11 adolescents as well as a total of 66 worksheets that were completed during the sessions. The audiotapes were transcribed and read to gain an overall understanding of the content. The aim of this transcription was to identify various in-session uses of the PF material. Based on the transcribed audiotapes, we explored whether the PF was used in each session and, if so, which part of the self-help kit was used. Since using the worksheets is supposed to be a central part of the PF, we wanted to analyze what psychological themes they were used to discuss. The worksheets were analyzed using a six-phase approach to thematic analysis (Braun & Clarke, 2008). The NVivo 10.2.1 software was used to make notes and to create and organize themes for the

worksheets.

The main themes and sub-themes reflecting the use of the worksheet were derived from the fixed categories given by the worksheet through a bottom-up analysis. They were obtained by first generating initial codes, then searching for themes, and finally reviewing potential themes. Codes, sub-themes, and main themes, including the process of defining and naming the themes, were discussed by the first, second, and fifth author to ensure they had a singular focus, did not overlap, and addressed our research questions. The validity of the themes was strengthened by comparing the ones we identified with the originally completed worksheets to ensure that 1) the meaning had not been altered during the analysis process and 2) the themes were grounded in the data (Berg, 2007). Drawing from our experience as psychologists and cognitive behavioral therapists, our terminology and frames for understanding themes stem from a psychological, trauma, and CBT perspective. Thematic analyses were conducted in Norwegian, close to the source material and in the mother tongue of the researchers, to increase the validity of the research (Qvale, 1998).

Results

Dropout date

Due to enrollment in another treatment, one adolescent resigned from the study before the intervention started. Once the intervention began, there were no dropouts.

Quantitative results

There was a significant decrease in the CRIES score over time, $F(2,16) = 7.87$, $p < .05$. Post-hoc tests indicated significant reductions from 29.67 ($SD = 3.6$) at pre-intervention to 18.89 ($SD = 3.36$) at post-intervention and 13.00 ($SD = 4.54$) at follow-up (see Table 1). The effect size in terms of Hedge's g was 0.98 from pre- to post-intervention and 1.29 from pre-intervention to follow-up. The proportion of adolescents who scored above the cutoff on the CRIES decreased from 80% at pre-intervention to 40% at post-intervention. All three therapists had clients who moved from above to below the cutoff on the CRIES during the intervention period. There was a significant increase in the CGAS score over time, $F(2,16) = 15.06$, $p < .05$, from 71.63 ($SD = 7.95$) at pre-intervention to 79.38 ($SD = 6.68$) at post-intervention and 81.23 ($SD = 7.69$) at follow-up. There was also a significant decrease in the PERQ score over time, $F(2,16) = 20.39$, $p < .05$, from 42.56 ($SD = 8.05$) at pre-intervention to 34.56 ($SD = 11.36$) at post-intervention and 27.78 ($SD = 5.63$) at follow-up. The mean scores of other measures of symptom levels tended to decrease over time, while scores of quality of life tended to increase over time; however, none of these changes was statistically significant.

TABLE 1: Changes in Symptom Level, Quality of Life, and Functioning.

Measures	n	Pre			Post			Follow-up		F(2/16)	Sign			Hedges' g		
		M	SD	M	SD	M	SD	a	b		c	a	b	c		
CRIES	9	29.67	10.84	18.89	10.07	13.00	13.63	7.87	*	*	n.s.	0.98	1.29	0.45		
cPTCI	9	19.78	8.79	11.11	6.35	14.33	12.26	3.34	*	*	n.s.	1.08	0.48	0.31		
KINDL-C	9	86.22	15.06	94.11	13.15	88.15	13.69	1.65	*	n.s.	n.s.	0.53	0.12	0.42		
C-GAS	8	71.63	7.95	79.38	6.68	81.23	7.69	15.06	*	*	n.s.	1.01	1.17	0.24		
PERQ	9	42.56	8.05	34.56	11.36	27.78	5.63	20.39	*	*	n.s.	0.77	2.03	0.72		
SDQ	9	12.78	6.69	10.89	7.09	10.50	4.77	1.33	n.s.	n.s.	n.s.	0.31	0.37	0.06		
SCAS	9	18.78	5.69	21.79	7.45	15.69	5.90	3.25	n.s.	n.s.	n.s.	0.43	0.51	0.86		
SMFQ	9	5.89	5.16	4.78	3.23	4.52	2.99	0.57	n.s.	n.s.	n.s.	0.24	0.31	0.08		
KINDL-P	9	90.89	12.21	88.56	10.49	88.85	10.59	0.43	n.s.	n.s.	n.s.	0.19	0.17	0.03		

NOTE: The Children's Revised Impact of Event Scale and the Child Post-Traumatic Cognitions Inventory (cPTCI) were completed by the adolescent. The Children's Global Assessment Scale (C-GAS) was completed by the therapist. The Parental Emotional Reaction Questionnaire (PERQ), the Strengths and Difficulties Questionnaire (SDQ), the Spence Children's Anxiety Scale (SCAS), and the Short Mood and Feelings Questionnaire (SMFQ) were completed by the parent. The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents was completed by both the adolescent (KINDL-C) and the parent (KINDL-P). Changes were calculated from (a) pre to post, (b) pre to follow-up, and (c) post to follow-up. The mean from the three follow-up measure points was used as a composite follow-up score in tests for significance. Significant at the $p < 0.05$ level.

Qualitative analyses and results

A summary of the parts of the PF used in the sessions, in terms of frequency of use, is presented in Table 2. All parts of the PF were used in all the interventions. The textbook was used in the sessions to explain the basic CBT principles and was read as a homework assignment. The red and green figurines were used for symbolizing thoughts, for fun in the sessions, and as reminders of helpful thoughts between sessions.

TABLE 2: Elements of the self-help material used in each session.

Part of PF used	S1	S2	S3	S4	S5	S6
Worksheet	91	100	100	80	100	100
Textbook	73	82	67	40	0	0
Figurine	73	73	56	0	0	0

NOTE: % of sessions where treatment worksheet, textbook, or figurines was used; coded from reviewing session audiotapes.

Data from the 66 worksheets that adolescents completed during sessions were used to address the following themes: 1) situations, 2) feelings, 3) red thoughts, 4) green thoughts, 5) coping strategies, and 6) supporters. Examples from the process of analyses, including text-abstracts from the worksheets, are presented in Table 3.

TABLE 3: Extract of qualitative analyses of 66 in-session completed worksheets.

Main themes	Sub-themes	Data extracts
<u>Situation described</u>		
Trauma	Dealing with trigger	<i>In school, thinking about the assault</i>
	Processing narrative	<i>A boy led me into the bathroom</i>
	Safety planning	<i>If my dad, the perpetrator, shows up again</i>
Relation	Challenge	<i>Mummy refused to buy me a new schoolbag</i>
	Problem	<i>A friend turned his back to me and said, "Just leave!"</i>
	Conflict	<i>My best friend's father has told her that the abuse I suffered was not true.</i>
Activity	Bullying	<i>Bob says rude things to me, that I'm a slut and a fucking whore – and the other boys just laugh.</i>
	School work	<i>I will have a school presentation.</i>
	Sleep	<i>In bed, try to sleep.</i>
<u>Red thoughts</u>		
Internal attribution	Not coping, future	<i>I'll make a fool of myself.</i>
	Not coping, past	<i>I didn't try hard enough to get away.</i>
External attribution	Not good, future	<i>Maybe he will hit me or do something that can destroy me.</i>
	Not good, past and now	<i>They did not trust me previously and will not support me now.</i>
<u>Green thoughts</u>		
Internal attribution	Coping, past	<i>I said let me go, stop!</i> <i>I said I didn't want this!</i>
	Coping, now	<i>I am older now, I am stronger, and I dare to do more.</i>
	Coping, future	<i>I can manage to walk away.</i>
External attribution	Bad, past	<i>It was his fault.</i>
	Good, now	<i>He cannot do me any harm now.</i>
<u>Coping strategies</u>		
Regulate myself	Talking	<i>Report it; it gives me release and my thoughts clear up.</i>
	Doing, escape	<i>Run away.</i>
	Doing, exposure	<i>Take the tube several times, practice.</i>
Regulate other(s)	Talking	<i>Answer them rudely; tell the adults.</i>
	Talking	<i>Tell her about my feelings.</i>
	Doing, help-seeking	<i>Go for help.</i>

Related to the *situations* theme, three sub-themes were found: a) trauma-related situations (safety planning, dealing with trauma triggers, working with the trauma narrative), b) relational situations (challenge, problem, conflict, bullying), and c) situations involving activities (schoolwork, sport, sleep). Related to the *feelings* theme, the sub-themes of anxiety, courage, guilt, anger, happiness, proudness, engagement, and affiliation were explored. Related to the themes of *red and green thoughts*, four

sub-themes were identified: a) internal-external attribution, b) negative-positive thinking, c) time (past, present, future), and d) meta-thoughts (e.g., “stop thinking” and “change thoughts”). Related to the *coping strategies* theme, two sub-themes were identified: a) behavior to regulate oneself or the other person(s) and b) behavior to change the situation (escape, talking, help-seeking, listening, thinking, and writing). Related to the *supporters* theme, grown-ups, peers, and oneself were the main categories identified, with mothers and friends specifically mentioned most often as supporters.

Discussion

The level of PTS symptoms decreased during the intervention period and remained low in the one-year follow-up period. It was promising that the proportion who scored above cutoff on the CRIES decreased from 80% pre-intervention to 40% post-intervention. These results are in line with the emerging body of research suggesting that CB early interventions can contribute to a reduction in PTS symptoms in traumatized adolescents (Gillies, Taylor, Gray, O'Brien, & D'Abrew, 2012; Meiser-Stedman et al., 2016; Roberts, Kitchiner, Kenardy, & Bisson, 2010). The results are also consistent with studies on LI-CB treatment for adults with elevated levels of PTS, indicating that interventions with minimal therapist contact combined with self-help material can contribute to significant decreases in PTS symptoms for traumatized individuals (Cuijpers, van Straten, & Andersson, 2008; Ivarsson et al., 2014). Still, it should be noted that a recent meta-analysis suggests that considerable natural recovery can occur up to six months post-trauma (Hiller et al., 2016).

From analyses of the in-session completed worksheets, we found that they were used to enhance coping in areas related to trauma, interpersonal relations, and school activities. The PF material was used to address maladaptive trauma responses in terms of developing safety plans, encouraging exposure to non-dangerous trauma reminders, and empowering reattribution work. The plurality of dilemmas, situations, symptoms, feelings, and thoughts for which the worksheets were used in the sessions suggests the value and necessity of a flexible and context-oriented approach in a low-threshold service for traumatized adolescents. This finding is consistent with previous research on early-intervention work with abused children in which the help-seeker receiving low-threshold services for trauma typically requires support in a vast and diverse problem area (Constantino, Crane, Noll, Doswell, & Braxter, 2007).

During the sessions, a broad spectrum of coping strategies was discussed and a diversity of supporters was identified. This suggests that the intervention helped the adolescents to use and strengthen their coping strategies and social network in challenging situations. Developing helpful coping strategies is a central element in recovery after trauma (Ellis, Nixon, & Williamson, 2009; Greenberg, Brooks, & Dunn, 2015) and is also a strategy recommended by female child abuse victims (Smith, 2007). Given that the availability of an effective social support system after traumatic

events is crucial for progress in the early phase after trauma, an early intervention that might strengthen the traumatized adolescent's social network is promising (Constantino et al., 2007; Ellis et al., 2009).

Methodological limitations and strengths

A number of limitations in the present study preclude the conclusions we can draw about the effects of the intervention on participant outcomes. One limitation is the small number of participants and the lack of a control group. Then, factors other than the intervention might have been more important for change. Such factors include natural recovery and maturation (Kazdin, 2003) and other treatment interventions the participants might have received during the follow-up period. Since the brief intervention was flexible with regard to the number of sessions and consisted of more elements than just the self-help kit, we also cannot draw conclusions about which of its specific components might have contributed to the decrease in PTS symptoms. Importantly, these therapists were highly experienced, and their own expertise might have influenced the results in a positive way. Further, another threat to the external validity of our findings was that none of the study participants were boys. Finally, the therapists who also administered and collected the data were supervised by the developer of the PF. This relationship may have biased the results in a favorable direction. Also, in the present study, the outcome measures were not specifically selected based on the intervention content, although they have been used in previous CBT trials on children with PTSD (Cary & McMillen, 2012; Dyregrov & Yule, 2006; Mifsud & Rapee, 2005). Future studies on this patient population should include outcome studies pertaining more specifically to the intervention process and content. Conversely, control groups, a higher number of participants, and researchers unaffiliated with the delivery of the therapy would be strengths associated with a more rigorous research design, one that would be appropriate for drawing conclusions regarding the effect of the intervention.

Limitations notwithstanding, the pilot study suggested that the intervention, which included CB self-help material and was carried out in a natural setting within an agency that specializes in working with traumatized adolescents, was feasible. This study advances its field by incorporating a mixed methods design rather than relying solely on qualitative or quantitative methods (Carr, 2008; Creswell & Plano-Clark, 2006). Outcome data provided by multi-informants—adolescents, parents/guardians, and therapists included—comprised another asset of the study, hence the relatively long follow-up period. Furthermore, because there has been relatively little qualitative research on what traumatized adolescents and their therapists actually discuss in cognitive behavioral-based early interventions (Jones, 2011), this study makes an important contribution to the literature.

Conclusion

This pilot study adds to the growing literature on LI-CB interventions for adolescents.

The study represents the first evaluation of a brief intervention that included the The Psychological First Aid Kit (PF) in a low-threshold service. Our findings suggest that the intervention is feasible. The PF was used in a flexible way, and important intervention gains were realized and sustained during long-term follow-up for the majority of the participants. The results are promising and provide a basis for future research with methodological rigor to investigate the potential effects of LI-CB interventions that include use of the PF.

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Abstract

A pilot study of a low-threshold, low-intensity cognitive behavioral intervention for traumatized adolescents

This pilot study investigated whether traumatized adolescents ($N = 11$) who received brief cognitive behavioral intervention, including self-help material, reported symptom relief. It also explored how the self-help material was used. A mixed methods, exploratory, one-group intervention design was used. The results indicated that the self-help material served as a flexible and useful therapeutic tool, one used to enhance coping in areas related to trauma, interpersonal relations, and school. Adolescents' levels of post-traumatic stress symptoms decreased, and the results were sustained at the one-year follow-up period. The promising results provide a basis for studies with better methodological rigor to investigate effects of interventions that include the use of self-help material in low-threshold services for adolescents.

Keywords: adolescent, CBT, mixed method, self-help, trauma.

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Competing interests: The authors alone are responsible for the contents and writing of this paper. The first author discloses the following commercial relationship: “The Psychological First Aid Kit” is a self-help material that I, Solfrid Raknes, have developed, and I receive royalties related to sales in accordance with the standard sharing rules for innovation in the public sector in Norway.

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