IMPACTS OF A NATIONAL RECOMMENDATION ON THE SALE OF SWEET PRODUCTS IN FINNISH SCHOOLS

School-Level Factors and Oral Health Inequalities

Jaakko Anttila
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‘Why treat people and send them back to the conditions that made them sick?’

– Sir Michael Marmot

To Anne and my wonderful boys
ABSTRACT

Jaakko Anttila

Impacts of a National Recommendation on the Sale of Sweet Products in Finnish Schools – School-Level Factors and Oral Health Inequalities

University of Turku, Faculty of Medicine, Department of Community Dentistry

Finnish Doctoral Program in Oral Sciences (FINDOS-Turku)

Annales Universitatis Turkuensis, Series D, Medica- Odontologica, Turku, Finland, 2018

The objective was to find out 1) if the national recommendation has had any effect on schools' oral health-promoting actions, 2a) whether the school-level intermediary determinants were associated with the school-level socioeconomic position (SEP) and 2b) whether the effects of the national recommendation on schools' intermediary determinants differed according to the school-level SEP.

The study is based on two datasets independently collected from Finnish upper-level comprehensive schools (N=970): the oral health-promoting actions (OHPA) data were collected through an online survey arranged in 2007 (n=480), 2008 (n=508), 2009 (n=593) and 2010 (n=478) and the oral health behaviour data via the national School Health Promotion Study. The combined, longitudinal dataset (n=360) used in this study was formed based on the two datasets. Aim 1 was investigated based on the schools that responded to the OHPA survey in 2007 - 2009 (n=258) and both in 2007 and in 2010 (n=237). The baseline and longitudinal combined data were used to examine aims 2a and 2b, respectively.

The national recommendation has influenced schools' oral health-promoting actions: schools have decreased their sweet snack and soft drink selling to pupils. In addition, there seem to be associations between school-level intermediary determinants and the school-level SEP. The impact of the national recommendation on the sale of sweet products in schools was similar across all school-level SEP groups.

Overall, the national recommendation was an effective tool to decrease sweet selling in Finnish schools without increasing inequalities in sweet selling. To eradicate the sale of sweet products altogether from Finnish schools, stricter actions such as legislation prohibiting the sale of unhealthy products in schools may be needed.

Keywords: Adolescents, Sweets, Carbonated Beverages, Oral Health Promotion, Inequalities, National Recommendation, Schools, Socioeconomic Factors
Abstract

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Tiivistelmä

Jaakko Anttila

Kansallisen suosituksen vaikutukset koulujen makeanmyyntiin – koulutason tekijät ja suun terveyserot

Turun yliopisto, Lääketieteellinen tiedekunta, Sosiaalihammaslääketieteen oppiaine

Suun terveystieteen tohtoriohjelma (FINDOS-Turku)

Annales Universitatis Turkuensis, Series D, Medica- Odontologica, Turku, Finland, 2018

Väitöstutkimuksessa selvitettiin, 1) vaikuttiko kansallinen suosituus koulujen suun terveyttä edistäviin toimiin, 2a) ovatko koulutason välilliset tekijät yhteydessä koulujen sosioekonomiseen asemaan ja 2b) vaihtelivatko kansallisen suosituksen vaikutukset välillisiin tekijöihin koulujen sosioekonomisen aseman mukaan.

Tutkimuksen tietoaineisto koostui kahdesta kaikilta suomalaisilta yläkouluilta (N=970) erikseen kerätystä aineistosta: suun terveyden edistämiseen liittyvät toimia koskeva aineisto kerättiin vuosina 2007 (n=480), 2008 (n=508), 2009 (n=593) ja 2010 (n=478) kouluille järjestetyn kyselyn avulla, kun taas suun terveyteen liittyvät toimet koskeva aineisto koostettiin Kouluterveyskyselyyn vastanneilta oppilailta. Näistä aineistoista muodostettiin yhdistetty aineisto (n=360). Ensimmäisästä tutkimuskysymyksestä selvitettiin suun terveyden edistämiseen liittyviä toimia koskevan, vuosina 2007–2009 (n=258) sekä vuosina 2007 ja 2010 (n=237) kerätyn pitkittäisaineiston perusteella. Toisen tutkimuskysymyksen (2a) selvittämisessä käytettiin yhdistettyä aineistoa tutkimuksen lähtötilanteessa, ja kolmatta tutkimuskysymyksestä (2b) selvitettiin pitkittäisen yhdistetyn aineiston perusteella.


Kansallinen suositus osoittautui tehokkaaksi työkaluksi suomalaisten yläkoulujen makeanmyynnin vähentämisen kannalta ilman, että makeanmyynnin sosioekonomiset erot olisivat lisääntyneet. Tiukempia toimia, kuten lainsäädäntöä, voidaan tarvita, jos koulujen makeanmyynti halutaan kokonaan lopettaa.

Avainsanat:
kansallinen suositus, koulut, makeiset, nuoret, sosioekonominen asema, suun terveys, terveyden edistäminen, terveyserot, virvoitusjuomat
TIIVISTELMÄ

Jaakko Anttila

Kansallisen suosituksen vaikutukset koulujen makeanmyyntiin – koulutason tekijät ja suun terveyserot

Turun yliopisto, Lääketieteellinen tiedekunta, Sosialihammaslääketieteen oppiaine
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Avainsanat: kansallinen suositus, koulut, makeiset, nuoret, sosioekonominen asema, suun terveys, terveyden edistäminen, terveyserot, virvoitusjuomat
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ABBREVIATIONS

BMI  Body mass index
CESCR  Committee on Economic, Social and Culture Rights
CRFA  Common risk factor approach
EFA  Explorative factor analysis
FDI  World Dental Federation
FNBE  Finnish National Board of Education (current Finnish National Agency for Education)
GLM  General linear model
ICOHIRP  International Centre for Oral Health Inequalities Research and Policy
LMM  Linear mixed modelling
SEP  Socioeconomic position
SHPS  School Health Promotion study
SSB  Sugar-sweetened beverage
SSSS  School Sweet Selling Survey
THL  National Institute for Health and Welfare
UN  United Nations
WHO  World Health Organization
LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following articles, which are referred to in the text by the Roman numerals I–IV


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LIST OF ORIGINAL PUBLICATIONS

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III Anttila J, Tolvanen M, Kankaanpää R and Lahti S. Social gradient in intermediary determinants of oral health at school level in Finland. Community Dent Health 2018; 35: 75-80

IV Anttila J, Tolvanen M, Kankaanpää R and Lahti S. School-level changes in factors related to oral health inequalities after national recommendation on sweet selling. Scand J Public Health 2018; published online. DOI: 10.1177/1403494818812641

The original publications have been reproduced with the permission of the copyright holders.
Over the last decades, clinical practice and dental services have been the main focus in efforts aimed to improve oral health. In industrialised countries, the mouth is the most expensive part of the body to treat (Sheiham et al. 2011). Finland has also spent a great deal of resources on treating dental caries, periodontal disease and other oral health-related problems. Still, the dramatic drop in dental caries and periodontal disease is mainly due to behavioural changes (e.g. those related to smoking or performing oral hygiene) and adding fluoride to products, whereas improved dental services only accounts for a small part of the reduction (Sheiham et al. 2011). In Finland, clinical procedures, such as professional fluoridation, fissure sealants and giving chair-side instructions for better self-care, have been used as preventative strategies against the most common oral diseases. Unfortunately, these measures are costly and tend to increase oral health inequalities (Watt et al. 2015b).

At the same time, Western countries are suffering from the major overweight and obesity epidemic, affecting both adults and children alike. Eating energy-dense carbohydrates causes not only weight gain but also oral diseases. Something needs to be done to reduce the burden of oral diseases and to stop the growing overweight and obesity problem. There is a social gradient both in obesity and in oral health, meaning that one group of people suffers from problems related to them more than other groups. Health inequalities are unjust and avoidable when people are made vulnerable by underlying social, political and economic structures (Sheiham et al. 2011). Reducing inequalities in general and oral health has been identified as an ethical imperative by the World Health Organization’s (WHO) Commission on Social Determinants of Health, but so far little has been achieved in terms of reducing disparities in oral health (Lee & Divaris 2014).

Upstream actions (e.g. legislation, fiscal actions and macro-level policies) at population level are needed to resolve the obesity issue and to cut down oral diseases. Schools, workplaces and hospitals are important places to implement upstream measures that could reduce inequalities (Watt & Sheiham 2012). Schools have indeed been a popular setting for general and oral health promotion, and a lot of research and implementation have been targeted at schools. The school system in Finland has elements that could narrow the gaps in social and health inequalities: Finnish schools are publicly funded, education is compulsory for 6- to 17-year-olds, and schools offer a healthy hot meal during the school day free of charge. Pupils are obligated to attend school every single working day. Therefore, the school environment should not have any elements that could compromise pupils’ health.
INTRODUCTION

Over the last decades, clinical practice and dental services have been the main focus in efforts aimed to improve oral health. In industrialised countries, the mouth is the most expensive part of the body to treat (Sheiham et al. 2011). Finland has also spent a great deal of resources on treating dental caries, periodontal disease and other oral health-related problems. Still, the dramatic drop in dental caries and periodontal disease is mainly due to behavioural changes (e.g. those related to smoking or performing oral hygiene) and adding fluoride to products, whereas improved dental services only accounts for a small part of the reduction (Sheiham et al. 2011). In Finland, clinical procedures, such as professional fluoridation, fissure sealants and giving chair-side instructions for better self-care, have been used as preventative strategies against the most common oral diseases. Unfortunately, these measures are costly and tend to increase oral health inequalities (Watt et al. 2015b).

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2 REVIEW OF LITERATURE

2.1 General and oral health promotion

2.1.1 Defining general and oral health

Already more than 70 years ago, WHO gave the following definition for ‘health’ in its Constitution: ‘Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.’ (World Health Organization 1946) This definition does not take into account the environment and circumstances people are living in. In recent years, there has been criticism that the old definition contributes to medicalisation if the ideal is to achieve a state of complete physical well-being (Huber et al. 2011, Jadad & O’Grady 2008). Huber et al. (2011) urge that in addition to the physical element, mental and social factors should be emphasised more in the reformulation of the definition for health. Shilton et al. (2011) have formulated a good alternative for a new definition of health: ‘Health is created when individuals, families, and communities are afforded the income, education, and power to control their lives; and their needs and rights are supported by systems, environments, and policies that are enabling and conducive to better health.’

Although there is no universal consensus on how to define ‘oral health’, many researchers and national dental associations have developed their own definitions for oral health (Glick et al. 2016). Some definitions make references to the functionality of the teeth and to the social aspect of oral health, while others also emphasise the absence of disease (Glick et al. 2016, World Health Organization 2012, Yewe-Dyer 1993). In 2016, the FDI World Dental Federation introduced the following definition for oral health: ‘Oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex.’ (Glick et al. 2016) This definition emphasises that oral health is more than merely an absence of oral disease. Along with this new definition, FDI also presented a comprehensive framework for the oral health definition (Glick et al. 2016). It shifts the focus of dentistry from treating disease to providing care and support for oral health and emphasises that oral health does not occur in isolation but is related to overall health.

It is not irrelevant how general and oral health are defined because health is considered a basic human right by the United Nations (UN). As the UN body the
Committee on Economic, Social and Cultural Rights (CESCR) has stated in its General Comment No. 14, ‘Health is a fundamental human right indispensable for the exercise of other human rights.’ (CESCR 2000) The key message of human rights conventions is that the resources of the state or nation should be targeted to decrease inequalities and improve the status of those who are in the lowest position in society (Nykänen 2016).

In recent decades, our knowledge of the interaction between general and oral health has significantly increased. For example, it is now known that there is a link between periodontal disease and other health conditions, such as pregnancy, diabetes or cardiovascular diseases, and thus treatment of oral health problems may also have a beneficial impact on these general health conditions (Hummel & Phillips 2016). Even better results could be achieved by preventing oral diseases from developing in the first place. Many risk factors of oral diseases, such as smoking and dietary sugars, are also risk factors of several chronic diseases, such as diabetes and cardiovascular diseases (Sheihman & Watt 2000). There is such a strong link between general and oral health that it is hard to imagine good general health without good oral health, and vice versa.

2.1.2 Shortcomings of health promotion strategies

According to the Ottawa Charter for Health Promotion, ‘Health promotion is the process of enabling people to increase control over, and to improve, their health.’ (World Health Organization 1986) The main pillars of the Ottawa Charter are building healthy public policies, creating supportive environments, strengthening community action, developing personal skills, and reorienting health services. These action areas have guided public health researchers, institutions and organisations, as well as entire nations to promote public health worldwide over the last three decades.

Even though all the action areas of the Ottawa Charter are well recognised, oral health promoters have mainly concentrated on the theme ‘developing personal skills’. Developing personal skills to maintain good oral health is well-suited to the biomedical model of medicine adopted by oral health professionals in the past decades (Watt et al. 2015b). Most strategies to prevent oral diseases are directed towards changing behaviours (Moyses 2012). The approach to oral health promotion in the biomedical model is that preventive interventions focus very narrowly on diseases of an individual patient. In addition, the biomedical model often involves professional intervention, such as applying topical fluorides or fissure sealants, which is criticised for increasing medicalisation and being expensive (Watt et al. 2015b). On the other hand, fissure sealants and fluoride
varnishes have been demonstrated to decrease caries occurrence among more deprived populations (Chestnutt et al. 2017). The problem is that it is very difficult to identify individuals at a high risk of developing dental caries (Hausen 1997).

The aim of targeting high-risk individuals could be due to the emphasis on individualism in the modern society. The prevailing political and economic climate in the Western world can broadly be referred to as neoliberalism. Neoliberalism highlights individual and market responsibility with minimal government involvement (Ayo 2012). In terms of health, neoliberalism emphasises individual responsibility for making healthy choices, and healthcare companies are more than happy to market them to people. Some individuals make healthy choices, for example, to improve their nutrition or increase their physical activity. Some have justified this individualistic approach by arguing that when individuals are informed of the importance of better self-care, for example, by dental health professionals, they are more motivated to change their behaviours (Watt 2005). Unfortunately, this kind of individual health education has been considered ineffective (Yevlahova & Satur 2009). Big multinational companies with their large marketing budgets act as commercial determinants, advertising their unhealthy products to citizens of the neoliberal Western countries, also targeting children and adolescents (Harris et al. 2009). It is generally considered in Western countries that health inequalities are a consequence of choice, while studies indicate that in reality health behaviours only account for a small part of oral health inequalities (Ayo 2012, Sabbah et al. 2009).

In Finland, oral health promotion has been separated from general health promotion efforts in the past decades. Oral health has been ignored in comprehensive health promotion policies and programmes, even though unfavourable health behaviours, such as poor diet, hygiene and smoking, are strongly linked to both the most common oral diseases (dental caries, periodontitis, oral cancer, etc.) and general health problems (Baelum 2011). Oral health promotion has mainly been left in the hands of oral health professionals working in dental clinics. A lot of effort has been made to reduce dental caries levels, such as promoting tooth brushing twice a day and preventive clinical procedures (e.g. topical fluoridation of teeth and use of fissure sealants) and arranging information campaigns. Such measures have proved either ineffective or expensive and results achieved have not been long-lasting (Watt et al. 2015b). In addition, although a lot of effort has been put to decrease inequalities in oral health, inequalities still persist and have even increased in recent years (Lee and Divaris 2014, Watt et al. 2016).
2.1.3 Factors compromising general and oral health

Oral diseases can cause, for example, pain, discomfort and social problems, and 5 to 10% of public health expenditure relate to oral health (Petersen et al. 2005). According to Petersen et al. (2005), dental caries and periodontal diseases are considered the two most important global oral health burdens. Other oral diseases or conditions affecting people worldwide include oral mucosal lesions, oral cancer, and tooth loss (Hujoel 2009, Petersen et al. 2005). General and oral health involve several risk factors that could have negative effect on them, unhealthy diet and tobacco smoking being the two main risk factors (Petersen et al. 2005). Use of tobacco is the most important risk factor for oral cancer: nearly 1.3 billion adults smoke daily and 5.4 million people die annually of smoking-related diseases (Johnson et al. 2011). Smoking is also a major risk factor for periodontal disease, as well as for several general health conditions, such as stroke (Hujoel 2009). This should encourage health advocates to try even harder to eradicate smoking. An unhealthy diet, especially if it contains lots of sugars, contributes to dental caries, obesity, diabetes and cardiovascular diseases (Hujoel 2009). Oral hygiene procedures such as toothbrushing, flossing and the use of fluoride products help to reduce adverse effects of dietary carbohydrates (e.g. dental caries and periodontitis) but they cannot fully eradicate them.

In dental caries prevention, clinical procedures and information campaigns promoting better oral hygiene would not be needed if one single cause was successfully tackled, namely sugar (Sheiham & James 2015). Carbohydrates, most often sugars, eaten too frequently can cause oral diseases such as dental caries and periodontitis (Hujoel 2009). Sugar intake and the frequency of sugar consumption are linearly associated with dental caries (Bernabe et al. 2016). Besides oral diseases, consuming energy-dense carbohydrates such as soft drinks, sweets, chocolate, cakes, doughnuts, potato crisps or chips can lead to overweight and obesity (Mozaffarian 2017). Even one daily soft drink unit can increase weight gain and the risk of developing type II diabetes (Schulze et al. 2004). To reduce these adverse effects from sugar intake, WHO has issued a strong recommendation that the daily intake of free sugars should be reduced to less than 10% of the total energy intake (World Health Organization 2015). The costs of treatment of general health conditions are enormous. In 2005, the costs of treating obesity-related diseases such as type II diabetes mellitus and cardiovascular diseases in the United States totalled around USD 190 billion, which is up to 20% of the total annual healthcare expenditure in the US, while reports from other countries indicate that the indirect costs of obesity are equal to the direct obesity-related costs or may even exceed them (Lehnert et al. 2013).
2.2 Social gradient and oral health

2.2.1 Health inequalities and social determinants of health

Health inequalities are systematic differences in the health status of different population groups (World Health Organization 2017). These stepwise differences, for example, in health between groups from top to bottom of the socioeconomic spectrum are referred to by the concept of ‘social gradient’. There are large inequalities in income, life expectancy and health within and across countries (Marmot 2005). The level of income, health and illness follows the social gradient: the higher the socioeconomic position (SEP) of an individual is, the better is their health (Marmot et al. 2008). Scandinavian countries have generally been considered more equal in terms of health and life expectancy than most other countries but, for example, in Finland in the 2010s, there are still inequalities in most dimensions of health and well-being that depend on the educational background (Talala et al. 2014). Absolute inequalities have decreased in other European countries except in Finland and Norway (Mackenbach et al. 2016).

Activities implemented to reduce inequalities can be broadly divided into the following three categories: (1) controlling major diseases that kill people, for example, via introduction of vaccinations and improvement of health systems (2) reducing poverty, for example, by offering more employment opportunities for deprived people, and (3) measures affecting social determinants of health, concentrating on the causes of the causes (Marmot 2005). Social determinants of health mean the circumstances in which people are born, grow up, live and work every day and cover factors that can affect people’s physical and mental wellbeing, such as social gradient, stress, early life, social exclusion, work, unemployment, social support, addiction, food, and transport (Wilkinson & Marmot 2003). In 2005, WHO established the Commission on Social Determinants of Health to review evidence, raise societal debate and recommend policies to reduce inequalities (Marmot 2005).

According to the Commission on Social Determinants of Health, social injustice is killing people on a grand scale (Marmot et al. 2008). Based on key findings, the Commission has recommended three principles of action to reduce health inequalities: (1) improve daily living conditions, with particular emphasis on early child development and the well-being of girls and women; (2) tackle the inequitable distribution of power, money and resources; and (3) measure and understand the problem and assess the impact of action (Marmot et al. 2008). Based on the work by the Commission on Social Determinants of Health, a conceptual framework was also developed (Solar & Irwin 2010). The WHO social
determinants framework combines both structural and intermediary determinants of health inequalities leading to good or poor health (Solar & Irwin 2010). Structural determinants include, for example, governance, macroeconomics and social/welfare policies, whereas intermediary determinants include elements such as material and social circumstances, behaviours and biological factors, psychosocial factors, and health services. Unequal distribution of intermediary determinants is associated with different amounts of exposure to health-compromising conditions generating health inequalities (Solar & Irwin 2010).

### 2.2.2 Social gradient in oral health and the framework for oral health inequalities

The mouth and oral health is intrinsically linked to the health of the rest of the body and to our surrounding environment. There is a social gradient in both general and oral health (Sabbah et al. 2007). Oral diseases have been, and still remain, a global problem, and disadvantaged people suffer more often from oral diseases compared to their well-off counterparts (Petersen & Kwan 2011, Schwendicke et al. 2015). Differences in oral health are not limited between the poorest and the richest but stepwise differences in oral health can be seen across the social spectrum, even in high-income countries (Moyses 2012, Sabbah et al. 2007). It has been discovered that there is a social gradient in several oral diseases and conditions, such as dental caries, oral cancer, periodontal disease, oral health-related quality of life, dental anxiety, tooth loss, and edentulousness (Bernabé et al. 2017, Burt 2005, Johnson et al. 2011, Sabbah et al. 2007, Sanders et al. 2009).

Oral health-related behaviours, such as toothbrushing with fluoride toothpaste, smoking and sugar consumption, also contribute to oral health inequalities but they do not fully account for the differences in oral health status (Watt et al. 2016). Poor oral health can affect the quality of life and even threaten job security and economic productivity (Petersen & Kwan 2011). Addressing oral health inequalities can only succeed if the underlying causes of social inequalities are tackled (Watt et al. 2015a). General and oral health inequalities have several similarities, suggesting that the social determinants are mainly the same for both general and oral health (Sabbah et al. 2007).

As in the WHO framework for social determinants of health, the framework for oral health inequalities also has two levels that contribute to oral health inequalities: structural determinants and intermediary determinants (Figure 1). Structural determinants cause unequal distribution of intermediary determinants through SEP that generates oral health inequalities. Based on this framework, it is necessary to balance the unequal distribution of intermediary determinants through
policies aimed at structural determinants in order to reduce inequalities in oral health (Watt & Sheiham 2012).

**Figure 1.** The framework for oral health inequalities, modified from (Watt & Sheiham 2012). Produced with the permission of the author.

In 2015, policy-makers and academics from 15 countries established a global network called the International Centre for Oral Health Inequalities Research & Policy (ICOHIRP) to reduce inequalities within and between countries. Following the launch conference, ICOHIRP published the London Charter on Oral Health Inequalities, which states that oral health inequalities are avoidable and that downstream individualistic interventions alone will not reduce oral health inequalities (Watt et al. 2016). Watt et al. (2016) called for a more fundamental upstream public health agenda and action at regional (e.g. creating healthy environments at a local level), national (e.g. regulating the sale of health compromising products and taxation thereof) and international (e.g. guidance by WHO on how to deal with, for example, sugar as a health compromising item) levels. Upstream actions are more distant factors from the perspective of the individual and aimed more often at the structures of society. Furthermore, oral health advocacy is another important element in lobbying local and national decision-makers to acknowledge the importance of oral diseases and their shared common risks with other diseases (Watt et al. 2016).
2.2.3 **Strategies to improve general and oral health**

*Towards upstream actions*

After the mid-1900s, some health policy researchers suggested that in order to decrease the rapid growth of health expenditure, social and environmental management should be used to improve the health of the population (McKinlay 1979). Around that time, the term ‘upstream actions’ was coined to describe actions that focus on the sources of illness in the social and physical environment. The term ‘downstream actions’ is used to refer to actions closer to individuals, such as people’s behaviours or treatment provided by the healthcare system (Waitzkin 2016).

Downstream actions such as victim blaming, preventive care and lifestyle approaches covering measures such as fluoridation, the use of fissure sealants and chair-side prevention have not reduced oral health inequalities and may even increase them (Watt et al. 2015b, Watt 2007). Consequently, the social determinant framework instead encourages focusing on upstream factors, which are more underlying factors compared to downstream factors (Watt and Sheiham 2012). Instead of downstream actions, upstream actions such as legislative measures and healthy public policies are needed to achieve more sustainable changes in oral health, as well as to reduce oral health inequalities (Watt 2007). Upstream actions can address the causes behind oral health inequalities, i.e. the social determinants that affect general and oral health. Of our daily environments, schools are among the most important places to promote general and oral health (Watt & Sheiham 2012).

*The common risk factor approach*

Oral diseases share the same risk factors (stress, poor diet, smoking and alcohol consumption, etc.) as several illnesses of general health, such as cardiovascular diseases, diabetes, cancer, and respiratory diseases. The concept of the common risk factor approach (CRFA) is that many conditions could improve if those few common risk factors were controlled (Sheiham & Watt 2000). Instead of focusing on only one disease and its risk factors, the CRFA should be used for promoting both general and oral health to reduce the costs and to achieve a greater efficiency and effectiveness (Petersen & Kwan 2011, Sheiham & Watt 2000, Sheiham et al. 2011). This is very important since the costs of healthcare, including treating dental diseases, are constantly increasing and the money targeted to health promotion is limited (Fineberg 2013, Lehnert et al. 2013, Petersen et al. 2005). The CRFA also enable health professionals to avoid giving mixed messages to the public:
information disseminated in narrow disease-specific campaigns can be conflicting compared to other campaigns, which could confuse members of the public.

Although the CRFA has already been applied to integrate oral health promotion and general health promotion strategies, too often the target has still been on intermediary determinants instead of structural determinants (Watt & Sheiham 2012). It would be most effective to target the actions to early childhood, but also schools, workplaces and hospitals are key environments for health promotion and should be designed so that healthy choices are easy to make throughout people’s lives (Watt & Sheiham 2012).

In medicine, the individualist approach is adopted too often. This means that rather than trying to find out real causes of the conditions at population level, practitioners are trying to identify a single factor behind the patient’s illness (Rose 1985). In the prevention of diseases, there have been two main strategies: the high-risk strategy and the population strategy. In the high-risk strategy, individuals who already have a disease or a symptom of a disease are exposed to the intervention to promote healthier behaviours (Rose 1985). The high-risk strategy is also often adopted in oral health promotion: a patient who has cavities in the mouth is advised to brush their teeth more often. As previously mentioned, it is very hard to identify individuals at a high risk of developing dental caries (Hausen 1997). In the population strategy, the objective is to eliminate the underlying causes behind the disease and to make the entire population healthier (Rose 1985). To narrow the gaps in oral health and improve the health of the entire population, the population strategy should be used together with the CRFA and aimed to upstream actions (Watt & Sheiham 2012).

The effects of different health-promoting actions

Although numerous actions to improve general or oral health have been implemented throughout the world, too often only little attention has been paid to evaluating the effects of such measures on inequalities, or the effects have not been measured or reported at all (McGill et al. 2015, Moore et al. 2015). Mass-media campaigns and workplace smoking bans can be effective, but they tend to increase inequalities in health (Lorenc et al. 2013). In contrast, fiscal interventions, lowering price barriers and other upstream actions demonstrably reduce such inequalities (Lorenc et al. 2013). Obesity prevention programmes that have also worked in lower socioeconomic settings have included community-based strategies aimed at structural changes affecting the living environment, whereas interventions that have not been successful among lower SEP populations have targeted more individual-level behaviours (Beauchamp et al. 2014).
Interventions targeted at prices or everyday environments have proven the most effective. In addition, they have not increased health inequalities and in some cases have even decreased inequalities in health (McGill et al. 2015). In Brazil, children in lower SEP kindergartens with no policy on sugar consumption had a 4.8 times higher risk of dental caries (Rodrigues & Sheiham 2000). This encourages the use of upstream actions such as policies affecting everyday living environments, which could narrow inequalities in general and oral health. In order to tackle obesity in all socioeconomic groups and even to narrow the social gradient in obesity, whole-of-community interventions are recommended, meaning that the actions should be implemented in several environmental contexts (Boelsen-Robinson et al. 2015). If diet is one element of such a whole-of-community obesity intervention, it will likely also improve the oral health situation. A classic example of a successful whole-of-community intervention is the North Karelia Project, which significantly decreased cardiovascular mortality in Eastern Finland (Jousilahti et al. 2016).

### 2.3 Everyday environments to promote oral health

#### 2.3.1 Childhood and adolescence everyday living environments

Early childhood environments are major predictors of cognitive and non-cognitive skills, and a child who falls behind may never catch up (Heckman 2006). Therefore, in early childhood, families are important targets for general and oral health promotion. When children grow up, the importance of parental involvement decreases, and adolescents are exposed to influences outside home. The peers and hobbies become more important and children start spending more time in schools, shopping centres and other gathering sites. Adolescence is a critical period in life and health behaviours adopted during that time can last throughout the rest of the lifetime (Viner et al. 2012). According to life-course epidemiology models, risks of oral disease can accumulate over the lifetime, meaning that health behaviours during adolescence do matter (Nicolau et al. 2007). For example, a study (Peres et al. 2016) carried out among Brazilian adolescents indicates that the higher the consumption of sugar consumption in adolescence, the higher the dental caries increment. According to a Norwegian cohort study, the consumption of soft drinks seems to increase and eating behaviours only rarely improve between the ages of 14 and 21 years (Lien et al. 2001). Consequently, childhood and adolescence are both important periods in life in terms of maintaining healthy behaviours and thus promoting healthy living environments is essential.
Adolescents’ food choices do not merely depend on knowledge or behaviours learnt at home. Compared to children, adolescents are more independent in terms of making their own food choices, and the choices are not always good for their general or oral health (Story et al. 2002). Adolescents themselves have reported that easy access to unhealthy foods (both in schools and in environments where they spend their free time), peer influence and the price of unhealthy foods (unhealthy foods being most often the cheaper option) affected the most their food choices (Watts et al. 2015). During puberty and adolescence, brain development leads to new sets of behaviours and eventually to good or poor health over time (Viner et al. 2012). Improving adolescents’ health requires improving their daily living environments. Safe and supportive schools are crucial in terms of helping adolescents to develop to their full potential and to reach the best possible health in adulthood (Viner et al. 2012).

2.3.2 Schools as avenues for oral health promotion

Schools are great places to promote oral health: at the global level, 80% of children attend primary school in an influential stage of their lives in terms of adopting sustainable oral health-promoting habits (World Health Organization 2003). According to WHO, ‘Schools provide the most effective and efficient way to reach large portions of the population, including young people, school personnel, families and community members. Students can be reached at influential stages in their lives, during childhood and adolescence when lifelong nutritional patterns are formed.’ (World Health Organization 1998) For example, drinking an adequate amount of safe drinking water enhances health and learning abilities, indicating that fresh drinking water should be available throughout the school day (World Health Organization 1998).

A health-promoting school environment helps pupils to make healthier choices and may even impact their lifelong attitudes and beliefs because this period is among the most influential in their lives (Kwan et al. 2005). In Finland, health and oral health promotion have been integrated to policy-making for decades (Melkas 2013). Schools have been an important venue for the implementation of those policies. In fact, health education is now compulsory for pupils (currently 1 one-hour lesson per week) in Finnish upper-level comprehensive schools (grades 7 to 9). (European Commission 2018) Health education books include one or two chapters about oral health, but it is not compulsory to teach oral health-related topics and thus about nine out of ten health education teachers teach oral health-related topics to their pupils (Kankaanpää 2014). Consequently, pupils are taught
a maximum of a couple of hours about oral health during their three years in upper comprehensive school.

Due to long school days, pupils spend a large part of their waking hours in school, which makes the school environment one of the most important places in their lives. In Finland, almost all comprehensive schools are public schools funded through taxation and education is provided free of charge at all levels (Finnish National Board of Education 2012). Every school day, schools must offer one warm meal free of charge to their pupils. This obligation is based on various acts (Finlex 1998a, Finlex 1998b, Finlex 2017). The school meal should also contain all the components of a well-balanced meal (Finnish National Board of Education 2008). In addition, the National Nutrition Council, Finnish National Agency for Education and the National Institute for Health and Welfare (THL) have jointly issued their comprehensive recommendations for school meals, (originally given in 2008 and updated in 2017; National Nutrition Council et al. 2017). The recommendations include information about the nutritional quality of school meals, including menus, as well as about specific foods and nutrients. The school meal is considered an important tool in the promotion of healthier food behaviours, and nutritious school meals have at least beneficial short-term impacts in terms of children’s consumption of calories and key nutrients (Oostindjer et al. 2017).

One example of Finnish schools as an avenue for oral health-promotion is schools’ tendency to encourage the use of Xylitol chewing gum. Xylitol chewing gum products are considered an anti-cariogenic agent (Maguire & Rugg-Gunn 2003). In Finland, the school-based xylitol programme has provided equally good results in caries prevention as the pit and fissure sealant programme (Alanen et al. 2000). Therefore, offering xylitol products or at least encouraging xylitol usage after school lunch could promote oral health among adolescents.

2.3.3 General and oral health-promoting interventions at school level

Schools are important venues for the promotion of dietary changes among adolescents (Prell et al. 2005). There are also studies that suggest the opposite, i.e. that the school food environment does not affect pupils’ sweet consumption (Cvjetan et al. 2014, van der Horst et al. 2008). Nevertheless, most studies indicate that the school food environment really matters. According to a study carried out in the United States (Briefel et al. 2009), in schools that do not sell sweet products from stores or canteens, the total energy intake of pupils from sugar-sweetened beverages (SSB) is lower than in middle schools and high schools selling these products. Briefel et al. (2009) also state that pupils’ energy intake was smaller if the school did not have a ‘pouring rights’ deal in place with a soft drink
manufacturer. Interventions implemented in schools have also proven to be effective in terms of affecting children’s consumption of targeted nutrients, indicating that the school food environment does indeed have an effect on pupils’ eating habits (Lytle et al. 1996). Furthermore, according to another study, competitive pricing increased the sale of low-fat snacks in US secondary schools (French et al. 2001). If pupils had access to unhealthy snacks, they chose more often the unhealthy option over fruits (Kubik et al. 2003). It has been noticed in the Netherlands that if an external operator was responsible for selling products from café, healthy products were sold less often (Mensink et al. 2012).

It has been suggested that selling sweet products in schools can be more harmful for children with a lower socioeconomic background: children from higher social groups use vending machines less often compared with children from other social groups (Maliderou et al. 2006). Pupils from a lower socioeconomic background also skip lunch more often (Park et al. 2010). Vending machines are considered particularly harmful for pupils’ general and oral health, as products sold in vending machines are mostly soft drinks with lots of sugars and limited nutritional value. School vending machines have been shown to affect the total food consumption in younger grades but not among older pupils (Rovner et al. 2011). In a cohort study in Minnesota, the availability of soft drinks was associated with 9th grade students’ total soft drink intake (Nanney et al. 2016). The study also showed that the availability of unhealthy snacks and drinks was associated with a small but significant (1%) increase in the student body mass index (BMI) percentile at school level.

Schools have also been a popular venue for reducing health inequalities. It has been reported that school-based interventions could worsen, improve or be neutral in terms of inequalities (Moore et al. 2015). In a German randomised controlled trial concerning an intervention on weight status, lifestyle and blood pressure targeted at 6-year-olds revealed that eight years later, the BMI was lower in high SEP groups than in lower SEP groups (Plachta-Danielzik et al. 2011). Overall, this intervention increased inequalities in participants’ weight status. In a Canadian study, school-day food choices of students with a higher socioeconomic background were better than those of students with a lower socioeconomic background (Ahmadi et al. 2015). Restricting access to unhealthy foods during school hours should therefore improve the nutrition of pupils from lower socioeconomic backgrounds, which could eventually also decrease the social gradient concerning unhealthy eating during school hours.

Eating school meals, especially if the nutritional value of the meal is good enough, is important for rapidly growing and developing adolescents. Pupils choose an unhealthy snack over lunch more often in schools that have a vending machine
selling soft drinks (Park et al. 2010). Pupils also eat the school meal less often if competitive foods are available (Templeton et al. 2005). The findings presented in this section indicate that pupils’ consumption of unhealthy products is a complex subject and that the school food environment should be considered as a whole.

2.3.4 National recommendations, statewide mandates and other policies influencing the school food environment

According to the WHO Commission on Ending Childhood Obesity, policies to reduce obsogenic environments are needed, among other actions (Swinburn & Vandevijvere 2016). The school environment should be healthy: there should be no smoking or selling of sweet products, and the food offered should have good nutrition value. In addition, schools should also educate pupils on oral health and on the school health services available to them (World Health Organization 2003). Schools have been a very popular target for a number of interventions in the field of general and oral health promotion (Weichselbaum et al. 2011). Among other policies, the school policy is likely to have a great impact on the current and future well-being (Forrest & Riley 2004). According to the ICOHIRP conference themed ‘Policy Solutions for Oral Health Inequalities’, held in 2017, the school food policy is considered an important determinant for high sugar consumption (Rugg-Gunn 2017).

Policies have also been proposed to have favourable effects at international, national and local levels. Macro-level policies are regarded as structural determinants in the WHO social determinants framework that combines the structural and intermediary determinants of health inequalities leading to good or poor health (Solar & Irwin 2010). National recommendations, which can also be considered macro-level policies and structural determinants, are efforts targeted at, for example, institutions, schools or work places to promote healthy behaviours. National recommendations that focus on factors influencing population health can also be considered upstream factors, which are considered more effective in reducing the social gradient in health compared to downstream factors (Watt & Sheiham 2012). Schools’ oral health-related actions, such as selling unhealthy products, can be considered an intermediary determinant that can be affected through structural determinants such as national recommendations (Figure 1).

Since schools are an important venue for promoting child and adolescent health, many countries and states have used national recommendations or comparable upstream actions to support pupils’ healthy behaviours during the school day. In Norway, a national programme offering free fruits increased pupils’ fruit consumption both during school hours and at home (Bere et al. 2010). Some school
policies have been effective in improving the food environment and dietary intake in schools (Jaime & Lock 2009). A statewide mandate obligating schools to implement local health-promoting policies improved schools’ nutrition practices in the United States (Boles et al. 2011) In Minnesota, school policies promoting healthy eating were associated with improvements in the consumption of sugary drinks and fruits and vegetables (Nanney et al. 2014). Another study showed that a strict policy concerning the sale of competitive foods decreased pupils’ BMI (Taber et al. 2012).

In Canada, a statewide recommendation was given on nutrition standards for foods and beverages offered in schools. As a result, the schools that implemented the recommendation reduced their sales of unhealthy products (Watts et al. 2014). School health policies should be broad enough to have real impact on several risk factors of different diseases with one policy (Kwan et al. 2005). Kwan et al. (2005) argue that the first step should be banning the sale of sweet products in schools. In France, a national recommendation succeeded in influencing the targeted nutrient intake in upper secondary schools (Bertin et al. 2012). According to reports, school guidelines on the food environment have also affected pupils’ perception of their school-time consumption of beverages and, in some cases, even of the consumption of beverages outside the school hours (Vecchiarelli et al. 2006).

Not all interventions have succeeded in making the school environment healthier. For example, according to Kubik et al. (2010), policies restricting the sale of junk foods did decrease the sales in elementary and middle schools but not in high schools. In another case, although a statewide mandate did restrict the sale of sweet products in schools, at the same time it also decreases the provision of healthy products (Boles et al. 2011). There is a risk that if schools did not offer healthy products, pupils’ would just venture outside the school area to buy their snacks, and most likely not the healthy ones, where possible. In open-campus-policy schools, students have been reported to eat more often in fast foods restaurants than in closed-campus-policy schools, whereas buying snacks has been shown to be related to the number of vending machines in schools (Neumark-Sztainer et al. 2005). A New Zealand study reported that a nutrition policy implemented at schools in deprived areas to ban soft drink consumption, launch a water-only policy and inform parents to supply their children with a healthy lunch decreased the caries levels in the participant schools compared with the control schools (Thornley et al. 2017). The most effective interventions take into account the school nutrition policy as a whole instead of only focusing on a single nutrient or site, as well as the circumstances outside school (Jaime & Lock 2009).

In the early 2000s, it was first noticed that some upper-level comprehensive schools in Finland had started to allow the sale of sweet products in schools. For
example, soft drinks and sweets were sold through tuck shops, cafés and vending machines. Since Finnish schools already provide a warm, free meal to their pupils, there is no need for any sweet products during school hours. In spring 2007, the National Board of Education (FNBE) and THL gave a national recommendation that schools should refrain from selling sweet products, that fresh drinking water should be available throughout the school day, and that any snacks sold or provided should be nutritionally appropriate (FNBE and THL 2007).

National recommendations have proven to be an effective tool to influence schools’ food environment. However, there are no previous national or international studies on the long-term effects of national recommendations to schools’ oral health-promoting actions. In addition, it is unclear if national recommendations concerning the school food environment have different effects on schools depending on the school’s socioeconomic status.
3 AIMS OF THE STUDY

The general aim of this study is to determine any changes took place in the oral health-related environment of Finnish upper-level comprehensive schools following the national recommendation issued by the FNBE and THL. The specific aims are:

1. To find out if the national recommendation has had any effect on schools’ oral health-promoting actions (Papers I and II).

2. To explore factors related to oral health inequalities at school level and
   (a) whether school-level intermediary determinants are associated with the school-level socioeconomic position (Paper III) and
   (b) whether the effects of the national recommendation on intermediary determinants differed according to the school-level socioeconomic position (Paper IV).
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1. To find out if the national recommendation has had any effect on schools' oral health-promoting actions (Papers I and II).
2. To explore factors related to oral health inequalities at school level and (a) whether school-level intermediary determinants are associated with the school-level socioeconomic position (Paper III) and (b) whether the effects of the national recommendation on intermediary determinants differed according to the school-level socioeconomic position (Paper IV).

Materials and methods

This study was implemented at the Universities of Oulu and Turku in 2007-2018 in cooperation with the FNBE and THL. The study is based on two datasets independently collected from Finnish upper-level comprehensive schools (N=970), where pupils are between the ages of 13 and 16 years. Almost a total of 200,000 pupils attended the schools. The datasets are (1) the dataset of oral health-promoting actions and (2) the dataset of oral health behaviours, and they are discussed on more detail in sections 4.1 and 4.2, respectively. On the basis of these two datasets, a combined dataset was also formed. This is discussed in more detail in section 4.3. This thesis is a further study to the study of Kankaanpää (2014).

4 MATERIALS AND METHODS

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4.1 Dataset of oral health-promoting actions

The dataset of oral health-promoting actions was collected via the School Sweet Selling survey (SSSS) and included information about schools’ oral health-related actions. The SSSS was conducted in cooperation by the FNBE and THL. The data were collected through questionnaires sent by email to every school in 2007 (N=985), 2008 (N=988), 2009 (N=970), and 2010 (N=970). The email included a web-link to the online questionnaire, produced using the Webropol program. In 2007, the survey was carried out at the same time when the FNBE and THL gave the national recommendation concerning the sale of sweet products. Consequently, the 2007 survey was used in this study as the baseline survey concerning the sale of sweet products in schools. The FNBE gave the email addresses of the schools to the research group in 2007. In most cases, the recipient was either the principal or a member of the school administrative staff. In the email sent to schools, it was requested that the questionnaire be answered by the person who knows the most about the sale of sweet products at the school in question. The list of addresses was updated for the following year’s survey each year by asking the respondents to indicate their email address and based on information published on schools’ web pages. Two (in 2007) or three (in 2008-2010) reminder emails were sent if the school had not answered the questionnaire. The writer of this thesis conducted the study in 2009 and 2010.

The SSSS questionnaire included a total of 34 questions. It was drawn up by modifying the questionnaire used in the longitudinal study ‘Dentists against sweets and soft drinks in school’ carried out by the Swedish Dental Association (Suslick 2009). The questionnaire was originally drawn up for the study of Kankaanpää (2014). Answering the survey took approximately fifteen minutes. The respondents were asked questions about the school practices related to the sale of
sweet products, providing healthy snacks, availability of fresh drinking water, and xylitol products, as well as about their policies regarding the consumption or sale of sweet products. All the questions used in the 2007 survey are listed in Appendix 1.

The following changes were made to the questionnaire after the 2007 survey: In 2008 and 2009, a new question was formulated regarding the topic of providing pupils with healthy snacks: ‘Does your school provide a healthy snack during the school day?’ In 2008, there were two alternative answers: ‘Yes’ and ‘No’. In 2009, there were three alternative answers: ‘Yes, and it is free’, ‘Yes, pupils pay for it’ and ‘No’. In 2007, the topic of providing healthy snacks was incorporated in the question covering the contents of the school guidelines. The changes were made because offering a healthy snack to pupils became more popular in schools after 2007. In 2008-2010, schools were also provided with a possibility to answer the questionnaire in Swedish, which is the second official language in Finland. In 2010, the response alternative concerning energy drinks was added to the questions covering the sale of soft drinks.

From the total of nine themes of the questionnaire, three variables were formed by weighting the response categories. The variables were: Exposure, Enabling and Policy (Table 1). The lower the score, the better the school’s oral health-promoting actions. Replies to open-ended alternatives were checked individually and, where appropriate, added to the sum scores. Due to differences in the questionnaires for 2007, 2008, 2009 and 2010, the Enabling variable was calculated differently depending on the year (Table 1). In 2007, 0 points were given if the school had chosen the item ‘School provides a healthy snack during the school day’ in the question about the contents of the school guidelines. The variables Exposure, Enabling and Policy were used in the theoretical framework for oral health inequalities as intermediary determinants to describe the schools’ oral health-related actions (Figure 2)

The number of schools that answered the questionnaire was 480 in 2007, 508 in 2008, 593 in 2009, and 478 in 2010, resulting in the response rates of 49%, 51%, 61%, and 49%, respectively. Of all schools, a total of 258 schools participated in the survey in 2007, 2008 and 2009 (response rate 27%, Paper I), and in total 237 schools participated in the survey both in 2007 and in 2010 (response rate 24%, Paper II). These two groups of schools were studied to find out if the national recommendation did have any impact on schools' oral health-promoting actions (Papers I and II).
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Table 1. Calculation of the Exposure, Enabling and Policy variables. The lower the score, the better the oral health-promoting actions. Modified from Anttila et al. 2012.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Points awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exposure (0-10 points)</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Selling soft drinks (maximum 4 points) | 0: Soft drinks are not sold  
1: Elsewhere but not through a vending machine  
2: Through a vending machine without visible trademarks  
3: Through a vending machine with visible trademarks |
| Selling sweets (maximum 4 points) | 0: Sweets are not sold  
1: Elsewhere but not through a vending machine  
2: Through a vending machine without visible trademarks  
3: Through a vending machine with visible trademarks |
| Selling sweet juices, cakes, doughnuts or biscuits (maximum 2 points) | 0: Are not sold  
1: Are sold |
| **Enabling (0-10 points)** |
| Availability of drinking water during the school day (maximum 3 points) | 0: In classrooms with mugs or from water taps in the hallway  
1: In classrooms or at any time from the canteen  
2: In bathrooms or during the lunchtime from the canteen  
3: Through a vending machine |
| School’s actions concerning xylitol products (maximum 3 points) | 0: School offers free xylitol products  
1: School sells xylitol products  
2: Xylitol products are allowed  
3: Xylitol products are forbidden |
| Selling and providing healthy snacks (maximum 4 points) 2007 | 0: School provides a healthy snack and sells healthy products  
1: School provides a healthy snack  
2: School does not provide a healthy snack but does sell healthy products  
3: School does not provide a healthy snack or sell healthy products |
| Selling and providing healthy snacks (maximum 4 points) 2010 | 0: School provides a free healthy snack and sells healthy products  
1: School provides a free healthy snack  
2: School provides a healthy snack AND sells healthy products  
3: School provides a healthy snack OR sells healthy products  
4: School does not provide a healthy snack or sell healthy products |
| **Policy (0-12 points)** |
| Leaving the schoolyard (maximum 3 points) | 0: Banned and controlled  
1: Banned but cannot be controlled  
2: Only during breaks or lunchtime  
3: At any time |
| Policy-makers (maximum 5 points) | 0: At least five participants of the following: principal, teachers, pupils, parents, municipality, other  
1: Four participants  
2: Three participants  
3: Two participants  
4: One participant  
5: No participants |
| Guideline contents (maximum 4 points) | 0: No consumption of sweet products and the school provides a healthy snack  
1: No sweet-product selling  
2: Restriction or guidance on selling or consuming  
3: No guideline |
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Figure 2. The variables used in the presented framework for oral health inequalities. Modified from Anttila et al. 2018.

School participation was voluntary, and the participants were informed of the study. Responding was considered a consent to participate. The Finnish Medical Research Act (Finlex 1999) and the ethical principles of the Finnish Advisory Board on Research Integrity (National Advisory Board on Research Ethics 2009) waive the need for obtaining approval for these types of studies.

4.2 Dataset of oral health behaviours

The data concerning pupils’ perceived daily environment and oral health-related behaviours were collected in connection with the School Health Promotion study (SHPS), which has been conducted every two years (once a year for half of the schools) among all eighth and ninth grade pupils (i.e. children aged 14 to 15 and 15 to 16 years, respectively) in Finland since 1996. The study was carried out in Southern, Eastern and Northern Finland in spring 2006 and 2008 and in Western
Materials and methods

Figure 2. The variables used in the presented framework for oral health inequalities. Modified from Anttila et al. 2018.

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The participation in the SHPS was anonymous for pupils, and the participants were informed of the study. If there were fewer than 10 participants in a certain school or municipality, the results were not published at school- or municipality-level to safeguard the privacy of the respondents. The Ethics Committee of the National Institute for Health and Welfare gave its approval for the study.

Of the SHPS questions, we selected those that were applicable to the present theoretical framework for oral health inequalities (Figure 1), i.e. 29 questions in total (Appendix 3). If a question included multiple items (a, b, c,...k), the overall mean for the question was calculated from the item-wise means. Traditionally, there are no social class divisions in Finland (Karvonen et al. 2001). Therefore, five questions were chosen to describe the school-level SEP. The questions covered parental unemployment or lay-off (range 1-3), family structure (range 1-7), the highest education level the mother and the father have achieved (range 1-4), and the amount of spending money available to the pupil per week (range 1-6). The mean value was calculated to describe the school-level SEP; the lower the value, the better the school-level SEP. The schools were also classified into three equal-sized groups based on their school-level SEP, i.e. to low-, middle- and high-SEP schools.

Explorative factor analysis (EFA) with varimax rotation was used for the remaining 24 questions to form the intermediary determinants of oral health inequalities. The EFA revealed the following four factors: attitudes and access to intoxicants (F1), school health services (F2), school environment (F3), and home environment (F4) (Table 2, Figure 2). ‘Attitudes and access to intoxicants’ describes the attitudes towards intoxicant use and the availability of intoxicants. It covers questions such as whether smoking is allowed in school, how closely possible restrictions are monitored, and how easy it is to get alcohol or drugs in the pupil’s area of residence. ‘School health services’ covers questions such as how easy it is to get help if needed from a school nurse, physician, social worker or psychologist and how easy it is to get an appointment. ‘School environment’
describes how burdening the pupil feels going to school and whether the school environment is supportive and safe. It covers questions such as does the pupil feel stress from school work, does the pupil receive support and help from teachers, is the classroom discipline good, are there any factors that can disturb the school work (e.g. hurry, crowded teaching spaces, noise, inappropriate lighting, bad indoor air, temperature, dirt) and what is the mealtime environment like. ‘Home environment’ describes the level of support and the atmosphere at home. It covers questions such as if the pupil has difficulties at school, do they get help at home, does the family have family dinners, do the pupil’s parents know personally most of their child’s friends, do the parents know where the pupil spends their weekend nights and do the parents talk about things the pupil is concerned about. These factors explained 67.73% of the common variance. The factor scores were calculated as mean values of the items in each factor; the lower the mean, the better the pupil’s perceived daily environment.

Table 2. Factor structure, percentage of common variance explained (%), loadings and mean values (SD) of pupils’ perceived daily environment and school-level SEP. Modified from Anttila et al. 2018.

<table>
<thead>
<tr>
<th>Factor Structure</th>
<th>Loadings</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1: Attitudes and access to intoxicants (32.05%)</td>
<td></td>
<td>0.81</td>
<td>2.42</td>
<td>0.26</td>
<td>1.44</td>
</tr>
<tr>
<td>Chance to buy alcohol nearby</td>
<td></td>
<td>0.77</td>
<td>1.51</td>
<td>0.16</td>
<td>1.14</td>
</tr>
<tr>
<td>Chance to buy drugs nearby</td>
<td></td>
<td>0.35</td>
<td>1.78</td>
<td>0.21</td>
<td>1.42</td>
</tr>
<tr>
<td>School’s attitude towards smoking</td>
<td></td>
<td>0.96</td>
<td>2.38</td>
<td>0.20</td>
<td>1.91</td>
</tr>
<tr>
<td>F2: School health services (18.40%)</td>
<td></td>
<td>0.96</td>
<td>2.32</td>
<td>0.19</td>
<td>1.95</td>
</tr>
<tr>
<td>Health services in the school</td>
<td></td>
<td>0.79</td>
<td>2.25</td>
<td>0.21</td>
<td>1.70</td>
</tr>
<tr>
<td>Access to school health services</td>
<td></td>
<td>0.69</td>
<td>2.11</td>
<td>0.15</td>
<td>1.72</td>
</tr>
<tr>
<td>F3: School environment (9.14%)</td>
<td></td>
<td>0.68</td>
<td>2.31</td>
<td>0.13</td>
<td>1.76</td>
</tr>
<tr>
<td>Physical hazards in the school</td>
<td></td>
<td>0.43</td>
<td>2.47</td>
<td>0.09</td>
<td>1.96</td>
</tr>
<tr>
<td>Peaceful school environment</td>
<td></td>
<td>0.42</td>
<td>2.01</td>
<td>0.10</td>
<td>1.69</td>
</tr>
<tr>
<td>Support from teachers and/or school</td>
<td></td>
<td>0.39</td>
<td>1.35</td>
<td>0.09</td>
<td>1.06</td>
</tr>
<tr>
<td>Stress from school</td>
<td></td>
<td>0.45</td>
<td>1.40</td>
<td>0.07</td>
<td>1.19</td>
</tr>
<tr>
<td>F4: Home environment (8.14%)</td>
<td></td>
<td>1.59</td>
<td>0.78</td>
<td>0.08</td>
<td>1.36</td>
</tr>
<tr>
<td>Parental support</td>
<td></td>
<td>0.81</td>
<td>1.78</td>
<td>0.08</td>
<td>1.36</td>
</tr>
<tr>
<td>Family smoking</td>
<td></td>
<td>0.45</td>
<td>1.40</td>
<td>0.07</td>
<td>1.19</td>
</tr>
<tr>
<td>School-level SEP</td>
<td>N/A</td>
<td>2.23</td>
<td>0.17</td>
<td>1.70</td>
<td>2.68</td>
</tr>
</tbody>
</table>

From the SHPS, four most relevant questions related to oral health were chosen as the intermediary determinants of oral health (Figure 2). The questions covered the following topics: tooth brushing frequency (how often the pupils brush their teeth), eating the school meal (which parts of the school meal do the pupils eat), eating unhealthy items (such as sweets or SSBs) at school outside the school canteen (and apart from the school meal), and eating unhealthy items (such as sweets or SSBs) overall during the last seven days (Appendix 3). The sum variable ‘eating habits at school’ was calculated based on the variables ‘eating the school meal’ and ‘eating unhealthy items at school’.
unhealthy items (such as sweets or SSBs) at school outside the school canteen (and apart from the school meal), and eating unhealthy items (such as sweets or SSBs) overall during the last seven days (Appendix 3). The sum variable ‘eating habits at school’ was calculated based on the variables ‘eating the school meal’ and ‘eating unhealthy items at school’.

4.3 Combined dataset

To form a conceptual entity for the framework for oral health inequalities, the datasets of oral health-promoting actions and oral health behaviours were linked together to form a combined dataset (Figure 3). The linking was done manually by school name and location.

Figure 3. The datasets, numbers of respondents and response rates.

For this combined dataset, only the schools whose pupils had answered the oral health behaviour questionnaire both in 2006 or 2007 and in 2008 or 2009 and whose staff had completed the oral health practices questionnaire in 2007 and in 2008 or in 2009 were selected (n=360) (Figure 3). The baseline data from 2006 or 2007 were used to find out if the intermediary determinants were associated with the school-level SEP (Paper III). To examine whether the impact of the national recommendation on intermediary determinants differed based on the school-level SEP, the longitudinal data from 2006 or 2007 and 2008 or 2009 were used (Paper IV).
4.4 Analyses of the different datasets

To find out if the national recommendation has had an effect on schools’ oral health-promoting actions, the data obtained through the SSSS was used (Papers I and II). Associations between the variables Exposure, Enabling and Policy were evaluated with Spearman correlation coefficients. The changes in Exposure, Enabling and Policy were evaluated using the Wilcoxon signed-ranks test. The changes in the sale of sweet and healthy products, the provision of xylitol products and fresh drinking water, allowing pupils to leave the schoolyard, school guidelines regarding the sale of sweet products, and in the number of guideline decision makers were analysed using McNemar’s test. To explore status changes in the Exposure, Enabling and Policy variables, schools were divided into three groups. Schools were put in the Poor category if the Exposure score was 5 to 10 points, Enabling score 6 to 10 points and Policy score 8 to 12 points. Schools were in the Moderate category if the Exposure score was 2 to 4, Enabling score 4 to 5 and Policy score 6 to 7 points. Schools were placed in the Good category if the Exposure score was 0 to 1, Enabling score 0 to 3 and Policy score 0 to 5 points. The significances of the changes between the status of the Exposure, Enabling and Policy variables were analysed using McNemar-Bowker’s test.

In Paper III, the baseline data of the combined dataset were used. The associations between the school-level SEP and intermediary determinants were evaluated using Pearson’s or Spearman’s correlation coefficients. In addition, correlations between different intermediary determinants were evaluated. Differences in the school-level SEP according to background variables (the school’s geographical location, school size and teaching language of the school) were analysed using one-way ANOVA.

For the multivariable analysis, the General Linear Model (GLM) was used to determine the independent contribution of each intermediary determinant to the school-level SEP when controlling for background variables. The dependent variable was the school-level SEP and the independent variables were all the intermediary determinants of oral health, i.e. factors F1 to F4, the school’s oral health-promoting actions (the Exposure, Enabling and Policy variables) and the pupils’ oral health-related actions (tooth brushing, eating the school meal, eating unhealthy snacks at school and eating unhealthy snacks overall). The confounding factors were the school’s geographical location (Southern Finland, Western Finland, the Oulu Region, Eastern Finland, and Lapland), school size (large: <500 pupils, medium-large: 300 to 499 pupils, medium-sized: 100 to 299 pupils, and small: <99 pupils) and teaching language (Finnish or Swedish). The model was conducted using manual backward elimination: all independent variables for which p>0.05 were excluded from the model to get a parsimonious and sufficiently
fitting model. For the final model, beta and Partial Eta Squared coefficients were reported. Since all the variables were coded in the same direction (the lower, the better), a positive beta coefficient indicates a positive association. Partial Eta Squared is a measure of effect size and describes the proportion of variance in the dependent variable explained by that independent variable.

To find out if the effect of the national recommendation on intermediary determinants differed based on the school-level SEP, the combined and longitudinal data were used (Paper IV). To evaluate the effects of the national recommendation and other changes in the intermediary determinants, the Wilcoxon signed-ranks test was used. Differences in the changes to the intermediary determinants between school SEP groups were analysed using the Kruskal-Wallis test. For the longitudinal multivariable analysis, Linear Mixed Modelling (LMM) was used to determine the independent contribution of each intermediary determinant to the changes in pupils’ eating habits at school (a separate model for each SEP group). The dependent variable was pupils’ eating habits at school at baseline and after the intervention, while the independent variables were all the intermediary determinants of oral health at baseline and after the intervention, i.e. factors F1 to F4 and the school’s oral health-promoting actions (the Exposure, Enabling and Policy variables). For the model, beta and p-values were reported. Since all the variables were coded in the same direction (the lower, the better), a positive beta coefficient indicates a positive association.

The writer of this thesis conducted all the analyses, except for GLM and the LMM, which the writer carried out together with the supervisors.
5 Results

5.1 Associations between oral health-related actions and reasons behind the changes in the sale of sweet products in schools by 2009 (Paper I)

Among the schools that responded to the survey every year between 2007 and 2009 (n=258), a positive correlation was found between the schools’ oral health-promoting policies and oral health-enabling factors both in 2007 and in 2009. The schools that had allowed the sale of sweet products offered less oral health-enabling factors both in 2007 and in 2009 (Figure 4). The correlation between the Policy and Exposure variables in 2008 was weak but positive.

The main reason for the changes in the sale of sweet products differed among the schools that participated in the survey in all three years (i.e. in 2007, 2008 and 2009; n=258). Of the schools, the proportion of the schools that responded that their pupils’ health was the main reason for the changes was 22.1%, 32.9% and 17.8% in 2007, 2008 and 2009, respectively. The decision of the municipality was given as the main reason by 7.0%, 17.4% and 11.6% of the schools. Of the schools, 0.8%, 17.1% and 8.1% stated that the recommendation of the FNBE and THL was the main reason for the changes.
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Figure 4. The associations between schools’ oral health-promoting actions among the schools that responded every year between 2007 and 2009 (n=258). The correlations are statistically significant (p<0.05) if the line and the related text are bolded. A continuous arrow indicates a positive and a dotted arrow a negative correlation.
5.2 Effects of the national recommendation on schools’ oral health-promoting actions (Paper II)

5.2.1 Changes in schools’ oral health-related actions by 2010

Among the upper-level comprehensive schools that responded the survey both in 2007 and in 2010 (n=237), the schools had restricted the exposure of pupils to sweet products, increased their provision of oral health-enabling items to pupils and improved their oral health-promoting policy (Figure 5).

**Figure 5.** The mean changes in the Exposure (range 0-10), Enabling (range 0-10) and Policy (range 0-12) variables among the schools that responded the survey both in 2007 and in 2010 (n=237). The lower the score, the better the actions taken to ensure a healthier school environment. Modified from Anttila et al. 2014.

Furthermore, the upper-level comprehensive schools that responded both in 2007 and in 2010 (n=237) decreased their selling of sweets and soft drinks, but there were no changes in their selling of other sweet products during the follow-up (Figure 6). Selling soft drinks through vending machines had significantly decreased and selling sweets through vending machines had almost vanished.
Results

5.2 Effects of the national recommendation on schools’ oral health-promoting actions (Paper II)

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Figure 5. The mean changes in the Exposure (range 0-10), Enabling (range 0-10) and Policy (range 0-12) variables among the schools that responded the survey both in 2007 and in 2010 (n=237). The lower the score, the better the actions taken to ensure a healthier school environment. Modified from Anttila et al. 2014.

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Figure 6. The percentage changes concerning the sale of sweet products in Finnish upper-level comprehensive schools between 2007 and 2010 among the schools that responded in the survey both in 2007 and in 2010 (n=237).

The schools provided a healthy snack and made fresh drinking water available slightly more often in 2010 than in 2007, but the changes were not statistically significant (Figure 7). School practices concerning xylitol products had not changed during the follow-up, however, the schools had improved all the three items comprising the Policy variable: they allowed their pupils to leave the school premises less often, their guidelines concerning the sale of sweet products were improved, and the number of people involved in making decisions about the sale of sweet products had increased (Figure 7).
Figure 7. The mean changes in the Enabling and Policy variable items among the schools that responded in the survey both in 2007 and in 2010 (n=237). The lower the score, the better the actions taken to ensure a healthier school environment.

More schools improved than worsened their Exposure and Policy status (p<0.001), but schools in the good and poor Enabling category moved to the moderate Enabling category (p=0.036) between 2007 and 2010 among the schools that responded in both years (n=237) (Figure 8). Most of the schools kept their non-exposing status if they did not expose their pupils to sweet products at baseline.
Results

Figure 7. The mean changes in the Enabling and Policy variable items among the schools that responded in the survey both in 2007 and in 2010 (n=237). The lower the score, the better the actions taken to ensure a healthier school environment. More schools improved than worsened their Exposure and Policy status (p<0.001), but schools in the good and poor Enabling category moved to the moderate Enabling category (p=0.036) between 2007 and 2010 among the schools that responded in both years (n=237) (Figure 8). Most of the schools kept their non-exposing status if they did not expose their pupils to sweet products at baseline.

5.2.2 Other changes related to the sale of sweet products

There were changes in the main venue for the sale of sweet products, the party responsible for the sale of sweet products, and the party collecting the benefits from the sale of sweet products between 2007 and 2010 among the school that responded in both years (n=237). In 2007 (n=63), the main venue for the sale of other sweet products (sweetened juices and cakes, doughnuts or biscuits) were tuck shops (43%) and cafés (33%). In 2010 (n=59), the school canteen was the main venue for the sale of sweetened juices (37%) and cakes, doughnuts and biscuits (44%). The party responsible for the sale of other sweet products was the student council in 76% and 54% of the schools and a party outside the school in 27% and 55% of the schools in 2007 and 2010, respectively. The party that collected the profits from the sale of other sweet products was the student council in 76% and 58% of the schools and a party outside the school in 27% and 53% of the schools.
in 2007 and 2010, respectively. In the schools that sold sweets or soft drinks, there 
were no changes in terms of the party responsible for the sale of these products, 
but a party outside the school collected the profits more often in 2010.

5.3 Social gradient and intermediary determinants in schools  
(Paper III)

5.3.1 Associations between the school-level SEP and intermediary 
determinants

The school-level SEP correlated strongly and negatively with the attitudes and 
access to intoxicants (r=-0.60) in 2007 among the schools that were included in the 
combined data (n=360) (Figure 9). The school-level SEP correlated positively with 
the pupils’ tooth brushing frequency (r=0.47) and negatively with the exposure to 
sweet products at school (r=-0.22), eating of the school meal (r=-0.31) and eating 
unhealthy snacks during the school day (r=-0.24).
Results

Figure 9. The intermediary determinants’ associations with the school-level SEP and each other in 2007 among the schools that were included in the combined data (n=360). Abbreviations in used in the figure: School-level SEP (SEP), Attitudes and access to intoxicants (F1), School health services (F2), School environment (F3), Home environment (F4), Eating unhealthy snacks overall (Unhealthy overall), Eating unhealthy snacks at school (Unhealthy at school), Eating all elements of the school meal (Eating school meal), Pupils’ tooth brushing (Toothbrushing), Schools’ oral health-promoting policies (POL), Schools’ oral health-enabling actions (ENB), and Schools’ sweet product exposure (EXP). All the correlations were statistically significant (p<0.05).
5.3.2 **Intermediary determinants’ associations between each other**

There were several correlations between the intermediary determinants in 2007 (n=360) (Figure 9). The schools’ oral health-promoting actions correlated with the pupils’ perception about the attitudes and access to intoxicants and the school health services, as well as with the pupils’ oral health-related behaviour. Of the oral health-promoting actions, exposure to sweet products at school correlated most often with other intermediary determinants.

5.3.3 **Social gradient in schools**

A social gradient was also observed in all the background variables. The school-level SEP differed according to the school’s geographical location (from the highest to the lowest): Southern Finland, Western Finland, the Oulu Region, Eastern Finland, and Lapland (2.16, 2.23, 2.32, 2.34, and 2.36, respectively). The school-level SEP also differed according to the school size (from the highest to the lowest): large (>500 pupils), medium-large (300 to 499 pupils), medium-sized (100 to 299 pupils), and small (<99 pupils) schools (2.16, 2.19, 2.29, and 2.37, respectively). On the basis of the teaching language, the school-level SEP was 2.24 and 2.05 when the language was Finnish and Swedish, respectively. All the differences were statistically significant (p<0.001).

The results of the multivariable GLM revealed that there was a social gradient in the pupils’ perception about the attitudes and access to intoxicants, school health services and home environment and in the pupils’ tooth brushing frequency, when adjusted for the school’s geographical location, school size and teaching language of the school (Figure 10). The higher the school-level SEP, the worse the attitudes and access to intoxicants and the school health services and the better the home environment and the pupils’ tooth brushing frequency. ‘Attitudes and access to intoxicants’ had the strongest and ‘home environment’ had the second strongest association with the school-level SEP, accounting for 24% and 10% of the variance in the school-level SEP, respectively. Overall, the model explained 55% of the variance in the school-level SEP.
5.3.2 Intermediary determinants' associations between each other

There were several correlations between the intermediary determinants in 2007 (n=360) (Figure 9). The schools’ oral health-promoting actions correlated with the pupils’ perception about the attitudes and access to intoxicants and the school health services, as well as with the pupils’ oral health-related behaviour. Of the oral health-promoting actions, exposure to sweet products at school correlated most often with other intermediary determinants.

5.3.3 Social gradient in schools

A social gradient was also observed in all the background variables. The school-level SEP differed according to the school’s geographical location (from the highest to the lowest): Southern Finland, Western Finland, the Oulu Region, Eastern Finland, and Lapland (2.16, 2.23, 2.32, 2.34, and 2.36, respectively). The school-level SEP also differed according to the school size (from the highest to the lowest): large (>500 pupils), medium-large (300 to 499 pupils), medium-sized (100 to 299 pupils), and small (<99 pupils) schools (2.16, 2.19, 2.29, and 2.37, respectively). On the basis of the teaching language, the school-level SEP was 2.24 and 2.05 when the language was Finnish and Swedish, respectively. All the differences were statistically significant (p<0.001).

The results of the multivariable GLM revealed that there was a social gradient in the pupils’ perception about the attitudes and access to intoxicants, school health services and home environment and in the pupils’ tooth brushing frequency, when adjusted for the school’s geographical location, school size and teaching language of the school (Figure 10). The higher the school-level SEP, the worse the attitudes and access to intoxicants and the school health services and the better the home environment and the pupils’ tooth brushing frequency. ‘Attitudes and access to intoxicants’ had the strongest and ‘home environment’ had the second strongest association with the school-level SEP, accounting for 24% and 10% of the variance in the school-level SEP, respectively. Overall, the model explained 55% of the variance in the school-level SEP.

Figure 10. GLM of the school-level SEP contribution to the intermediary determinants in the Finnish upper-level comprehensive schools that were included in the combined data (n=360) in 2007, $R^2=0.551$. The numbers above the arrows are the Beta coefficient, the Partial Eta Squared and p-value, respectively. The continuous arrow indicates positive and dashed arrow negative correlation; the thicker arrow indicates a stronger correlation. The model is adjusted for the school’s geographical location, school size and teaching language of the school.

5.4 Changes in intermediary determinants after the national recommendation and school-level SEP (Paper IV)

5.4.1 Changes in intermediary determinants

After the intervention, the schools that were included to the combined data (n=360) improved their oral health-promoting policies and decreased their sale of sweet products (Table 3). In addition, the school-level SEP and attitudes and access to intoxicants improved following the intervention.
Table 3. Mean values of the school-level SEP and the intermediary determinants before and after the intervention among the schools that were included in the combined data (n=360). Bolded values indicate that the change was statistically significant.

<table>
<thead>
<tr>
<th>Factors F1-F4</th>
<th>2006-07</th>
<th>2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1: Attitudes and access to intoxicants</td>
<td>1.90</td>
<td>1.87***</td>
</tr>
<tr>
<td>Chance to buy alcohol nearby</td>
<td>2.42</td>
<td>2.36***</td>
</tr>
<tr>
<td>Chance to buy drugs nearby</td>
<td>1.51</td>
<td>1.49*</td>
</tr>
<tr>
<td>School’s attitude towards smoking</td>
<td>1.78</td>
<td>1.75***</td>
</tr>
<tr>
<td>F2: School health services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health services in the school</td>
<td>2.38</td>
<td>2.35*</td>
</tr>
<tr>
<td>Access to school health services</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>F3: School environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical hazards in the school</td>
<td>2.11</td>
<td>2.09</td>
</tr>
<tr>
<td>Peaceful school environment</td>
<td>2.31</td>
<td>2.30</td>
</tr>
<tr>
<td>Support from teachers and/or school</td>
<td>2.47</td>
<td>2.45*</td>
</tr>
<tr>
<td>Stress from school</td>
<td>2.01</td>
<td>2.02</td>
</tr>
<tr>
<td>Eating circumstances in school</td>
<td>1.35</td>
<td>1.35</td>
</tr>
<tr>
<td>F4: Home environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental support</td>
<td>1.78</td>
<td>1.77*</td>
</tr>
<tr>
<td>Family smoking</td>
<td>1.40</td>
<td>1.39</td>
</tr>
<tr>
<td>School oral health-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>promoting actions</td>
<td>6.66</td>
<td>6.26*</td>
</tr>
<tr>
<td>Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure</td>
<td>2.69</td>
<td>1.69***</td>
</tr>
<tr>
<td>Enabling</td>
<td>5.12</td>
<td>5.25</td>
</tr>
<tr>
<td>Pupils’ oral health-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>related habits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating school meal</td>
<td>1.23</td>
<td>1.24</td>
</tr>
<tr>
<td>Unhealthy eating outside school canteen</td>
<td>0.72</td>
<td>0.74*</td>
</tr>
<tr>
<td>Eating habits at school</td>
<td>1.95</td>
<td>1.98**</td>
</tr>
</tbody>
</table>

* p<0.05; ** p<0.01; *** p<0.001
5.4.2 Changes in intermediary determinants in different school-level SEP groups

There was an inverse social gradient in exposing pupils to sweet products based on the school-level SEP groups: schools in the high-SEP group sold sweet products more often compared to schools in the middle- and low-SEP groups. The national recommendation did not increase inequalities concerning the sale of sweet products in schools among the schools that were included in the combined data (n=360) (Table 4). The decrease after the intervention in the Exposure was almost identical for every school-level SEP group: 38%, 35% and 39% in high-, middle- and low-SEP groups, respectively. Oral health-promoting policies did improve only in the low-SEP schools after the intervention.

There was an inverse social gradient in eating school meal and eating unhealthy snacks at school both at baseline and after the intervention: pupils ate all the different elements of their school meal more often in the low-SEP schools than in the middle- and high-SEP groups (Table 4). After the intervention, pupils ate unhealthy snacks slightly more often at school in all school-level SEP groups but the changes were not statistically significant. In high-SEP schools, pupils’ eating habits deteriorated after the intervention.

Table 4. The changes in intermediary determinants between the baseline (2006–07) and after the intervention (2008–09) according to the school-level SEP among the schools that were included in the combined data (n=360).

<table>
<thead>
<tr>
<th></th>
<th>Highest SEP (N=120)</th>
<th>Middle SEP (N=120)</th>
<th>Lowest SEP (N=120)</th>
<th>p-value1</th>
<th>p-value2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure</td>
<td>Baseline</td>
<td>3.57</td>
<td>2.61</td>
<td>1.88</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>2.22</td>
<td>1.70</td>
<td>1.15</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>p-value2</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Enabling</td>
<td>Baseline</td>
<td>4.78</td>
<td>5.10</td>
<td>5.48</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>5.14</td>
<td>5.52</td>
<td>5.10</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>p-value2</td>
<td>0.045</td>
<td>0.038</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Policy</td>
<td>Baseline</td>
<td>6.63</td>
<td>6.48</td>
<td>6.86</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>6.18</td>
<td>6.29</td>
<td>6.30</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>p-value2</td>
<td>0.07</td>
<td>0.61</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Eating school meal</td>
<td>Baseline</td>
<td>1.27</td>
<td>1.23</td>
<td>1.20</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>1.29</td>
<td>1.23</td>
<td>1.19</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>p-value2</td>
<td>0.045</td>
<td>0.50</td>
<td>0.73</td>
<td></td>
</tr>
<tr>
<td>Unhealthy snacking at school</td>
<td>Baseline</td>
<td>0.77</td>
<td>0.72</td>
<td>0.68</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>0.79</td>
<td>0.75</td>
<td>0.69</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>p-value2</td>
<td>0.14</td>
<td>0.07</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Eating habits in schools</td>
<td>Baseline</td>
<td>2.04</td>
<td>1.95</td>
<td>1.88</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>2.07</td>
<td>1.98</td>
<td>1.89</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>p-value2</td>
<td>0.017</td>
<td>0.090</td>
<td>0.382</td>
<td></td>
</tr>
</tbody>
</table>

p-value1, the significance of the difference between the SEP groups (Kruskal-Wallis test); p-value2, significance of the change (Wilcoxon Signed-Ranks test)
Among the schools that were included in the combined data (n=360), pupils ate more often all the elements of the school meal and less often unhealthy snacks at school in schools that did not expose their pupils to sweet products. The difference between exposing and non-exposing schools increased further after the intervention (Table 5).

Table 5. Mean values of pupils’ eating behaviours according to the school’s status of exposing their pupils to sweet products among the schools that were included in the combined data (n=360).

<table>
<thead>
<tr>
<th></th>
<th>Always bad (n=144)</th>
<th>Worsened (n=15)</th>
<th>Improved (n=67)</th>
<th>Always good (n=134)</th>
<th>p²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating school meal</td>
<td>At baseline</td>
<td>1.25</td>
<td>1.25</td>
<td>1.24</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>1.27</td>
<td>1.32</td>
<td>1.22</td>
<td>1.20</td>
</tr>
<tr>
<td>p²</td>
<td></td>
<td>0.01</td>
<td>0.003</td>
<td>0.21</td>
<td>0.86</td>
</tr>
<tr>
<td>Eating unhealthy snacks</td>
<td>At baseline</td>
<td>0.75</td>
<td>0.74</td>
<td>0.73</td>
<td>0.69</td>
</tr>
<tr>
<td>at school</td>
<td>After intervention</td>
<td>0.78</td>
<td>0.81</td>
<td>0.71</td>
<td>0.71</td>
</tr>
<tr>
<td>p²</td>
<td></td>
<td>0.01</td>
<td>0.17</td>
<td>0.27</td>
<td>0.11</td>
</tr>
<tr>
<td>Eating habits at school</td>
<td>At baseline</td>
<td>2.00</td>
<td>1.99</td>
<td>1.97</td>
<td>1.89</td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>2.05</td>
<td>1.99</td>
<td>1.93</td>
<td>1.92</td>
</tr>
<tr>
<td>p²</td>
<td></td>
<td>&lt;0.001</td>
<td>0.017</td>
<td>0.100</td>
<td>0.135</td>
</tr>
</tbody>
</table>

p-value¹, the significance of the difference between the groups (Kruskal-Wallis test); p-value², significance of the change (Wilcoxon Signed-Ranks test)

5.4.3 Intermediary determinants’ contribution to pupils’ eating habits in different school-level SEP groups

The results of the longitudinal multivariable LMM revealed that the school-level intermediary determinants contributed differently to pupils’ eating habits in schools in different SEP groups among the schools that were included in the combined data (n=360) (Figure 11). The intermediary determinants contributed more to the eating habits of the pupils in lower-SEP schools.
Among the schools that were included in the combined data (n=360), pupils ate more often all the elements of the school meal and less often unhealthy snacks at school in schools that did not expose their pupils to sweet products. The difference between exposing and non-exposing schools increased further after the intervention (Table 5).

Table 5. Mean values of pupils' eating behaviours according to the school's status of exposing their pupils to sweet products among the schools that were included in the combined data (n=360).

<table>
<thead>
<tr>
<th>Always good (n=144)</th>
<th>Worsened (n=15)</th>
<th>Improved (n=67)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating school meal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At baseline</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>After intervention</td>
<td>1.27</td>
<td>1.32</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.001</td>
<td>0.003</td>
</tr>
<tr>
<td>Eating unhealthy snacks at school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At baseline</td>
<td>0.75</td>
<td>0.74</td>
</tr>
<tr>
<td>After intervention</td>
<td>0.78</td>
<td>0.81</td>
</tr>
<tr>
<td>p-value</td>
<td>0.011</td>
<td>0.013</td>
</tr>
<tr>
<td>Eating habits at school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At baseline</td>
<td>2.00</td>
<td>1.99</td>
</tr>
<tr>
<td>After intervention</td>
<td>2.05</td>
<td>1.99</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.001</td>
<td>0.017</td>
</tr>
</tbody>
</table>

p-value1, the significance of the difference between the groups (Kruskal-Wallis test); p-value2, significance of the change (Wilcoxon Signed-Ranks test)

5.4.3 Intermediary determinants’ contribution to pupils’ eating habits in different school-level SEP groups

The results of the longitudinal multivariable LMM revealed that the school-level intermediary determinants contributed differently to pupils' eating habits in schools in different SEP groups among the schools that were included in the combined data (n=360) (Figure 11). The intermediary determinants contributed more to the eating habits of the pupils in lower-SEP schools.

Figure 11. Results of the longitudinal LMM regarding the changes in pupils’ eating habits at school among the schools that were included in the combined data (n=360), separate model for each SEP group. The Beta coefficient and p-value are indicated above the arrows. The continuous arrow indicates a positive and dashed arrow a negative contribution.

5.5 Summary of the results

Nearly a third of the schools stopped selling sweet products. The selling of sweets and soft drinks, especially through vending machines, decreased remarkably during the study. Schools’ intermediary determinants were associated with each other and with the school-level SEP. Schools’ exposure to sweet products correlated with many other intermediary determinants. The decrease in sweet product selling following the national recommendation was similar in each school-level SEP group. Pupils’ eating behaviours were better in the schools that had not exposed their pupils to sweet products during this study. School-level intermediary determinants contributed differently to pupils’ school-time eating habits in different SEP groups.
6 DISCUSSION

6.1 Main results

After the national recommendation, schools decreased their sale of sweets and soft drinks to the pupils (Aim 1). In addition, schools improved their oral health-promoting policies. Higher-SEP schools sold more often sweet products, and a high school-level SEP was associated with (1) pupils’ worse perception of the attitudes and access to intoxicants, (2) eating all elements of the school meal less often, (3) eating unhealthy snacks more often at school, and (4) better toothbrushing frequency (Aim 2a). Furthermore, pupils’ perception about the attitudes and access to intoxicants and school health services contributed negatively to the school-level SEP, while the home environment and the pupils’ tooth brushing frequency contributed positively to the school-level SEP. The effect of the national recommendation on the sale of sweet products in schools was similar in all school-level SEP groups (Aim 2b).

6.2 Results of the study in relation to previous research

6.2.1 Impacts of the national recommendation on schools’ oral health-promoting actions

National recommendations have been used worldwide as a tool to improve the school environment, and they have proven to be effective. The national recommendation investigated in this study also had an impact on schools’ oral health-promoting actions, particularly on the sale of sweet products in schools. In Sweden, where the society is rather similar to that of Finland, the proportion of schools selling sweet products decreased from 58% to 10% during the three-year follow-up after the ‘Dentists against sweets and soft drinks’ project implemented by the Swedish Dental Association (Hörnell et al. 2009). The decrease in the sale of sweet products in Sweden was even bigger than it was in Finland following the national recommendation, suggesting that Swedish schools might be better at implementing such guidelines. In British Columbia, Canada, a recommendation was given to restrict what food and beverages can be sold in schools to eliminate high sugar and fat food entirely (Watts et al. 2014). Four years after high schools were obligated to implement the recommendation, the schools had implemented the recommendation more often and they had lower odds of having SSBs, baked
Discussion

goods, chocolates and sweets available. As in Scandinavia, the Canadian society and decision-makers may be receptive to national recommendations.

In the United States, many states have given recommendations or mandates to their schools to improve the nutrition environment in schools. As in the present study, many other studies indicate that recommendations and mandates could decrease the sale of sweet products in schools. Typically, a mandate is a bit stronger policy instrument than a recommendation, but it seems that there are no punishment in the US if a mandate is not followed, meaning that a mandate without punishment can be considered quite similar to a recommendation. In Maine, US, high schools were given a recommendation to decrease the availability of SSBs (Blum et al. 2008). The number of intervention and control schools was too low to perform a statistical analysis, but overall the intervention schools decreased their availability of SSBs more than their control counterparts. In Washington, a state mandate was successful in restricting the sale of sweet products (Boles et al. 2011). Another instrument stronger than a recommendation was the state nutrition law given to middle and high schools in Massachusetts. It managed to decrease the provision of unhealthy products but did not reach 100% compliance, meaning that the sale of banned products continued in some schools (Gorski et al. 2016).

According to this study, the provision of healthy snacks did not decrease even if the sale of sweet products decreased at the same time. In Washington, the state mandate that succeeded in restricting the sale of sweet products in schools also decreased the sale of healthy products (Boles et al. 2011). The United States is the largest consumer of carbonated soft drinks in the world and almost nine out of ten high school students had access to soft drinks in schools in 2004 and 2005, indicating that the consumption of soft drinks at school is also more common in the US than in Finland (Hawkes 2010, Johnston et al. 2007). It is possible that the sale of soft drinks in US schools may be so established that in order to stop the selling they had to stop the selling of everything. At the time when the FNBE and THL gave the recommendation in Finland, there was an ongoing project called ‘Järkipalaa’ (‘Smart snacks’ in English) encouraging schools to offer and sell healthy snacks and that could support Finnish schools to continue or start the provision of healthy snacks (Järkipalaa 2018). The ‘Järkipalaa’ project is still running. In the case examined in this study, it was positive that the sale of sweets and soft drinks through vending machines almost disappeared because most often those products are available from vending machines throughout the school day, if they are present. If there are unhealthy snacks available from vending machines, pupils could easily choose them instead of buying a healthy snack.

Many studies confirm the finding of this study that national recommendations are an effective intervention instrument in changing the nutrition environment in
schools. The national recommendation targeted at French secondary schools improved the nutritional value of the school meals in schools that had a high compliance with the recommendation (Bertin et al. 2012). The US study found out that upper-level recommendations at state level rather than at district level are more effective in decreasing the availability of unhealthy products in schools (Kubik et al. 2010). Some studies have also found out that district-level recommendations can also be effective: according to a US study, district-level recommendations regulating vending machines and school stores also managed to decrease the availability of unhealthy products (Larson et al. 2016). Another US study has also shown that district-level recommendations regarding school (oral) health-related actions (such as restricting the sale of beverages and offering healthy alternatives) did decrease the soft drink consumption in US high schools (Miller et al. 2016).

This study has proved that, at least in Finland, national recommendations can be effective in upper-level comprehensive school (or upper secondary school) settings. In Boston, Massachusetts, district-wide recommendations concerning SSBs decreased the availability of those products in elementary, middle and high schools (Mozaffarian et al. 2016). In contrast, Kubik et al. (2010), Larson et al. (2016) and Palakshappa et al. (2016) argue that the recommendations were not as effective in improving the food environment in high schools as they were in elementary and middle schools. As presented before, the consumption of unhealthy products, such as soft drinks, is more common in the US than in Finland or in Europe. Perhaps US high schools think that their students will consume unhealthy products no matter what they do. In this study, schools rarely started to expose their pupils to sweet products if they did not already sell sweet products at the beginning of the study. It seems that once a school makes the decision of not selling sweet products, they do not change their mind that easily.

After the national recommendation, Finnish schools have improved their oral health-promoting policies. According to this study, schools also improved their policies concerning the leaving of the school premises in order to prevent their pupils, for example, from buying unhealthy snacks or eating at fast food restaurants. In US high schools, pupils ate more often at fast food restaurants if their schools had the open-campus policy meaning that they were allowed to leave the school area (Neumark-Sztainer et al. 2005). However, another US study found out that students’ soft drink consumption was not associated with the closed-campus policy, which means that students are not allowed to leave the school area (Miller et al. 2016). Some studies from the US suggest that there are more energy-dense foods available nearby schools with pupils with a lower socioeconomic background (Sturm 2008, Neckerman et al. 2010). Based on these findings, it seems that pupils from lower socioeconomic backgrounds would benefit the most from the closed-campus policy.
6.2.2 Associations of schools’ intermediary determinants with each other and with the school-level SEP

Intermediary determinants’ associations with each other

In this study, schools’ intermediary determinants were associated with each other. The most important finding was that if the school sold sweet products, pupils seemed to consume more unhealthy products during the school day. A cross-sectional study suggests that the school food environment does not have much influence on pupils’ soft drink or snack consumption (van der Horst et al. 2008). However, several studies, including longitudinal studies, have reported similar findings as in this study that schools’ intermediary determinants are associated with each other; for example, selling SSBs in schools has previously been found to be associated with the consumption of SSBs by pupils (Masse et al. 2014). According to the study in Maine, United States, although the recommendation decreased the availability of SSBs, it did not change the consumption of SSBs in the intervention schools (Blum et al. 2008). This could be due to the fact that at the same time there were other policy initiatives being discussed regarding healthy food choices in Maine public schools. Therefore, also control schools may have been influenced with other policies targeting pupils’ SSB consumption.

In this study, schools’ better oral health-promoting policy on sweet product selling was associated with eating unhealthy snacks at school less often. Bere et al. (2008) have reported similar findings: if the school had rules concerning soft drink consumption, it decreased the odds of pupils’ drinking soft drinks at school. Another study from the US indicate that in Minnesota high schools that had adopted recommended policies concerning, for example, the availability of sweet products, pupils decreased their consumption of sugary drinks (Nanney et al. 2014).

We found out that if schools sell sweet products, pupils do not tend to eat all the components of the school meal very often. Park et al. (2010) have reported similar findings: if a school had a vending machine selling soft drinks, pupils chose more often an unhealthy snack instead of the school meal. In addition, items sold in the vending machines of the schools had an effect on pupils’ overall dietary intake (Rovner et al. 2011). In US middle schools, if competitive foods are available, pupils eat less often the school meal and do not eat all element of the meal (Templeton et al. 2005). These studies confirm the findings of this study that schools’ intermediary factors, schools’ oral health-promoting actions and pupils’ oral health-related factors are associated with each other.
Discussion

Social gradient in schools’ intermediary determinants

As far as I know, this is the first study to support the theoretical framework for oral health inequalities by Watt and Sheiham, showing that there is a social gradient in the intermediary determinants of oral health at the school level.

Based on the findings of this study, Finnish schools with a higher SEP sell more often sweet products to their pupils compared to other schools. Previous studies have also indicated that higher socioeconomic background of the pupils leads to more nutritious food choices at school (Ahmadi et al. 2015). Schools with higher-SEP pupils may not think that they have a big problem with sweet products because most of the pupils can make good food choices and the adverse effects of sugary foods are not obvious. The school intake in Finland is socially heterogeneous, which means that in higher SEP schools there are also pupils from a lower socioeconomic background (Karvonen et al. 2001). The availability of sweet products in schools and the SEP do affect the sugar intake, food choices and oral health: at the individual level, pupils from lower socioeconomic backgrounds consume more sweet products if there are sweet products available (Maliderou et al. 2006). It could be also the case in Finland that pupils from lower socioeconomic backgrounds in high-SEP schools consume more sweet products than their counterparts from higher socioeconomic backgrounds. This could widen the social gradient in general and the gap in oral health between the pupils in high-SEP schools.

In contrast to this study, a US study found out that schools with pupils from lower socioeconomic backgrounds were more likely offered unhealthy products during school day (Nanney et al. 2008). In the United States, many schools are private schools unlike in Finland, where almost all schools are publicly funded schools run by local authorities. Many US schools have also ‘pouring rights’ contracts, which are lucrative contracts between the schools and soft drinks manufacturers and which can account for a large part of the school budget. In exchange, soft drinks manufacturers are allowed to sell their products in schools. A US study suggests that schools with lower socioeconomic background students did not have more pouring rights contracts with soft drink manufacturers compared with higher SEP schools (Johnston et al. 2007). However, Johnston et al. (2007) found out that students from lower socioeconomic backgrounds were more likely to attend schools where soft drink manufacturers advertise in schools and sponsor school sporting events. Unfortunately, if schools with pupils from lower socioeconomic backgrounds expose their pupils to sweet products or tempt them to use more sweet products, the food environment of pupils may be poor throughout the day, as a low SEP has been linked to poorer nutrition habits.
6.2.3 Changes in intermediary determinants after the national recommendation and the relations to school-level SEP

Based on the framework of oral health inequalities, as a structural determinant and as an upstream factor, national recommendation should not increase inequalities in school sweet product selling (Watt & Sheiham 2012). In this study, the decrease in sweet product selling was similar among all school-level SEP groups. This is in line with the findings of Moore et al. (2015), who suggest that school-based interventions concentrating only on the school environment have at least a neutral effect on the social gradient.

There have been mixed results in previous studies as to whether school-based interventions increase or decrease inequalities by SEP. According to a French study, a school-based intervention to increase physical activity was successful in reducing the increase in BMI, and there were no differences between the participants based on their SEP (Simon et al. 2008). One reason for this could be that the school systems in European countries, such as in France and in Finland, have some elements that do not generate inequalities as easily as in some other countries. A systematic review by Lorenc et al. (2013) found out that school-based interventions related to healthy eating alone or combined with other actions could be neutral in terms of social gradient or could increase inequalities. Another review concludes that nutrition interventions at schools may widen inequalities (Oldroyd et al. 2008). Maybe too often, interventions on nutrition and healthy eating in schools require active choosing from pupils between the foods, leading to situation that pupils from higher SEP families make better choices compared to other pupils, which could generate health inequalities. This could be the case in the German quasi-randomised, controlled trial with an eight-year follow-up, in which a school-based health promotion intervention had favourable effects on BMI but only among students from high-SEP families (Plachta-Danielzik et al. 2011).

There are mixed results from the United States compared to the finding of this study that a national recommendation does not increase inequalities in terms of the sale of sweet products. A state mandate targeting schools was more effective in decreasing the sale of SSBs than district-wide recommendations, especially among African American students (Terry-McElrath et al. 2015). This encourages the use of national recommendations and statewide mandates to promote healthy eating at schools. In a Californian study, it was found out that the recommendations concerning competing foods and beverages in schools improved the trends of the child overweight/obesity prevalence in all socioeconomic groups (Sanchez-Vaznaugh et al. 2015). However, the overweight/obesity trend improvement evened in the low- and middle-SEP school groups but declined in the high-SEP
school group, indicating that such a recommendation could increase the social gradient in overweight/obesity prevalence, at least in that population.

6.3 **Strengths and weaknesses of the study**

The strength of the study is the longitudinal design that makes it possible to measure the intervention effects of the national recommendation. However, since the study was an ecological one, care must be taken when drawing assumptions about individual effects on pupils based on the findings of this study.

Another strength of the study was that the study used two independent datasets. The school principal or personnel answered the questionnaire concerning the school’s oral health-related actions (the SSSS survey) and pupils answered the SHPS questionnaire concerning their oral health-related behaviours independently of each other. Therefore, the combined data makes the study even more valid at the school level. In addition, the SHPS is a traditional and respected survey among upper-level comprehensive schools in Finland and attracts an excellent response rate every year. However, the total response rate of the combined data was quite small due to the low response rate in the SSSS survey. The weakness of the study was that the questionnaires’ self-reporting nature could lead to potential bias. For example, the principal or school personnel could underestimate the sale of sweet products in their school, or pupils could under- or overestimate their eating habits at school. On the other hand, differences between schools are smaller than differences between individuals. In this study, the distribution of the responding schools’ geographical location, size and teaching language were similar to the geographical location, size and teaching language of all the schools in Finland. The study population can be considered to be sufficiently representative to allow the generalisation of the results to all Finnish upper-level comprehensive schools.

Another weakness of the study was that the dataset of oral health behaviours was obtained through a secondary analysis of the data from the SHPS, including only school-level means. We could not include the questions we wanted in the SHPS but could only use the existing questions to form the school-level SEP and the factors describing the intermediary determinants of oral health inequalities. In addition to the strongest key marker of SEP, parental education, we felt it appropriate to include income-related measures to describe the school-level SEP, as Finland does not have as clear social classes compared, for example, to the United Kingdom (Karvonen *et al.* 2001). The income-related measures, such as parental lay-off, family structure (one-parent families have more often less money available to their children, too) and the amount of pocket-money, were used to describe more specifically the possibilities these adolescents have and to make the...
measurement of the school-level SEP more robust compared to a situation where only parental education was measured. The distributions of the school-level SEP in combined data were very close to the distributions of the school-level SEP in all schools that had answered the SHPS, indicating that the selection bias is very similar.

6.4 Significance of the study to science and public health practice

The findings of this thesis support the use of upstream-level recommendations, at least on a national level, to improve schools’ food environments. The results of the study also support the current view that school policies and actions concerning sweet products are a very important issue and could affect adolescents’ sugar consumption (Rugg-Gunn 2017).

It is well known what kind of interventions work in school settings. This study suggests that national recommendations can decrease the sale of sweet products to pupils in schools. It also seems that, at least in Finland, the effect of national recommendations on the sale of sweet products in schools is similar across all school-level SEP groups. The findings of this study could encourage decision-makers to give recommendations to schools to improve their nutrition environment because it is unlikely that such recommendations would increase inequalities in terms of sweet selling.

In this study, pupils in the schools that had sold sweet products during the intervention had worse eating habits at school compared to their peers in schools that did not sell sweet products at all. Several studies indicate that the school food environment influences pupils’ nutrition habits (Bere et al. 2010, Masse et al. 2014, Nanney et al. 2014, Park et al. 2010, Rovner et al. 2011, Templeton et al. 2005). Therefore, national recommendations may also impact pupils’ oral health in the long-term.

The school environment is not the only environment that needs to be taken into account in order to improve children and adolescents’ eating habits. A systematic review by Boelsen-Robinson et al. (2015) discusses an Australian study where school nutrition recommendations formed one element of the ‘Be Active, Eat Well’ campaign together with other community actions. The most effective interventions in a school setting have been those that take into account the nutrition policy of the school on the whole, including access to food outside the school area (Jaime & Lock 2009).
Based on this study, the national recommendation did not succeed to eradicate the sale of sweet products in schools. The reason for this could be that unhealthy snacking is so established in some schools that it is not that easy to stop the selling of sweet products. Sometimes stricter actions are needed. Spain has banned the sale of products containing lots of saturated fat, trans-fat, salt or sugar in schools (de Lago 2011). In the EU, school-based interventions have achieved short-term narrowing inequalities in SSB consumption, however, SSB taxation has been found to be a more effective instrument (Health Equity Pilot Project 2017). At population level, tax on SSBs has proved to be an effective way to decrease the overall consumption of SSBs (Colchero et al. 2016).

6.5 Recommendations for action

- Especially adolescents with a lower SEP suffer the most from an unhealthy nutrition environment in schools. Therefore, a healthy nutrition environment in schools should be the goal when aiming to improve the position of those who would benefit from a healthy school environment the most.

- Schools need support and advice from authorities (state, regional, municipal) and health professionals to make decisions that can promote pupils’ health. There is always some degree of resistance to change from pupils, school staff and parents concerning issues such as the availability sweet products to pupils. Authorities and health professionals should offer arguments to schools on which they can lean when implementing the changes.

- To decrease the sale of sweet products in Finnish upper-level comprehensive schools, a new and more comprehensive national recommendation for schools concerning the sale of sweet products is needed.

- To improve the school nutrition environment as a whole, the implementation of the previous recommendations, such as the school meal recommendation issued in 2017, should be continued and possibly supplemented with further recommendations.

- To end the sale of sweet products in schools and to make the nutrition environment in schools healthier, stricter actions such as legislation prohibiting the sale and provision of unhealthy products in schools may be needed.
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7 CONCLUSIONS

The national recommendation did affect Finnish schools’ oral health-promoting actions. It proved particularly successful in reducing the sale of sweet products in Finnish upper-level comprehensive schools. In addition, the present study indicates that schools’ intermediary determinants seem to be associated with each other and with the school-level SEP, and several intermediary factors seem to contribute to the school-level SEP. Furthermore, it seems that the national recommendation did not reduce or increase inequalities concerning the sale of sweet products in schools. It is also possible that sweet selling in schools has affected pupils’ eating habits during school hours.
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Lappajärvi, November 2018    Jaakko Anttila
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Jaakko Anttila


Anttila J, Tolvanen M, Kankaanpää R and Lahti S. Social gradient in intermediary determinants of oral health at school level in Finland. *Community Dent Health* 2018; 35: 75-80


Blum JEW, Davee A, Beaudoin CM, Jenkins PL, Kaley LA and Wigand DA. Reduced availability of sugar-sweetened beverages and diet soda has a limited impact on beverage consumption patterns in Maine high school youth. *J Nutr Educ Behav* 2008; 40: 341-347.


Colchero MA, Popkin BM, Rivera JA and Ng SW. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. *BMJ* 2016; 352: h6704.

Cvjetan B, Utter J, Robinson E and Denny S. The social environment of schools and adolescent nutrition: associations between the school nutrition climate and adolescents’ eating behaviors and body mass index. *J Sch Health* 2014; 84: 677-682.

References


Glick M, Williams DM, Kleinman DV, Vujicic M, Watt RG and Weyant RJ. A new definition for oral health developed by the FDI World Dental Federation.


National Advisory Board on Research Ethics. 2009. Ethical principles of research in the humanities and social and behavioural sciences and proposals for ethical review. Available at: http://www.tenk.fi/sites/tenk.fi/files/ethicalprinciples.pdf


Sanchez-Vaznaugh EV, Sanchez BN, Crawford PB and Egerter S. Association between competitive food and beverage policies in elementary schools and childhood overweight/obesity trends: differences by neighborhood socioeconomic resources. JAMA Pediatr 2015; 169: e150781.


Suslick J. Tandläkare mot godis och läsk ger resultat [‘Dentists against sweets and soft drinks’ is giving results]. *Tandläkartidningen* 2009; 8: 28–29.


Vecchiarelli S, Takayanagi S and Neumann C. Students’ perceptions of the impact of nutrition policies on dietary behaviors. *J Sch Health* 2006; 76: 525-531.


APPENDICES

Appendix 1. The questionnaire of the School Sweet Selling Survey in Finnish. For translation and validation in English, please contact the author.

Tutkimus virvoitusjuomien ja makeisten myynnistä perusopetuksen vuosiluokkien 7-9 koulussa (yläkouluissa) 2007

1. Koulun nimi
   Läänin
   Kunta

2. Koulun oppilasmäärä?
   ○ alle 99
   ○ 100-299
   ○ 300-499
   ○ yli 500

3. Toiniiko yläkoulun kanssa samoissa tiloissa myös 1-6 vuosiluokkien koulu(alakoulu)?
   ○ Kyllä
   ○ Ei

4. Voivatko oppilaat ostaa koulusta syötävää tai juotavaa, esim. kahvilasta, kioskista, automaateista tai ruokalasta?
   ○ Kyllä   Jos vastaat kyllä, siirry suoraan kysymykseen 6.
   ○ Ei   Jos vastaat ei, vastaa kysymykseen 5.

5. Mikä on tärkein syy, jonka vuoksi koulussa ei ole myynnitä?
   ○ Koululla on tehty linjaus, joka on myynnin vastainen
   ○ Muu syy, mikä?
   Jos vastaat muun syyyn, siirry kysymykseen 29.

6. Onko koulussa juoma-automaatti, joka on kouluaikana oppilaiden käytössä?
   ○ Kyllä   Jos vastaat kyllä, vastaa kysymyksiin 7 ja 8.
   ○ Ei   Jos vastaat ei, siirry suoraan kysymykseen 9.

7. Myydiänkö juoma-automaattissa
   ○ tavallisia virvoitusjuomia
   ○ ketinomakreettistä virvoitusjuomia (ns. Light-tuotteita)
   ○ makeutettuja mehuja
   ○ ei mitään edellisistä
    Voit valita yhden tai useamman vaihtoehdon.

   ○ Kyllä
   ○ Ei

9. Onko koulussa jokin muu automaatti, joka on kouluaikana oppilaiden käytössä?
   ○ Kyllä   Jos vastaat kyllä, vastaa kysymyksiin 10 ja 11.
   ○ Ei   Jos vastaat ei, siirry suoraan kysymykseen 12.
10. Myydiänkö automaattisissa makeisissa?
   o Kyllä
   o Ei

11. Näkyvätkö automaattissa tuotemerkit (esim. Mars)?
   o Kyllä
   o Ei

12. Onko koulussa kioski?
   o Kyllä Jos vastasit kyllä, vastaa kysymykseen 13.
   o Ei Jos vastasit ei, siirry suoraan kysymykseen 14.

13. Myydiänkö kioskissa
   o tavallisista virvoitusjuomista
   o keinomakeutettuja virvoitusjuomia (ns. Light-tuotteita)
   o makeutettuja mehuja
   o makeisia
   o ei mitään edellisistä
   Voit valita yhden tai useamman vaihtoehdon.

14. Onko koulussa kahvila?
   o Kyllä Jos vastasit kyllä, vastaa kysymykseen 15.
   o Ei Jos vastasit ei, siirry suoraan kysymykseen 16.

15. Myydiänkö kahvilassa
   o tavallisista virvoitusjuomista
   o keinomakeutettuja virvoitusjuomia (ns. Light-tuotteita)
   o makeutettuja mehuja
   o makeisia
   o levoksiä, munkkeja, pullia tai keiksejä?
   o ei mitään edellisistä
   Voit valita yhden tai useamman vaihtoehdon.

16. Myydiänkö koulun ruokalassa
   o tavallisista virvoitusjuomista
   o keinomakeutettuja virvoitusjuomia (ns. Light-tuotteita)
   o makeutettuja mehuja
   o makeisia
   o levoksiä, munkkeja, pullia tai keiksejä?
   o ei mitään edellisistä
   Voit valita yhden tai useamman vaihtoehdon.
17. Mikäli koulussa myyläin makeita syötäviä tai juotavia, mikä on tärkein syy siihen?
   ○ Koulussa ei myydä makeita syötäviä eliä juotavia
     Jos vastasit, että koulussa ei myydä syötäviä eliä juotavia, *siirry suoraan kysymykseen 20.*
   ○ Ooppilaisten toivomus
   ○ Vanhempien toivomus
   ○ On parempi, että ostetaan koulusta kuin koulun ulkopuolella sijaitsevasta kaupasta tai kioskista
   ○ Muu syy, mikä?

Jos vastasit jotakin muuta, jatka kysymykseen 18.

18. Kuka/ketkä vastaavat makeiden syötävien tai juotavien myynnistä koulussa?
   *Voit valita yhden tai useamman vaihtoehto.*
   ○ Koulu
   ○ Ooppilaskunta
   ○ Opetajaryhdistys
   ○ Vanhempiarvonryhdistys
   ○ Ulkopoliisin yritys
   ○ Hyväntekeväisyysjärjestö
   ○ Joku muu, mikä

19. Kuka/ketkä saavat makeiden syötävien tai juotavien myynnin tulot?
   *Voit valita yhden tai useamman vaihtoehto.*
   ○ Koulu
   ○ Ooppilaskunta
   ○ Opetajaryhdistys
   ○ Vanhempiarvonryhdistys
   ○ Ulkopoliisin yritys
   ○ Hyväntekeväisyysjärjestö
   ○ Joku muu, mikä

20. Myydäinkö koulussa hedelmäiä, voileipiä tai muita terveellisiä valipaloja?
    ○ Kyllä  *Jos vastasit kyllä, siirry suoraan kysymykseen 22.*
    ○ Ei  *Jos vastasit ei, vastaa kysymykseen 21.*

21. Mikä on tärkein syy siihan, että koulussa ei myydä terveellisiä valipaloja?
    ○ Koulu tarjoaa terveellisen välipalan,
    ○ Ooppilaat ottavat terveellisen välipalan tarpeen vaatimessa kotoa mukaansa,
    ○ Ooppilaat eivät ole kyselleet terveellisiä valipaloja,
    ○ Vanhemmat eivät ole kyselleet terveellisiä valipaloja
    ○ Muu syy, mikä?
22. Oletteko tehneet muutoksia myynnissä viimeisen kahden vuoden aikana?
   Voit valita yhden tai useanman vaihtoehton.
   o Emme Jos vastasi emme, sitä kysyttiin kysymykseen 24.
   o Kyllä, myymme nykyistä pelkkästään hedelmää, voileipää tai maattotuotteita.
   o Kyllä, oleme lopettaneet virvoitusjuomien myynnin.
   o Kyllä, oleme lopettaneet makeisten myynnin.
   o Kyllä, oleme lopettaneet muiden makeiden syötävien/juotavien, kuten mehujen, leivosten ja pullien myynnin.
   o Kyllä, oleme vähentäneet virvoitusjuomien tarjontaa.
   o Kyllä, oleme vähentäneet makeisten tarjontaa.
   o Kyllä, oleme vähentäneet muiden makeiden syötävien/juotavien, kuten mehujen, leivosten ja pullien tarjontaa.
   o Kyllä, oleme aloittaneet virvoitusjuomien myynnin.
   o Kyllä, oleme aloittaneet makeisten myynnin.
   o Kyllä, oleme aloittaneet muiden makeiden syötävien/juotavien, kuten mehujen, leivosten ja pullien myynnin.
   o Kyllä, oleme tehneet jotain muuta, mitä?
   
   Jos vastasit kyllä, vastaa kysymykseen 23.

23. Mikä on pääasiallinen syy siihen, että järjestelyjä on muutettu?

24. Onko koululla jotakinlaista linjausta koskien virvoitusjuomien, makeisten ja muiden makeiden syötävien/juotavien myyntä ja/tai naautimista koulussa?
   o Kyllä Jos vastasi kyllä, jatka kysymykseen 25.
   o Ei Jos vastasi ei, sitä kysyttiin kysymykseen 29.

25. Mitä linjaus pitää sisällään?
   Voit valita yhden tai useanman vaihtoehton.
   o Oppitunteilla ei nautita virvoitusjuomia eikä makeisia
   o Kouluassa ei nautita virvoitusjuomia eikä makeisia
   o Kouluassa ei myydä virvoitusjuomia eikä makeisia
   o Kouluassa ei myydä lainkaan makeita tuotteita
   o Kouluassa ei myydä mitään
   o Myyntipisteissä myydään terveellisiä tuotteita
   o Vähennetään makeita tuotteita kahvilan valikoimasta
   o Rajoitetaan kahvilan aukioloaikoja
   o Ohjataan oppilaata syömään kouluuruaa
   o Koulu tarjoaa terveellisen välipulan
   o Muuta, mitä?

26. Ketkä päätävät koulun linjauksesta?
   Mikäli linjaus on tehty yhdessä, valitse kaikki päätöksen osallistuneet tahot.
   o Kunta
   o Opettajat
   o Oppilaat
   o Vanhemmat
   o Muu taho, mitä?
27. Onko linjaus muuttunut kahden viimeisen vuoden aikana?
   - Kyllä, Jos vastasit kyllä, vastaa kysymykseen 28.
   - Ei, Jos vastasit ei, siirry seuraava kysymykseen 29.

28. Miten ja mistä syystä linjaus on muuttunut?

29. Onko oppilailla lupa käydä ostamassa syötäviä tai juotavaa koululaiseen ulkopuolelta esim. kaupasta tai kioskista?
   - Kyllä, ruokatunnila
   - Kyllä, välitunnila
   - Kyllä, milloin tahansa
   - Ei, ja poistumista pystytään valvomaan
   - Ei, mutta oppilaat kävät siitä huolimatta

30. Mistä oppilaat saavat vettä juodakseen koulupäivän aikana?
    **Voit valita yhden tai useamman vaihtoehdon.**
    - ostamalla juoma-auomaatista
    - koulun käytävillä olevista vedenjuontipisteistä
    - ruokalasta ruokatunnin aikana
    - ruokalasta muillekinkin kuin ruokatunnin aikana
    - vessaan tai puckuhuoneiden hanoista
    - jostain muualta, mistä?

31. Miten koulussanne suhtaudutaan ksytilolipurukumi/-pastillien käyttöön/tarjoontaan kouluaikana?
    **Voit valita yhden tai useamman vaihtoehdon.**
    - Purukumin käyttö on kieltetty johtuen sittemmista
    - Purukumia saa pureskella välitunnila
    - Purukumia saa pureskella ruokatunnila
    - Purukumia saa pureskella milloin tahansa
    - Koulun tarjoaa ksytilolipurukumin ruokalun jälkeen
    - Koulun tarjoaa ksytilolipurukumi/pastillien
    - Koulusta on mahdollisuus ostaa ksytilolipurukumia/-pastilleja
    - Koulussa on ksytilolipurukumi/-pastilliautomatit
    - Muuten, miten?

32. Muita kommentteja ____________________________

33. Päätösmäärä
   Vastaajan tehtävä koulussa ____________________________
   Kouluun puhelinnumero ____________________________
   Kouluun sähköposti ____________________________
Appendix 2. The questions of the School Health Promotion Study questionnaire in Finnish. For translation and validation in English, please contact the author.

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**Koulu terveyskysely 2007**

Sosiaal- ja terveyden

tutkimus- ja kehittämiskeskus

Stakes

Koulu terveyskysely

PL 220

00531 Helsinki

Tietokirjastosta vastaa
Erika Mustika

Minna Piisinkinen

Hei!

Koulu terveyskyselyssä kerätään tietoa koulukokemuksista,
koulujen ja oppilaiden työoloista sekä oppilaiden terveydestä
ja elämäntavoista. Kysely tehdään huhtikuussa 2007 useissa
uuosikurssille. Tuloska käytetään muuten hyvinvoinnin
edistämisessä sekä kouluhyvin ja terveydenhuollon kehittämisessä.

Vastaaminen on vapaaehtoista. Älä kirjoita nimeäsi lomakkoon.
Kysely on nimettömiä ja luottamuksellinen. Tulokset käsittävät vain
tilastollisesti. Lomakkeet suljetaan kirjeena, joka lähettetään
koulusta suljettuna tallennuskeskukseni. Tallennuksen jälkeen
lomakkeet hävitetään.

Jos kysymyksit jäävät askarruttamaan Sinua, keskustele niistä
vanhempasi kanssa tai ota yhteyttä opettajasi tai
koulu terveydenhoitajaan.

Tutkimuksen tulokset valmistuvat syksyllä 2007. Ne julkaistaan
koulu- ja kuntakohdaisesti tutkimuksen tulaisille kunnille sekä
maakuntia- ja lääkintäkohdaisesti netissä verbalilla
info.stakes.fi/koulu terveyskysely.

Huhtikuussa 2007

Minna Piisinkinen

erikoistutkija

---

*Täyttöohjeet*

Lue ensin koko kysymys. Vastaa merkitsemyllä rasti olkean tai sopivinan
valinnoehdon makaiseen ruutuun. Käytä päämääriä lyökyntää (tai koulakirjienkäyttä tai
muutettuun).

Virheet sattuessa älä käytä pyyhekuuma, vaan täytä virheen
merkitseminen ruutu kokonaan ja rastit olkeaa valinnoehdon
ruutuun. Ei ole sellaista virheen kohdalla.

*Virhe:


Oikea

Joidenkin kysymysten jälkeen huomaatetaan, että voit siirtyä suoraan numerolle
ilmotettuun kysymykseen. Tällöin Sinun ei tarvitse vastata välin jälkeen kysymyksiään.

Esimerkki: Jos keskiarvosi olisi 7,2, vastaasi oheiseen kysymykseen näin:

*Mikä olisi keskiarvosi (kaikki aineet)*

viime todistuksessasi?

Sineke reunoa

<table>
<thead>
<tr>
<th>Sinnes reunoa on</th>
<th>viime todistuksessasi?</th>
</tr>
</thead>
<tbody>
<tr>
<td>merkkejä ja numeroita, joita tarvitaan</td>
<td>&lt; 6,5</td>
</tr>
<tr>
<td>lomakkeen optiivissa tallennuksessa</td>
<td>8,0 - 8,4</td>
</tr>
</tbody>
</table>

1659618321
1. Sukupuoli
- poika
- tyttö

2. Syntymävuosi ja -vuosi
- tummi
- 1987 tai aiemmin
- maalis
- 1988
- huhti
- 1989
- touko
- 1990
- kesä
- 1991
- heinä
- 1992
- syys
- 1993
- joulukuu
- 1994 tai myöhemmin

3. Koulutus/oppilaitos
- peruskoulu, 8. luokka
- peruskoulu, 9. luokka
- lukio, 1. vuosikausi
- lukio, 2. vuosikausi
- lukio, 3. vuosikausi

KOUŁUTYÖ

4. Mitä pidät koulunkäynnistä tällä hetkellä? Pidän koulunkäynnistä
- hyvin paljon
- melko paljon
- melko vähän
- en lainkaan

5. Millaiseksi olet kokenut koulutyöön liittyvän työmääränä tämän lukuvuoden aikana?
- jatkuvasti liian sauri
- melko usein liian sauri
- sopiva
- melko usein liian vähän
- jatkuvasti liian vähän

6. Mikä olis keskiarvosi (kaikki aineet) viime toistutukessa?
- < 6,5
- 6,5 - 6,9
- 7,0 - 7,4
- 7,5 - 7,9
- 8,0 - 8,4
- 8,5 - 8,9
- 9,0 - 9,4
- 9,5 - 10,0


- Opiskelutilojes ahtaus
- Melu, kaik
- Supeinä toimintavaruste
- Huono ilmavaihto tai huoneilma
- Lämpötila (luumuu, kynttyys, veto)
- Liikaisuus, pölyisyys
- Epiämäiset työoloitin tai -pöytä
- Huonet sosiaaliyht
- WC, pukeutumis- ja peseyttymis
- Työympäristö
- Kiireisyys
- Väkivaltaallenteet
- Tapaturmaavaara

<table>
<thead>
<tr>
<th>Ei lainkaan</th>
<th>Melko vähän</th>
<th>Melko paljon</th>
<th>Erittäin paljon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opetuksen seuraaminen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Työskentely ryhmässä</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lukijan tai muiden vastaanv. tehtävien tekemiseen</td>
<td></td>
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<tr>
<td>Kokeisiin valmistautuminen</td>
<td></td>
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<tr>
<td>Isäntien vaihde sopivan opiskelutoivan löytämiseen</td>
<td></td>
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<tr>
<td>Omanomaisuutta vaativien tehtävien aloittaminen tai valmiiksi hoitaminen</td>
<td></td>
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<tr>
<td>Kirjoittamista vaativien tehtävien tekemiseen</td>
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<tr>
<td>Lukemista (esim. kirjasta) vaativien tehtävien tekemiseen</td>
<td></td>
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<tr>
<td>Koulutusaineiden kanssa toimeentulamisen</td>
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<tr>
<td>Opettajien kanssa toimeentulamisen</td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th>Aina</th>
<th>Usein</th>
<th>Harvoin</th>
<th>Enkä koskaan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koulussa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korona</td>
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<table>
<thead>
<tr>
<th>Erittäin hyvin</th>
<th>Melko hyvin</th>
<th>Melko huonosti</th>
<th>Erittäin huonosti</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turveldenhointijalta</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lääkäriä</td>
<td></td>
<td></td>
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<tr>
<td>Koulutusjohtajalta</td>
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<tr>
<td>Opettajalta</td>
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<table>
<thead>
<tr>
<th>Ei yhtään</th>
<th>Yhden päivän</th>
<th>2-3 päivää</th>
<th>Yli 3 päivää</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sairauden takia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plaaniamisen tai tuesta osoittuen takia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muiden syistä</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th>Ei juuri koskaan</th>
<th>Muutaan mannaan kuussa</th>
<th>Muutaan mannaan päivänä viikossa</th>
<th>Lähdes päivityin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunnen hukkuvan kehityshin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunteen, että opinnoitaman olisi enää merkitystä</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minulla on riittämättömyydet tunteita opinnoissani</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

KOULUKIUSAAMINEN

Kiusaamisella tarkoitetaan tässä sitä, kun toinen oppilaan tai ryhmän oppilaatannan tai tekee epämiellyttäviä asioita joillekin oppilaalle. Kiusaamista on myös se, kun oppilasta kiusaamisessa toistuvasti tavalla, josta hän ei pidä. Kiusaamista ei ole se, kun kaksi suunnilleen samaa kahvasta oppilasta riitelyvät.

14. Kuinka usein Sinuun on kiusattu koulussa tämän LUKUKAUDEN aikana?

- useita kertoja viikossa
- noin verran viikossa
- harvemmin
- ei lainkaan

15. Kuinka usein Sinulla on osallistunut muiden oppilaaiden kiusaamiseen tämän LUKUKAUDEN aikana?

- useita kertoja viikossa
- noin verran viikossa
- harvemmin
- ei lainkaan
16. Jos sinua on kiusattu tai olet osallistunut mulleen oppilaiden kiusaumiseen tämän LUKUVUODEN aikana, onko tilanteesta puuttuttu koulun aikuisten toimesta?
   □ ei  □ kyllä

   TERVEYS

17. Mitä miettii olet terveydentilastasi?
   Onko se
   □ erittäin hyvä
   □ melko hyvä
   □ keskinäisesti
   □ melko tai erittäin huono

   Harvoin
   □ ei
   □ haluaisin kertoa
   □ haluaisin poistua
   □ haluaisin miettiä

   Noin kerran
   □ ei
   □ haluaisin kertoa
   □ haluaisin poistua
   □ haluaisin miettiä

   Nein
   □ ei
   □ haluaisin kertoa
   □ haluaisin poistua
   □ haluaisin miettiä

21. Kuinka hyvin koulussa terveydenhuolto toi-
   mällä silloin, kun oppilaat haluavat keskustel-
   la henkilökohtaisista asioistaan (esim. seksi, 
   masennus)? Oletko siihen
   □ erittäin tyytyväinen
   □ melko tyytyväinen
   □ melko tyytyväinen
   □ erittäin tyytyväinen

22. Jos jostakin syystä haluaisit mennä koului
   läänä, terveydenhoitajan, kuraattorin tai
   psykologin vastaanotolle, miten helppo sin-
   ne on mielestäsi päästä? Vastaa joka koht-
   taan.
   Erinomainen
   □ erittäin helppo
   □ helppo
   □ vaikea
   □ erittäin vaikea

   Melko
   □ erittäin helppo
   □ helppo
   □ vaikea
   □ erittäin vaikea

23. Pituus ja paino (merkitse selkein numeroin)
   Pituus  
   □ cm

   Paino  
   □ kg

   MIELIALA

Seuraavat kysymykset käsittelevät mielillään erila-
   sia piirtelöitä. Vastaabankin kysymykseen siten, 
   millaiseksi tunnelissasi tähän. Valitse kustakin kysymyk-
   sestä vain yksi vaihtoehto. Joku kysymys voi tuntua
   Sinusta yllättävältä. Toivomme kuitenkin, että vastaat
   kaikkiin kysymyksiin.

24. Mielilläsin on mielivaloja?
   □ mielilläsin on melko valoisia ja hyvä
   □ en ole alakuntoinen tai surullinen
   □ tunnen ienön alakuntoisesti ja surulliseksi
   □ olen alakuntoinen jatkuvasti enää pitäisi siitä
   □ olen niin masentunut ja alavireinen, etten
   □ enää

25. Miten suhtaudut tulevaisuuteen?
   □ suhtaudun tulevaisuuteeni toiveikkaasti
   □ suhtaudun tulevaisuuteeni toivoaamuista
   □ tulevaisuus tuntuu minusta mello masentavaan
   □ minusta tuntuu, ettei minulla ole tulevaisus-
   □ tulevaisuus minusta toivottomasta, enää
   □ jaka uokia, että asiat muuttuisivat parempaan pään

5955618324
26. Miten katsovat elämäsi sujuuneen?
☐ olen elämässäni onnistunut huomattavan usein
click on button
☐ en tunne epäonnistuneena elämässä
☐ minusta tuntuu, että olen epäonnistunut pyrkimyksissäni tavallista useammin
☐ elämäni on tihin saakka ollut vain sarja epäonnistumisia
☐ tunnen epäonnistuneena täydellisesti ihmisenä

27. Miten tyytyväiseksi tai tyytymättömäksi tunnet itseä?
☐ olen varsin tyytyväinen elämääni
☐ en ole erityisen tyytyväinen
☐ en nauti asioista samalla tavalla kuin ennen
☐ minusta tuntuu, etten saa enää tyytyväisyttä puri mäistään
☐ olen täysin tyytyväinen kaikkeen

28. Minkälaisena pidät itseäsi?
☐ tunnen itseeni melko hyväksi
☐ en tunne itseäni huonoksi ja arvottomaksi
☐ tunnen itseeni huonoksi ja arvottomaksi melkein aina
☐ tykkään tunnen itseeni arvottomaksi melkein aina
☐ olen kerta kaikkiaan arvoton ja huono

29. Osako Sinulla pettymyksen tunteita?
☐ olen tyytyväinen itseeni ja suurintakaisi
☐ en ole pettynyt itseeni suhteen
☐ olen pettynyt itseeni suhteen
☐ minua ihottaa oma itse
☐ vihaan itetäni

30. Miten suhtaudut vieraitten ihmisten tapaamiseen?
☐ pidän ihmisten tapaamisesta ja juttelemisesta
☐ en ole menettänyt kunnioitustasi muihin ihmisin
☐ teitit ihmiset eivät edäli kunnosta minua niin paljon kuin ennen
☐ olen menettänyt muistanne sekä tunnette toisia ihmisiä kohtaan
☐ olen menettänyt muistannekset muihin ihmisiin, enkä välttä heistä lainkaan

31. Miten koet päätösten tekemisen?
☐ erilaisien päätösten tekeminen on minulle helppoa
☐ pystyn tekemään päätöksiä samoan kuin ennenkin
☐ varmutena on vähentynyt ja yritän lykätä päätösten tekoa
☐ minulla on suuria vaikeuksia päätösten teossa
☐ en pysty enää lainkaan tekemään ratkaisuja ja päätöksiä

32. Minkälaisena pidät olemustasi ja ulkonäköstäsi?
☐ olen melko tyytyväinen ulkonäköstäni ja olemuksesta
☐ ulkonäköstäni ei ole minua haittaavia piirteitä
☐ olen huoltona siitä, että näytän epäonnistuttavalla
☐ minusta tuntuu, että näytän riittävästi
☐ olen varma, että näytän riittävän ja vastenmietellä

33. Minkälaisessa nukkumisessa on?
☐ minulla ei ole nukkumisessa nikoiluja vaikeuksia
☐ nukumisessa onkin
☐ herätä vaimeni olen paljon väsynempi
click on button
☐ minua haittaa unettomuus
☐ kärsin unettomuudesta, nukkumisvaikeuksista tai liian aikaisen kesän unien herättämisestä

34. Tunneta kohtalosta ja uupumusta?
☐ väsymien on
☐ en väsymästäkään
☐ väsymän syytä ei olen
☐ väsymän syytä olen
☐ en olen väsymästä

35. Minkälainen ruokahalusi on?
☐ ruokahalusi on
☐ ruokahaluseni on
☐ ruokahalusi on
☐ ruokahaluseni on
☐ ruokahaluseni

36. Tuntuuko Sinusta, että tarvitset apua masentuneen tai ahdistuneen miehalta?
☐ kyllä
☐ en osoita sen
☐ eihän

37. Oletko joskus yrittänyt suada apua masentuneeseen tai ahdistuneeseen oloon puhumalla siitä?
Vasta ja oletko kohtaan.

KYLLÄ
☐

EN
☐

8.10.53

30971109_Turun_yliopisto-Valtokirja_Jaakko_Anttila_Laaketiet_ldk situua_18_12_17.indd 90
18.12.2018 8.10.53
38. Oletko joskus hakenut apua joltakin ammatitaittaalta masentuneen tai ahdistuneen mielilaita? Vastaa joka kohdasta.

Kyllä □ □ □ □
En □ □ □ □

Lääkäriltä □ □ □ □
Terveydenhoitajalta □ □ □ □
Psychologilta □ □ □ □
Koulutusaukioriitilta □ □ □ □
Muulta terveydenhuollollisesta ammattilaisesta □ □ □ □
Opettajalta □ □ □ □
Muun alan ammatitaittaalta □ □ □ □

39. Jos olet käynyt lääkärin tai muun terveydenhoitohenkilön vastaanotolla masentuneen tai ahdistuneen mielilaitan, kuinka monta kertaa yhteenä?

□ kerran □ kahdesti □ useita kertoja □ en ole käynyt vastaanotolla näistä syistä

TERVEYSOPETUS

40. Oletko osallistunut tämän LUKUVUODEN aikana terveyttiedon oppitunnille?

□ kyllä □ en

41. Lue seuraavat terveyttiedon opetusta koskevat viitteet huolellisesti. Merkitse se vaihtoehto, joka parhaiten kuvaa mielipidettääsi. Vastaa joka kohdasta.

Täysin samaa mieltä □ □ □ □
Samaa mieltä □ □ □ □
Eri mieltä □ □ □ □
Täysin eri mieltä □ □ □ □

Terveyttiedon opetuksen aiheen kiinnostavat minua □ □ □ □
Olen oppinut terveyttiedon opitunnilla hyödyllistä asiasta terveydestä □ □ □ □
Terveyttiedon tunnelia käsiteltävät asiat ovat vaikuttavat □ □ □ □
Terveyttiedon opetus saa minua pois terveydestä □ □ □ □
Terveyttiedon opetus on liisnyt taitojani ja valmistautunut minua terveydestä □ □ □ □
Olen oppinut terveyttiedon opetukseen myydyt pohtimattomasti terveydenmerkintä laajentuneen yhteiskunnassa □ □ □ □

42. Mitä mieltä olet terveystieto-oppiaineesta?

□ se on yksi mieheltämistä oppiaineista □ □ □ □ □
□ se on yksi mieheltämistä oppiaineista - keskiverto □ □ □ □ □
□ se on yksi mieheltämistä oppiaineista - väistämö □ □ □ □ □

43. Seuraavat viitteet häiritsevat pääteos- siin liittyviä tietoja ja käsittelemääsi. Vasta joka kohdasta.

Oikein □ □ □ □
Viiloin □ □ □ □
En tiedä □ □ □ □

Tapakohtain aiheuttaa huonoa haastattelua □ □ □ □
Niissä sanotun keskustelun vaikutteen □ □ □ □
Vihreänä on paljon vähemmän vaikutusta kuin muut suvutteet □ □ □ □
Nuuksiksen parantaa fyysistä voimakkuutta suoraan □ □ □ □
Suuret satupitiotteet haluaisin juomista heikkentää muihin ja vaikuttaa oppimaan □ □ □ □
Alkoholijuonon haitallisuus on käsiteltävä ainoastaan 18-vuosieläjä □ □ □ □
Sama miellet alkoholiin nostaa yhtä paljon samapainoisena raisuna ja miehen terveyden alkoholipitoisuutta □ □ □ □

44. Seuraavat viitteet häiritsevat seksuaalisuuteen liittyviä tietoja ja käsittelemääsi. Vasta joka kohdasta.

Oikein □ □ □ □
Viiloin □ □ □ □
En tiedä □ □ □ □

Keukukustien alkamisen on merkki siitä, että tyttö on tuolloin raukaaksi □ □ □ □
Ehdot yläluokinnasta vain kondomi suojaa sukupuolitunnasta □ □ □ □
Sukupuolitunnut on jokaisen täysin oikea □ □ □ □
Koti tai rakkausaika ei voi tulla raukaaksi ennen kuin asiantuntijat näkivät □ □ □ □
Mies ei voi tuolloin raukaaksi luottaa tietämään tarkan □ □ □ □
Siemensbyöjänpäivän alkamisen on merkki siitä, että poika on tullut sukukypsyneeksi ja voi siittää lapsia □ □ □ □
Kuolemantuntieeskuus voi aiheuttaa hengellistä turhaa □ □ □ □
Kerran sairaanjuustu sukupuolitunnut ei voi tuolloin raukaaksi □ □ □ □
Sairaan H-linjan henkilö ei voi tuolloin raukaaksi □ □ □ □
SEKSUAALITERVEYS
Seuraavat kysymykset eivät ehkä ole useimmille tekisi ajankohtaisia. Vastaavallaohjelmissa olevan ohjeen mukaan voit siirtyä niiden kysymysten ohi, jotka eivät koskaan.

45. Seurusteletko nykyisin VAKITUISESTI?
   □ kyllä  □ en

46. Oletko koskaan tehnyt seuraavia asioita?
   Vastaa joka kohtaan.
   □ Kyllä  □ En
   Suahellar miellet
   □ hyvät
   □ huonot
   □ muut

47. Oletko ollut sukupuolihynynä?
   □ en (siirry kysymykseen 51)
   □ kyllä, kansion kertaa yhteensä
     □ kerran
     □ 2-4 kertaa
     □ 5-9 kertaa
     □ 10 kertaa tai useammin

48. Kuinka usein olet ollut yhdyneissä viimeksi kuluneen KUUKAUDEN aikana?
   □ en kertaan
   □ kerran
   □ 2-3 kertaa
   □ neljän kertaa tai useammin

49. Kuinka monen kumppanin kanssa olet ollut sukupuolihynynä?
   □ yden
   □ kahden
   □ kolmen tai neljän
   □ viiden tai useamman

50. Mitä ehkäisymenetelmää käytitte VII-
MEISSIMÄSSÄ yhdyneessä?
   □ ei mitään
   □ kondomia
   □ e-pilléreitä
   □ kondomia ja e-pilléreitä
   □ jotain muita menetelmiä

51. Ajattele mahdollista seksuaaliterveyteen liittävää käytäntymistäsi tulevaisuudessa. Kuinka helppoa tai vaikeaa sinulle olisi
   Erittäin
   Melko
   Melko
   Erittäin
   Puhaa avoimesti seksisä pois-työntyvää kanssa
   Hänkää kondomi
   Ehdtattaa pois-työntyvää kondomin käyttöä
   Vaatia pois-työntyvää kondomin käyttöä yhdyneessä
   Käyttää kondomi oikein
   Kieltäytyä sellaisesta seksuaalikäytäntömistä, jota et halua
   Varata aika lääkärille tai terveydenhoitajille seksuaaliterveyteen liittyvissä asiissa

Tytöille (pojat siirtyvät kysymykseen 54)

52. Oletko käyttänyt jälkiekäisyä?
   □ en tiedät, mitä jälkiekäisy on
   □ en ole käyttänyt
   □ kyllä, kansion kertaa yhteensä
     □ kerran
     □ kaksi kertaa
     □ kolme kertaa

53. Käyttätkö nykyisin ehkäisypilleireitä?
   □ en  □ kyllä

TUPAKOINTI

54. Miten helppoa ikäistesi on nykyisin ostaa tupakkaa kotiisi lääkärauosta, kioskeista, huoltoasemilla tai automaatteista?
   □ erittäin helppaa
   □ melko helppaa
   □ melko vaikeaa
   □ erittäin vaikeaa
55. Oletko OSTANUT viimeksi kuluneen KUUKAUDAEN aikana tupakkaa?

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<th>En</th>
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Mistä ostit? Vastaa joka kohtaan.
Kuinka monta savuketta, pilpullista ja sikaria olet pohtinut yhteensä tähän mennessä?

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<th>Kyllä</th>
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56. Oletko SAANUT tupakkaa viimeksi kuluneen KUUKAUDAEN aikana jollain muulassa tavalla?

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<th>Kyllä</th>
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57. Kuinka monta savuketta, pilpullista ja sikaria olet pohtinut yhteensä tähän mennessä?

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58. Mikä seuraavista vaihtoehtoista kuvaa parhaiten NYKVISTÄ TUPAKOINTIA-SI?

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<table>
<thead>
<tr>
<th>En kaan</th>
<th>Silloin</th>
<th>Joka päivä</th>
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<table>
<thead>
<tr>
<th>Koulutarkennus</th>
<th>Koulutus, koulutuksella</th>
<th>Koulutus, koulutuksella aikana</th>
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<tbody>
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60. Onko tupakointi sallittua siinä koulussa, joota käyt?

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61. Miten tarkkaan oppilaiden tupakointirajoituksia valvotaan koulussasi?

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62. Tupakoivatko opettajat tai muu henkilö, kunta koulurakennuksessa tai koulun alueella?

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63. Ovatko vanhemmat tupakoineet Sinun elin-aikana?

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<thead>
<tr>
<th>Äiti</th>
<th>Isä</th>
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64. Oletko koossa kokeillut nuuskaamista?

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65. Nutsaatko nykyisin?

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66. Miten helppoa ikääntesi on nykyisin ostaa KESKIOLUTTA TAI SIDERIA kotisä lähiapoistoa, kioskeista tai huoltosemittaa?

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4418618327
67. Kuinka usein kaiken kaikkiaan käyttät alkoholia, esimerkiksi puoli pulloa keski-olutta tai enemmän?

☐ Kerran viikossa tai useammin
☐ Pari kertaa kuukaudessa
☐ Noin kerran kuukaudessa
☐ Harvemmin
☐ En käytä alkoholi-juomia (siirry kyseiseen 70) 

68. Kuinka usein käytät alkoholia TOSI HUMAAN as??

☐ Kerran viikossa tai useammin
☐ Noin 1-2 kertaa kuukaudessa
☐ Harvemmin
☐ En koskaan 


Kyllä  Ei

☐ Hän itse alkosta
☐ Hän itse kaupasta
☐ Hän itse käyttäen liikaa tai tarjosi
☐ Vanhemmat saivat rankan hakivat tai tarjosi
☐ Otta kotona
☐ Kaverit hakivat tai tarjosi
☐ Joku tuntiainen hankki haki tai tarjosi
☐ Ulkomailta tai laivalla

70. Tiedätkö tutvusties joukossa Jonku, joka viimeksi kuluneen VIUDEN aikana olisi kokeillut huumaavia aineita (hasisita, tinneri tai muuta huhkilattavaa, lääkkeitä, joista saa humalan, tai muita vastaavia aineita)?

☐ En tiedä kotitalon
☐ Tiedän yhden naon
☐ Tiedän 2-5 naota
☐ Tiedän useampia kuin 5 naota

71. Onko Sinulle viimeksi kuluneen VIUDEN aikana tarjottu huumaavia aineita SUOMESSA?

☐ Ei
☐ Kyllä, kuka tarjosi?
☐ Ystävät tai tuttavat
☐ Vapaa-ajat vanemmat heilkotit


☐ En koskaan
☐ 2-4 kertaa
☐ 5 kertaa tai useammin

Häiristät jotain huumaavaa aineetta (tinneri, liimaa, tms.) päätyykeisessä

☐ Alkoholia ja lääkkeitä yhdessä
☐ Lääkkeitä (rauhottavia, uusi tai siirtyvää lääkkeitä, ilman alkoholia)
☐ Päätyykeisesä
☐ Eiktaasia
☐ Sobutexia
☐ Heroïinia, kokainia, amfetaminiä, LSD-tä tai muita vastaavia huumeita

73. Muistelee viimeksi kuluneita 30 PÄIVÄÄ.
Kuinka monta kertaa olet tuona aikana käyttänyt HUUMAavia AINEITA (esim. tinneriä, liimaa, lääkkeitä, alkoholia ja lääkkeitä yhdessä, hasista, ekstaasia, substanssi, heroïinia, kokainia, amfetaminiä, LSD-tä)?

☐ En lainkaan
☐ Kerran
☐ 2-4 kertaa
☐ Viisi kertaa tai useammin

74. Millaisiksi arvioit IKEOVERIESI mahdollisuuksia hankkia huumeita, esimerkiksi matrikua tai hasista, OIMALLA paikkakunnallasi?

☐ Erittäin helppoa
☐ Melko helppoa
☐ Melko vaikeaa
☐ Erittäin vaikeaa

75. Mitä mieltä olet seuraavasta väitteestä? "Matrikunan ja hasien kokeileminen ei ole sen vaarallisempaa kuin muutaman olut-pullon juominen."

☐ Työntäin saman mieltä
☐ Samaa mieltä
☐ Ei mieltä
☐ä

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MUUT TERVEYSTOTTUMUKSET

77. Kuinka usein harrastat urheilua tai liikutaa vapaa-ajan käsittäen POULEN TUNNIN ajan?

80. Mikä seuraavista vaihtoehtoista parhaiten kuvaa perheesi ateriolintia ilta-ovin yllällä tai iällalla?


82. Mikä seuraavista vaihtoehtoista parhaiten kuvaa koulurukkailuasi?

83. Mitä aterianosia yleensä syöt kouluruokalla?

84. Mitä MUUTA kuin koulurukkailassa tarjottua ruokaa syöt yleensä koulussa koulurukkon aikana?

79. Kuinka usein syöt aamupalaa (muutakin kuin vain kahvia, mehua tai muita juomia) koulurukon aikana?

Harvemmin 1-2 kerta viikossa 3-5 kertaa viikossa

<table>
<thead>
<tr>
<th>Hedelmät/heidelmat sisältöitä</th>
<th>Leipä</th>
<th>Makkeakahvileipää</th>
<th>Lihapiirakkaa, hamppuriita tms.</th>
<th>Makkeisa</th>
<th>Jäätelöitä</th>
<th>Sokeroilua virvoitsijaemaa</th>
<th>Vähäkalorisista virvoitsijaemaa</th>
<th>Jotain muita</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

- Kyllä
- Ei

Koulun välipalatarjoilusta
Koulussa olevista automaatista
Kaupasta, kioskista tai huolto-asemalta
Tuon välipalat kotona

86. Kuinka usein olet juonut tai syönyt seuraavia viimeksi kuluneen VIikon (7 pv) aikana? Vastaa joka kohtaan.

<table>
<thead>
<tr>
<th>En kertaankaan</th>
<th>1-2 päivinä</th>
<th>3-5 päivinä</th>
<th>6-7 päivinä</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sokereointuja virvoja, tuusia</td>
<td></td>
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<tr>
<td>Vähäkalenteria, virvoitusjuomia</td>
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<tr>
<td>Makeisia</td>
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<tr>
<td>Sekkista</td>
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<tr>
<td>Tuoreita vihanneksia, salaatia</td>
<td></td>
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<tr>
<td>Hedelmäiä, marjoja</td>
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<tr>
<td>Ramkaaperoneisto</td>
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<td></td>
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<tr>
<td>Perunamatoja tms.</td>
<td></td>
<td></td>
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<tr>
<td>Hupparilaisia, hot dogeja tms.</td>
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<tr>
<td>Maksaavat kalvileipäitä</td>
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<tr>
<td>Pizzaa</td>
<td></td>
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<tr>
<td>Lihapizzakoista, lihasta pastioista</td>
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<tr>
<td>Jääeläisiä</td>
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</table>

87. Mitä miettii olet painostasi?

- Oletko mielestäsä
  - selvästi ylipainoinen
  - itseman ylipainoinen
  - sopivan painoinen
  - itseman tai selvästi alipainoinen

88. Mihin aikaan tavallisesti menet mukkumaan koulupäivinä?

- noin 21.00 tai aikaisemmin
- noin 21.30
- noin 22
- noin 22.30
- noin 23
- noin 23.30
- noin 24
- noin 24.30
- noin 01
- noin 01.30 tai myöhemmin

89. Kuinka usein harjaat hampaasi?

- en koskaan
- noin kerran viikossa tai harvemmin
- noin 2-3 kertaa viikossa
- noin 4-5 kertaa viikossa
- noin kerran päivässä
- useampikin kertoja päivässä

KOULUTAPATURMAT

90. Onko Sinulle tämän LUKUVUODEN aikana sattunut koulussa tai koulutarkalla tapaturma, joka on edellyttänyt lääkkeerän tai terveydenhoitajan vastaannota käyntiä?

<table>
<thead>
<tr>
<th>Ei kertaakaan</th>
<th>Kerran kertaan</th>
<th>Kaksi kertaa tai useammin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Välitunnilla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liikutusmulla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tekstiili- tai teknisen työn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tuotilla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muralia tuotilla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Koulumatkalla</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
92. Onko Sinulle viimeksi kuluneen 12 KUU-KAUDEN aikana tehty seuraavia asioita?
Vastaa joka kohtaan.
Kyllä Ei

- Vanastettu tai yritytety varastaa
  jostain käytännöllä väkivaltaa tai
  ulkomaalalla sillä
- Muuten varastettu jostain
- Uhan vahingoittaa
  ruumiillisesti
- Käytä ruumiillisesti kirppupaasi
  kuten lyöty, poikkiin tai käytetty
  jostain asetta

RAHAPELIIT

93. Kuinka usein pelaat rahapelejä?
- päivittäin tai lähes päivittäin
- 1-3 kertaa viikossa
- 2-3 kertaa kuukaudessa
- verran kuukaudessa tai harvemmin
- en ole pelannut viimeiseen vuoden aikana

KOTI JA YSTÄVÄT

94. Onko Sinulla tällä hetkellä todella läheis-
  tä ystäviä, jonka kanssa voit keskustella
  luottamuksellisesti lähes kaikista omista
  asioistasi?
- ei ole läheisiä ystäviä
- on yksi läheinen ystävä
- on kaksi läheistä ystäviä
- on useampia läheisiä ystäviä

95. Tuntevatko vanhempiasi useimmat ystä-
  vää?
- molemmat tuntevat
- vain isä tuntee
- vain äiti tuntee
- eikä kumpikaan tunne

96. Tietävätkö vanhempiasi, missä vietet per-
  jantaita ja lauantaita?
- lentävät aina
- lentävät josko
- useimmiten eivät tiedä

KIITÄMME VASTAUKSISTASI!
Jos kysymyksiä järjestätkää askarrutamaan miettää, keskustelee niistä
vanhempiesi tai muun aikuisen kanssa. Voit myös ottaa yhteyttä
opettajasi, terveydenhoitajaan, koulussa psykologin tai kurssattoriin.
Appendix 3. Questions and scoring of response alternatives from School Health Promotion study that suits theoretical framework of new conceptual model of oral health inequalities.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Response alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School-level socioeconomic position</strong></td>
<td></td>
</tr>
<tr>
<td>1. During the past year, have your parents been unemployed or laid-off?</td>
<td>1: neither of my parents 2: one of my parents 3: both parents</td>
</tr>
<tr>
<td>2. Who are the adults you live with? Choose the option that best describes your situation.</td>
<td>1: my mother and my father 2: my mother and my stepfather 3: my father and my stepmother 4: only my mother 5: only my father 6: my husband/my wife 7: other carer</td>
</tr>
<tr>
<td>3. What is the highest educational level your mother has achieved?</td>
<td>1: University, university of applied sciences or other higher education institution 2: Occupational studies in addition to upper secondary school or vocational education institution 3: Upper secondary school or vocational education institution 4: Comprehensive school or primary school</td>
</tr>
<tr>
<td>4. What is the highest educational level your father has achieved?</td>
<td>1: over 35€ 2: 18-35€ 3: 10-17€ 4: 7-9€ 5: 3-6€ 6: under 3€</td>
</tr>
<tr>
<td>5. On average, how much spending money do you have per week (pocket-money or other income you can use at your own discretion)?</td>
<td></td>
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</tbody>
</table>

**Social environment**

1. Is smoking allowed in your school? | 1: Forbidden 2: Allowed in certain areas 3: Allowed without restrictions |
2. In your school, how closely are the smoking restrictions concerning pupils monitored? | 1: Very closely 2: Fairly closely 3: Hardly at all |
3. Do the teachers or other personnel smoke in the school or on school premises? | 0: I don't know 1: No 2: Yes, sometimes 3: Yes, daily |

**Chance to buy alcohol nearby**

1. How easy is it nowadays for people your age to buy beer or cider at convenience stores, mini markets or petrol stations near your home? | 1: Very difficult 2: Fairly difficult 3: Fairly easy 4: Very easy |

**Chance to get drugs nearby**

1. During the past year have you been offered narcotic substances in Finland? | 1: No 2: Yes |
2. In your opinion, what opportunities does a person your age have to obtain narcotics, such as marijuana or hashish, where you live? | 1: Very difficult 2: Fairly difficult 3: Fairly easy 4: Very easy |

**School health services**

**Health services in school**

1. If you have other problems than those related to school work, how easily can you get help for them from school nurse, physician, social worker, psychologist or teacher? | 1: Very easy 2: Fairly easy 3: Fairly difficult 4: Very difficult |

**Access to health services**

1. How well is your school's health services working when pupils want to discuss their personal subjects with someone (for example sex, depression)? Are you... | 1: Very satisfied 2: Fairly satisfied 3: Fairly unsatisfied 4: Very unsatisfied |
2. If you wanted to visit your school nurse, physician, social worker or psychologist, how easy would it be to get an appointment? | 1: Very easy 2: Fairly easy 3: Fairly difficult 4: Very difficult |

**School environment**

**Stress from school**
<table>
<thead>
<tr>
<th>Question</th>
<th>1: Very much</th>
<th>2: Rather much</th>
<th>3: Rather little</th>
<th>4: Not at all</th>
<th>1: Hardly ever</th>
<th>2: A few times a month</th>
<th>3: A few days a week</th>
<th>4: Almost daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. At the moment, how do you like going to school?</td>
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<tr>
<td>2. Have you had any of the following feelings relating to school work?</td>
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<tr>
<td>a) I feel overwhelmed by school work</td>
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<tr>
<td>b) It feels that there is no point in studying</td>
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<tr>
<td>c) I feel inadequate at my studies</td>
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<tr>
<td>Support from teachers and/or school</td>
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<tr>
<td>1. Select the alternative that best describes your opinion.</td>
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<tr>
<td>a) Teachers encourage me to express my opinions in class</td>
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<td>b) Teachers are interested in how I am doing</td>
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<tr>
<td>c) My teachers expect too much from me at school</td>
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<tr>
<td>d) Teachers treat us fairly</td>
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<td>2. If you have difficulties at school or with your school work, how often do you get help at school?</td>
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<tr>
<td>Peaceful school environment</td>
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<tr>
<td>1. Select the alternative that best describes your opinion:</td>
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<tr>
<td>a) The classroom discipline in my class is good</td>
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<tr>
<td>2. In your school, do the following conditions disturb your school work?</td>
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<tr>
<td>a) Restless working environment</td>
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<tr>
<td>b) Hurry</td>
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<td></td>
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<tr>
<td>Physical hazards in school</td>
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<tr>
<td>1. In your school, do the following conditions disturb your school work?</td>
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<tr>
<td>a) Crowded teaching spaces</td>
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<td>b) Noise, echoes</td>
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<tr>
<td>c) Inappropriate lighting</td>
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<td>d) Insufficient ventilation or bad indoor air</td>
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<td>e) Temperature (hot, cold, draft)</td>
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<td>f) Dirt, dust</td>
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<td>g) Uncomfortable chairs or desks</td>
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<td>h) Inadequate facilities (toilets, changing rooms, showers)</td>
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<tr>
<td>i) Restless working environment</td>
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<tr>
<td>Physical hazards in school</td>
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<td>2. In your school, do the following conditions disturb your school work?</td>
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<tr>
<td>a) Restless working environment</td>
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<td>b) Hurry</td>
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<tr>
<td>Eating circumstances at school</td>
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<td>1. What is the mealtime environment at your school like, in general?</td>
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<td>a) The mealtime environment is pleasant</td>
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<td>b) The mealtime environment is noise-free</td>
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<td>The queue moves fast</td>
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<td>d) There are adults eating with us in the lunch room</td>
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<tr>
<td>Eating school meal</td>
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<td>1. How often do you brush your teeth?</td>
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<td>2. Have you had any of the following feelings relating to school work?</td>
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<td>a) I feel overwhelmed by school work</td>
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<td>b) It feels that there is no point in studying</td>
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<td>c) I feel inadequate at my studies</td>
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<td>Eating school meal</td>
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<td>1. How often do you brush your teeth?</td>
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</table>

**Appendices**
## Appendices

1. Which of the following alternatives best describes your school lunch eating?

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Most often I eat the hot school lunch offered by school</td>
</tr>
<tr>
<td>2</td>
<td>Most often I eat the bread, drink and/or salad offered by school</td>
</tr>
<tr>
<td>3</td>
<td>Most often I don't eat school lunch offered by school</td>
</tr>
</tbody>
</table>

### Eating unhealthy snacks during school day

1. What do you eat or drink at school apart from school meals served in the lunchroom? a) cookies b) meat pies or hamburgers c) sweets d) ice cream e) sugar-sweetened beverages f) low-calorie beverages

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>Yes</td>
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</tbody>
</table>

### Eating unhealthy snacks overall

1. During the past week (7 days), how often have you eaten or drunk the following? a) sugar-sweetened beverages b) low-calorie beverages c) sweets d) chocolate e) chips f) crisps g) hamburgers or hot dogs h) cookies i) pizza j) meat pies k) ice cream

<table>
<thead>
<tr>
<th>frequency</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Not once</td>
</tr>
<tr>
<td>2</td>
<td>1-2 days</td>
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<tr>
<td>3</td>
<td>3-5 days</td>
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<tr>
<td>4</td>
<td>6-7 days</td>
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</tbody>
</table>

*) If there were multiple items (a, b, c,...k) within questions total means for the questions were calculated from item-wise means.