



UMEÅ UNIVERSITY

# Health for future

## Self-rated health and social status among adolescents

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*To my beloved family*



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## Abstract

Adolescent health is an important public health concern, both from the perspective that adolescents may have specific health problems related to youth (e.g. smoking initiation), and from the understanding of a healthy childhood as the foundation for a healthy adult life. To promote health in adolescence, more knowledge about adolescents' perceptions of health and the factors that influence health is needed. The overall aim of this thesis was to explore self-rated health, subjective social status and smoking in adolescents.

The thesis consists of a qualitative study (papers I and IV) and a quantitative study (papers II and III). The qualitative study was an interview study that included 58 participants in the 7<sup>th</sup> (12–13-year-olds) and 12<sup>th</sup> (17–18-year-olds) grades. The cognitive interviewing technique 'think-aloud' was employed to explore how adolescents interpret and reason when answering a question about self-rated health ('A person may feel good sometimes and bad sometimes. How do you feel most of the time?'). Additionally, factors contributing to subjective social status in school and the different strategies adolescents used for self-positioning were explored. Qualitative content analysis and thematic network analysis were used to analyze the data. The quantitative study was a cohort study involving 1046 adolescents who answered questionnaires about their health and a number of selected health-related factors. Surveys were conducted in the 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> grades. The survey data were used to investigate predictive factors in the 7<sup>th</sup> grade for smoking in the 12<sup>th</sup> grade, as well as to study associations between subjective social status in school, socioeconomic status and self-rated health in boys and girls in the 12<sup>th</sup> grade. Data were analyzed using chi-square tests, binary logistic regression and ordinal logistic regression analyses. Additional analyses of self-rated health over time and in relation to gender (not previously published) were also performed for the thesis summary.

When adolescents' interpretations of the self-rated health question were explored during the interviews, the data showed that participants interpreted the question in holistic terms including social, mental and physical aspects. Participants reflected on the response options and described differences between all the options. Results from the quantitative study (not previously published) showed that boys rated their health higher than girls at all ages. In addition, 50% of the participants' self-rated health remained unchanged from the 7<sup>th</sup> to the 12<sup>th</sup> grade. In a multivariable analysis, lower self-esteem, a less negative attitude towards smoking and ever using snus (moist smokeless tobacco) in the 7<sup>th</sup> grade were significant predictors of smoking in the 12<sup>th</sup> grade. Girls had an increased risk of becoming smokers. Cross-sectional analyses in the 12<sup>th</sup> grade showed that adolescents' self-rated health was positively associated with subjective social

status in school, mood in the family and self-esteem in both girls and boys. No association was found between self-rated health and socioeconomic status (parental education). Univariable and gender-specific analyses of self-rated health and subjective social status in school indicated that higher steps on the subjective social status scale (10-point scale) increased the likelihood of reporting higher self-rated health. Boys rated their subjective social status higher than girls did. When subjective social status in school was further explored through qualitative research interviews, status hierarchies in school were confirmed. Factors tied to gender, ethnicity, age and parental economy, as well as expectations about how to look, act and interact influenced their social positioning, which suggests that social positioning in school is complex and multifaceted.

In conclusion, this thesis contributes to an increased understanding of adolescents' self-rated health, social status and health behavior (smoking), issues that are relevant in health promotion. The qualitative findings suggest that the self-rated health question: 'How do you feel most of the time?' is useful for capturing a multidimensional view of health. Smoking is one of our greatest public health challenges and society has much to gain by preventing adolescent smoking. Early efforts to strengthen adolescents' self-esteem, promote anti-smoking attitudes and avoid early initiation into snus use seem to be important components of smoking prevention in adolescence. The positive association between self-rated health and subjective social status in school indicates that the subjective social status measure seems to be a useful health-related measure of social position in adolescents. The qualitative findings provide a deeper understanding of the complexity of social hierarchies in school. Because social desirability was defined by norms that left little room for diversity, the possible negative impact of status hierarchies on adolescents' health should to be considered. The gender difference in health and social status observed in this thesis emphasizes the need for a gender-sensitive understanding of factors that impact upon the daily lives of adolescents.

## Sammanfattning på svenska

Titel: Hälsa för framtiden. Självskattad hälsa och social status hos ungdomar

Ungdomars hälsa är en viktig folkhälsofråga, både utifrån perspektivet att ungdomar kan ha specifika hälsoproblem relaterade till ungdomsåren (såsom initiering av rökning), och utifrån perspektivet att en hälsosam ungdomstid utgör en grund för en god hälsa som vuxen. För att främja ungdomars hälsa behövs mer kunskap om hur de själva ser på sin hälsa och vilka faktorer som påverkar hur de mår. Det övergripande syftet för avhandlingen var att utforska självskattad hälsa, subjektiv social status och rökning hos ungdomar.

Avhandlingen baseras på en intervjustudie (artikel I och IV) och en enkätstudie (artikel II och III). Intervjustudien innefattade 58 ungdomar i årskurs sju (12–13-åringar) och årskurs tre i gymnasiet (17–18-åringar). Den kognitiva intervjutekniken 'think-aloud' användes för att undersöka hur ungdomar tolkar och resonerar när de besvarar en fråga om självskattad hälsa ('Man kan må bra ibland och dåligt ibland. Hur mår du för det mesta?'). Därtill undersöktes faktorer som bidrar till subjektiv social status i skolan och vilka strategier som används för att positionera sig i den sociala hierarkin. Kvalitativ innehållsanalys och tematisk nätverksanalys användes för att analysera intervjuerna. Enkätstudien var en kohortstudie där 1046 ungdomar svarade på frågor om hälsa och andra utvalda hälsorelaterade faktorer. Enkäterna besvarades i årskurs sju, åtta, nio, samt årskurs tre i gymnasiet. Enkätdata användes för att undersöka vilka faktorer i årskurs sju som kunde förutsäga rökning i årskurs tre i gymnasiet, samt för att undersöka samband mellan subjektiv social status i skolan, socioekonomisk status och självskattad hälsa hos pojkar och flickor i årskurs tre i gymnasiet. Data analyserades genom  $\chi^2$ -test, binär logistisk regressionsanalys och ordinal logistisk regressionsanalys. Ytterligare analyser av utvecklingen av självskattad hälsa, över tid och i relation till genus (inte tidigare publicerade), genomfördes också till ramberättelsen.

När ungdomarnas tolkning av frågan om självskattad hälsa studerades genom intervjuer, visade resultaten att ungdomarna tolkade frågan som multidimensionell inkluderande sociala, psykiska och fysiska aspekter. Deltagarna reflekterade kring svarsalternativen och beskrev skillnader mellan samtliga alternativ. Resultat från den kvantitativa studien (inte tidigare publicerade) visade att pojkar skattade sin hälsa högre än flickor gjorde i alla åldrar och att 50% av skattningarna förblev oförändrade från årskurs sju till årskurs tre i gymnasiet. I en multivariabel analys var lägre självkänsla, en mindre negativ attityd till rökning och ett tidigt snusbruk, faktorer som förutsade rökning i gymnasiet. Flickor hade en ökad risk att bli rökare. Tvärsnittsanalyser i årskurs

tre i gymnasiet visade att ungdomars självskattade hälsa hade ett positivt samband med subjektiv social status i skolan, stämningen i familjen och självkänsla hos både flickor och pojkar. Socioekonomisk status (föräldrars utbildningsnivå) visade inget samband med ungdomars självskattade hälsa. Univariabla och genus specifika analyser av självskattad hälsa och subjektiv social status i skolan visade att högre steg på den subjektiva sociala statusstegen (som hade tio skalsteg) ökade sannolikheten för att rapportera högre självskattad hälsa. Pojkar skattade sin subjektiva sociala status högre än vad flickor gjorde. När den subjektiva sociala statusen undersöktes ytterligare genom intervjuer så bekräftades statushierarkier i skolan. Faktorer knutna till genus, ålder, etnicitet och föräldrars ekonomi, samt förväntningar kopplade till utseende och interagerande påverkade deras sociala positionering, vilket tyder på att den sociala positioneringen i skolan är komplex och mångfacetterad.

Sammanfattningsvis bidrar denna avhandling till en ökad förståelse för ungdomars självskattade hälsa, sociala status och hälsobeteende (rökning), frågor som är viktiga i hälsofrämjande arbete. Resultat från intervjuerna visar att självskattad hälsa som undersöks genom frågan 'Hur mår du för det mesta?' tycks vara lämplig för att fånga en multidimensionell syn på hälsa. Rökning är en av våra största utmaningar för folkhälsan och samhället har mycket att vinna på att förhindra att ungdomar börjar röka. Tidiga insatser för att stärka ungdomarnas självkänsla, främja anti-rökattityder och att undvika tidig start av snusbruk, verkar vara viktiga komponenter i det tobaksförebyggande arbetet under tonåren. Det positiva sambandet mellan självskattad hälsa och subjektiv social status i skolan indikerar att den subjektiva sociala statusfrågan tycks vara ett användbart hälsorelaterat mått på social position under ungdomsåren. Eftersom normer som styrde social positionering i skolan var snäva, så behöver statushierarkiernas eventuella negativa inverkan på ungdomars hälsa uppmärksammas. Könsskillnader i hälsa och social status understryker behovet av genusperspektiv när det gäller förståelsen för olika faktorer som påverkar ungdomarna i deras dagliga liv.

## Abbreviations

CI	Confidence Interval
ERIC	Ethical Research Involving Children
HBSC	Health Behaviour in School-aged Children
HUNT	Norwegian Nord-Trøndelag Health Study
OR	Odds Ratio
UNCRC	United Nations Convention on the Rights of the Child
VIP	Very Important Person
WHO	World Health Organization

## Original papers

This thesis is based on the following papers:

- I            Joffer J, Jerdén L, Öhman A, Flacking R. Exploring self-rated health among adolescents: a think-aloud study. *BMC Public Health* 2016, 16:156 <https://doi.org/10.1186/s12889-016-2837-z>
  
- II           Joffer J, Burell G, Bergström E, Stenlund H, Sjörs L, Jerdén L. Predictors of smoking among Swedish adolescents. *BMC Public Health* 2014, 14:1296 <https://doi.org/10.1186/1471-2458-14-1296>
  
- III          Joffer J, Flacking R, Bergström E, Randell E, Jerdén L. Self-rated health, subjective social status in school and socioeconomic status in adolescents: a cross-sectional study. *BMC Public Health* 2019, 19:785 <https://doi.org/10.1186/s12889-019-7140-3>
  
- IV          Joffer J, Randell E, Öhman A, Flacking R, Jerdén L. Playing the complex game of social status in school – A qualitative study. *Submitted to Global Health Action*

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## Preface

Adolescence is often described as a healthy period in life. Therefore, adolescent health has attracted comparatively little interest in global health policies (1). However, with increased awareness of adolescence as an important period during which the foundations for health across the life course and capabilities related to health are developed, more attention has been directed toward this group (1, 2).

In Sweden today, adolescents' health is debated and described in somewhat contradictory ways. On the positive side, most adolescents in the study 'Health Behaviour in School-aged Children' (HBSC) rate their general health as 'excellent' or 'good', with no major changes during the past two decades (3-7). On the negative side, other data from the HBSC study reveal increasing numbers of self-reported psychological and psychosomatic symptoms, such as feeling irritated, low, nervous, or having headaches (8). When evaluating mental ill health, the mixed use of data on self-reported symptoms and mental disease complicates the debate. The conclusion drawn by the Swedish National Board of Health and Welfare that increasing numbers of adolescents are experiencing mental ill health (9), based on the number of adolescents treated for mental disease, has been questioned. Engström, Bremberg and Wikman (10) emphasize the need to investigate whether this reported increase is valid or could be explained by other factors. For example, increased awareness and acceptance of mental health problems in society may result in more adolescents seeking health care, and being more likely to report symptoms. As more young people seek care, there is a risk that normal life strains will become medicalized. The authors debate the need to explore possible explanations before medication and treatment are introduced (10). In this debate, Wickström and Kvist Lindholm (11) also argue that self-reported symptoms may sometimes be misleading, as they seem to cover both everyday transitory problems, and more profound problems.

Regardless of whether there has been an actual increase in mental health problems or not, today most researchers and experts seem to agree that adolescents' health is an important public health concern and priority. The focus of this thesis is on self-rated health, i.e. subjective general health as perceived by the adolescents themselves. The initial description of the current public debate in Sweden is important for contextualizing this thesis. The motive for focusing on self-rated health derives from an interest in exploring health from a multidimensional and subjective perspective. The scientific support for self-rated health as an important predictor of morbidity and mortality is another motive for this choice of focus (12). This thesis summary thus seeks to provide a deeper understanding of adolescents' health as a way to support 'health for future'.

# Theoretical and conceptual framework

This thesis derives from the interdisciplinary field of public health and the underlying assumption that good health in early life is the basis for good health in adult life, and for the future health of a nation (13). The need to give voice to adolescents in research (14) and acknowledge them as co-creators of knowledge has been central to this research project. Because it is essential to address gender issues in all health research (15, 16), gender theory is integrated.

## My position and perspectives

With my background in public health, my basic perspective is that health is a human right for all people, as stated in the Constitution of the World Health Organization (WHO).

The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition. (p.2) (17)

When I first engaged myself in public health work, I instantly identified children and adolescents as the most important groups to focus on in public health interventions. The reasons for this are two-fold.

First, children are vulnerable and, due to their young age, they are dependent on adults to provide for them. Throughout adolescence, their independence grows but they are still dependent on adults in many aspects. Within research focusing on children, the children usually need adults in order to be heard. The project ‘Ethical Research Involving Children’ (ERIC) (14) underlines the need to view children and young people as capable and to give them a voice in research. The project also acknowledges that research involving children is vital in order to fully understand their lives (14). According to the ‘United Nations Convention on the Rights of the Child’ (UNCRC) (18), which was incorporated into Swedish law in January 2020, children are entitled to have a say and to be heard on issues that affect them, and their opinions should matter in due processes.

The second reason for my focus on children and adolescents stems from a public health perspective in which a healthy childhood is regarded as a cornerstone for a healthy adult life (2). The promotion of health during early years is likely to reduce the need for interventions later in life. While this prospective view is central, it should also be emphasized that children have a right of their own to enjoy a good life here and now. As stated by Petersen (19), “children are not only human ‘becomings’. They are also human ‘beings’, with limited influential power, but all the same with their own rights of a good life – here and now” (p.1).

### ***Adolescents as co-creators of knowledge***

A growing body of research acknowledges the need to involve adolescents more actively in the creation of knowledge. Adolescents are increasingly regarded as competent and involved actors who can provide information about their own experiences and reflections (2, 14, 20). The recent work performed by Hiltunen (21), Duberg (22), Randell (23), Strömbäck (24), Warne (25), Wiklund (20), Landstedt (26) and Ambjörnsson (27) are some important contributions to this field.

### ***Ontology, epistemology and methodology***

Modern science has its roots in philosophy, with ontological (the nature of being) and epistemological (the nature of knowledge) considerations (28). One of the strongest influences in the emergence of modern science was the positivist paradigm, initially developed by the French philosopher Auguste Comte, within which the valuing of absolute objective knowledge and empirical evidence constitute central aspects (28). For this research project, however, I lean more towards the paradigm of constructionism (29) because the project involves socially constructed phenomena that may change depending on time and place (health, social status, gender, etc.). The project derives from the ontological assumption that ‘realities’ are socially constructed, subjective and multiple, and the epistemological assumption that knowledge is generated through interaction between the study participants and the researcher (30, 31), thus recognizing knowledge as co-created. This view of knowledge as constructed and subjective is most evident in the qualitative elements, but also to some extent in the quantitative sections through the choice of survey questions, mode of distribution of questionnaires, choice of statistical methods and interpretation of the results. Throughout the scientific process, I have tried to follow a systematic plan and remain as objective as possible, yet humble in the understanding that what I ask, how I ask it, how I analyze the data and present the results, all influence the outcome.

Ontological and epistemological assumptions influence the choice of scientific methodology (31). In the social sciences, the strengths and weaknesses of qualitative and quantitative methods are continuously debated (32). In the history of gender research and feminist theory, qualitative methods have been argued to be best suited to scrutinizing gendered phenomena, and especially when listening to and giving voice to women. However, in recent times it has been highlighted that different research questions require different methods (33, 34). In the history of health and medical sciences, the reverse argument has been predominant; namely, that statistics and quantitative approaches are best suited to studying health and well-being. This notion has been revisited and currently both approaches are frequently seen in health sciences. This thesis acknowledges

that quantitative methods are helpful to describe such aspects as the magnitude of a phenomenon or when statistical generalizability is desired, while qualitative methods are more helpful when exploring issues such as the meaning of new and unknown concepts and to study a phenomenon in depth (31). Furthermore, this thesis recognizes mixed methods, in which both qualitative and quantitative methods are used and integrated to enable the study of complex phenomena (35-38).

### **A public health approach**

Public health science studies the state of health, its changes and distribution in the general population and the determinants influencing health. Public health science also addresses how to influence the development of health and the health gaps between different groups in society (39). ‘Health promotion’ and ‘disease prevention’ are central perspectives in public health work. Health promotion, as defined by the WHO, refers to “the process of enabling people to increase control over, and to improve, their health” (5 p.) (40). Disease prevention within healthcare refers to a procedure through which people are treated to prevent disease. When treatment or other procedures are initiated before the onset of disease, e.g. vaccinations or reducing exposure to risk factors, this is named primary prevention (41).

In public health, the ‘determinants of health’ are used to explain the complex set of factors that influence the development of health (42). Some factors are largely fixed, e.g. age, sex and heredity (43), while other characteristics/determinants are, in theory, modifiable via policy measures: lifestyle factors; social and community networks; living and working conditions; and socioeconomic, cultural and environmental conditions (42). The determinants as such are neutral and, depending on life circumstances, they influence health in positive or negative ways, either as resources for health, or as risks (44). The WHO’s ‘Commission on Social Determinants of Health’ acknowledges that most inequalities in health are avoidable, and calls for action to close the health gap (45).

Patton and colleagues (1) state that substantial investments in prevention directed towards adolescents are required to promote their health. However, due to life circumstances and different determinants of health, adolescents’ opportunities to take part in universal actions may be limited. This has been more widely acknowledged during the last decade as the term ‘proportionate universalism’ has warranted much attention (46). Proportionate universalism relates to societies’ aspirations towards ‘health equity’. Equity implies that everyone should have a fair opportunity to attain their full health potential (47). Proportionate universalism acknowledges that actions should be universal, but

also proportionate to the level of disadvantage. The Swedish national public health policy (48) underlines that actions aiming to promote health and prevent disease should be adapted so that disadvantaged groups are enabled to participate.

## **Adolescence**

This thesis includes children as defined by the UNCRC, i.e. human beings below the age of 18 years (18). In this thesis, the term ‘adolescent’ will be used, as a way of emphasizing the older age of the participants (involving participants aged between 12 and 18 years). The WHO defines an adolescent as a person aged 10 to 19 years (49, 50). The word ‘adolescence’ derives from the Latin ‘adolescere’ which means growing up (2). The thesis covers both early adolescence (age range 10–14), and late adolescence (age range 15–19) (1).

## **Gender theoretical views**

In accordance with Öhman (16), and in line with a social sciences approach, this thesis acknowledges ‘gender’ as the socially and culturally constructed conditions and processes determining what it means to be a girl or a boy. In contrast to the concept of ‘sex’, which refers to biological characteristics, gender is something that we do or perform in social practice (51). In gender research, biology is regarded as an aspect that is intertwined with social life (16). Paechter (52) states that gender identities are constructed and performed in various ways based on time, place and circumstances.

The social practice of gender implies that young people learn to ‘do’ gender (51). As adolescents are often encouraged to adopt a gender performance that follows a heterosexual norm, gender constructions have restraining effects. The terms ‘emphasized femininity’ (53) and ‘hegemonic masculinity’ (54) can be used to describe normative femininities and masculinities. From such perspectives, the doing of ‘girl’ may involve e.g. beauty, empathy, dependence and sexual attractiveness, while the doing of ‘boy’ may involve e.g. heterosexuality, toughness, strength and risk-taking, or simply not ‘doing girl’. Connell (55) argues that hegemonic masculinity is facilitated by marginalized and subordinated masculinities, and is thus not uniform for all boys.

In this thesis, and in accordance with Landstedt (26), gender is acknowledged as a social determinant of health that cuts through all layers of health determinants (42). Sen and Östlin (56) state that: “Gender relations of power constitute the root causes of gender inequality and are among the most influential of the social determinants of health” (p.xii).

Öhman (16) states that gender should be considered an analytical tool for analyses of social factors and underlines the need to properly integrate gender as a theoretical concept into public health research. This means not simply to control for statistically significant differences between men and women, but to adopt a gender theoretical framework. When gender theory is overlooked, there is a risk that male-dominated views will be preserved and that the research will suffer from ‘gender-blindness’. As elaborated further in the following sections, this thesis acknowledges relational gender theory (15) and discusses gender through intersectional theory (57-59). By the adoption of a gender perspective, it is recognized that gender is an underlying factor that produces inequalities in health.

### ***Relational gender theory***

Relational gender theory, according to Connell (15), stresses the importance of looking beyond a categorical way of thinking in which masculinity and femininity are seen as opposites. From this perspective, gender is regarded as multidimensional and Connell acknowledges differences within gender categories; for example, between subordinated and hegemonic masculinities. Relational gender theory reflects upon social embodiment and states that gender theory must recognize both social dynamics and the agency of bodies. By referring to Krieger (60), who recognizes that “we live embodied” (p.351), Connell acknowledges that bodies and social processes are deeply enmeshed with one another (15).

### ***Intersectional theory***

Intersectional theory is recognized by a variety of disciplines (sociology, health sciences, philosophy, feminist studies, ethnic studies, etc.) to promote social justice (61). Intersectionality (57) supports the idea that human lives cannot be reduced to single characteristics (62). It provides an understanding of human beings as shaped by interactions within specific social locations (61). Hill Collins (58) states that “Race, class, gender, sexuality, age, ability, nation, ethnicity, and similar categories of analysis are best understood in relational terms rather than in isolation from one another” (p.14). From this perspective, inequalities are not the result of single factors, but rather the outcome of intersections of different social locations. An intersectional perspective acknowledges people’s lives as multidimensional and complex (61).

## **Health**

The word ‘health’ has its origins in the Old English word ‘hael’, which means whole. This suggests that health concerns the whole person (41). There are numerous definitions of health arising from different perspectives, from an early

disease-oriented paradigm to later multidimensional and holistic models (17, 41, 63-66). The WHO (17) recognizes health as a positive concept, “a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity” (p.2). This definition has been criticized for describing a utopian state and for not being accompanied by any operational definitions (67). Yet, the definition as such has led to greater focus on a positive and broad definition of health. The WHO’s declaration of ‘physical’, ‘mental’ and ‘social’ dimensions has become accepted to such an extent that a health measure that fails to include all of these dimensions is likely to be poorly received (67). In Sweden, the National Board of Health and Welfare (68) uses a definition similar to that of the WHO, but without the term ‘complete’; namely, “physical, mental and social well-being, not merely the absence of illness or injury” (my translation) (in Swedish: “fysiskt, psykiskt och socialt välbefinnande, och inte endast frånvaro av sjukdom eller skada”). This thesis acknowledges the multidimensional definition of health as declared by the WHO and the National Board of Health and Welfare. While the ‘complete state’ of health in the WHO definition is regarded as an ideal, this thesis primarily leans towards the view that one can experience good health without experiencing a ‘complete state’ of well-being.

### ***Measuring health***

Going back in history, a number of objective measures have been used to assess health, e.g. use of health services, mortality rates, morbidity or physical conditions (67). Since the 1980s’ there has been an increased focus on subjective measures that cover a broader view of health, e.g. health-related quality of life (69). There are numerous subjective measures that aim to capture general health or specific dimensions of health (67). Among these subjective measures, research shows that single-item general health questions, asking individuals to rate their overall health on a scale, are strong predictors of morbidity and mortality (12). Such questions are usually referred to as ‘self-rated health’, but also ‘subjective health’, ‘self-reported health’, ‘perceived health’ and ‘self-assessed health’. In this thesis, the term ‘self-rated health’ is used. Idler and Benyamini (70) claim that an individual’s health cannot be assessed without self-rated health, as it represents “an irreplaceable dimension of health status” (p.34).

Self-rated health questions were first used in healthcare as an easy and non-threatening way of starting a conversation about health with patients. The question was asked in a formal way and the respondent was instructed to pick one of the predetermined responses (71). In 1982, Mossey and Shapiro (72) found that self-rated health could predict mortality. Thereafter, numerous studies have confirmed that self-rated health is a strong predictor of future health, clinical outcome and mortality (12, 70, 73-75). The association with mortality remains even after adjustment for key covariates (75). The reliability has been claimed to

be good (76). Unlike more specific instruments that involve a series of questions or items, a single general health question enables respondents to decide for themselves how to value and combine various dimensions (12). People use different frames of reference when rating their health (70, 77, 78), indicating that self-rated health is a complex and multidimensional construct (79). Bailis, Segall and Chipperfield (80) claim that self-rated health is not only a spontaneous assessment, but also an enduring self-concept.

The WHO (81) and the EURO-REVES 2 group (82) recommend the use of a global self-rated health measure for population health monitoring. Garbarski, Schaeffer and Dykema (83) suggest that self-rated health should be placed before domain-specific health measures to increase inter-survey comparability, as specific items will vary across surveys. Self-rated health questions are usually divided into three different groups: non-comparative, age-comparative and time-comparative questions (84). The WHO (81) recommends the use of a question that refers to 'health in general' rather than a comparative question such as 'compared to other people of your own age'. Because the WHO definition of health acknowledges 'well-being' as part of the definition, the subjectivity of health is recognized. From this perspective, it could be claimed that assessments of health should include subjective measures. Table 1 describes some examples of self-rated health questions.

**Table 1.** Examples of self-rated health questions.

Question	Response options	Source
<b>In general, would you say your health is:</b>	Excellent Very good Good Fair Poor	Included in the instrument 'Short Form Health Survey' (SF36) (85)
<b>Your own health state today</b>	100-point visual analogue scale with 'best imaginable health state' (100) at the top, and 'worst imaginable health state' (0) at the bottom	Included in the instrument 'EQ-5D' developed by the EuroQol Group (86)
<b>How is your health in general? Is it...</b>	Very good Good Fair Bad Very bad	Included in the study 'European Health Interview Survey', performed by Eurostat (the statistical office of the European Union) (87)
<b>How would you describe your health in general?</b>	Very good Good Fair Poor Very poor	Included in the national Swedish study 'Health on equal terms?' performed by the Public health agency of Sweden, Statistics Sweden and the Swedish County Councils (88)
<b>Would you say your health is...<sup>a</sup></b>  In Swedish: Hur tycker du din hälsa är?	Excellent Good Fair Poor	Included in the international 'HBSC' study, performed by the WHO (89) in collaboration with national health authorities (7)
<b>If you think about your health, how do you think you feel?<sup>b</sup></b>  In Swedish: Om du tänker på din hälsa, hur tycker du att du mår?	Very good Rather good Not that good Not good at all	Included in the national Swedish study 'Living Conditions Survey of Children' performed by Statistics Sweden (90)
<b>How is your overall health?</b>  In Swedish: Hur mår du rent allmänt?	Very good Good Neither good nor bad Bad Very bad	Included in the Swedish study 'Life and health – Young people' (in Swedish: 'Liv och hälsa ung') (91)

<sup>a</sup> The Swedish part of the HBSC study uses the response options: 'Very good', 'Good', 'Rather bad', and 'Bad' (my translation). In this thesis, however, response options are worded in line with the international report published in 2016 (89). In 2014, the third response option for the Swedish question was changed from 'Rather good' to 'Rather bad'.

<sup>b</sup> My translation.

## Background

### Health in adolescence

As adolescents' health corresponds strongly with their health in adult life, an increased understanding of how determinants affect their health is crucial to the whole population (92). Viner and colleagues (92) underline that structural factors, such as access to education, national wealth and income inequalities, represent the strongest determinants of adolescent health worldwide. Also, safe and supportive families and schools, along with positive peer relations, are central in helping adolescents to develop their full health potential.

### *Understanding 'health'*

Self-rated health measures are often used when investigating adolescents' health. Studies on self-rated health primarily derive from the epidemiological tradition and a more thorough understanding, including the cognitive processes of self-rated health assessments, has been called for (73). Qualitative studies involving adult populations (77, 93-95) show that self-rated health captures emotions, health behaviors, physical functioning and health problems. Krause and Jay (78) conducted interviews with both adolescents and adults in the USA to evaluate what it is that self-rated health captures. It was found that young people (14-24 years old) were more likely to discuss health behaviors, while older people were more prone to mentioning health problems. The findings suggest that people in different age groups use different frames of reference.

Qualitative studies evaluating adolescents' self-rated health are lacking, but there are studies exploring adolescents' understanding of health in more general terms (96-100). Findings from interviews with 15-year-olds in Sweden show that social factors are central when adolescents are asked to describe how they feel (100). Group discussions about 'being healthy' with 15-year-olds in Italy revealed a view of health as an active and positive concept. Having a healthy weight, eating fruit, commitment in school and having plans for the future, possession of such items as a new phone or designer clothes and a strong sense of social belonging in the family and among peers, were some of the factors that were mentioned (97). When children and adolescents in the USA were asked to define health in 1978, Natapoff (99) found that they saw it as a positive attribute and that mental health was not considered part of being healthy, except for some of the older participants in the 7<sup>th</sup> grade.

Randell and colleagues (96) conducted interviews with 16-17-year-old boys in Sweden about their understanding of the concept of 'health' and what they did to

feel well. Health was described as holistic, but was dealt with in a dualistic manner. The participants made a differentiation between the body and the mind and emotional and relational aspects were emphasized (96). During focus group interviews about 'health' with 15–24-year-olds in the USA (98), participants reflected spontaneously about obesity and risk behaviors such as smoking, drinking and having unprotected sex. After additional discussions, however, these participants regarded health as a broader construct and discussed it in terms of an individual level, a relational level (e.g. supportive family or school) and a contextual level.

### ***Gender and age patterns in self-rated health***

Boys generally report better self-rated health than girls (101-104). In Sweden, data from the HBSC study show significant gender differences among both 13- and 15-year-olds. Among 15-year-olds, 26% of girls and 43% of boys report 'excellent' self-rated health (four-grade scale) (7). Data from the Swedish study 'Life and health – Young people' (Örebro County, year 2017) show that 19% of 15-year-old girls, and 42% of 15-year-old boys reported 'very good' self-rated health (five-grade scale) (105). Since Patton and colleagues (1) state that inequities (including gender inequities) shape all aspects of adolescent health, there is a need to reach a deeper understanding of adolescents' health linked to gender aspects.

Adolescents in Sweden report comparatively low rates of 'fair' or 'poor' self-rated health compared to other countries in the HBSC study (in 2014) (89). Among 15-year-olds in Sweden, only 15% of girls and 9% of boys reported 'fair' or 'poor' self-rated health, compared to 23% of girls and 17% of boys in Canada. Among the Nordic countries, Iceland shows the highest prevalence of 'fair' or 'poor' self-rated health (girls: 25%, boys: 18%).

Results from the HBSC study show a decline in self-rated health during adolescence. Among girls in Sweden, 48% of 11-year-old girls report 'excellent' self-rated health. Corresponding numbers for 13-year-olds are 37%, and for 15-year-olds, 26%. Among boys, 'excellent' self-rated health was reported by 52% of 11-year-olds, and by 45% and 43% of 13- and 15-year-olds respectively (7). In late adolescence, information is more limited but the Swedish 'Living Conditions Survey of Children' (conducted in 2017–2018) shows that 37% of girls and 63% of boys aged 16–18 rate their health as 'very good' (four-grade scale) (106).

In the study 'Health on equal terms?', young adults are included in the study population (16–29-year-olds). Results from the survey conducted in 2018 show that 25% of girls/women and 30% of boys/men rate their health as 'very good' (five-grade scale) (107). Longitudinal data from the 'Add Health' study in the USA

show a slight downward development in self-rated health from adolescence to young adulthood (108). The overall pattern suggests that there is a gender difference and a decline in self-rated health during adolescence.

### ***Time-trends and stability of self-rated health***

Based on data from the HBSC study, Potrebny and colleagues (109) reported a small improvement in ‘excellent’ self-rated health in the Nordic countries between 2002 and 2006, and thereafter a stable trend up until 2014. Different patterns were identified, however, among the Nordic countries, with Finland having a decreasing trend, while Norway had an increasing trend. In 2018, new data was collected within the HBSC collaboration. However, the international report, including 49 countries and regions, is not yet available (110). When looking at ‘excellent’ self-rated health in Swedish adolescents between 2002 and 2018, results from the HBSC study show a rather stable level between 2002 and 2010, a decrease between the years 2010 and 2014, followed by an increase in 2018 (3-7, 111). Time trends of ‘excellent’ or ‘very good’ self-rated health in US adolescents in the ‘National Health and Nutrition Examination Survey’ show a fairly stable development from 2001–2002 through 2003–2004, after which a negative development was seen between 2003–2004 and 2009–2010 (112).

Self-rated health has been referred to as a ‘relatively stable construct’ during adolescence, with 59% of the ratings remaining unchanged during a period of four years in the ‘Norwegian Nord-Trøndelag Health Study’ (Young-HUNT) (113). When monitoring self-rated health from adolescence to young adulthood (an 11-year period) in the HUNT study, the majority of participants (57%) gave identical ratings for their self-rated health (79). Boardman (114) drew a similar conclusion for adolescents in the USA, as self-rated health at baseline was strongly associated with self-rated health at follow-up one year later. Boardman argued that adolescents’ self-rated health “is in part a spontaneous health assessment but it is best understood as an enduring self-concept” (p.401) (114).

### ***Self-rated health and associated factors***

Cross-sectional findings show associations between adolescents’ self-rated health and a variety of intra- and interpersonal factors, including: psychological factors (115, 116), self-esteem (115), body concerns (115), body mass index (BMI) (116), health behaviors (115, 116), medical factors (115, 117), disability (115, 116), frequent use of social media among girls (118), subjective social status (119, 120), household income (116, 121), self-reported family wealth (103), family affluence (Family Affluence Scale) (122), family structure (103, 116), school type (121) and academic well-being and achievement (103, 123, 124).

In addition to studies using cross-sectional designs, some longitudinal studies, which provide a more comprehensive framework, have also been performed (79, 104, 108, 113, 114, 125-128). In the Norwegian Young-HUNT study, it was found that health-compromising behaviors, poorer quality of life, body dissatisfaction and disability predicted a deterioration in self-rated health over a four-year period. Self-rated health at baseline was the strongest predictor of future self-rated health (113). Boardman (114) found that self-rated health at follow-up was largely determined by self-rated health at baseline, as the explanatory power of 24 items (headache, stomachache, moodiness, trouble sleeping, etc.) at baseline was lower compared to the explanatory power of self-rated health. High levels of health-related empowerment, positive school experiences and a good mood in the family were found to predict the positive development of self-rated health in adolescents in Sweden (104). Goodman and colleagues (129) found that lower subjective socioeconomic status predicted poorer self-rated health. In the German 'Health Interview and Examination Survey for Children and Adolescents' (the KiGGS study), the relation between family structure (nuclear, single-parent, etc.) and self-rated health was investigated. It was found that better self-rated health was reported by adolescents from families that did not experience any change in structure between baseline and follow-up (127). Longitudinal findings from adolescence to young adulthood show that depressive symptoms, higher BMI and risk behaviors (drinking, smoking and inactivity) had strong negative associations with self-rated health over time (108), and in the Norwegian Young-HUNT study (79), self-rated health predicted allostatic load (systolic and diastolic blood pressure etc.).

### ***Adolescent health and tobacco***

Health behaviors represent important health determinants in adolescence (92). Behavioral risk factors such as tobacco use, harmful use of alcohol, physical inactivity and an unhealthy diet are closely linked to non-communicable diseases across the world. Among these risk factors, tobacco represents one of the world's leading preventable killers (130). From a global perspective, tobacco use (smoking and smokeless tobacco) has been described as a pandemic (131). While smoking is often initiated during adolescence (132), and while the risk of starting to smoke on a regular basis decreases after the age of twenty (133), adolescence represents a crucial time period for smoking prevention. If efforts are made to keep adolescents tobacco free, most of them will never start (134). Because symptoms of tobacco dependence develop rapidly after the onset of smoking (135), it is important to prevent adolescents from initiating smoking.

International data on weekly smoking (smoking at least once a week) from the HBSC study show that smoking increases significantly with age in most countries. Gender differences are observed in almost a quarter of the HBSC countries and,

in general, boys smoke more than girls (89). In Sweden, however, girls in the 9<sup>th</sup> grade smoke significantly more than boys (136). There is also a relatively high use of ‘snus’ (moist smokeless tobacco), which is more common in boys. The overall use of cigarettes amongst adolescents in Sweden has declined over the last few decades (136).

Longitudinal findings show that poorer self-rated health predicted smoking in girls in the USA (137), and cross-sectional findings show an association between poor self-rated health and smoking in adolescents in, amongst others, Norway (115), Canada (116) and Finland (138). A systematic review investigating the determinants of the onset of smoking in adolescents, performed by Wellman and colleagues (139), found that higher sensation-seeking, risk-taking, rebelliousness, susceptibility to smoking and intention to smoke in the future are some of the aspects that are related to smoking. Self-rated health was not included in the review. Smoking initiation seems to be more common in adolescents from disadvantaged backgrounds (139, 140). Research shows that having parents, teachers and/or peers who smoke are important factors that influence smoking in adolescence (132, 138, 139, 141-143). Short-term longitudinal findings show that low self-esteem is related to smoking onset in girls in the Netherlands (144).

### ***Adolescent health and social factors***

Over the past few decades, explanations for people’s chances of being healthy have shifted from focusing on individual risk and protective factors towards a focus on the influences of social structures and patterns (92). It is now well recognized that social factors are central to the health of individuals (45, 145, 146). Social position at a societal level (the macrostructure of society) has long been recognized as an important health determinant (145). In this regard, social position usually refers to socioeconomic status (occupational class, education or income). There is strong scientific evidence for health differences due to socioeconomic status, and the notion of a socioeconomic gradient in health is widely accepted (147, 148). However, the consistency across the lifecycle has been discussed as associations between parental/family socioeconomic status and adolescent health, show inconsistent results. Some studies show an association (128, 149-151), while others show a weak or no association (124, 152-154). The ‘equalization in health hypothesis’ is a popular explanation for the lack of consistency. This hypothesis suggests that family background grows less important in adolescence as they become more independent and are exposed to other influences (155).

In the exploration of a social gradient in health, subjective social status measures have warranted increased attention. In the year 2000, Adler and colleagues (156)

introduced the ‘MacArthur Scale of Subjective Social Status’, by which respondents are able to assess their sense of place within a social hierarchy. Subjective measures have been argued to predict various health outcomes better than traditional objective socioeconomic measures (157). In adolescents, subjective socioeconomic measures do show associations with their self-rated health (119, 129, 158). Goodman and colleagues (129) found that self-rated health correlated both to objective and subjective socioeconomic measures of social status, although more strongly to the subjective. One qualitative study from Canada showed that socioeconomic aspects, well-being and family life were central elements when adolescents were asked to describe their subjective social status within the community (159).

### *Social status in school*

Most subjective social status measures refer to socioeconomic aspects (156, 160), but youth versions referring to a school context have also been developed (161, 162). A positive association between self-rated health and subjective social status in school has been found in adolescents from Central and Eastern Europe (119) and in German university students (120). Associations between subjective social status in school and other factors have also been found, including: smoking (163-165), drinking (163, 165), physical symptoms and anger (166), psychological distress (161, 166, 167), ethnicity (168) and BMI (161, 168, 169).

School is central in the lives of adolescents, and is one of their most influential social contexts due to the amount of time they spend there (170). Although qualitative studies on adolescents’ social status in school are limited, Hiltunen (21) found that social status in school constitutes an important aspect influencing adolescents’ health. This was stated by adolescents in Sweden when they were asked to write essays about factors that influence ill health. Hiltunen describes the social game in school and acknowledges that social status can never be taken for granted, as it constantly needs to be upheld and defended. In this regard, exposure to social evaluative threats was regarded as a source of ill health. When adolescents in the USA were asked to describe kids in school who have high status, material goods and behavioral elements such as hanging out with a popular crowd were described (171).

## **Rationale**

In order to effectively promote health and reduce health inequalities, we need to elucidate how adolescents understand and define health, and determine the aspects that influence their health. Although self-rated health questions are widely used in studies investigating adolescents’ health, we lack a deeper understanding of how such questions are understood by the adolescents themselves. This knowledge is imperative to enable us to interpret the results

correctly. While different wordings and expressions are used in self-rated health questions, it is also important to explore the interpretations of such wordings.

As mentioned earlier, most adolescents in Sweden report ‘excellent’ or ‘good’ self-rated health (7). Yet, gender differences and a decline in self-rated health during the adolescent years indicate a health gap that needs to be further addressed. It has been claimed that self-rated health is a relatively stable construct during adolescence (113), but such studies are sparse and more longitudinal information is needed.

Self-rated health is multidimensional and associated with many different factors in life. Among the associated factors, health behaviors have been found to be central (115, 116), and among them, tobacco use is an important public health challenge. Although there has been a decline in the prevalence of tobacco smoking across the world since the beginning of the twenty-first century (172), the burden of smoking-related disease is still of major importance (130), motivating early preventive action. More research on self-rated health as a predictor of smoking is needed. To facilitate primary prevention, there is also a need for longitudinal studies that are able to assess other predictors of smoking.

Social aspects are regarded as central to adolescents’ health (21). Socioeconomic measures, such as education or income, are often used to describe associations between health and social position. While an association has been established for small children and adults, current findings are inconclusive for adolescents. Within this field of research, subjective social status measures are increasingly used and, for adolescents, a measure investigating ‘subjective social status in school’ has been developed (161). Although we have a limited understanding of the association between subjective social status in school and self-rated health, the studies that do exist (119, 120) reveal interesting results that warrant further attention. Also, there is a lack of knowledge concerning the factors that contribute to social positioning in school. Such knowledge is central to understanding and addressing social hierarchies in school. Qualitative studies exploring the concept of subjective social status are needed (173).

# **Aims**

## **Overall aim**

The overall aim of this thesis was to explore self-rated health, subjective social status and smoking in adolescents.

## **Specific aims**

The specific aims were:

I: to explore how adolescents interpret and reason when answering a question about self-rated health;

II: to examine predicting factors in early adolescence for smoking in late adolescence;

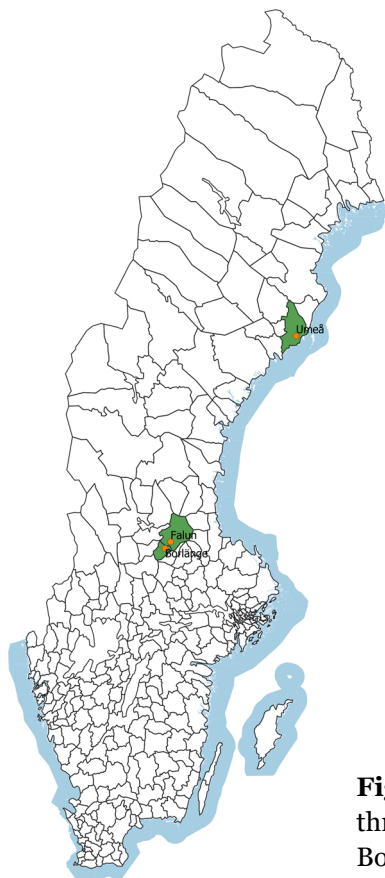
III: to examine associations between subjective social status in school, socioeconomic status and self-rated health in adolescent boys and girls;

IV: to explore what contributes to subjective social status in school and the strategies used for social positioning.

## Materials and Methods

### The overall research design and setting

This thesis comprises a sequential mixed methods design (38), aiming to integrate qualitative and quantitative findings in the results and the discussion of the thesis summary. The purpose of integrating data was to use ‘complementary’ findings, taking a mixed methods approach in which qualitative and quantitative results supplement each other (35). The collection and analysis of data were carried out separately and the findings were consolidated during the stage of presenting data and interpreting the results. In the four separate papers, results from the qualitative study are presented in papers I and IV, and results from the quantitative study are presented in papers II and III. An overview of the papers is given in Table 2. The qualitative study was performed in one Swedish municipality (Falun), and the quantitative study in three Swedish municipalities (Figure 1)



**Figure 1.** Map of Sweden with the three participating municipalities Borlänge, Falun and Umeå.

**Table 2.** Overview of papers I–IV of this thesis.

<b>Papers</b>	<b>Aims</b>	<b>Study design</b>	<b>Data sources</b>	<b>Participants</b>	<b>Analyses</b>
<b>I</b>	To explore how adolescents interpret and reason when answering a question about self-rated health	Qualitative Exploratory	Interviews	58 adolescents in lower and upper secondary school (12–13 years old, and 17–18 years old)	Qualitative content analysis
<b>II</b>	To examine predicting factors in early adolescence for smoking in late adolescence	Quantitative Longitudinal	Questionnaires (VIP study)	649 adolescents followed from 7 <sup>th</sup> grade in lower secondary school (12–13 years old) to 12 <sup>th</sup> grade in upper secondary school (17–18 years old)	Descriptive statistics, univariable- and multivariable logistic regression analyses
<b>III</b>	To examine associations between subjective social status in school, socioeconomic status and self-rated health in adolescent boys and girls	Quantitative Cross-sectional	Questionnaire (VIP study)	705 adolescents in upper secondary school (17–18 years old)	Descriptive statistics, univariable- and multivariable ordinal regression analyses
<b>IV</b>	To explore what contributes to subjective social status in school and the strategies used for social positioning	Qualitative Exploratory	Interviews	58* adolescents in lower and upper secondary school (12–13 years old, and 17–18 years old)	Thematic network analysis

\* In paper IV, one boy in the 12<sup>th</sup> grade was excluded from the analysis because he had difficulties in understanding the subjective social status question; thus, the analysis included 57 participants

## **The qualitative study**

The qualitative study comprises papers I and IV and derives from an inductive (emergent) research design employing the interviewing technique ‘think-aloud’, with probes (follow-up questions) and semi-structured interview questions. The interviews were performed by JJ.

Think-aloud is a cognitive interviewing technique that seeks to reveal the process of thinking when answering survey questions, and to detect potential sources of response errors within questions. During a think-aloud, thoughts can either be captured ‘concurrently’ (as participants answer the question) or ‘retrospectively’ (immediately afterwards) (174). In the study, a combination of concurrent and retrospective think-alouds was used, which has been suggested for optimal data quality (175).

## ***Research setting***

The study was performed in Falun (Figure 1), a town located in the middle of Sweden with approximately 56 000 inhabitants at the time of the study (176). The town is representative of the country with respect to income, employment, educational level and academic school grades (177). Furthermore, the outcome of elections to the national parliament is similar to the national results (178). Two schools in the 7<sup>th</sup> grade (lower secondary school, 12–13-year-olds) and one school in the 12<sup>th</sup> grade (upper secondary school, 17–18-year-olds) were approached and asked to participate. All three schools accepted the invitation.

## ***Recruitment and participants***

Classes were selected in consultation with the headmasters of the schools. A purposive sampling that aimed for maximum variation was applied. Four classes in the 7<sup>th</sup> grade and seven in the 12<sup>th</sup> grade (academic, vocational and introductory school programs) were approached during class hours. Potential participants were provided with both oral and written information about the study during class hours. Adolescents in the 12<sup>th</sup> grade were able to sign a consent form immediately upon receiving the information, while adolescents in the 7<sup>th</sup> grade also had to obtain informed consent from their parents/guardians. Adolescents who were absent at the time when the information was given received only written information, which was provided by the class teachers. The participants’ characteristics are described in Table 3.

**Table 3.** Characteristics of the study participants in the qualitative study.

	7 <sup>th</sup> grade n=23	12 <sup>th</sup> grade n=35
<b>Gender</b>		
Boys	10	19
Girls	13	16
<b>School program</b>		
Academic	-	17
Vocational	-	11
Introductory	-	7
<b>Country of birth</b>		
Born in Sweden	22	30
Born outside of Europe	1	5
<b>Self-rated health</b>		
Very good	9	14
Rather good	13	19
Neither good, nor bad	1	1
Rather bad	0	1
Very bad	0	0
<b>Subjective social status in school</b>		
1-3	0	0
4	1	4
5	5	2
6	2	10
7	10	8
8	4	5
9	1	3
10 (highest)	0	2

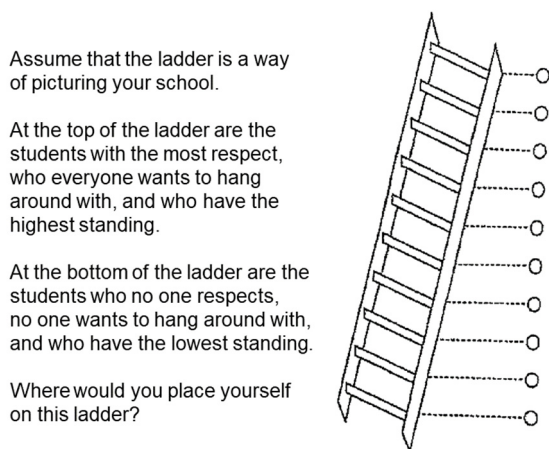
### **Data collection**

Two pilot interviews (not included in the analysis) were conducted to test the research protocol and the think-aloud technique. All participants chose to be interviewed in school and the interviews were conducted in a quiet room. The interviews lasted between 20 and 90 minutes (31.5 hours in total). All interviews were audio recorded and transcribed verbatim, after which the recordings were deleted.

### *The interviews*

All interview sessions were initiated with a questionnaire asking for background information (name, age, country of birth, etc.). Thereafter, the think-aloud procedure was described and practiced through neutral questions such as: ‘How do you consider the weather today?’ Participants were asked to imagine answering a questionnaire without the presence of the interviewer (as questionnaires are usually conducted) and to think aloud when answering the

questions. Once the participant understood the think-aloud technique and the way in which the interview would be performed, the actual interview was initiated. The participants were interviewed only once, and during the interview session, two survey questions were explored. First, self-rated health: ‘A person may feel good sometimes and bad sometimes. How do you feel most of the time?’ (in Swedish: ‘Man kan må bra ibland och dåligt ibland. Hur mår du för det mesta?’). Second, subjective social status in school (Figure 2) (in Swedish: ‘Tänk dig nu att denna stege är ett sätt att beskriva din skola. På toppen av stegen finns de elever som är mest respekterade, som alla vill vara med och de som har den högsta ställningen. Nederst på stegen finns de elever som ingen respekterar, som ingen vill vara med och de som har den lägsta ställningen. Var skulle du placera dig själv på denna stege?’).



**Figure 2.** The survey question ‘subjective social status in school’.

The survey questions were presented to the participants on sheets of paper with the response options. The first question (self-rated health) was explored in full, after which the second question (subjective social status in school) was explored. Results pertaining to self-rated health are presented in paper I, and results about subjective social status in paper IV.

In the concurrent phase of the interview, the participant was instructed to say out loud everything that came to mind when answering the question. In cases where they silently answered the question, the participant was asked: ‘What were you thinking about when answering the question?’ As part of the retrospective phase, the following probes were used: ‘Did you say everything that you were thinking about? Did you get a direct feeling of which option you would choose? Were you

sure about your answer?’ In the final stage of the interview, semi-structured questions were used to investigate why the respondent had chosen one response option instead of another, and how they felt about answering potentially sensitive survey questions. During the exploration of the self-rated health question, participants were also asked what they would have answered if they had been asked about their ‘health’. After approximately half of the interviews had been conducted, a question about gender was added, because this was a frequently occurring topic.

A total of 58 interviews were conducted. The researchers experienced saturation by the time the last few interviews were being held. All participants received a movie ticket after the interviews. In the analysis of subjective social status in school (paper IV), one boy in the 12<sup>th</sup> grade was excluded due to difficulties in understanding the concept of ‘social status’, due to not having Swedish as his native language. Hence, the analysis in paper IV included 57 participants.

## ***Data analyses***

### *Paper I*

Qualitative content analysis (179) taking an inductive approach was used to analyze the interview transcripts. These transcripts were divided into four groups: younger girls, younger boys, older girls and older boys. The division and color-coding helped to explore potential differences and similarities between groups. Transcripts were read several times to get a sense of the whole. After that, meaning units were identified, condensed, labeled with codes and sorted into content areas. Categories were developed at both manifest and latent levels, i.e. what was clearly reasoned and obvious information, and the underlying meanings of the text. Two authors (JJ and RF) performed separate coding of all transcripts and conducted most of the analysis. All authors discussed the content of the transcripts and were involved in the analytical phase and the interpretation of the text.

### *Paper IV*

Thematic network analysis (180) was used to analyze the parts of the interviews pertaining to subjective social status in school. Thematic analysis involves the creation of basic, organizing and global themes of qualitative material that can be presented in web-like illustrations (networks). The aim of a thematic network is “to explore the understanding of an issue or the signification of an idea” (p.387) (180). A basic theme is the lowest-order theme derived from textual data. Together, basic themes represent an organizing theme. A global theme comprises the principal metaphor of the data as a whole. A network is developed by starting with the basic themes and working inward towards a global theme.

During the analysis, transcripts were read to form an overall impression of the content. Then they were divided into four groups (younger girls, younger boys, older girls, and older boys), which were color-coded. This division facilitated the explorations of potential differences and similarities between boys' and girls', and younger and older participants' ways of describing subjective social status. After re-reading and coding the transcripts, separate codes were clustered into ten basic themes. These in turn generated three organizing themes that were clustered into a global theme, representing the key point of the text. In the next stage, the original transcripts were re-read with the aid of the generated network. A summary of the themes, and the patterns characterizing them, were described. In the final stage, the themes were related back to the original research question.

Although some gender and age differences could be discerned, it was still feasible to summarize the participants' views within one common network. The identified differences are described within the separate themes in the Results section. Two authors (JJ and ER) performed separate coding of all transcripts and conducted the main analysis. All authors discussed the content of the transcripts, took part in the analytical phase, and contributed to the interpretation of the text and the creation of the network.

### **The quantitative study**

The quantitative study comprises papers II and III and derives from a prospective cohort study entitled 'Very Important Person' (VIP). Data were gathered before JJ entered the research project. The study has been described before in detail by Jerdén (181).

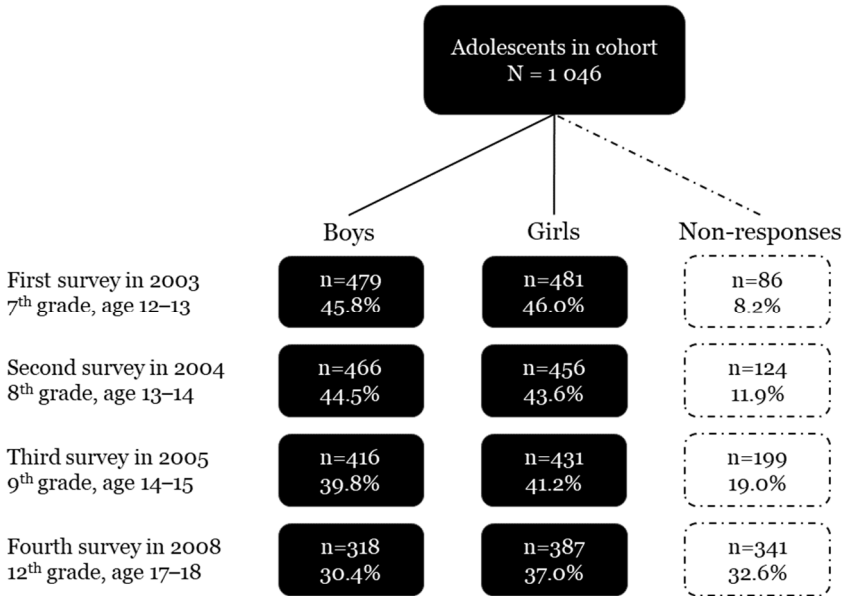
### ***Research setting***

The study was performed in three municipalities in Sweden: Borlänge and Falun in Dalarna County, located in the middle of Sweden, and Umeå in Västerbotten County, located in northern Sweden (Figure 1). Seven schools, selected on the basis of different levels of parental socioeconomic status (educational level), were approached for participation. Three schools covering the highest parental educational level, and four schools covering the lowest were invited. All seven schools accepted the invitation.

### ***Recruitment and participants***

The study commenced in 2003 when participants entered the 7<sup>th</sup> grade (lower secondary school, 12–13-year-olds), and the fourth survey was performed when they had reached the 12<sup>th</sup> grade (upper secondary school, 17–18-year-olds) in the year 2008. A total of 1 046 adolescents were included in the study, i.e. all the students who were available in the selected school classes when the study was

initiated. Participants and non-responses (drop-out and un-identified) are described in Figure 3.



**Figure 3.** Adolescents in the cohort.

Baseline characteristics of the study participants are described in Table 4. At baseline and in the two following surveys, the questionnaire was answered in school, during school hours. For the fourth survey, a postal questionnaire sent to participants’ homes was used. This choice was made for logistical reasons, since adolescents in Sweden change school level after 9<sup>th</sup> grade and are spread out across different school units.

**Table 4.** Baseline characteristics of the study participants in the quantitative study.

	<b>Boys n=479 n (%)</b>	<b>Girls n=481 n (%)</b>
<b>Age (n=955)</b>		
12 years old	102 (21.4)	109 (22.7)
13 years old	353 (74.2)	361 (75.4)
14 years old	21 (4.4)	9 (1.9)
<b>Country of birth (n=958)</b>		
Born in Sweden	446 (93.3)	448 (93.3)
Born outside Sweden	32 (6.7)	32 (6.7)
<b>Residence (n=926)</b>		
City/Town	273 (59.0)	257 (55.4)
Village	115 (25.0)	109 (23.5)
Rural area	74 (16.0)	98 (21.1)
<b>Parental education (n=937)</b>		
High	243 (52.1)	231 (49.0)
Low	223 (47.9)	240 (51.0)
<b>Self-rated health (n=953)</b>		
Very good	266 (56.0)	223 (46.7)
Rather good	181 (38.1)	213 (44.5)
Neither good, nor bad	25 (5.3)	33 (6.9)
Rather bad	3 (0.6)	7 (1.5)
Very bad	0 (0)	2 (0.4)

### **Questionnaire**

A questionnaire measuring factors such as sociodemographic characteristics, self-rated health, health behaviors and health-related empowerment was developed. Some of the questionnaire items were selected from other Swedish surveys (182-184), such as the Swedish part of the HBSC study, and some items were developed by the research group. During this development, efforts were made to use accessible language. The questionnaire was tested in a pilot study in 2002 involving 150 students in the 7<sup>th</sup> grade, and was discussed with students and teachers in two classes. Thereafter, in 2005, the questionnaire was tested for reliability through a test-retest. A total of 204 students in the 7<sup>th</sup> grade were invited to answer the questionnaire on two occasions with a one-week interval. Of these, 171 students (84%) responded to both questionnaires. Items with kappa-values <0.40 were excluded from the analyses. In the fourth questionnaire, a question about subjective social status in school was added.

**Sex/gender** was measured by asking if they were a boy or a girl. In the presentation of results, the term ‘gender’ will be used to acknowledge gender as socially constructed. In the analyses, gender was operationalized as a binary category based on participants’ own choice of gender (boy/girl) in the questionnaires.

**Country of birth** was measured using four options: ‘In Sweden’, ‘In Norway, Denmark, Finland or Iceland’, ‘In another country in Europe, namely...’, and ‘In another country outside Europe, namely...’. This question was used in papers II and III and the participants were dichotomized as born either in Sweden, or abroad.

**Residence** was measured via three options: ‘City/town’, ‘Village’ and ‘Rural area’. This question was used in paper II.

**Self-rated health** was measured by the question: ‘A person may feel good sometimes and bad sometimes. How do you feel most of the time?’ with five response options: ‘Very good’, ‘Rather good’, ‘Neither good, nor bad’, ‘Rather bad’ and ‘Very bad’. During the test-retest procedure, this question showed a kappa-value of 0.54 (n=135) (paper I). During this procedure, the self-rated health question was also compared with another self-rated health question that had recently been included in the HBSC study (3), i.e. ‘Do you think your health is...?’ with four response options: ‘Excellent’, ‘Good’, ‘Rather good’, and ‘Bad’. Bivariate non-parametric correlation indicated a moderate correlation (Spearman’s rho = 0.439, p<0.001) (not previously published). Changes in ratings in the different measures during the one-week test-retest interval are shown in Table 5 (not previously published).

**Table 5.** Changes (%) in the self-rated health questions used in the quantitative study (VIP study) and in the HBSC study with a one-week interval.

	-4	-3	-2	-1	0	+1	+2	+3	+4
<b>VIP</b> n=165	0.0	0.0	0.0	11.5	73.3	13.9	1.2	0.0	0.0
<b>HBSC</b> n=164		0.0	0.0	10.4	75.6	13.4	0.6	0.0	

In the VIP questionnaire, the question ‘How do you feel most of the time?’ was chosen based on the young age of the study participants. The research group considered that such a question (including the word ‘feel’) could be more easily understood by the young participants. The research group also acknowledged that such wording is often used when talking about ‘health’ in everyday language in Sweden. Previous research from Sweden shows that ‘feel’ is used as a synonym

for 'health' (94). Self-rated health questions including the word 'feel' are sometimes used in youth studies in Sweden (185, 186).

Efforts have been made to achieve an optimal English translation of the self-rated health question. First, the question was translated from Swedish to English by academics whose mother tongue was Swedish, but who spoke English fluently. Thereafter, alternative wordings were discussed with native English-speaking academics, who were asked to elaborate upon how they believed adolescents would perceive these terms. Finally, adolescents in England were asked to describe how they perceived the wording of the question. Based on this procedure, the wording 'How do you feel most of the time?' was considered an accurate translation of the question.

In the analysis in paper II, self-rated health was divided into three groups: 'high' was defined by the answer 'Very good'; 'medium' by the answer 'Rather good'; and 'low' by the remaining three options. In paper III, however, all five response options were included in the analyses. This decision was made after conducting interviews with adolescents in the qualitative study (paper I), indicating that participants could comprehend differences between all five response options.

**Self-esteem** was measured by the question 'Do you like yourself?' with a three-point ordinal scale. In paper II, the three original answers 'Yes, most often', 'Yes, sometimes' and 'No, seldom' were defined as 'high', 'medium' and 'low'. In paper III, the first option was defined as 'high' while the two remaining options were defined as 'low'. This decision was made due to a small reference group in boys (n=7), resulting in a wide confidence interval. A dichotomization of the variable resulted in a more robust way of presenting the data.

**Mood in family** was measured by the question 'How do you consider the mood in your family?' This question was used in papers II and III, and in both papers the five-grade ordinal scale was dichotomized. The answers 'Very good' and 'Rather good' were merged as 'good', while 'Neither good, nor bad', 'Rather bad' and 'Very bad' were merged as 'not good'.

**Subjective social status in school** was measured using the MacArthur Scale of Subjective Social Status in school (Figure 2), originally developed by Goodman and colleagues (161). The wording was slightly modified compared to the original question. While Goodman and colleagues used the term 'grades' in their question, as a way of describing top-positioned students, this was not included in the Swedish version. Subjective social status in school was used in paper III (and in the qualitative study in paper IV). In both the descriptive statistics and the univariable models (performed to calculate model-based probabilities), all ten stages (response options) of the subjective social status measure were reported.

In the multivariable ordinal regression model, the question was evaluated as a continuous variable.

**Physical exercise** was measured by the question ‘How often do you usually exercise in your spare time (i.e. outside school) so that you become breathless or sweaty?’ A seven-point ordinal scale was used and the answers ‘Every day’, ‘4–6 times weekly’ and ‘2–3 times weekly’ were merged as ‘high’, while ‘Once a week’, ‘Once a month’, ‘Less than once a month’ and ‘Never’ were merged as ‘low’. Physical exercise was examined in papers II and III.

**Binge drinking** was measured by the question ‘Have you ever consumed so much alcohol that you have become really drunk?’ The question was dichotomized as those who had never been drunk and those who had been drunk (once or more). This question was used in paper II.

**Snus use** (moist snuff) was measured by the question ‘Have you ever used snus?’ with a four-grade ordinal scale. The answer ‘No, I have never used snus’ was defined as ‘no’, while the answers ‘Previously but no longer’, ‘Sometimes’ and ‘Every day’ were merged as ‘previous or current use’. This question was used in paper II.

**Smoking** was measured by the question ‘How often do you smoke these days?’ which was assessed on a four-point ordinal scale with the alternatives: ‘Every day’, ‘At least one time per week but not every day’, ‘Less than one time per week’, and ‘I don’t smoke’. All categories of smoking were defined as ‘smoker’. In paper II, this question was used as a predictor in 7<sup>th</sup> grade and as a dependent variable in 12<sup>th</sup> grade. In paper III, it was used as an independent variable.

**Attitudes towards smoking** were measured by a question about ‘health attitudes’. Participants were asked which factors they found important to ‘staying healthy’. One of the issues to evaluate was ‘Not to smoke’ and the responses were evaluated on a four-grade ordinal scale. The answers were dichotomized with those who considered it ‘Very important’ as having ‘very negative’, and the rest of the answers as having ‘not very negative’ attitudes.

**BMI** was calculated through self-reported weight and height, with the standard equation:  $BMI = \text{weight (kg)}/\text{height (m)}^2$ . BMI was used in paper III, and analyzed in two different ways: as a categorized variable including four groups in the descriptive statistics: ‘underweight’ (<18.5), ‘normal weight’ (18.5–24.9), ‘overweight’ (25–29.9), and ‘obese’ ( $\geq 30$ ). In the multivariable model, BMI was analyzed as a continuous variable.

**Socioeconomic status** was measured by the level of parental education, which was obtained from Statistics Sweden, the central government authority for official statistics. Data was derived from the Education registry, a reliable national data source (187) which contains information about the formal educational level of Swedish citizens. A data file was sent to Statistics Sweden, where information about the parents' educational level was added to the file. During this stage, the code numbers were removed. In the analyses in papers II and III, parental socioeconomic status was dichotomized. Families in which at least one parent had a college or university degree were defined as 'high socioeconomic status', whereas 'low socioeconomic status' included those whose highest educational level was either compulsory school or upper secondary school.

### ***Data analyses***

#### *Paper II*

In paper II, differences in frequency distributions were evaluated using chi-square tests with  $p < 0.05$  as significance level. Odds ratios (OR) and 95% confidence intervals (CI) were estimated using univariable and multivariable binary logistic regression analyses. The multivariable analysis included all theoretical predictors at baseline (7<sup>th</sup> grade) related to smoking at follow-up (12<sup>th</sup> grade). First, a stepwise backward procedure was performed, followed by a stepwise forward procedure. SPSS 20.0 was used to analyze data.

#### *Paper III*

In paper III, descriptive statistics with chi-square tests were used to evaluate frequency differences of study characteristics by gender. Gender-specific multivariable ordinal regression analyses with proportional odds (188) were performed in order to assess possible significant effects. The choice of an ordinal regression, which accommodates an ordinal dependent variable (instead of a binary dependent variable used in binary logistic regression) was guided by the findings of paper I, showing that participants could comprehend differences between all five response options in the self-rated health question (the dependent variable). In an ordinal regression analysis, the coefficients for the independent variables (expressed as ORs) represent the odds of being one unit higher in the dependent variable associated with an increase of one unit in the independent variable. The multivariable model constituted a full model, meaning that all available independent variables that were theoretically potentially related to the dependent variable were included. Before the final multivariable model was determined, two different analyzes were performed, one in which subjective social status was evaluated as an ordinal variable with ten steps, and one in which it was treated as a continuous variable. As the conclusions of these analyzes were

the same regardless of how subjective social status was analyzed, a continuous variable was chosen, motivated by its ability to facilitate interpretations.

Finally, to investigate the relation between self-rated health and subjective social status in school further, gender-specific univariable ordinal regression analyses were applied to calculate model-based probabilities. Descriptive statistics and the multivariable model were analyzed using SPSS 24.0, and model-based probabilities were calculated using SAS 9.4.

#### *Additional analyses in the thesis summary*

For this thesis summary, additional analyses were performed. The findings from these analyses are labeled ‘not previously published’. First, data from the test-retest procedure (the reliability testing in the VIP study) were analyzed using bivariate non-parametric correlation (Spearman’s rank correlation, using all response options) to describe the correlation between the self-rated health questions used in the VIP study and the HBSC study (presented in the Methods section). Second, descriptive statistics were employed to describe gender differences in self-rated health in the 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> grades, the development of self-rated health between the 7<sup>th</sup> and 12<sup>th</sup> grades, and changes in self-rated health ratings. A chi-square test was used to evaluate frequency differences in self-rated health (all response options) between boys and girls.

### **Ethical considerations**

In the Declaration of Helsinki, the World Medical Association (189) set out ethical principles to ensure that human rights are protected during medical research involving human subjects. In this declaration, it is underlined that vulnerable groups must receive specific consideration and protection. Since this research project involves adolescents, this issue was carefully considered. In particular, voluntary participation and having a plan for how to deal with any discomfort that might arise during data collection were discussed. Ethical considerations were accounted for throughout the whole research process, from the design of the studies, through data collection, to the presentation of results. Ultimately, the benefits of involving adolescents in the studies were assessed as greater than the risks.

The qualitative study was approved by the Regional Research Ethics Committee at Uppsala University (Dnr 2011-110), and the quantitative study was approved by the Regional Ethical Review Board at the Medical Faculty, Umeå University (Dnr 03-073).

### ***The qualitative study***

The headmasters of the participating schools approved the study and school nurses and class teachers were informed about it before students were approached. Potential participants received both oral and written information about the research project, and by signing a consent form, students agreed to participate and for data to be published. In accordance with Swedish regulations (§18 (190)), children from the age of 15 were able to provide written consent on their own behalf, while younger participants were also required to obtain informed consent from their parents/guardians. The older participants had the option of consenting immediately upon receiving the information, but they were also provided with a pre-stamped envelope in case they wished to return their consent form later.

In both the oral and written information, and at the time of interview, participants were informed about their right to end the interview at any time without having to explain their reasons. After each interview, all participants were asked how they felt about being interviewed. They were also informed that they could talk to the school nurse/counselor if they had a need to do so. Transcribed interviews were labeled with a code number and digitally stored on the servers of the County Council of Dalarna. The code list was stored separately from the transcribed interviews in a filing cabinet at the County Council of Dalarna.

### ***Considerations about the risk of reinforcing status hierarchies in school***

Before conducting the interviews, the research group discussed the potential risk that the question about subjective social status in school would evoke discomfort and induce thoughts about status hierarchies. Amoroso, Loyd and Hoobler (191) describes the risk that attention to status differences in the classroom might reinforce and strengthen them once they have been identified. This ethical challenge was partly handled by prolonging the interviews with probes and semi-structured questions, which facilitated deeper reflections on the topic. The research group also emphasized the need for the interviewer to remain attentive to signs of discomfort during the interviews.

### ***The quantitative study***

Potential participants and their parents/guardians were informed about the study by a letter sent to their homes. This letter stressed that participation in the study was voluntary. The consent procedure was an 'opt out' one, implying that no active consent was asked for. No parents refused permission for their child to participate.

The three initial questionnaires were distributed in school during classroom hours, and the fourth survey was performed as a postal questionnaire. Before they

answered each survey, participants were once again informed that their participation was voluntary and that they could refrain from answering individual questions or the whole questionnaire if they wished. The questionnaire was provided with a code number, and when the participants had finished the questionnaire, they put it in an envelope, then sealed it and handed it to the teacher (first, second and third survey). During the fourth survey, the questionnaire was sent to the research team by the participants. When the data file was sent to Statistics Sweden for the adding of data on parental educational level, the code list was attached to enable personal identification. After this data had been added, Statistics Sweden returned the file without code numbers.

All data files are digitally stored on the servers of the County Council of Dalarna, and the paper questionnaires with code numbers are stored separately from the code list at the County Council.

#### *Considerations about the 'opt out' procedure*

The 'opt out' procedure (passive consent) is different from the present standard of 'active consent', and should be discussed. One argument against passive consent is that there is a risk that some parents/guardians might miss the information about the study and therefore be unable to refuse their child's participation. If active consent had been used, however, there is a risk that some consent forms would not have been signed and returned, implying that some adolescents would not have had the chance to participate, even if they wanted to. After all, answering a survey is one way for adolescents to 'speak' their minds.

One benefit of the passive consent was that no child had to feel singled out by not receiving a questionnaire in the classroom at the time of data collection (as no parents/guardians refused to allow their child to participate). On the other hand, classroom surveys have the ethical downside that participants might feel forced to participate. In this study, the information clearly stated that participants could return a blank questionnaire if they wished.

As passive consent exposes potential participants to greater demands in terms of deciding for themselves whether to participate or not, and in order to assess the risks and benefits, it is necessary to reflect upon the young age of the study participants (from age 12). In this regard, providing information about the study and voluntary participation that could be easily understood by the participants was essential. The cover sheet clearly stated that participation was voluntary and that they could refrain from answering either individual questions or the whole questionnaire.

## Results

### Understanding self-rated health in adolescence

In the exploration of the self-rated health question: ‘A person may feel good sometimes and bad sometimes. How do you feel most of the time?’, participants described their interpretation of the question, strategies for determining a response, and their understanding of the different response options (paper I).

#### *The interpretation and essence of self-rated health*

Self-rated health was mostly interpreted as a holistic question that included social, mental and physical aspects (paper I). Participants described social and mental aspects in detail, but used shorter statements to describe physical aspects. Younger participants were more prone to reflecting upon recent everyday events, and used a less complicated and more direct way to describe how they felt, while older participants made more complex interpretations involving more detailed reasoning.

Social aspects were evident among both boys and girls of different ages. Relationships with friends, families or a partner (older participants) were considered, and social relations with peers were described as both empowering and stressful. In this regard, social aspects were intertwined with mental aspects. This was most evident among the younger girls, who expressed deep concerns about not fitting into their peer group. Affirmation from peers and being included in the peer group contributed to how they felt. Teachers were described as important for the creation of a positive atmosphere within peer groups. Yet, comments about their failure to do so were also made. Stress caused by homework was a central school-related influence on how they felt. While all four groups evidenced this, older girls in particular reported that a heavy workload in school affected them. One girl, who answered ‘neither good, nor bad’, described her situation: “I take it [homework] with me on the weekends... sometimes I even forget to eat... It’s too much, school takes up my life” (Girl, 12<sup>th</sup> grade). Participants also described stress relating to societal norms, such as future education, job opportunities, and expectations stemming from being a boy or a girl.

Physical aspects were mainly described through statements about health behaviors, illness or injuries. Participation in sports was regarded as a fun activity and as something that made the body feel better. Younger boys emphasized spare-time activities and discussed the importance of getting enough sleep. An illness or injury was primarily discussed by those who had recently had such an experience.

When participants were asked if they would have given the same response if they had been asked about their 'health' instead of how they 'feel' (paper I), reflections were mostly related to health behaviors. Physical activity, food habits and tobacco were some of the aspects that were described. Participants also reflected upon aspects such as having a cold or being sick. One older boy who reported that he felt 'very good' when the question included the word 'feel', reflected upon how his answer might have differed if the question had included the word 'health'.

No, then I would have responded "Rather good." I watch what I eat and I work out. But then I use snus [Swedish moist snuff]. And I'm like... I drink maybe a bit too much during the weekends. I know it is not possible to do so all my life. But my health is still very good, I think at least. I eat a lot of vegetables and get everything I need. I exercise and get fresh air... Health for me, it's more about how I take care of my body and everything like that... purely chemical. Just how the body feels, but not how I feel as a person. (Boy, 12<sup>th</sup> grade)

When contrasting the wordings, the question 'How do you feel most of the time?' primarily seemed to capture mental aspects, while 'health' captured physical aspects. But the concepts were also regarded as interrelated.

If I had to describe it in short, I guess I would say that health is more physical and how you feel is more mental. That is to say, health is how you feel in your body. And how you feel, it's more... I mean they are intertwined. If you don't feel good mentally, then your health gets worse and then it will be a bad circle. And the same goes the other way, if you are less healthy you feel worse. If I had to choose, I would rather have slightly worse health but feel very good than the other way around. (Boy, 7<sup>th</sup> grade)

### ***Strategies for determining a response***

Participants used different strategies when determining a response option (paper I). By *stating*, *comparing*, *weighing* and *summarizing*, a judgment was made. Some participants seemed to have an instant sense of which response option to choose and simply *stated* their response. This was more common among younger participants. Others made more complex, time-bound *comparisons*, *weighed* positive and negative experiences and *summarized* various aspects that influenced their choice. Comparisons were made with regard to previous experiences, not to peers. One girl in the 12<sup>th</sup> grade weighed up positive and negative experiences.

In reality it is very good. I go to a very good school. I have very nice classmates. I have good teachers, only good teachers. And then I also have a very good relationship with my mother. I have very good relationships with my roommates and so on. But it is also very stressful in school. The schedule is packed. We have a lot of homework. And it feels like there is no time. What should I say I feel... how does one do if it feels pretty good, but also pretty bad... I'll circle this one ["Neither good, nor bad"]. (Girl, 12<sup>th</sup> grade)

### ***Choosing a response***

The self-rated health question was accompanied by five response options, and participants reflected differently about these (paper I). The response option *Very good* was sometimes viewed as a utopian or extreme value. Some used the phrase “all of the time” and described the option as a constant state, “You can’t feel good all the time, then you live in an illusion” (Boy, 12<sup>th</sup> grade). Others regarded it as a positive state in which occasional negative feelings could occur.

Many participants regarded the response option *Rather good* as an attractive choice and this option comprised a large and rather varied group, including those who described ‘very good’ as an unattainable state and those who reasoned about negative aspects in life, but found the other options too negative. Some participants opted for an alternative option, such as “good”, because they found the term ‘rather’ a bit negative.

The option *Neither good, nor bad* was interpreted in various ways. While some regarded it as a middle option and used terms like “neutral”, “normal”, “in the middle” or “50/50”, others regarded it as a bit more negative, “That is a little more negative, I would say... if you do not know whether you feel good or bad” (Boy, 7<sup>th</sup> grade). One of the older girls described it as a passive state, as being “in limbo”. A suggestion for the alternative phrasing “sometimes good, sometimes bad” was made.

*Rather bad* was regarded as a very negative response option and reflections about mental illness and bullying were made. Some regarded it as bad, but not excessively so. One boy explained: “That you feel bad most of the time. But you might sometimes still feel quite ok. In general however, you feel bad” (Boy, 12<sup>th</sup> grade).

The final option, *Very bad*, was regarded as an extreme value and a constant state. Feeling apathetic toward life, living with a lifelong disability or experiencing a recent death in the family were some examples given by participants.

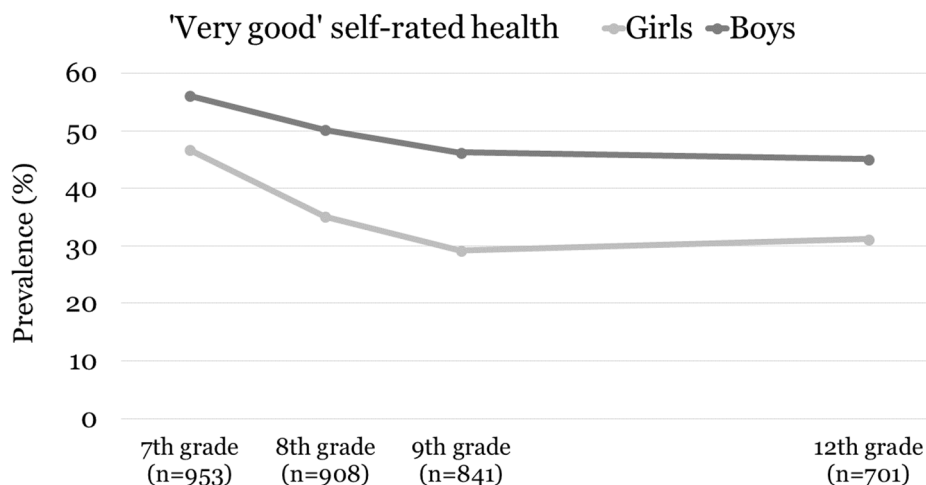
A final aspect that influenced the participants’ choice of response option was their attitude toward providing an honest answer. Some clearly stated that being honest was natural, and that it was irrelevant whether the study was conducted in private and/or anonymously: “I don’t understand why I wouldn’t do it [give an honest answer]. If you are doing a survey, it must be filled out properly. You cannot make things up and lie” (Girl, 12<sup>th</sup> grade). Other participants reasoned about biased answers, and expressed concern about being offered help from a teacher if they saw that a student had chosen a response option that indicated poor self-rated health. The likelihood of choosing a less flattering option (when relevant) increased if the questionnaire was anonymous. Participants reasoned

about their sense of confidentiality, i.e. the option of answering the questionnaire in private. One girl in the 12<sup>th</sup> grade explained that she would probably give answers that were more honest if she filled in the questionnaire at home. Another reason that participants gave for providing biased answers was the fear of confirming negative feelings to themselves. Admitting such feelings in a survey seemed to make them too definite.

No... I would not like to admit it in writing, so that it sticks. Because even if you look down on yourself... you do not want to admit you are at the bottom, it's like to confirming that it's like that. (Girl, 7<sup>th</sup> grade)

### Frequencies and development of self-rated health

Data from the quantitative study show that the boys rated their health significantly higher than the girls at all ages: 7<sup>th</sup> grade  $p=0.026$ , 8<sup>th</sup> and 9<sup>th</sup> grade  $p<0.001$ , and 12<sup>th</sup> grade  $p=0.004$  (not previously published). The prevalence of 'very good' self-rated health in the 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> grades, divided by gender, is described in Figure 4 (not previously published). Self-rated health declined from the 7<sup>th</sup> to the 9<sup>th</sup> grade and leveled out between the 9<sup>th</sup> and 12<sup>th</sup> grades.



**Figure 4.** Prevalence (%) of 'very good' self-rated health from the 7<sup>th</sup> to the 12<sup>th</sup> grade, by gender (not previously published). Note that the different study years include different numbers of participants.

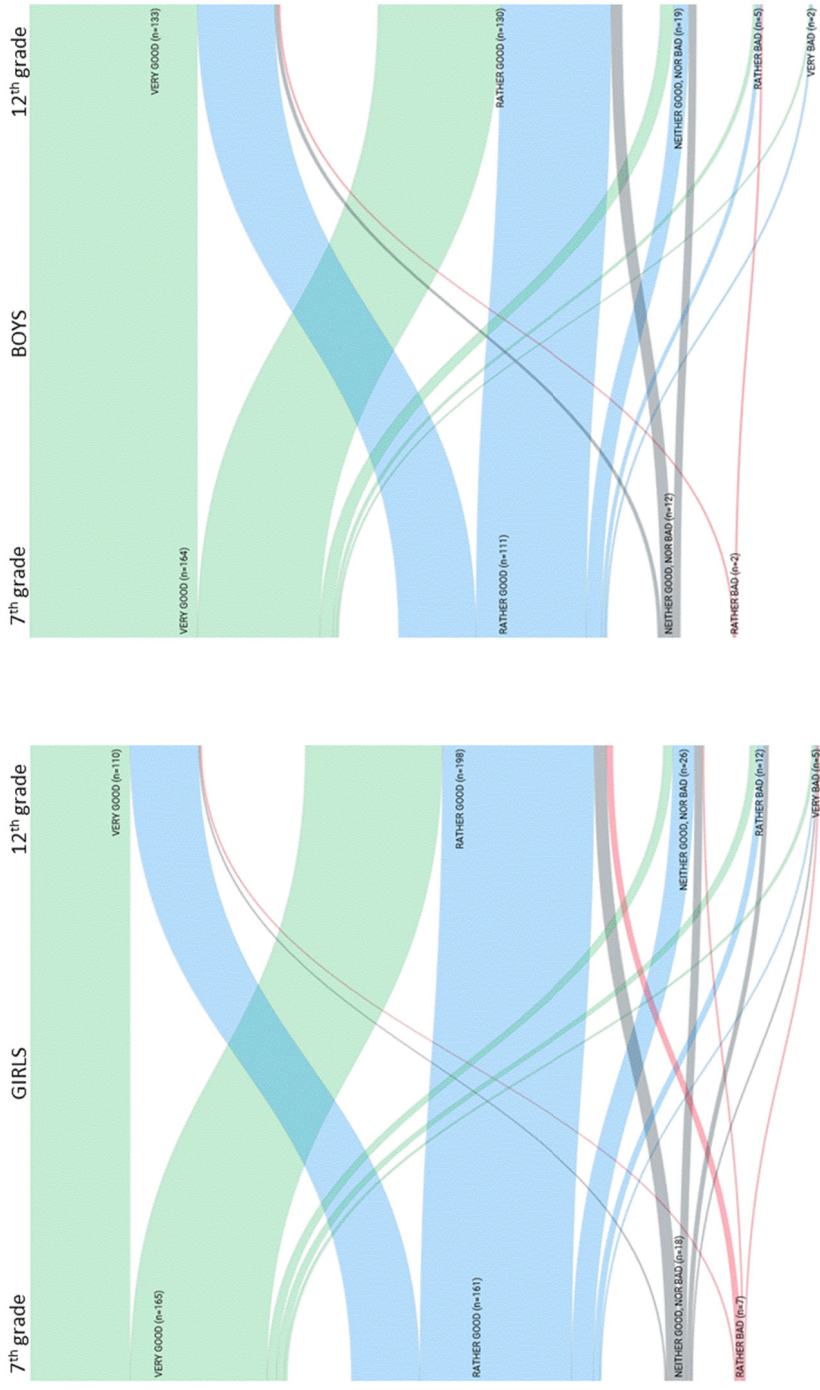
Altogether, 640 participants responded to the self-rated health question in both the 7<sup>th</sup> and the 12<sup>th</sup> grade (not previously published). This represents 61% of the eligible study population. Self-rated health ratings were unchanged for 50% of

these participants, while only 6.4% changed their ratings by two or more steps on a five-grade scale (Table 6). As visualized in Figure 5, the most common change over a five-year period was a one-step decline from ‘very good’ to ‘rather good’ self-rated health. It should also be noted that a fair number of participants improved their health from ‘rather good’ to ‘very good’.

**Table 6.** Changes (%) in self-rated health from the 7<sup>th</sup> to the 12<sup>th</sup> grade, by gender (not previously published).

	-4	-3	-2	-1	0	+1	+2	+3	+4
<b>Girls</b> (n=351)	0.6	1.7	3.1	30.2	47.6	15.1	1.4	0.3	-
<b>Boys</b> (n=289)	0.3	1.0	3.1	25.3	52.9	16.3	0.7	0.3	-
<b>Total</b> (n=640)	0.5	1.4	3.1	28.0	50.0	15.6	1.1	0.3	-

## Results



**Figure 5.** Changes in self-rated health for girls (n=351) and boys (n=289) over a five-year period, in the 7<sup>th</sup> grade and in the 12<sup>th</sup> grade (not previously published).

## Self-rated health and other predictors of smoking

Low self-rated health in the 7<sup>th</sup> grade was a significant predictor of smoking in the 12<sup>th</sup> grade in a univariable analysis: OR = 3.3 (95% CI, 1.67–6.51), but not in the multivariable analysis (paper II). Besides having low self-rated health, the univariable analyses also revealed additional significant predictors: being a girl, lower levels of parental education, poorer family mood, lower self-esteem, a less negative attitude towards smoking, binge drinking, ever using snus and smoking.

In the multivariable model, being a girl, having lower self-esteem, having a less negative attitude towards smoking and ever using snus remained significant and independent predictors of smoking. Significant variables in the multivariable model are shown in Table 7.

**Table 7.** Multivariable binary logistic regression analysis showing predicting factors in the 7<sup>th</sup> grade for smoking in the 12<sup>th</sup> grade.

Factors 7 <sup>th</sup> grade	Non-smokers	Smokers	Multivariable logistic regression	
	12 <sup>th</sup> grade	12 <sup>th</sup> grade	12 <sup>th</sup> grade (n=564)	
	n (%)	n (%)	OR	CI
<b>Gender</b>				
Boys	232 (80)	60 (20)	1.00	Ref
Girls	252 (71)	102 (29)	1.64	1.08–2.49
<b>Self-esteem</b>				
High	293 (81)	69 (19)	1.00	Ref
Medium	154 (70)	66 (30)	1.57	1.03–2.38
Low	28 (53)	25 (47)	2.79	1.46–5.33
<b>Attitudes towards smoking</b>				
Very negative	433 (78)	119 (22)	1.00	Ref
Not very negative	46 (52)	42 (48)	2.81	1.70–4.66
<b>Snus use</b>				
No	452 (77)	133 (23)	1.00	Ref
Previous or current	24 (46)	28 (54)	3.43	1.78–6.62

## Self-rated health and associated factors

Gender-specific multivariable ordinal regression analyses in the 12<sup>th</sup> grade (paper III) showed that subjective social status in school, mood in the family and self-esteem were positively and independently associated with self-rated health in both girls and boys (Table 8). In girls, being born in Sweden was also independently and positively associated with self-rated health, and in boys,

smoking was independently and negatively associated with self-rated health. Socioeconomic status (parental education) was not associated with self-rated health.

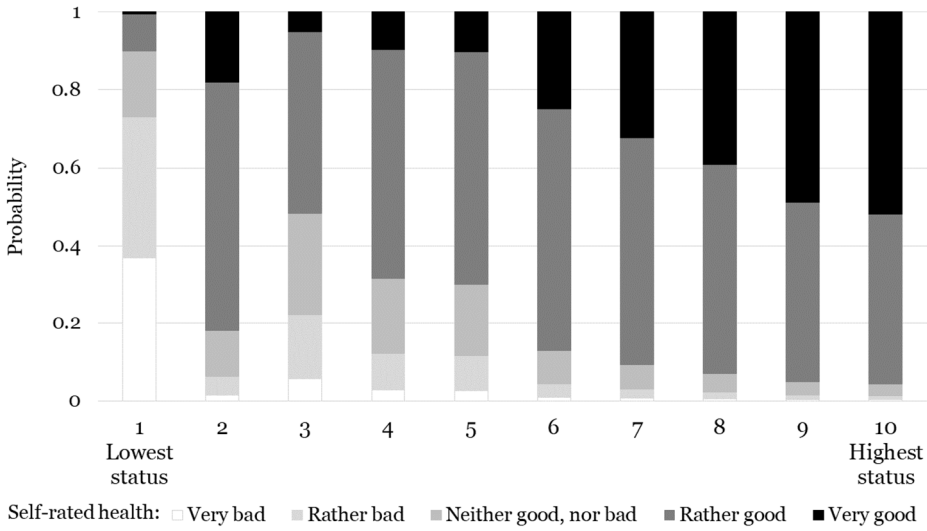
**Table 8.** Multivariable ordinal regression analysis of self-rated health by gender.

	Boys (n=261)			Girls (n=294)		
	OR	CI	p-value	OR	CI	p-value
<b>Subjective social status in school*</b>	1.53	1.28–1.82	<0.01	1.45	1.24–1.70	<0.01
<b>Country of birth</b>						
Born in Sweden	1.67	0.56–4.96	0.36	3.85	1.44–10.28	0.01
Born outside Sw.	1.00	Ref		1.00	Ref	
<b>Socioeconomic status</b>						
High	0.90	0.53–1.51	0.68	1.42	0.88–2.28	0.15
Low	1.00	Ref		1.00	Ref	
<b>Mood in family</b>						
Good	3.53	1.62–7.67	<0.01	1.96	1.10–3.51	0.02
Not good	1.00	Ref		1.00	Ref	
<b>Self-esteem</b>						
High	3.15	1.61–6.15	<0.01	3.73	2.17–6.40	<0.01
Low	1.00	Ref		1.00	Ref	
<b>Body mass index*</b>	1.00	0.92–1.08	0.96	0.94	0.87–1.02	0.14
<b>Physical exercise</b>						
High	1.26	0.73–2.16	0.41	1.35	0.82–2.22	0.24
Low	1.00	Ref		1.00	Ref	
<b>Smoking</b>						
Non-smokers	2.30	1.16–4.55	0.02	0.95	0.54–1.68	0.86
Smokers	1.00	Ref		1.00	Ref	

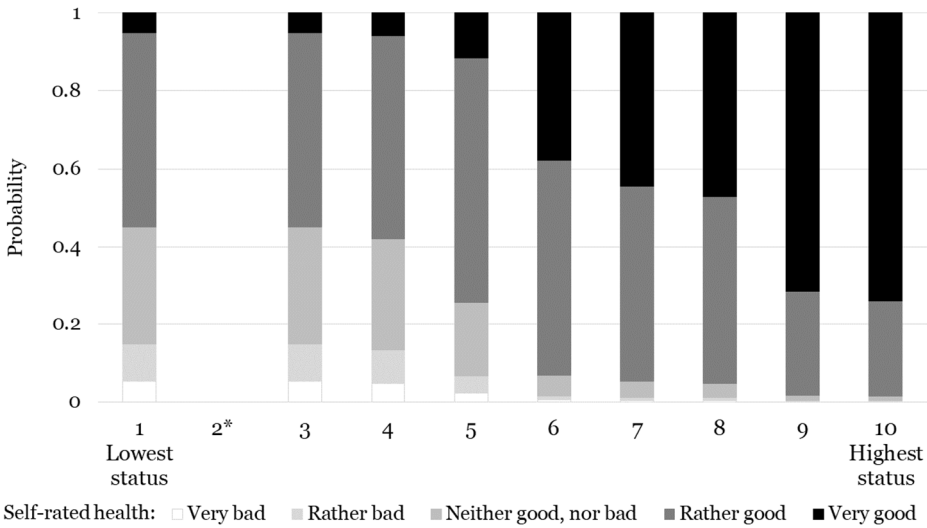
\* Continuous variable

### ***Self-rated health and subjective social status in school***

Findings from the multivariable analyses show that subjective social status in school seems to be an important factor associated with self-rated health. An increase of one step on the ladder was associated with an increase in the odds of reporting a higher level of self-rated health (paper III). Further analyses, using predicted cumulative probabilities, revealed a linear association, implying that higher steps on the subjective social status scale increased the likelihood of reporting better self-rated health in both girls (Figure 6) and boys (Figure 7).



**Figure 6.** Predicted cumulative probabilities of subjective social status in school and self-rated health in girls in the 12<sup>th</sup> grade (n = 351) (paper III).

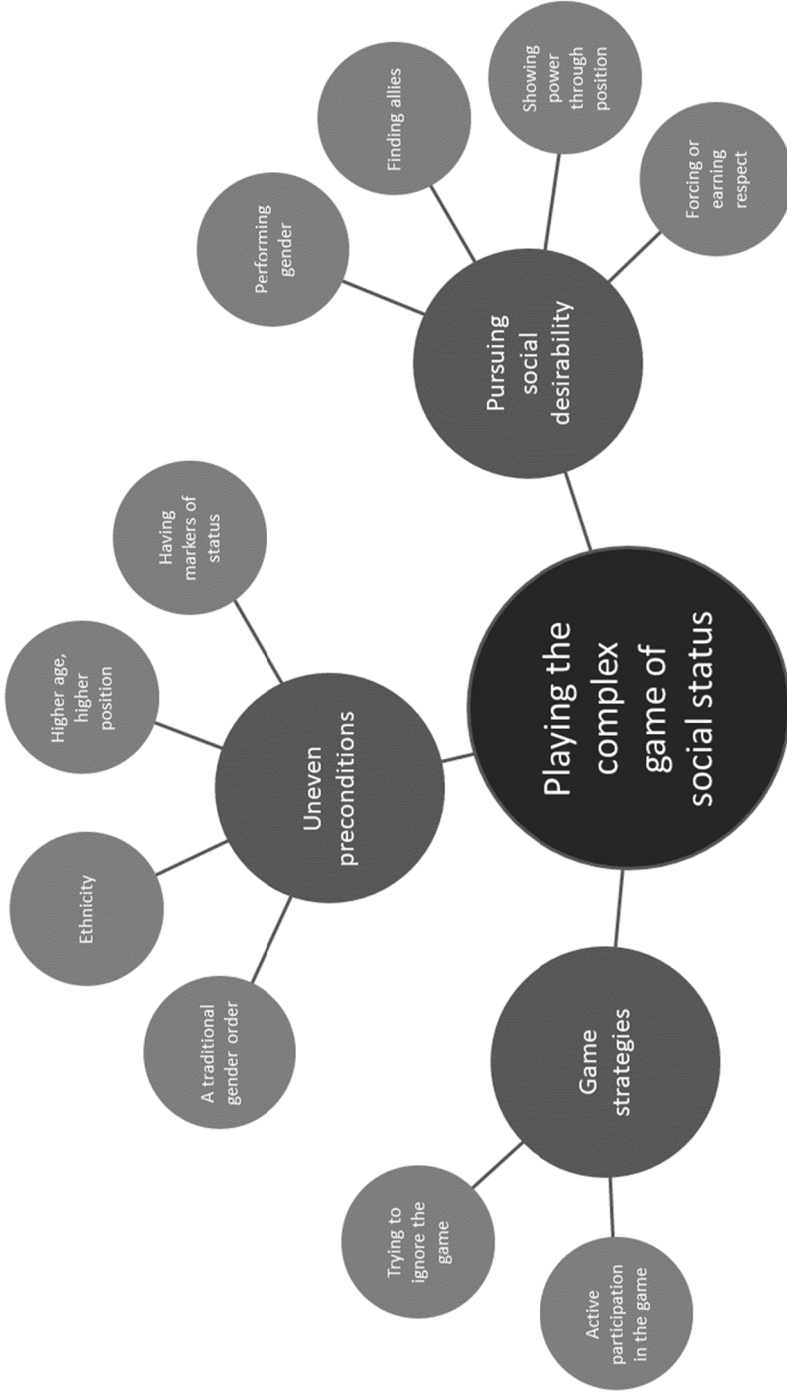


\*no boys rated their social status as '2'

**Figure 7.** Predicted cumulative probabilities of subjective social status in school and self-rated health in boys in the 12<sup>th</sup> grade (n = 277) (paper III).

### ***Subjective social status in school***

Boys rated their subjective social status in school significantly higher than girls did ( $p=0.02$ ) (paper III). While the quantitative findings established an association between subjective social status and self-rated health (paper III), the qualitative study provided a deepened understanding of subjective social status in school (paper IV). The social positioning had similarities to a complex game. Figure 8 depicts the characteristics and game strategies that influenced the participants while **playing the complex game of social status**.



**Figure 8.** Network of global, organizing and basic themes, describing social positioning in school (paper IV).

The participants were highly aware of the game of social status and described their **game strategies**. Social comparisons were mostly regarded as a natural phenomenon and participants described *active participation in the game*. Girls and younger participants expressed a more obvious need to follow prevailing norms and attempted to play the game by following the rules. While some were striving upwards, others expressed satisfaction with a less demanding position as they were playing it safe. Safe play was often linked to a position on the middle of the ladder. This position enabled socialization with peers at both ends of the ladder. A few participants had a hard time accepting the presence of a social status ladder.

Of course, you can see this ladder everywhere, really. You want to see yourself as a bit higher than you really are. I have a hard time accepting the ladder. But as I said, you see it all the time. (Boy, 12<sup>th</sup> grade)

A few participants were *trying to ignore the game* and actively distanced themselves from it: “Now I don’t know what to answer, because I don’t think there is such a thing here” (Girl, 12<sup>th</sup> grade).

Participants entered the social game with **uneven preconditions**, which resulted in different degrees of opportunity. Gender, ethnicity, age and parental economy intersected and contributed to their positioning. A *traditional gender order* was demonstrated by the power dynamics between girls and boys and within groups of girls and boys. The boys’ advantage was reflected through their higher positioning on the ladder: “The most popular boys [points at the top of the ladder] and the less popular boys and the most popular girls [points a little lower on the ladder]” (Girl, 7<sup>th</sup> grade).

Older participants talked about different *ethnicities*, and the social exclusion of peers from cultural minorities was highlighted. Having an appearance that differed from the ethnic norm (being white-skinned and fluent in the Swedish language) implied a higher risk of being excluded and bullied: “So, I’ve always been bullied, since I was three years old, because of the color of my skin and everything” (Girl, 12<sup>th</sup> grade).

When age groups were compared, *higher age* implied a *higher position*. Younger participants reflected on the superiority of older peers: “If you position yourself in relation to the whole school, then 9<sup>th</sup> graders see themselves as the best” (Boy, 7<sup>th</sup> grade). Older participants commented upon status markers that came with being older, such as getting a driver’s license.

Participants' reflections on their parents' economic situation were made in terms of *having markers of status*. Status markers facilitated a higher position in the social hierarchy, and having money enabled them to buy status markers.

In the *pursuit of social desirability*, participants explained that the way a person looked, acted and interacted with others revealed that person's position on the ladder. Participants reflected on *performing gender* and reported that boys and girls were expected to look and act in certain ways. One girl in the 7<sup>th</sup> grade described the greater demands that came from being a girl.

Boys should have a brand sweatshirt, nice jeans or chinos. Not everyone can afford it, so those who can become higher ranked. With the girls, it's so much. You can't have sweatpants, that's just wrong. You should have leggings or jeans. It's so much. I mean the hair and everything. Shoes – it's so very much.  
(Girl, 7<sup>th</sup> grade)

Prevailing gender norms guided the valuing of different characteristics. Popular girls were often valued by factors such as “nice clothes”, “nice hair” or “being cute”, whereas popular boys were described as “being strong”, “athletic” or “having high self-esteem”. Boys were expected to be confident and show a tough attitude, while girls were expected to do things in moderation. Achievements in school and good grades were used to describe high-positioned girls. Norm-compliance was important for a higher position, which was most prominent in younger participants and girls. One participant described how different looks for boys and girls revealed their social status position.

Popular students are those wearing a cap, having rather short hair and some kind of hoodie. Not black – black hoodies are for nerds. Girls with far too little clothes, who walk around freezing are popular. Let's see – if you look like me – torn jeans and a poorly fitting t-shirt, then you're rather low [on the social status ladder]. (Boy, 12<sup>th</sup> grade)

Highly ranked students could influence norms. There was a fine line, however, between influencing norms and the risk of losing a good reputation. Girls seemed to be particularly targeted: “Girls are at risk of losing their reputation very, very quickly. It might be because she's trash-talking other people or maybe because she's sleeping with guys” (Boy, 12<sup>th</sup> grade). When older participants discussed sexuality, both boys and girls expressed similar views on how boys and girls were expected to behave.

If a boy has sex with several girls, then he's very manly, he's popular, whereas if a girl has sex with several boys, then she becomes known as a whore... then you're promiscuous, while if a boy does it, he becomes instantly highly ranked, a real stud.  
(Girl, 12<sup>th</sup> grade)

Participants were conscious of whom they ‘hung out’ with and they strived to *find allies*. Their closest group belonging was highly valued, and the younger participants in particular emphasized the importance of having friends. One’s social status position was influenced by the position of the group: “In my school class I’m one of the highest-ranking students. However, since my class is rather lowly placed in school, I’d place myself low: the fourth step from the bottom” (Boy, 12<sup>th</sup> grade). Among older participants, the type of school program they were following influenced their position, with academic programs (preparatory for higher education) having higher value. Participants seemed to value their closest group belonging higher than their overall position in school. For participants who belonged to groups with lower social status, their closest group belonging seemed to serve as a protective shield.

The way of acting within the school space seemed to reveal where peers in school were positioned, which implies that they *showed power through position*. One boy reflected upon how social positioning was revealed.

Someone standing in the middle talking a lot, they may be at the top. Then those who stand around and listen, they’re in the middle. And then those who sit by themselves at the table are down here. (Boy, 7<sup>th</sup> grade)

Participants described the duality of a top position through *forcing or earning respect*. Respect was described partially as something that high-ranked students had forced others to give them, and had not truly earned, i.e. “fake-respect”. One boy made the following comment related to bullying: “Those who bully get one kind of respect, you don’t argue with them. But I don’t respect them for what they do; they don’t get my respect” (Boy, 12<sup>th</sup> grade). Respect was also regarded as a positive attribute, e.g. when referring to oneself as a good friend, or showing respect for others: “Behaves in a good way, also in class, and doesn’t disturb others” (Boy, 7<sup>th</sup> grade). The terms ‘respect’ and ‘popularity’ were both used to describe top-positioned peers. One participant reflected upon the complex meaning of being at the top of the ladder.

Some become popular because they have money; some because you’re afraid of them or because you don’t want to become their enemy. Or it’s because they’re very nice people who you look up to. (Girl, 12<sup>th</sup> grade)

## Summary of the main findings

- The self-rated health question: ‘A person may feel good sometimes and bad sometimes. How do you feel most of the time?’ was understood as a holistic health measure that included social, mental and physical aspects (paper I). When considering the five different response options, participants were able to comprehend differences between all of them. Participants spontaneously reflected upon health behaviors when asked about their ‘health’.
- The proportion of participants who reported ‘very good’ self-rated health declined between the 7<sup>th</sup> and 9<sup>th</sup> grades, then leveled out by the 12<sup>th</sup> grade (not previously published). At all ages, boys self-rated their health higher than girls. The rating remained unchanged for 50% of the participants during a period of five years (not previously published).
- Significant predictors in the 7<sup>th</sup> grade for smoking in the 12<sup>th</sup> grade were: ever having used snus, a less negative attitude towards smoking and lower self-esteem (paper II). Girls had an increased risk of becoming smokers.
- Self-rated health was positively associated with subjective social status in school in the 12<sup>th</sup> grade (paper III). Higher steps on the subjective social status ladder increased the likelihood of reporting better self-rated health in both boys and girls. No association was found between self-rated health and socioeconomic status (parental education). Boys rated their subjective social status higher than girls did.
- Participants confirmed the existence of a social status ladder in school and were aware of their position on it (paper IV). Elements tied to gender, ethnicity, age and parental economic status, as well as expectations about how to look, act and interact in order to pursue social desirability contributed to their positioning. Social positioning in school was complex and multifaceted.

## Discussion

### Self-rated health – which measure to choose?

In the qualitative study, it was found that a self-rated health question that included the word ‘feel’ captured a holistic health construct with social, mental, and physical aspects (paper I). Recent findings from interviews with 15-year-olds in Sweden (100) confirm that social factors such as friends and family are central to how adolescents feel. The authors also found that adolescents described school and conflicts with family or friends when reflecting about ‘feeling low’ (100). Thus, both this thesis and other research suggest that social factors are central to how adolescents feel.

When participants in the qualitative study were asked about their ‘health’, they mostly reflected upon physical aspects and health behaviors, such as physical activity, food habits and smoking. One possible explanation for this may be the school subject ‘Sports and health’, in which students in Sweden practice sports and study topics that primarily relate to lifestyle factors. The way in which ‘health’ is addressed in the media, i.e. often related to exercise, fitness and healthy eating, is another possible explanation. Furthermore, the risk of bias due to the order in which the questions were asked must also be considered as a possible explanation for the differences between their responses to the words ‘health’ and ‘feel’. It is possible that participants described ‘health’ in a different way because they may have felt obligated to provide a different response. Participants were asked about their ‘health’ at the end of the interview, after having reasoned about how they ‘feel’ for rather a long time. Nonetheless, they exhibited spontaneous reflections about their ‘health’ and seemed certain about their responses. When Krause and Jay (78) evaluated a traditional self-rated health question (‘If you were asked to describe your health, would you say it was excellent, good, fair or poor?’), they found that young people (14–24 years old) in the USA were more likely to discuss health behaviors than to older people (who were more prone to mention health problems). This supports the view that health is associated with health behaviors among adolescents.

Adolescents’ understandings of health have been investigated in other qualitative studies. When Randell and colleagues (96) performed explorative interviews with teenage boys in Sweden about their understandings of the concept of health and what they do to feel well, health was described as holistic. The exploration of the concepts of both ‘health’ and how they ‘feel’ during the interviews may be one explanation for the wide and multidimensional view of health. Furthermore, Ott and colleagues (98) studied young people’s views of health in the USA and found that participants initially reflected upon obesity and risk behaviors such as

smoking, drinking and having unprotected sex. After additional discussion, however, participants came to regard health as a broader construct. In general, it seems that findings from qualitative studies involving adolescents show that health is understood as a holistic construct. Yet, since these conclusions were drawn after having explored the concept of health in depth, e.g. through explorative interviews, it could be suggested that spontaneous understandings differ from what is described after prolonged reflection. When self-rated health is evaluated in a questionnaire, it is likely that a more spontaneous view is captured, thus emphasizing the need to carefully select a proper survey question, based on what aspects one wants to capture.

In Sweden, various self-rated health questions are used, some involving the word 'feel', and others the word 'health' (Table 1). In questionnaires used by student health care in schools, e.g. in the Counties of Dalarna, Örebro and Värmland (185), self-rated health questions including the word 'feel' are sometimes used. Statistics Sweden (90) uses a question that includes both the words 'health' and 'feel'. Since health is a multidimensional construct (as defined by the WHO and the National Board of Health and Welfare in Sweden), studies investigating adolescents' self-rated health should strive to use questions that capture health from a multidimensional perspective. Based on findings from these interviews, showing that both younger and older participants understood the question: 'How do you feel most of the time?' as multidimensional, the question seems to be a proper self-rated health measure for adolescents in Sweden.

### ***Response options***

Findings from the interviews showed that all five response options of the self-rated health question represented perceived differences in subjective health. This is important to consider when analyzing self-rated health in quantitative studies and in public health monitoring. When analyzing self-rated health questions, it is common to merge the two most positive options, see e.g. the Swedish studies 'Health on equal terms?' (88) and the 'Living Conditions Survey of Children' (90). When doing so, a majority of respondents ends up in this group, and we risk losing important information. This can be exemplified by comparing different ways of presenting data gathered in the quantitative study of this research project:

- 91% of boys and 87% of girls in the 12<sup>th</sup> grade rated their health as 'very good' or 'rather good'.
- Versus
- 45% of boys and 31% of girls in the 12<sup>th</sup> grade rated their health as 'very good'.

In the first example, it is found that most boys and girls perceive their health as good. In the second example, a clear gender difference is found. When reviewing self-rated health in the ‘Living Conditions Survey of Children’ (90) similar patterns are found, i.e. that most boys and girls perceive their health as good. For the writing of this thesis, however, Statistics Sweden (106) shared additional data, showing all four response options. Once again, when evaluating solely ‘very good’ self-rated health (study year 2017–2018), an interesting gender pattern emerges:

- 99% of boys and 92% of girls in the age range 16–18 rate their health as ‘very good’ or ‘rather good’.

Versus

- 63% of boys and 37% of girls in the age range 16–18 rate their health as ‘very good’.

Sometimes, the dichotomizing of response options is necessary (e.g. due to a small number of participants), but these examples demonstrate that differences between groups may be lost when options are merged. This should encourage researchers and analysts to try to avoid merging response options when analyzing self-rated health questions. An additional strength of presenting data in its original form is that the comparability between studies increases. For the writing of this thesis, Statistics Sweden (106), Region Örebro County (105) and the Public Health Agency of Sweden (107, 111) contributed with additional data on self-rated health. A selection of this data is presented in the Background section. As different self-rated health questions with different response scales are used, the presenting of response options in its original form is one way of increasing the comparability between studies.

During the interviews, participants reasoned about the different response options (paper I). The middle option ‘neither good, nor bad’, seemed to be somewhat problematic because it was understood in various different ways by the participants: as a negative alternative, a middle option, or a passive state. A similar conclusion has previously been drawn by Schytt, Waldenström and Olsson (94), who found that it ‘excluded everything’. An alternative phrasing may be ‘fair’ (81) but, as pointed out by Schnohr and colleagues (192), people in different countries still understand this option in various ways (as negative in most countries, and positive or neutral in others). Other options, such as ‘both good and bad’, and ‘sometimes good, sometimes bad’, may also be problematic, as they tend to be too general.

### **Development of self-rated health during the adolescent years**

When looking at ‘very good’ self-rated health in the quantitative study, a decrease was found between the 7<sup>th</sup> and 9<sup>th</sup> grades. Similar age-patterns, based on cross-

sectional data, have been described previously (7, 193). While the qualitative study (paper I) showed that older participants included a wider variety of aspects in their health judgements (compared to younger participants), it may be hypothesized that increasing age implies increasing responsibilities and stressors, which might be part of the explanation for the decline in self-rated health during adolescence.

When younger participants in the qualitative study responded to the self-rated health question, they provided more direct health assessments, than the older participants (paper I). This age difference agrees with Piaget's (194) description of the development of a more complex way of thinking during adolescence. Despite younger participants' more direct assessments, which were colored by recent everyday events, 50% of the ratings in the quantitative study remained unchanged between the 7<sup>th</sup> and 12<sup>th</sup> grades. When reviewing these data, the higher drop-out rate in 12<sup>th</sup> grade should be considered, but a comparison of participants at baseline (7<sup>th</sup> grade) and follow-up (12<sup>th</sup> grade), to those lost to follow-up, shows no significant differences in self-rated health (paper II). Also, previous studies show similar changes over time and refer to self-rated health as a time-stable construct (113, 114). In the Norwegian Young-HUNT study, when using a four-grade ordinal scale, 59% of the ratings remained unchanged during a four-year period (113). Because a five-grade scale was used in this thesis, somewhat increased changes could be expected compared to the Young-HUNT study. A similar change was also found in adults in Canada, with approximately half of the ratings remaining unchanged over a period of two years (80), thus suggesting that changes in self-rated health over time in adolescents are comparable to changes among adults. It should be noted, however, that different self-rated health questions were used ('health' versus 'feel'), implying that the studies might not be fully comparable.

Self-rated health has also been investigated in longitudinal studies, using models controlling for other factors. One study shows that self-rated health at baseline was the strongest predictor of future self-rated health (113). Boardman (114) confirms that future self-rated health is largely determined by former self-rated health. Previous findings from the VIP study show that self-rated health in the 7<sup>th</sup> grade was a significant predictor of self-rated health in the 9<sup>th</sup> grade, independent of other factors (104). These studies provide additional understanding of the stability of self-rated health measures. Although adolescence is known as a time-period associated with development and change, it is interesting to see that half of the ratings remained unchanged. Since self-rated health seems to be established in early adolescence in many cases, this measure should be regarded as an important indicator of health, and poor self-rated health needs to be taken seriously.

## **Self-rated health and social status**

Quantitative findings showed a positive association between self-rated health and subjective social status in school (paper III) but the cross-sectional study design does not allow any judgment about causation. Similar associations have been found for adolescents in Central and Eastern Europe (119) and German university students (120). In those studies, however, stronger associations were detected with subjective socioeconomic measures. Among the German university students, this observation might be explained by the older age of the study participants (mean age 22.69 years). With increased age, measures linked to socioeconomic indicators are likely to become more influential. As a subjective socioeconomic status measure was not included in the present research project, it is not possible to make comparisons.

The presence of a social ladder in school was confirmed as most participants described their active participation and factors that contributed to their positioning (paper IV). Previous research shows that adolescents constantly compare themselves with others (21). Status hierarchies in schools could be considered a natural phenomenon (195), but Hiltunen (21) also argues that the constant need to maintain and defend one's position can be a source of ill health. Garandau, Lee and Salmivalli (196) found that higher levels of classroom status hierarchy were associated with higher levels of bullying.

### ***The importance of having friends***

The importance of social relations and friends was described when the participants reasoned about their health (paper I). When reflecting upon social status in school, a low position in the social hierarchy seemed to be compensated for by their closest group belonging (paper IV). Previous research shows that social relations are central to adolescents' health (21, 170). Adolescents' quest for belonging and peer group approval play an integral role in their everyday lives (21, 197, 198). This may be a possible explanation for the positive association between self-rated health and subjective social status in school (paper III). Previous research shows that the importance of peer relations increases throughout childhood and adolescence, in which such factors peer acceptance and peer rejection are important (199). Social relations in school are often investigated through network analysis and sociometric nominations. In such studies, adolescents are asked, for example, to list/nominate the peers in their class whom they like best, or the most popular pupils. The findings show that lower peer status is associated with poorer self-rated health (149, 200, 201). Longitudinal data reveal negative health effects in adulthood among adolescents who attend school classes characterized by a more unequal distribution of status positions (170). Although sociometric nominations represent a different type of indicator of peer status, the combined findings from previous research and the

present project underline the importance of friends. Accordingly, it seems that the closest group belonging during adolescence should not be underestimated.

### ***Intersections of norms in the school setting***

The qualitative study showed that norm compliance was important for achieving a top position in the social hierarchy (paper IV). Norms represent what is socially desirable and guide us about how to act in different social settings (202). However, norms are also limiting for people whose identity lies far from the norm. In the qualitative study, norm compliance was characterized by factors such as having status markers, being perceived as male, heterosexual, tall, muscular and being white-skinned. Participants who followed these norms were positioned at the top of the social ladder. If one of these factors were to change, so would the position on the ladder. This shows that norms interact and reinforce one another, as shown in intersectional theory (61, 203). Among the older participants in the study, the type of school program (academic, vocational or introductory) also influenced the position. Academic school programs were more highly valued. This is consistent with previous research (204). Our findings indicate that the valuing of school programs should be understood through a system of interacting factors, in line with intersectional theory (203). Solely belonging to an academic school program did not by itself result in high social status. Narrow and exclusionary norms must be considered worrisome, as they are an obstacle to diversity. Still, as norms are bound to time, context and situation, they are also susceptible to change (202). Because norm compliance was highly important to adolescents as part of the social game (and thus presumably important for their health), it seems that society needs to make an effort to work with the widening of norms. Since school is a setting in which norms are both reinforced and challenged, norm-critical pedagogy (205) could be a way of addressing this.

### ***Self-rated health and socioeconomic status***

In the quantitative study, no association between self-rated health and parental socioeconomic status was found, supporting the hypothesis of the socioeconomic equalization of health in adolescence (155). Adolescence is often described as a transition period during which, among other things, parents' influence decreases and autonomy increases (206), which may be a feasible explanation for the 'equalization of health' theory. This non-significant finding is supported by Siahpush and Sing (153) who reported similar results for parental education and occupation in adolescents in Australia. Wilkinson (207) suggests that it is people's notion of inequality, rather than absolute socioeconomic resources, that influence health. This might provide an additional understanding as to why subjective measures are so strongly related to health (157). Sweeting and Hunt (166) acknowledge a weaker association between socioeconomic status and

health in adolescence than during other life stages. They performed analyses that included both objective and subjective socioeconomic measures (family affluence, residential deprivation and societal subjective social status), and school-based social status (related to peers, scholastic achievements and sports) and found that measures tied to the school context were more strongly related to their health. However, Sweeting and Hunt used a different proxy for health (physical symptoms, psychological distress and anger); thus, the results are not fully comparable. Still, they emphasized the need to study school-based subjective social status in adolescence.

We used parental education as a proxy for socioeconomic status. One possibility to consider is that other socioeconomic measures, based on economic and material resources, would judge social status among adolescents in a more evident way (149). Plenty and Mood (149) demonstrate associations between parental income and occupation and self-rated health, but not between the educational level of parents and self-rated health. Educational level is considered a valid measure in adults (208) and, in Sweden, register data from Statistics Sweden is considered a reliable data source (187). However, based on the findings of Plenty and Mood, data covering additional socioeconomic measures would have been valuable in the analysis. In the qualitative part of this research project, adolescents reasoned about aspects that contributed to their social status in school. Parental economy was mentioned in terms of being able to buy status markers. Previous research shows that social status among peers can be acquired via material resources that are observable to others (21, 171). Thus, findings from the present research project and previous research indicate that economic resources influence adolescents' social status, which may also be related to their health.

Another aspect to consider when reflecting upon the non-significant association between self-rated health and parental socioeconomic status is the approach to conducting the analysis. Parental educational level was dichotomized and families in which at least one parent had a college/university degree were defined as 'high', while 'low' included a highest educational level of either compulsory or upper secondary school. A trichotomization was considered, but was not chosen because the group 'compulsory school' was small.

### ***Gender differences in self-rated health and social status***

Analyses performed for this thesis summary showed that boys rated their health higher than girls at all ages. These findings are in accordance with the general pattern among 15-year-olds in the international HBSC study. Among 11-year-olds, however, gender differences are not that common (89). Although gender differences among 15-year-olds are noted in most countries, cross-country

comparisons among the Nordic countries in the HBSC study (in 2014) do show some differences. Significant gender differences within 'fair' or 'poor' self-rated health were found in Sweden (girls: 15%, boys: 9%), Denmark (girls: 20%, boys: 10%) and Iceland (girls: 25%, boys: 18%), while no gender differences were seen in Norway (girls: 15%, boys: 12%) or Finland (girls: 17%, boys: 17%). Among the 42 participating countries in the HBSC study in 2014, non-significant gender differences were only found in Norway, Finland and Armenia (15-year-olds). Non-significant gender differences for 15-year-olds in Norway and Finland were also reported in the previous HBSC study performed in 2010 (209). While Norway and Finland could be assumed to have similar cultures and gender norms to Sweden, this difference is interesting and somewhat surprising.

Among 15-year-old girls in the HBSC study, Latvia has the highest prevalence of 'fair' or 'poor' self-rated health (38%). However, Schnohr and colleagues (192) underline the need to interpret cross-country findings cautiously as semantic bias may affect the comparability. When the response option 'fair' in the HBSC study was evaluated, it was found that this option seems to be perceived as negative in most countries, but as positive or neutral in some. By presenting 'excellent' self-rated health, as done by Potrebny and colleagues (109), one may reduce the risk of semantic bias.

In our quantitative study, boys rated their subjective social status in school higher than girls did (paper III) and the qualitative study indicated that boys were considered the norm (paper IV). This gender difference is in contrast to findings from US adolescents (161). A possible explanation for the difference may be that slightly different wordings were used for the subjective social status question in these studies. In the US study, the term 'grades' was embedded in the question as a way of describing students with a high social status. In general, girls achieve better academic grades than boys, which might explain girls' perception of higher social position in the US sample. As academic grades were not included in the Swedish question, this criterion was not considered in their evaluation. Although it is not possible to determine whether the different gender patterns in Sweden and the USA are dependent on the wording of the question, the observed difference is interesting and should be given attention in future research.

### *Social desirability bias*

When considering gender differences in self-rated health, one may wonder whether there is an actual difference between boys and girls, or whether differences may be biased in any way. In survey research, social desirability is generally considered a source of response bias (210). Thus, it may be hypothesized that the different expectations of boys and girls could bias the results. In the qualitative study, the hegemonic boy norm (54) was described through expectations of being strong and confident (paper IV). From a hegemonic

perspective, it may be argued that striving for norm compliance and social desirability might discourage boys from providing poor health ratings. Previous research, investigating adolescents' reflections on mental health, shows that boys believe that boys in general are less likely to mark the worst alternative on questionnaires (211). A similar topic was investigated in the qualitative study (paper I), but no gender difference in the participants' propensity to provide honest or biased answers was found. Since findings from the interviews suggest that girls are subjected to more stressors than boys (papers I and IV), it may be argued that there is an actual difference between boys' and girls' self-rated health. The overall consistency between adolescent studies, showing gender differences in self-rated health in most cases (mostly among older adolescents) (7, 101-103, 186), is another factor supporting an actual gender difference. Since the findings from our qualitative study revealed that some adolescents described resistance towards providing honest answers in surveys (paper I), it may be suggested that this could produce an under-representation of poor self-rated health. Thus, when performing surveys, appropriate precautions should be taken to ensure privacy.

#### *Handling multiple expectations*

Girls' reflections on stressors related to achievements such as excelling at school, gaining future education, and finding jobs (paper I), along with the pronounced judgment of girls' looks (paper IV), indicate that girls need to handle multiple expectations. Within the social hierarchy, both boys and girls were judged on their looks, but girls had to follow more rules than boys. Wiklund (20) recognizes the body as central in the identity-making of young women, and describes young women as being very aware of their bodies as a central feature in the performing of social status (20). In our qualitative study (paper IV), older participants reflected upon the reproduction of traditional gender norms through girls' sexuality, which was subjected to moral judgment. While boys gained status from having many sexual partners, such behavior reduced the social status of girls. This shows that traditional subordinated female roles, referred to as 'emphasized femininities' (212), were evident in the study. The reproduction of a gender order and sexualization in schools, in which boys are considered the norm, has been described previously (202, 213). The act of ensuring sexual attractiveness among girls, without the taint of sexuality, has been likened to walking a narrow tightrope between constructions of 'madonna' and 'whore' (214). Traditional expectations of gender affects and limits the behaviors of both girls and boys (202), as well as non-binary adolescents. As Sweden is known, from a global perspective, as a gender-equal country (215), it is troublesome that this traditional view of gender existed to the extent that it did in the study. However, reflections upon the unfairness of masculine dominance indicated a degree of resistance towards the boy norm, indicating possibilities of future changes.

Girls' balancing of multiple factors in the pursuit of social desirability (paper IV), and stress related to achievements (paper I), are issues that relate to young women's striving for perfection (216, 217). This need to handle multiple expectations might be part of the explanation for poorer subjective health in girls. Strömbäck and colleagues (216) describe how young women face an exhausting and draining self-evaluating circle because they are expected to handle both their historical position as subordinated and a discourse of successful femininity, such as being clever, independent and successful (216). The heavy work-load in school and a more individualistic society have previously been discussed as possible explanations for mental health problems (8, 21). Similar explanatory models may be applicable to explain poor self-rated health. Previous findings from the quantitative study (104) underline the importance of school, because high self-rated health in the 9<sup>th</sup> grade was predicted by a positive school experience in the 7<sup>th</sup> grade for girls. School factors clearly seem to be central to adolescents' health and, depending on life circumstances, they function as both risks and resources for health. The need for girls to handle multiple expectations indicates that norms need to be addressed and problematized.

### **Smoking prevention in adolescence**

Univariable analyses reveal a multi-factorial explanation for smoking initiation in adolescence (paper II). The findings of the multivariable model have implications for smoking prevention initiatives in adolescence. The significant influence of attitudes suggests that actions influencing attitudes to smoking during the first six school years would be a good investment. As previously concluded by Edvardsson and colleagues (218), preventive actions need to be well established before tobacco is introduced in order to influence attitudes. As lower self-esteem predicted smoking, the findings suggest that strengthening self-esteem in adolescence could be a protective factor against smoking initiation. Previous short-term longitudinal research has found an association between low self-esteem and smoking in girls (144).

Ever having used snus in the 7<sup>th</sup> grade was a significant predictor of smoking in the 12<sup>th</sup> grade. Although snus carries fewer health risks compared to smoking in terms of death and disease (219), this present quantitative study suggests that another risk of snus use should be acknowledged in early adolescence; namely, that the early introduction of nicotine through snus use seems to increase the risk of becoming a smoker. Based on this finding, it is suggested that preventive efforts against snus use should be introduced early. Interestingly, ever having used snus was a stronger predictor of smoking than smoking itself. However, the OR for smoking in 7<sup>th</sup> grade as a predictor was high, and these non-significant findings could possibly be explained by the low prevalence of smokers in 7<sup>th</sup> grade.

From a Swedish perspective, girls' higher risk of becoming smokers might partly be explained by the fact that boys use snus significantly more than girls (136). National cross-sectional data from the Swedish Council of Information on Alcohol and Other Drugs show a significant difference between boys and girls in 11<sup>th</sup> grade, with girls smoking more than boys (136). International data from the HBSC study show gender differences in smoking in only a few countries (89). From a gender and Swedish perspective, an analysis employing separate models for girls and boys in paper II would have been favorable. However, the size of the present study sample was not sufficient to enable such an analysis.

Self-rated health failed to predict smoking in a multivariable analysis. Although the interviews revealed that a self-rated health question including the word 'feel' was understood as a holistic measure, the findings also indicated that health behaviors were more prominent when participants reasoned about their 'health' (paper I). Based on these findings, it could be hypothesized that a self-rated health question including the word 'health' would be a stronger predictor of future smoking.

## Methodological considerations

Qualitative and quantitative methods usually use different frameworks to assess methodological considerations and to ensure rigor (Table 9) (31, 220, 221). Qualitative studies assess trustworthiness in terms of credibility, transferability, dependability and confirmability. In quantitative studies, internal and external validity, reliability and objectivity are used. In this research project, a choice was made to combine qualitative and quantitative designs in order to gather both deep and broad information on the subject, comprising both qualitative interviews and statistical models. In this thesis summary, one goal has been to adopt a mixed methods approach (37) in order to integrate the data in the Results section and in the Discussion. The purpose of integrating data was to use it in a ‘complementary’ manner, implying that qualitative and quantitative results seek to supplement each other. Thus, in this thesis summary, the findings have been linked together to provide a more extensive exploration and understanding of adolescents’ health and related factors. The adoption of a mixed methods approach should strengthen the ‘truth value’ (internal validity and credibility) of this thesis summary, since the findings are integrated and consolidated. The methodological considerations of the qualitative and quantitative studies are described below.

**Table 9.** Questions and terminology used to assess methodological considerations in qualitative and quantitative studies, inspired by Dahlgren, Emmelin and Winkvist (31).

Question	Qualitative studies	Quantitative studies
<b>Have we measured what we intended to?</b>	Credibility	Internal validity
<b>How applicable are our results to other settings?</b>	Transferability	External validity
<b>Would repeated measures arrive at the same results?</b>	Dependability	Reliability
<b>How are the findings affected by personal biases?</b>	Confirmability	Objectivity

### Trustworthiness

Guided by the criteria and techniques described by Lincoln and Guba (220), the research group strived to achieve a high level of trustworthiness in the qualitative study. This study included a relatively large sample of both younger and older adolescent girls and boys from different schools in the 7<sup>th</sup> grade and different

school programs in the 12<sup>th</sup> grade. Adolescents with different ethnic backgrounds were also included in the study. The purposive sampling, aiming for maximum variation, strengthens the credibility and transferability of the results.

In qualitative research, there is a risk of 'elite bias', implying that the most articulate are the ones who volunteer to participate (222). In this study, efforts to capture participants with a variety of background characteristics were made by recruiting through the introductory school program. Nevertheless, the study failed to include people with 'very bad' self-rated health and only three participants with 'neither good, nor bad' or 'rather bad' self-rated health. The research group did, however, assess that a sufficient number of participants were able to reflect about negative response options, e.g. through previous experiences of poor health.

The interviews were audio recorded and transcribed verbatim to ensure the accuracy of the data. The use of both concurrent and retrospective think-alouds with probes and semi-structured questions, enhanced the dependability of the study and gave participants who were not as verbally skilled the opportunity to provide accurate descriptions. Previous research using cognitive interviewing suggests that children from the age of eight are able to adequately report on different aspects of their health (223). During the interviews, participants were asked the same interview questions (with the exception of a question regarding gender). This strengthens the dependability of the study.

Before each interview, participants were asked to fill in a form with background information. Participants reported their 'gender identity' through a binary variable ('boy' or 'girl'). It is possible that the use of a binary variable hindered participants to express thoughts about non-binary identities. Previous research acknowledges that non-binary adolescents report more mental health problems than adolescents with binary identities (224).

During the analytical stage, transcripts were sorted into groups based on age and gender. During the analysis, the risk of 'gender bias' (225), i.e. that gender differences are assumed and reproduced when in fact there are no differences, or that genuine differences are overlooked when assuming sameness between girls and boys, was carefully considered and discussed by the authors.

As the study was qualitative and conducted in one town in the high-income country of Sweden, the transferability of its results is limited. Since Sweden scores high on the Gender Development Index (215), the transferability of findings regarding gender may be limited to similar social settings. Findings regarding subjective social status and school programs are primarily transferable to similar school systems. For findings regarding the self-rated health question, it is

possible that the wording ('feel') has different meanings in different cultures, which limits the transferability of the results. As described in the Methods section, efforts to achieve an optimal translation into English have been made.

Since the study was carried out, the #MeToo movement, addressing the sexual harassment of women, has grown strong in society. Students in Sweden protested with a hashtag of their own (#tystiklassen) (226). If the study had been conducted today, it is possible that resistance toward gender inequality in the social hierarchy would have been even more pronounced.

The interdisciplinary research group was engaged throughout the whole research process, which strengthens the credibility. The group was schooled and trained within the areas of public health, social work, gender and feminist studies, pediatrics and family medicine. The interdisciplinarity of the group contributed to a multiplicity of aspects being reflected in the integration of theoretical perspectives. The re-reading of transcripts, the separate coding of data performed by two authors and the continuing discussions and negotiations within the research group throughout the analyses, strengthen the confirmability of the findings and the interpretations.

### **Validity, reliability and objectivity**

The quantitative study had relatively high response rates for the first three surveys, and a moderate response rate for the fourth (2003 = 92%, 2004 = 88%, 2005 = 81% and 2008 = 67%). In paper II, an analysis to compare baseline characteristics for those who participated in both the 7<sup>th</sup> and 12<sup>th</sup> grades to those who were lost in the 12<sup>th</sup> grade was made. The analysis showed that a higher proportion of boys, participants born outside of Sweden and snus users were lost in the 12<sup>th</sup> grade.

The three initial surveys were conducted in school. If classrooms do not offer a confidential atmosphere, there is a risk of collecting biased results. The conducting of a classroom survey is a well-established method in Sweden; nevertheless, this could be considered a limitation.

The questionnaire included items from other surveys, such as the Swedish part of the HBSC study, and some items that were developed by the research group, e.g. the self-rated health question. Analyses of the qualitative study showed that younger and older participants understood the self-rated health question in a similar way, and the quantitative data showed low missing values (lower than 1% in the first and fourth surveys). For the smoking question (selected from HBSC), the possibility of time-dependent misclassification must be acknowledged. It is possible that participants' perceptions of time, as defined in the question ('these

days'), might have changed between the 7<sup>th</sup> and 12<sup>th</sup> grades. In addition, the question had no information on previous smoking (which was available for snus). The question measuring subjective social status in school was originally developed by the 'MacArthur research network on SES and health'. This question suffered a rather high amount of missing data (10.5%, paper III). When reviewing the questionnaires it was found that several participants made their positioning between two steps, or marked two steps instead of one. The 'in-between positioning' was also made by some of the participants during the interviews. These problems suggest that the validity of the question needs to be explored further in future research.

In the analyses, several variables were dichotomized, which affects the interpretations of the results. Sometimes, this decision was made due to small numbers of participants in the different categories. Country of birth is one example where the low number of smokers born outside of Sweden hindered stratification based on native country. In the qualitative study, it was found that participants acknowledged differences between all five response options for the self-rated health question. Thus, in paper III, a decision to include all the original response options for the dependent variable (self-rated health) was made. The low number of responses at the negative end of scale is, however, a limitation. The question about subjective social status in school suffers from the same limitation because very few participants rated their status as 1–4.

A strength of paper II was the longitudinal design, which enabled causality to be investigated. During this analysis, several important factors were included. Data on parental smoking, parents' attitudes and peer smoking were not available, however, which is a limitation because these are factors that have been described as central in other studies. Data were collected between the years 2003 and 2008 and some changes have been noted in society during this period. Smoking rates have declined (136) and since the beginning of the study there have been some changes in legislation. In 2005, smoking bans were introduced in Swedish restaurants, bans against advertising outside stores selling tobacco products, and bans on selling cigarette packets with fewer than 19 cigarettes. In 2019, bans against smoking at such public places as bus stops, train platforms, outdoor diners and playgrounds were introduced. Despite these changes, the findings are still considered valid, because changes in legislation are not likely to change the influence of the predictors.

The cross-sectional research design in paper III enabled analyses of association but not of causation. This limits the conclusions that can be drawn from the study. Since the study was conducted (in 2008), there has been a development in society whereby social media and blogs are more intensely used, which may have intensified social comparisons. It is possible that the association between self-

rated health and subjective social status would be even stronger if the study had been performed today.

The study was conducted in Sweden, a high-income country scoring high on social indexes. The results might be difficult to generalize to countries with a different social system and culture. As the three participating municipalities are fairly representative of Sweden with respect to socioeconomic status, it is likely, however, that the results can be generalized to other adolescents in Sweden.

The outcomes of the quantitative study are affected by the choices made by the involved researchers at all stages of the research process, from the design of the study, the selection of questions and the data collection to the analysis of the results. Efforts were made via open discussions within the research group and collaboration with statisticians to increase the objectivity of the study and reduce the risk of personal biases.

## Conclusions

The self-rated health question: ‘How do you feel most of the time?’ captured a holistic view of health (social, mental and physical aspects) in both younger and older girls and boys. Since health is a multidimensional construct (as defined by the WHO), and because this question managed to capture these aspects, the question seems to be an appropriate self-rated health measure to use with adolescents.

All five response options for the self-rated health question represented differences in subjective health. This observation should be considered when performing statistical analyses. When variables are dichotomized, some differences are inevitably lost.

The decline in ‘very good’ self-rated health between the 7<sup>th</sup> and 9<sup>th</sup> grades indicates that health promotion needs to be established early. Since half of the ratings remained unchanged between the 7<sup>th</sup> and 12<sup>th</sup> grades, self-rated health seems to be established in early adolescence in many cases, suggesting that this measure should be regarded as an important indicator of health.

Girls’ descriptions of stressors related to achievements in school (paper I) and the balancing of multiple expectations about how to look, act and interact (paper IV) may be one explanation for the lower levels of self-rated health among girls. These findings suggest that efforts to strengthen girls’ health may be needed. The gender difference in health and social status emphasizes the need for a gender-sensitive understanding of factors that impact upon the lives of adolescents. Gender differences should be addressed by integrating gender theory and school interventions need to address norms from an intersectional approach.

The positive association between self-rated health and subjective social status in school indicates that the subjective social status measure seems to be a useful health-related measure of social position in adolescents (paper III). Because social desirability in the school hierarchy was defined by norms that left little room for diversity, the possible negative impact of status hierarchies on adolescents’ health should to be considered (paper IV).

Tobacco prevention efforts in early adolescence should acknowledge the higher risk of girls becoming smokers and the higher risks that are associated with the early introduction of snus, lower self-esteem and a less negative attitude towards smoking (paper II). These factors seem to be central in tobacco prevention directed toward a young population. Parents, schools, youth associations and legislating authorities are primary actors in such efforts.

## Implications for practice

A bioecological approach (227), linking the individual and their surrounding environment through micro, meso, exo and macro levels, is useful for guiding health promotion in adolescence. Adolescent health is a concern for several sectors and arenas: the government in its planning of resources and legislation; County Councils with their responsibility for health promotion; municipalities with their responsibility for education, social work, culture and the development of cities and environments to promote health; NGOs that provide services to support adolescents; and clubs/associations providing spare-time activities for adolescents.

### *Implications for national health authorities*

The decline in self-rated health during adolescence indicates that health promotion at early ages should be reinforced. Governments are central actors in this respect, not least in their distribution of resources to other actors. Support focusing on children and adolescents is an important investment in the future health of the nation.

### *Implications for County Councils*

County Councils are central actors concerning health promotion within health-care work and directed toward the general population. As self-rated health seems to be a rather stable health measure during adolescence, health-care personnel should acknowledge this and use the self-rated health question when meeting adolescents in health-care settings. Self-rated health could, in this regard, work as a screening instrument for the early detection of poor health.

Besides health care, County Councils also perform health monitoring of the population, often in collaboration with the national health authorities, municipalities, or both. Self-rated health is usually included in these surveys and, since differences between all five response options for the self-rated health question were recognized by adolescents, the merging of response options should be avoided.

### *Implications for municipalities*

Municipalities are responsible for schools and student health care, and thus are central actors in health promotion. According to national guidelines, all students attending compulsory school in Sweden should be offered at least three health visits with the school nurse during their school years. In upper secondary school, students should be provided with at least one visit (228). These visits offer unique opportunities to promote health and identify possible health problems (e.g. poor subjective health or smoking). Before these health visits, students are asked to

answer a questionnaire, which is later reviewed together with the school nurse. These visits should strive to capture health from a multidimensional perspective, and thus a question that measures how students 'feel' is recommended. In addition, when health behaviors are discussed with students, indications of early snus use should be regarded as a risk factor for future smoking. Efforts to strengthen adolescents' self-esteem and anti-smoking attitudes should be considered when discussing tobacco use.

In the school setting in particular, and municipalities in general, health promotion directed toward adolescents needs to acknowledge gender differences in health and social status and align with theories of gender. Gender-sensitive interventions may be a way of strengthening girls' health.

Narratives about social status in school show that traditional norms related to gender, ethnicity, sexuality, etc. influence adolescents' positioning. Because traditional norms may hinder adolescents from acting out their true selves, schools constitute central settings for the challenging of limiting norms. Based on the finding that status hierarchies very clearly exist in the school arena, the importance of norm-critical pedagogy (205) is emphasized. Students need to be acknowledged as active and competent actors in this respect. The survey question 'subjective social status in school' may be considered a tool to initiate dialog about norms in school. However, the potentially sensitive nature of the question also needs to be considered, as it may risk exposing adolescents to negative feelings.

#### *Implications for parents and adults in general*

All adults, not least parents and guardians, need to take responsibility for challenging unfavorable norms. How adults speak and act in every-day encounters influences norms (see e.g. 'doing gender' as described by West and Zimmerman (51)). Thus, adults have a responsibility for the widening of norms, and for the creation of a society in which all adolescents feel valued and appreciated. Leaders of youth clubs/associations and teachers in school (and pre-school) should also be mentioned as important actors.

The development over the past couple of years in which the Swedish climate activist Greta Thunberg initiated the 'school strike for climate' (#FridaysForFuture) (229) demonstrates the power and agency within the adolescent population. Adults need to support adolescents in various ways, as discussed above, but also need to recognize their strength. Adolescents need to be included in the development of solutions (2). Through the co-creation of action, 'health for future' is facilitated.

## Future research

### *Longitudinal studies*

Self-rated health needs to be further investigated in longitudinal studies ranging from early adolescence, through late adolescence, and on to young adulthood. Longitudinal studies would be beneficial because they provide models that enable analyses of causality.

### *Evaluation of different self-rated health questions*

Although the self-rated health question ‘How do you feel most of the time?’ seems to capture health from a holistic perspective, we lack knowledge about its ability to predict health outcomes in adulthood. Thus, future research needs to address the predictive value of different self-rated health questions through longitudinal studies. In addition, qualitative studies that can explore how different self-rated health questions are understood in different countries are needed in order to avoid semantic biases. In such studies, both the question and the response options should be evaluated.

### *A salutogenic approach*

In the quantitative study, a fair number of participants improved their health from ‘rather good’ to ‘very good’ during the five-year period. In future research, this group (i.e. adolescents who improve their health) should be subject to a more in-depth analysis. Health promotion would benefit from analyzing the positive end of the scale and identifying the factors that enhance health (i.e. adopting a salutogenic approach). This position is in line with previous recommendations (115).

### *Integrating gender theory when exploring gender differences*

Gender differences in self-rated health are evident in most studies. In future research, we need to integrate gender theory more profoundly when exploring these differences. In future explorations, the different gender patterns in self-rated health observed in such countries as Sweden and Norway should warrant attention.

### *Self-rated health and subjective social status in school*

A positive association between self-rated health and social status in school was found in the quantitative study. As the study was performed with a cross-sectional design, this association should be further explored with a longitudinal study design. The use of different subjective social status questions, addressing different contexts, may also be considered.

### *Validating subjective social status measures*

Because subjective social status measures are increasingly used, there is a need to validate the questions and explore how they are interpreted. For example, the different gender patterns in Sweden and the USA might partly be explained through such studies. A cognitive interviewing technique should be suitable in this regard.

### *Interventions addressing health and social status*

Adolescents confirmed the existence of status hierarchies in school. Because many of the factors that contributed to their positioning derived from limiting norms, the possible negative impact of social hierarchies needs to be further addressed in research. Gender-sensitive interventions that address norms and aim to make them broader and more inclusive are needed. 'Participatory action research' (230), advancing adolescents' engagement and participation, may be a suitable approach for this.

### *Health and climate change*

In 2018, the #FridaysForFuture movement grew strong as the 15-year-old Swedish climate activist Greta Thunberg initiated the 'school strike for climate' outside the Swedish parliament. This initiative has intensified the debate about climate change (229) and parallels between the climate and health are often made (e.g., climate anxiety). Thus, in future research, it would be valuable to explore whether adolescents' concerns about climate change have influenced their understanding of their health.

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