Breakfast and school lunch as pathways for enhancing educational outcomes and promoting public health

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Preface

> Across the developed world, and across the political spectrum, everybody agrees about the importance of education. It's good for society, which needs the contributions and economic productivity (…) of a skilled workforce, and it's good for individuals. People with more education (…) are less likely to be unemployed, more likely to be healthy, less likely to be criminals, more likely to volunteer their time and vote in elections (1, p.103, lines 1-8).

These lines are from the book *The Spirit Level* by Wilkinson and Pickett (2). What I find highly interesting is they write that such an idea is something everybody agrees with, and I argue that it is also applicable to the link between diet and education. In Norway, this relationship is often based on anecdotal evidence. We often use common sense, arguing for the importance of diet and nutrition in performance at school and at work. We feel that we are more able to focus and perform when we have regularly healthy meals. However, there is a lack of research in this area in the Norwegian educational context, and we also face challenges relating to diet, overweight, and obesity, social health inequalities, and the achievement gap.

The work in this thesis describes a three-year research process contextualizing breakfast and school lunch and the associations between education and public health in Norway. What I am truly interested in is how we can work to improve the lives and foundations of young people and ultimately their health later and for public health in general. I hope that the findings in this thesis can contribute to informing future research and guiding policymakers working with educational progress and public health promotion, in which healthy diets play an important role.

I am grateful for this experience, which has been challenging and enriching, both professionally and personally. Several key persons have contributed to making this work possible. I thank my main supervisor, Frøydis Nordgård Vik, not only for her professional expertise and insightful discussions but also for her moral support. I want to thank my co-supervisors, Nina Cecilie Øverby and Berit

Johannessen, for their valuable contributions during the past three years. I have truly learned a lot from all of you. I have also had the privilege of working with other brilliant researchers who have participated with important work in the papers in this thesis. Thank you for your contributions, Mary Barker, Polly Hardy-Johnson, Marissa LeBlanc, and Dorte Ruge. Likewise, I owe all the participants and schools included in the School Meal Project and the Progress in International Reading Literacy Study a great thanks.

This process would not have been possible without the support of my good friends, my Ph.D. colleagues, and, of course, my former colleagues in Iveland and NAV-jentene, who cheered me on initially in this process. My sincerest thanks go to Eirunn and Hilde for their help, especially at the beginning of my Ph.D. studies. Thank you, Henriette, for always having my back and for being my private IT support. Finally, thank you, May Linn and Tobias, not only for putting up with living with me during the different phases of my Ph.D. journey, but also for your tremendous support.

Thank you!

Kristiansand, March 2022
Kristine Engebretsen Illøkken

Summary

A healthy diet is fundamental to good health and optimal cognitive functioning. Promoting a healthy diet early in life is important, as health-promoting efforts at an early age can boost adult health later on. The food environment plays an important role in influencing eating behaviors, and the school is viewed as an important setting for health promotion efforts. Many young people spend much of their time at school, where they are ideally learn to be educated and about healthy lifestyles. As healthy diets contribute to good health and optimal cognitive abilities, in turn affecting students' school achievements and subsequent labor participation later in life, it is proposed that promoting breakfast and school lunches may benefit students' cognitive performance and academic achievements. Although this relationship is clear based on previous international evidence, in Norway, it is mainly based on anecdotal indications. If breakfast and school lunches are contributors to performance in education in Norway, more research is needed to enrich this research area and to inform policymakers in the Norwegian context.

Breakfast and school lunches are considered home responsibilities in Norway, as it is common for children and adolescents to have breakfast at home before school starts and to bring packed meals for their lunch at school. A challenge in this regard is the tendency for young people to adopt unhealthy meal patterns, including a higher intake of unhealthy food, an increased rate of meal skipping, and varying dietary qualities of packed meals; there may also be a stigma associated with packed meals in Norway.

The aim of this thesis was to investigate the potential role of having breakfast and providing free school lunches in educational outcomes and in public health promotion in Norway. This was done by investigating the results of a free school lunch intervention called the School Meal Project (SMP) with the use of quantitative and qualitative methods. The quantitative method examined the effect of free school lunches on the school environment using linear regression (N = 164). The qualitative method included individual interviews (N = 18) with students and teachers. These interviews, in which thematic analysis was applied, aimed to investigate students' experiences with the SMP. Furthermore, by investigating the association between having breakfast at home and reading

literacy. This association was also examined using linear regression, and was based on Nordic samples (N = 17.161). These samples were drawn from a large international reading literacy study called the Progress in International Reading Literacy Study.

The results showed that there was no significant effect of the free school lunch on the school environment. This lack of significant findings might be explained by methodological limitations. The interviews mainly identified positive experiences relating to the SMP. Students and teachers viewed the free school lunch as a social event in which students practiced social skills and made new friends, and they believed that it benefitted students' function at school, their diets, and social equality. The findings might be influenced by the small study sample and self-selection to participate. Furthermore, having breakfast at homeojkj was associated, positively, with reading literacy score. These results are discussed in relation to the potential of breakfast and school lunch as pathways for enhancing educational outcomes and promoting public health.

Although breakfast and school lunches are traditionally viewed as family responsibilities in Norway, this thesis discusses how having breakfast and providing a free school lunch might be beneficial for educational outcomes and public health. Therefore, these meals could also be considered a school domain, highlighting the need to place healthy eating on the school agenda. However, as the studies in this thesis had several methodological limitations, the positive influences of breakfast and school lunches should be interpreted with caution. Future research is needed to clarify the effects of having breakfast and providing school lunches on educational outcomes and public health in Norway.

Summary in Norwegian

Et sunt kosthold er med på å danne grunnlaget for god helse. Et sunt kosthold, sammen med en ellers sunn livsstil, er også en viktig bidragsyter for at barn og unge kommer i best mulig posisjon til å delta i læringsprosessen på skolen. Norske elever spiser vanligvis frokost før de drar på skolen og har med seg matpakke til lunsj. Ansvar for kostholdet har dermed vært plassert i hjemmet og skolen er sett på som en læringsarena. Matmiljøet på skolen utgjør en viktig påvirkning på elevenes kosthold, og har vært gjenstand for politisk debatt i Norge særlig med tanke på servering av skolemåltid. I regjeringsplattformen av 2021 kommer det frem at regjerningen gradvis vil innføre et skolemåltid, som et ledd i folkehelsearbeidet og for å fremme elevenes trivsel og læring. Samtidig trenger vi mer forskning på effekt av frokost og skolemåltid i forhold til skoleprestasjoner og folkehelse i Norge, og betydningen måltidene har for de involverte. Frokost og lunsjvaner er kontekstspesifikt, noe som vanskeliggjør direkte overføring av forskningsresultater utenfor Norge til en norsk sammenheng.

Ambisjonen med denne avhandlingen var derfor å bidra til mer forskning på feltet. Avhandlingens mål var å undersøke hvilken rolle frokost og skolelunsj kan ha for elevenes prestasjoner på skolen og for folkehelse. Tre delstudier ble brukt for å kunne svare til dette målet på ulikt vis.

Den første studien var basert på en intervensjonsstudie hvor målet var å evaluere effekt av et gratis skolemåltid, kalt «skolematprosjektet» på elevens skolemiljø. Denne studien fant ingen signifikante funn, noe som kan skyldes metodiske begrensninger.

I den andre studien ble det gjennomført kvalitative intervjuer blant et utvalg av elever og lærere som var involvert i skolematprosjektet, hvor målet var å undersøke deres erfaringer med skolemåltidet. Disse intervjuene ble gjennomført rett etter skolematprosjektet og en oppfølging fem år senere. Funn fra intervjuene viste at skolemåltidet var viktig for elevenes sosiale miljø, for vennskap og for sosial læring. Videre var skolemåltidet av betydning for kostholdet til elevene, og funnene indikerte at elevene tillærte seg nye sunnere matvaner som varte fem år senere. I tillegg var skolematprosjektet viktig for elevenes funksjon på skolen og

for en følelse av sosial likhet. Samtidig presiseres det at det var et lite utvalg, det var ikke det samme deltakerne begge år, og at de som meldte seg på intervjuene kan ha vært de mest positive.

Den tredje studien undersøkte sammenhengen mellom å spise frokost og leseprestasjoner. Den baserte seg på et utvalg av nordiske elever fra stor internasjonal leserundersøkelse. Resultantene fra denne tverrsnittsundersøkelsen viste en positiv sammenheng mellom det å ha spist frokost hjemme og elevenes leseprestasjoner.

I avhandlingen diskuteres disse funnene som betydningen av det å spise frokost og det å få lunsj på skolen kan ha for elevenes prestasjoner og for folkehelse. Selv om hjemmet tradisjonelt har hatt ansvaret for frokost og lunsj, gir funnene en indikasjon på at disse måltidene også kan ha betydning for hvordan elever presterer på skolen og for folkehelsen i Norge. Dette dokumenterer et behov for å plassere frokost og lunsj på skolens agenda. Funnene må samtidig tolkes i lys av metodiske utfordringer. Det er behov for mer forskning som kan tydeliggjøre mat og måltiders betydning for skoleprestasjoner og for folkehelsen i Norge.

Contents

List of Papers

Paper I

Illøkken, Kristine Engebretsen; Øverby, Nina Cecilie; Johannessen, Berit; Vik, Frøydis Nordgård (2021). Possible effects of a free school meal on school environment: The School lunch Intervention in Norway. *Journal of the International Society for Teacher Education.* 25 (1), 8-20.

Paper II

Illøkken KE, Johannessen B, Barker ME, Hardy-Johnson P, Øverby NC, Vik FN. Free school meals as an opportunity to target social equality, healthy eating, and school functioning: experiences from students and teachers in Norway (2021). *Food & nutrition research, 65,* 10.29219/fnr.v65.7702. Published 2021 Jul 9th. doi:10.29219/fnr.v65.7702.

Paper III

Illøkken, Kristine Engebretsen; Ruge, Dorte; LeBlanc, Marissa; Øverby, Nina Cecilie; Vik, Frøydis Nordgård. Associations between having breakfast and reading literacy achievement among Nordic primary school students. Submitted to *Education Inquiry* on December 3rd, 2021, under review from January 10th, 2022.

List of abbreviations

BMI: Body mass index
CEP: Community Eligibility Provision
CI: Confidence Interval
COREQ: Consolidated criteria for reporting qualitative research
HBSC: Health behavior in school-aged children
HICs: High-income countries
IEA: International Association for the Evaluation of Education Achievement
IRT: Item response theory
LICs: Low-income countries
PIRLS: Progress in International Reading Literacy Study
PISA: Program for International Student Assessment
SES: Socio-economic status
SMP: School Meal Project
TIMSS: Trends in International Mathematics and Science Study
WFP: World Food Programme
WHO: World Health Organization

List of figures and tables

1 Introduction

Health and education are closely linked. Healthy students are suggested to be better learners (3). Healthy behaviors, including healthy diets, physical activity, and sufficient sleep, might provide optimal conditions for adolescents' brain development and learning (4).

The overall aim of this thesis was to investigate the role of having breakfast (at home) and providing free school lunches in students' educational outcomes. The thesis also sought to assess the contributions of these meals to public health promotion. Its focus is adolescents (for the school setting, the term "students" is used). Adolescence is a period in life in which youth go through important developmental phases in their transition toward young adulthood. Health promotion efforts can make considerable contributions to their health, wellbeing, and education outcomes, that later on also might benefit their adult health and employment outcomes (3, 5-8). The Lancet Commission on Adolescent Health and Wellbeing therefore brought attention to the importance of health investments in adolescents, bringing a triple dividend of benefits for them now, in adulthood, and for their future children (6).

In this thesis, the term "educational outcomes" refers to the results of students' learning processes from a public health perspective and the role of having breakfast and providing school lunches in these processes. In school, students ideally learn to be healthy, educated, and engaged citizens (9). A good learning process is important for effective learning, which, in turn, can provide students with the skills and abilities they need to face a society in rapid change (10). Indeed, 21st-century society requires cognitive skills and adaptive expertise from its workforce (10). This is dependent on student factors, such as their emotions, cognitive abilities and motivation, and a good learning environment, which school practitioners are responsible for shaping (10). Although a healthy diet may contribute to providing optimal brain health and learning processes (4), and evidence suggests the great potential for breakfast and school lunches to influence educational outcomes by impacting cognition and academic performance (see, for instance, Lundqvist et al. (11) and Cohen et al. (12)), little attention has been given to the importance of these meals in relation to the educational process in Norway. If breakfast and school lunch are important for

Norwegian students' educational outcomes, then this issue may additionally be considered an opportunity to address important public health challenges in the country given the link between education and health (3).

To understand the role of having breakfast and providing school lunches in educational outcomes and public health, this thesis investigates the effects of and experiences with the School Meal Project (SMP). It also examines the association between having breakfast and reading achievement. The ability to read is an important factor in education and health. Reading competence is a cognitive skill that is essential to achieve educational and employment outcomes, and it has been positively associated with self-reported health, trust, political efficacy, and volunteer work (13, 14). Improvements in reading may thus have educational- and public health benefits.

This thesis will first outline public health challenges relating to *the welfare paradox,* dietary challenges and how public health can be improved, with a special focus on the educational sector and the school food environment (chapter two). Chapter three present breakfast and school lunch policies and practices, as well as how these meals may be related to educational outcomes through influencing cognitive function, academic achievement, and the school environment. Next, it presents the need for more research in this field in Norway, followed by the aims, methods, and results through chapters four to six. In chapter seven, it explores how breakfast and school lunch may be considered pathways for enhancing students' educational outcomes and promoting public health. The methodological considerations are also addressed. Further, this thesis will present the implications for practice and research. Finally, the conclusion is presented in chapter eight, linking the results of this thesis to the need to place healthy eating on the school agenda.

An important remark for the work in this thesis, including the studies covered, is that it was conducted by a Ph.D. candidate with a master's degree in public health, with a focus on free school lunches. In 2017, the Ph.D. candidate published a paper based on the SMP; see Illøkken et al. (15). The SMP was followed up in this Ph.D. thesis and is included in Papers I and II. The Ph.D. candidate also had practical work experience with the Norwegian Labor and Welfare administration (NAV in Norwegian) and in a municipality in which

addressing social inequalities and promoting economic well-being for children and families in low-income households were central. This background is likely to have influenced this thesis, including its theoretical framework, the research process, and the interpretation of the results.

2.0 Public health, diet, and education

In this thesis, public health is understood in line with the World Health Organization's (WHO) definition of the term in 1998. This definition acknowledges the social and political aspects of public health and highlights that people need support from their environments to live healthy lives. This is described in detail in the following:

> Public health is a social and political concept aimed at (…) improving health, prolonging life and improving the quality of life among whole populations through health promotion, disease prevention and other forms of health intervention. A distinction has been made in the health promotion literature between public health and a new public health for the purposes of emphasizing significantly different approaches to the description and analysis of the determinants of health, and the methods of solving public health problems. This new public health is distinguished by its basis in a comprehensive understanding of the ways in which lifestyles and living conditions determine health status, and a recognition of the need to mobilize resources and make sound investments in policies, programmes and services which create, maintain and protect health by supporting healthy lifestyles and creating supportive environments for health (16, p.3, lines 4-14.).

Children and adolescents have a need for, and the right to, healthy food to achieve good health, optimal growth, and learning (4,17,18). Certain structures in the food environment, such as easily available unhealthy foods, contribute to public health challenges, with a risk for overweight, obesity, and lifestyle-related diseases (19). Childhood overweight and obesity are persistent public health problems in Norway (20). People need support from their environment to choose healthy food, as the food environment plays an important role in influencing people's diets (19,21). In this regard, governments, as duty bearers of children's rights, have a key important responsibility in ensuring that all children have access to a healthy food environment (17). The school is a place where children and adolescents should be protected from unhealthy food. They usually eat one or two meals at school, and their cognitive defense against the marketing of unhealthy food might not be fully developed (17,22). Policies on healthy school

food have unique opportunities to influence students' eating habits (19,23). Thus, policymakers in Norway have previously been recommended to strengthen the implementation of school food policies and to introduce meal provision in schools (24). In addition, The United Nations Children's Fund and the UN state that healthy school meals should be provided as a means to support children in reaching their fullest potential (17). In the next section, breakfast and school lunch policies and practices and their potential for influencing educational outcomes will be described after a presentation of other public health and dietary challenges in Norway, first referred to as *the welfare paradox.*

2.1 The welfare paradox

Despite governmental efforts to reduce social health inequalities in Norway and other Nordic countries, these remain major public health challenges (25-27). Such inequalities that apply to Nordic countries are called the welfare paradox (25,26). While social health inequalities are systematic, socially produced differences in health statuses as a result of differences in social groups, for instance, differences in education, employment, and income (28), Wilkinson and Pickett (2) provided another interesting view illustrating the complexity of social health inequalities. The argument is that these inequalities are derived from, not only differences in income and/or health, but also the experienced differences within a population—whether people living in a society feel they are worse or better off than others (2). This is interesting in relation to school lunches, as these have been associated with stigma among students in different ways (explained later; see, for instance (29)). According to Mackenbach (26), the persistence of social health inequalities in welfare countries may be partly due to inequalities in access to health resources and different material and immaterial living conditions. This may indicate that governments fail to make health resources equally available and accessible, which is seen as part of the fundamental right to health (30).

The term "socioeconomic status" (SES) is used to classify social health inequalities within a population. SES is often described as a combination of educational level, occupation, and income, and it characterizes the position of persons in a society (31). In Norway, an increase in relative educational inequality in mortality from years 2000 to 2010 has been reported by Strand et al. (27). Additionally, Norway has an increasing poverty rate and an increasing

number of children living in poor families (32). In 2019, 115.000 children lived in low income households in Norway (32). Given the persistence of social health inequalities (33), and the link between health, education and social factors (see (3) and chapter 2.3.1), the country also faces an increase in the SES–achievement gap, which is related to different learning opportunities between higher- and lower-SES students (34).

Overall, in Norway, there is a need to promote public health, reduce the risk of overweight and obesity, address social health inequalities, and provide young people with equal learning opportunities. A healthy diet might be important in this regard, as as evidence has suggested that breakfast and school lunch in different ways may positively influence health, cognitive function and acadmic performance (see, for instance, Lundqvist et al. (11) and Cohen et al. (12)), which will be desribed in detail later.

2.2 Dietary challenges in Norway

Norwegian dietary guidelines recommend a varied diet including vegetables, fruits, and berries (at least five portions a day), whole grain products, and fish, as well as a limited intake of meat, red meat, processed meat, sodium, and sugar (35). Drawing on these dietary guidelines, estimates from Ungkost 3, a national dietary survey among 9- and 13-year-old adolescents in Norway, showed that the intake of saturated fat, added sugar, and salt in this population was above the recommendations, whereas the intake of fruit, vegetable, and fish was below the recommendations (36). These dietary challenges were confirmed in the Norwegian adapted ‘Health Behavior in School-aged Children’ (HBSC) survey in 2018 (37). This survey documented an insufficient intake of fruits, vegetables, and berries among 50% of children and adolescents in Norway. A negative time trend was likewise observed. Compared to HBSC data from 2014, girls at the age of 11 consumed less fruit and more sweets, and boys skipped breakfast more frequently in 2018 (37). In addition, 15- year-old boys in Norway had a higher intake of sugar than their counterparts in other Nordic countries. Both for Norway and in other Nordic countries, breakfast skipping seemed more common in older age groups. On weekdays, 73% and 75% of 11-year-old Norwegian girls and boys had breakfast, respectively. For the older age groups, 64% of 13-year-old girls and 70% of 13-year-old boys had breakfast during weekdays, whereas the rates were 56% for 15-year-old girls and 62% for 15-year-old boys. The rates

for other Nordic countries were comparable (37). The same tendency for older adolescents to skip breakfast, as well as school lunches more frequently, was also shown in the Ungkost study (36). School lunch skipping was more common among eighth graders than among fourth graders—59% among eighth graders versus 74% among fourth graders (36). In Norway, it is a specific aim to increase the number of adolescents having breakfast; eating breakfast is included as one out of 10 efforts that may reduce the burden of disease and promote public health (38,39).

Norway also faces challenges related to social inequalities in diet. This is documented in Norkost 3, a nationwide dietary survey among 18- to 70-year-old Norwegian men and women. Higher-educated people in Norway had a more favorable dietary profile compared with lower-educated Norwegians (40). Furthermore, the HBSC survey showed that children with a higher SES had a higher intake of vegetables compared with those with a lower SES (37). In addition, The Trøndelag Health Study showed that children, especially girls, who had parents with higher education had healthier dietary habits, with lesser consumption of soft drinks and more frequent consumption of fruits and vegetables (41). The same pattern has been documented in other developed European countries, such as France and Germany (42,43). An explanation for these social inequalities in diet may be that parents need to choose healthy food for their children, which, in turn, is determined by both the affordability and accessibility of food to them (21). It has also been suggested that parents with lower income may prioritize buying food that they know their children like to prevent food waste (44). This may hinder children's food exposure and the opportunity to develop new, possibly healthier, taste preferences (44), underpinning the importance of access to healthy food environments.

Given these dietary challenges, Norway needs to engage in efforts to improve diet among children and adolescents in the country. The following section will address how such efforts can be successful in improving public health.

2.3 How can public health be promoted?

Strategic government policies can improve the food environment, which is one factor that contributes to public health challenges (19). Before policy can be

informed, we need to understand the main determinants of health and how they may be influenced (45).

In 1991, Dahlgren and Whitehead (45) published their well-known *rainbow model*, which explains the main influences on health and opportunities for impacting health at different levels. A point they elaborated on more recently is that lifestyle is determined by the social and economic environments in which one lives (21). The outer part of the model refers to environmental conditions, through the conditions where people live, work and learn, social networks and lifestyle-related factors (see Figure 1). According to Dahlgren and Whitehead (45), the levels of the model can be considered layers, and the arrows illustrate that these layers do not work alone. As an example taken from Dahlgren and Whitehead (45), health education aimed at targeting the individual level be offset in case of negative actions in other levels, such as reduced availability of school lunches (45).

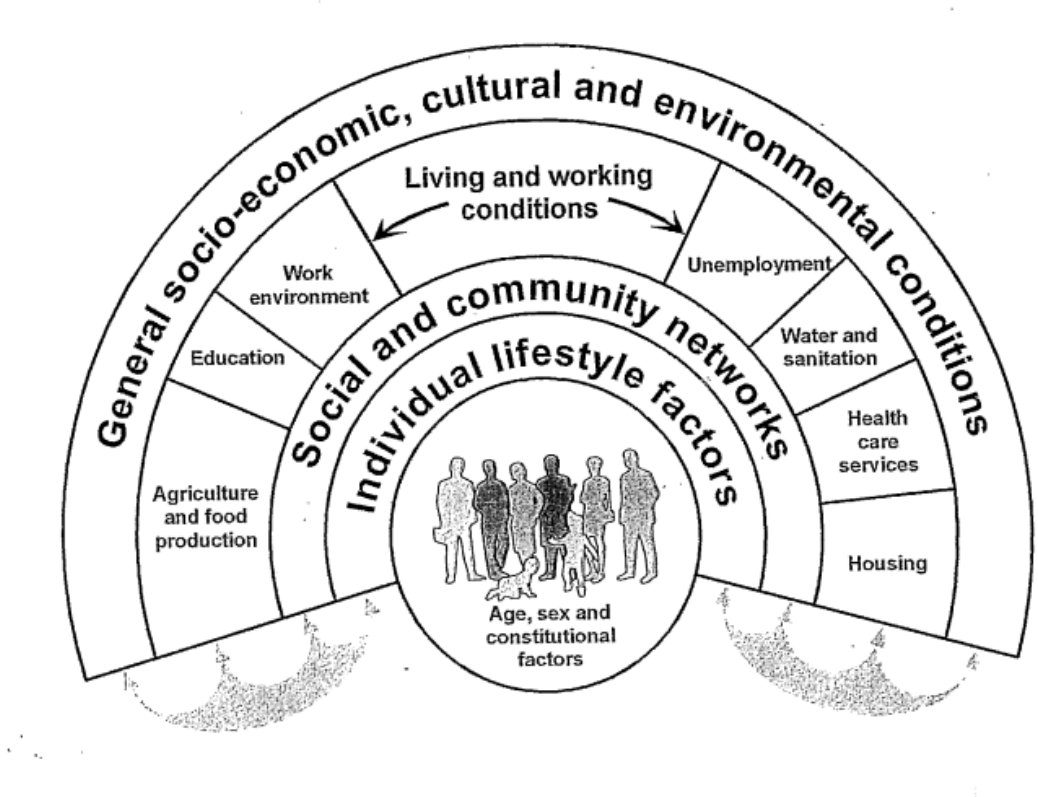

Figure 1: The Dahlgren – Whitehead model of health determinants. Derived from Dahlgren and Whitehead, p. 11 (45).

As shown in the model (Figure 1), the educational sector plays important role in influencing healthy behaviors.

2.3.1 The educational sector as a setting for public health promotion

As previously described, health and education are strongly intertwined. Poor health and diet may influence student cognition, learning, and educational outcomes (3,4). According to Basch (3), there is enough evidence to support the hypothesis that there is a causal reciprocal relationship between health, education, and socio-environmental factors (see Figure 2). Basch (3) argued that health disparities, in which breakfast skipping was included as one of the contributing factors, may limit students' motivation and abilities to learn. Breakfast and school lunch in relation to educational outcomes will be discussed in more depth in later sections. From Figure 2, it is clear that health, education, and social factors are complex and that efforts to promote health can benefit education and social factors and vice versa.

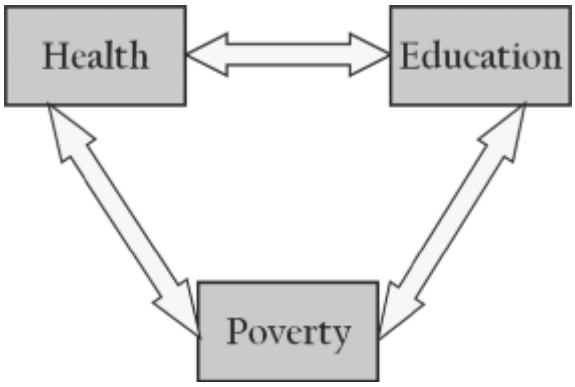

Figure 2. Relationship between health, education and poverty (poverty is used as an example for socio-environmental factors). Retrieved from Basch (3).

Most children and adolescents complete primary school, especially in the richest countries, so interventions in the educational sector have the potential to reach many students simultaneously, regardless of their SES (23,46). In Norway, children and adolescents have the right and obligation to attend elementary school (years 1–7 of schooling) and lower secondary school (years 8–10 of schooling) free of charge. This is based on the principle of equal education for all

children and adolescents (47). Approximately 95% of Norwegian students attend public school (48).

As mentioned in the introduction section, students ideally learn to be healthy, educated, and engaged citizens in school (9); in which cognitive abilities and motivation have an important role as contributing factors for students to finally obtain the skills they need when facing the demands of the society (10). A healthy diet, including breakfast and school lunch, may support them in this process by positively influencing their cognitive function and academic performance (4,11,12). Students' intake of these meals account for nearly 50% of their total energy intake. School lunch alone, both packed and provided, accounts for 23%–29% (49-51). Efforts to promote healthy breakfast and school lunch therefore have great potential to influence students' overall dietary intake and their educational process.

In 2020, Torheim et al. (24) documented the need for improvements in the school food policy environment in Norway. By conducting a comprehensive assessment of the Norwegian healthy food environment policy and comparing it with international best practice, the authors pointed out three main action points that need to be addressed. These included i) the need for a central political leadership concerning public health nutrition, ii) the use of acknowledged tools in nutrition policy (e.g., sugar tax), and iii) the need to strengthen nutrition promotion in the public sector. Although these three action points might be equally important, the focus of this thesis is the third one, as Norwegian students mainly attend public schools, as mentioned earlier. To contribute to making healthy food consumption an easy choice, municipalities in Norway should follow the guidelines for food and meals in schools. Another recommendation is that all municipalities should provide students with school lunches (24). This was acknowledged in the political platform of the Norwegian government called *Hurdalplattformen*, which was formed by the Norwegian Labor Party and the Centre Party in 2021. In this platform, the government aims to provide healthy school lunches as a means to promote public health and student wellbeing and learning (52). However, there is a lack of specific strategies for implementing school lunches, and it is up to each municipality to decide on the type of school meal arrangement to adapt. According to Kolve et al. (53), there is a need for more information on the effects of school meals on students' diet, learning, and health based on a Norwegian

context. More research is also needed to inform policy makers. To further understand the role of diet in education and public health, this thesis will next consider breakfast and school lunches in an educational context.

3.0 Breakfast and school lunch

Worldwide, over 388 million students receive one or several meals at school every day, which is equivalent to one out of two students; one out of five countries have a school policy addressing the food environment and content of meals (54). For low-income countries (LICs) and middle-income ones, the provision of meals in schools is viewed as a crucial safety net. It is important for increasing school participation, especially among out-of-school students, and it may protect them from early marriage and child labor (18,54). For high-income countries (HICs), the provision of meals in school shifted its focus from ensuring adequate nutrition after the Second World War to maintaining food quality and addressing the increasing rate of overweight and obesity, as well as serving as an overall means for achieving student health and well-being (23,55,56).

As stated by the UN World Food Programme (WFP), meal provision in schools is an important investment for building human capital—the sum of the health, skills, knowledge, and experiences of a population. Around 70% of a nation's wealth in HICs and 40% in LICs is attributed to human capital output (54). The WFP has, based on health/nutrition benefits, education benefit, cost of school feeding, and government subsidizes, calculated that a government can receive between three and eight US dollars (=27 and 72NOK) in economic returns for one US dollar spent on the provision of food in schools (57). This is due to improved health, reduced health care expenditure, improved productivity as a result of better education, and reduced disability-adjusted life years (58). Although this calculation is based on data from LICs, newer evidence from Sweden points toward the same direction. Students who received free school lunches during their entire schooling had better health and higher income later in life compared with students who did not receive free school lunch (8). It has also been suggested that free school lunches have the potential to positively impact diet, especially among lower-SES students, suggesting that the provision of free school lunches may reduce social health inequalities (49,59).

Acknowledging all these benefits of meal provision in schools, the WFP states that the COVID-19 pandemic outbreak starting in 2020 is a serious threat to children's health and development globally; many schools closed, thereby taking away students' access to nutritious meals at school (54). Before the pandemic

outbreak, the rate of students receiving meals in schools was increasing; only a few countries worldwide do not implement the national provision of meals in schools (54,60).

3.1 Having breakfast and school lunch: practice and policy

In Norway, students usually have breakfast at home before starting their school day. Some countries in Europe offer breakfast, however, the most common meal to provide is school lunch. Figure 3 illustrates the provision of school lunches in EU member states and additional countries, showing that Norway and Denmark are among the few countries that do not apply national programs for school meal provision (60).

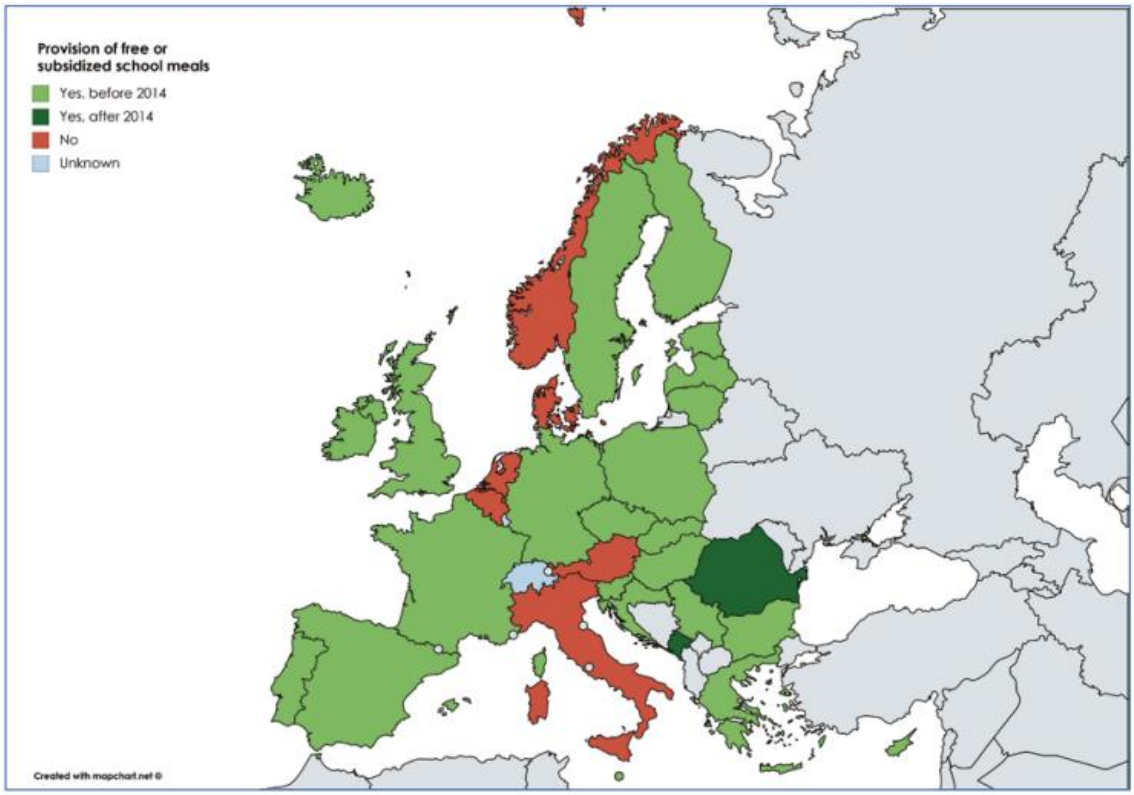

Figure 3. School meal provision (free or subsidized) in 28 EU member states, Iceland, Montenegro, Norway, Serbia, and Switzerland. Retrieved from Boer et al., p.77 (60).

Countries in Europe usually organize their school lunch policy through three different school lunch arrangements. Students either receive universal free school lunches, they may receive school lunch that is partly parent paid and subsidized for children from low-income families, or they have to bring packed lunch to school (56,60-63). Universal free school lunches are offered for students in

Estonia, Finland, and Sweden (56,64). Students in the first to third grades in primary school in Scotland also receive free school lunches (65,66).

Norway, Switzerland, and all EU countries have school food policies that often cover school lunch, the most common meal to have at school (67). Although the policy is as the national level, the countries share some main objectives. For instance, school food policy should improve student nutrition, support them in learning about and adopting a healthy diet and lifestyle, and prevent or reduce childhood obesity (67). The policies rarely include school food in relation to educational outcomes. The countries differ in how they enforce the school food policy, for instance, as requirements or recommendations, as comprehensive guidelines covering catering, kitchen, and dining facilities, or as simple lists of foods that are allowed to be served in schools (67,68). However, there is a lack of evaluation regarding school food policies, which hinders inferences on the effects that school food may have on the policy objectives (68,69). This is the case for Norway, where a government recommendation is to introduce improved monitoring of municipalities' compliance with the school food policy (24).

3.1.1 The Norwegian model for school lunch

In Norway, students usually bring packed meals for their school lunch, which is strongly embedded in the Norwegian food culture called *matpakke* (53,56,61). A few lower secondary schools provide meals at school (16% of these schools provide meals), and school lunch is the most common meal to provide (53). The packed meal usually consists of bread as the main component, with different spreads/toppings and, in some cases, accompanied by fruits or vegetables (70,71). Some schools in Norway offer fruits and vegetables to their students (72). The Norwegian Directorate of Health launched a revised national guideline for food and meals in schools in 2015, stating that students should have at least 20 minutes to consume their lunch. Schools should also facilitate student well-being, good health, food enjoyment, and a social arena where students can interact while dining. When meals are provided, national dietary guidelines should be followed (73). In Norway, these guidelines are enforced as recommendations, making it a school responsibility to prioritize school lunch breaks accordingly. This results in varying levels of school lunch practice (74). For instance, many students consume their packed meals in the classroom while sitting alone at their desks and watching a screen (71,75). In such a case, the

recommendation for the meal to be a social activity with an opportunity for interaction is overlooked. Some students may also not have enough time to eat their packed meals, or they may skip having breakfast and/or school lunch, as stated previously (see (36), (37), (71), and (75)).

3.2 Association of breakfast and school lunch with educational outcomes

As mentioned in the introduction section, educational outcomes refer to the results of students' learning processes from a public health perspective and the role of having breakfast and providing school lunches in these processes. Evidence suggests that there may be an opportunity for breakfast and school lunches to positively contribute to students' cognitive functioning and academic performance (11, 12). This is related to both having breakfast at home, and provision of meals at school including both breakfast and lunch (11, 12). These meals may also influence school environment in different ways (explained below). A good school environment may in turn promote student capability to take part in the learning process; students learn best when they are in safe, stimulating environments where they feel happy and confident that they can succeed (2,10).

3.2.1 Having breakfast, cognitive functioning, and academic performance

A positive association between having breakfast and cognitive functioning, academic performance, quality of life, and well-being was shown in a systematic review by Lundqvist et al. (11). The authors argued that cognitive functioning and academic performance may further influence students' results at school (such as student grades) and their opportunities for higher education, finally providing higher human capital (11). Adolphus et al. (76) also showed that having breakfast had an acute effect on students' cognitive functions (e.g. concentration, reaction and memory). Students subjective feelings of hungriness were also reduced, and their mood, motivation, and alertness improved when they had breakfast. The authors argued that breakfast consumption in turn may benefit student cognitive function and learning (76). Skipping of breakfast has previously been negatively associated with a range of educational outcomes, such as different cognitive factors related to attention, memory, and mood, mental distress, learning difficulties, and feelings of energy, tiredness, and hunger, as well as with academic performance in the form of scores in writing, language, math, reading,

and science (77-86). A recently published study by Vik et al. (87) documented that breakfast skipping and feeling hungry at school among Norwegian adolescents were associated with school achievements. A decrease in school achievements was observed from 2015 to 2019, and breakfast skipping explained one third of the decrease in science achievement and over half of the decrease in mathematics achievement from 2015 to 2019 (87).

3.2.2 School provision of meals, cognitive functioning and academic performance

Universal free school meal provision may contribute to provide all students an opportunity for optimal function at school. According to Cohen et al. (12), who conducted a systematic review covering the association between universal free breakfast *and* lunch provided at school, several benefits was suggested for academic performance. Provision of breakfast *and* school lunch has shown to improve student learning as perceived by school staff (88); performance in mathematics and reading particularly among those most in need (89); and improved reading among an 'at risk' population (90), based on US samples. Moreover, school lunch provision has been related to improved scores in math and language (91) and improved reading (92). Thus, Cohen, Hecht (12) documented a potential for universal free provision of meals that may be seen as a public health strategy to target student educational outcomes, although most consistent findings were been reported when lunch was provided as compared to breakfast provision alone (12).

3.2.3 Breakfast, school lunch, and the school environment

Having established that students need a good school environment for contributing to optimal learning (2,10), evidence interestingly suggests that sharing a meal together can generate a good social environment. For instance, students who received free school lunches experienced improvements in the classroom atmosphere with a sense of community and they enjoyed eating together in a study by Benn and Carlsson (93). In addition, students believed that the free school lunch strengthened their concentration, and it was suggested that the school lunch contributed to social learning (93). This is in line with Prell et al. (94) who argued that students influence each other and learn from their peers when they cook and eat a lunch together. A pilot study by Ask et al. (95) investigating breakfast provision for four months showed that more students had

breakfast, and boys reported increased satisfaction with schoolwork. Furthermore, some teachers reported that students showed improvements in their attention and social behavior, although few teachers were included in the study and the result was not statistically significant (95). Another pilot study by Kolve et al. (53) tested the provision of a hot school lunch for two weeks in five Norwegian secondary schools. While the feedback concerning students' uptake and liking of these meals varied, it was suggested that the shared meal provided a setting for social interaction and a more pleasant atmosphere as compared to when they had their packed meals (53).

Having school lunch has also been related to positively influencing social relationships and students' school enjoyment (96). This is interesting because students' social and emotional competencies, such as having positive relationships and caring for others, may contribute to promotinging academic performance (97). This finding is also supported by Hale and Viner (98), who argued that positive peer group connections seemed supportive of learning as social exclusion during adolescence could be related to poor educational outcomes and unemployment later in life. Thus, Oberle, et al. (97) argued that there is a need to support students' social and emotional development and to consider *the whole child* in order to promote academic growth, compared to than exclusively focusing on teaching in academic subjects. Further, they emphasized as need to promote social and emotional development to form students as responsible and competent people in a society (97).

Moreover, free school meals have been linked to reduced misbehavior in class and to lower suspension rates (99, 100). Misbehavior in class has been further linked to negative impacts on academic performance. Eriksen et al. (101) documented lower a grade point average among students who had been bullied. Teachers may also be negatively influenced in their teaching by students with nutritional deficits. An example by Marôco (102) showed that teachers reported feeling limited in their classroom instruction because of problems with discipline and students' readiness to learn. Students lacking proper nutrition were part of this explanation (102). Interesting arguments were provided by Altindag et al. (100) regarding students' reduced misbehavior because of free school lunches—free meals may limit the chances of exposing students' social classes (particularly for lower-SES students), which, again, may be related to reduced

bullying and victimization motivated by social factors. This is interesting because evidence suggests that there is stigma among lower-SES students associated with the provision of free meals only to students from low-income families or for students who bring *poor* packed meals to school (29,88,103). Following Altindag et al. (100), it can also be argued that meal provision may influence nutritional status, which, again, may improve discipline, especially among students who are food insecure if hunger increases aggressive and impulsive behavior. Free school lunches may also positively affect the households of those who are food insecure, allowing families to prioritize other important goods or services that may influence student behavior (100). These arguments may all seem plausible. Regardless of how these mechanisms work, evidence points to the fact that sharing a meal together can form a good dining experience in which students can interact, potentially positvely influencing their school environment.

3.2.4 Relevance for Norway

Although there is great potential for breakfast and school lunches to influence educational outcomes and public health, as described so far, several challenges can be observed regarding the provision of school meals in Norway. For instance, the effect of meal provision might be different in Norway because of the long tradition of packed meals in the country. Packed lunches may work well and be positive experiences for students, but they may also cause challenges. For instance, packed lunches have been related to stigma among students with lower SES, as some students may not have the capability to bring packed meals; others might be ashamed over their packed meals (29). Fossgard et al. (75) documented that there may be social differences with packed meals; students may compare meals, and some may feel that their packed meals are boring or that they receive criticism from classmates. Another challenge with packed meals is related to meal skipping and the acute consequences this may have for students cognitive function, such as feeling hungry or tired and being in a bad mood (37,75). However, many students also appreciate packed meals (75,104). Therefore, whether the cost of meal provision in schools can be justified remains unclear (53). There is an issue in which much of the previous evidence is based in the US and in areas that qualify for Community Eligibility Provision (CEP), a program offering school breakfast and lunch in which lower-SES groups are clustered (105). Some studies also show mixed findings, which may be difficult to explain. In an example from Denmark with free school lunches, while reading

performance (but not math performance) improved because of a free lunch intervention, an increase in factors related to inattention and impulsivity was also observed (92). Nevertheless, school provision of meals remains context specific, depending on factors related to culture, politics, and economy (106). Overall, this limits the generalizability of the findings to the Norwegian context and demonstrates the need for more studies on meals provided at schools in Norway.

3.3 The School Meal Project

During 2014-2015, fifth, sixth, and seventh graders in a Norwegian primary school participated in the SMP in Southern Norway. Papers I and II of this thesis were based on this project. Students in the intervention group, which consisted of three classes of sixth graders, were offered healthy free school lunches according to national dietary guidelines for one school year. The SMP started as a response to a growing concern among school and health practitioners in a rural municipality in Norway. They had concerns regarding the nutritional quality of packed meals and the school lunch situation, in which students consumed their packed meals in front of a screen. In addition, the prevalence of childhood overweight and obesity in this municipality was higher than that in comparable areas. Previous evidence from the SMP showed that students' diet was improved, especially among lower-SES students, suggesting that free school lunches may help reduce social health inequalities, as mentioned earlier (59). Vik et al. (59) also found an increase in body mass index (BMI), but not in waist circumference, among students receiving free school lunches. The SMP was likewise effective in increasing students' intake of vegetables on sandwiches, although not in reducing the intake of unhealthy snacks (107). There was not seen an effect of free school lunches on overall meal frequency (108)

3.4 Rationale for the aims of this thesis

Children and adolescents in Norway need to improve their diets. Challenges involving childhood overweight and obesity, social inequalities in health, and the trends of unhealthy eating habits and meal skipping seem to increase (20,33,34, 36,37). Based on previous findings, having breakfast, either at home or at school, and providing school lunches are associated in different ways with students' educational outcomes and with public health. However, in Norway, this relationship is mainly based on anecdotal evidence. Thus, there is a need for more research in this area in the Norwegian context.

4.0 Aims

The overall aim of this thesis was to investigate the role of having breakfast at home and providing free school lunches in students' educational outcomes. The research also seeks to assess the contribution of these meals to public health promotion.

The specific aims were as follows:

Paper I: To investigate the possible effects of a free, healthy school lunch (the SMP) on the school environment, including reducing students' behavioral issues and inactiveness in class, increasing self-efficacy and school enjoyment, and improving the classroom environment.

Paper II: To explore students' and teachers' experiences with the free school lunches after the SMP in 2015 and five years later.

Paper III: To explore the association between having breakfast and reading literacy among 10- to 11-year-old students in Denmark, Finland, Norway, and Sweden using secondary analysis of data from the Progress in International Reading Literacy Study (PIRLS) 2016.

5.0 Methods

This thesis consists of three papers, of which two were based on the intervention study the SMP in Southern Norway and one was based on the cross-sectional PIRLS (see Table 1 for an overview). This chapter will first introduce the SMP and Papers I–II before presenting the PIRLS and Paper III.

Table 1: Overview of the methods, participants, and materials in Papers I–III

	Paper I	**Paper II**	**Paper III**
Design	Non-randomized intervention	Qualitative semi-structured interviews	Cross-sectional
Setting	Elementary schools, rural area, Southern Norway	Elementary schools, upper secondary schools, rural area, Southern Norway	Elementary schools in Denmark, Finland, Norway, and Sweden
Participants	Students, a mean age of 11 years old (N = 164)	Subsample of students and teachers who participated in the SMP, a mean age of 11 in 2015. Age of 16 in 2020 (N = 18)	Students from Denmark, Finland, Norway, and Sweden, a mean age of 11 years old (N = 17.161)
Meal	School lunch	School lunch	Breakfast at home
Measures	Self-reported questionnaire	Individual interviews with semi-structured interview guides	Reading test and self-reported questionnaire
Outcome	Effects of a free school lunch on the school environment	Experiences with the free school lunch	Achievement in reading literacy
Analysis	Linear regression	Thematic analysis	Linear regression
Contributions of the Ph.D. candidate	Recruitment, data collection, and analysis	In 2020: recruitment, interview guide, interviews, and analysis	Analysis

5.1 SMP: Non-randomized intervention using qualitative and quantitative methods (Papers I and II)

The SMP in Southern Norway was a non-randomized intervention study using quantitative and qualitative components for research purposes. Students responded to a questionnaire before and after the intervention in 2014 and 2015 (Paper I), and students and teachers participated in interviews in 2015 and in follow-up interviews in 2020 (Paper II).

The intervention consisted of a free school lunch provided to an intervention group (N = 55) during one school year, from August 2014 to June 2015, and a control group that brought their packed lunch from home as usual. The free lunch was a bread meal, which is common for lunch in Norway. The meal consisted of whole grain bread and a variety of spreads/toppings, such as cheese, eggs, fish spread, and cold cuts. The meal was prepared according to the national dietary guidelines (see The Norwegian Directorate of Health (35)) (see Appendix IV for a list of foods allowed in the servings, in Norwegian). The lunch also included food options for students who had special needs, such as those with allergies. Fruits and vegetables were served daily together with the bread meal; occasionally, yogurt with berries was served. Before the SMP, students usually sat alone at their desks, eating their packed lunches while watching a screen. During the SMP, students were responsible for organizing their meals and arranging their desks and chairs so that they could share the meals. The students were seated around a table, or they organized a buffet, depending on how they preferred it (Figure 4).

The lunch was prepared by a local cook, who delivered the lunch on large platters and collected the leftovers which were served the next day to minimize food waste. The research team responsible for evaluating the SMP consisted of three experienced researchers and public health master's students (three in 2014 and two in 2015) as research assistants. From 2014 to 2015, the Ph.D. candidate contributed as a research assistant to the recruitment and data collection in the SMP and wrote her master's thesis within the project. Interviews in 2015 were conducted by two other master's students, while interviews in 2020 were conducted by the Ph.D. candidate.

Figure 4. Two school lunch arrangements in the SMP: around a table and a buffet arrangement (to the right). Photo: Private

Papers I and II use data from the SMP by investigating the effects of the school lunch on the school environment (Paper I) and by exploring the immediate and long-term experiences of students and teachers involved in the SMP (Paper II).

Regarding the qualitative interviews in Paper II, the initial plan was to produce an article solely on the interviews in 2020. However, we only reached out to those who were in the intervention group, and because of challenges with recruitment (described below) and the COVID-19 outbreak in 2020, we only managed to recruit eight participants in 2020. Master's students conducted interviews after the SMP in 2015, and these unpublished interviews were combined with those in 2020 to increase the study sample (109, 110). The interviews were based on different students and teachers (except for one teacher) in both years, as students in 2020 were not asked whether they participated in interviews in 2015.

5.1.1 Study sample in the SMP

For the SMP, convenience sampling was necessary because of practical considerations. First, it had to be manageable for the local cook, who delivered

the lunches every day. The intervention group consisted of sixth graders (N = 55) in three classes at a rural elementary school in Southern Norway. Second, a control school, also with sixth graders in three classes, was chosen; it matched the intervention group by i) being an elementary school that was in a rural area in Southern Norway and ii) having a comparable school structure. Third, as dropouts were expected, especially in the control group, fifth and seventh graders, both with three classes from the intervention school, were added to the control group. This also made the mean age in the control group comparable to that in the intervention group, which was 11 years old. Overall, the control group consisted of 109 students in nine classes from two schools.

Regarding the interviews in both years, students and teachers were deliberately selected based on their participation in the SMP from 2014 to 2015. In 2015, students were recruited by the research assistants. The 55 students in the intervention group and their teachers received written information that invited them to participate in the interviews. Seven students and three teachers signed up for the interviews in 2015. In 2020, those students who had received free school lunches when they were in the sixth grade were no longer attending the same school. We did not have access to their contact information, as their personal information was deleted according to the protocol after the SMP in 2015. In the case of the intervention school, students usually attended the same school, moving from elementary school to lower secondary school. Following students' standard graduation time (in Norwegian, *normert tid*), the last time the students from sixth grade were gathered at the same school would be when attending 10th grade in lower secondary school in 2019. The intervention school had access to the students who were in the sixth grade in 2015 through their latest registered home addresses from the 10th grade. Therefore, the intervention school assisted in the recruitment process by forwarding information letters to the students' home addresses in their register. Teachers were recruited through an information letter sent via e-mail by the intervention school's principal. A total of six students and two teachers were recruited for the interviews in 2020. Because of the nature of the sampling design, self-selection to participate was necessary both in 2015 and 2020.

5.1.2 Consent

Written parental consent was required to participate in both quantitative and qualitative data collection in 2015, as required for youth below 16 years of age in Norway (see Chapter 7.3; see Appendix II for information letters and consent forms, in Norwegian). Parents received information about the SMP and the quantitative data collection on parental meetings at the school in June 2014. Students received information about the nature of the project, including the study's purpose, their choice to withdraw from the study at any time, and the data collection procedures (such as responding to questionnaire and collecting anthropometric measures) by the research assistants before the data collection. Students who wanted to participate but did not have parental consent when data were collected were given opportunities to contact a parent/caregiver who could give verbal consent, which was required to participate, to the research assistant. In this case, written consent was gathered after data collection. If students with parental consent did not want to participate, they could withdraw from the project at any time. As the school lunch was free, all students could eat the meal regardless of their participation in the data collection procedures, or they could choose to partly participate in the data collection (see paragraph 5.1.3 for more information about the data collection).

For the interviews in 2015, information letters were sent home with the students, and they brought their signed parental consent letters back to the research assistants. Information about participation was emphasized to the students before the interviews (109). In 2020, consent was obtained from the students themselves. They received letters in advance and were also given information about the project and the interview before the data collection (see Appendix II). Participating students and teachers received a gift card worth 250 NOK (≈25 EUR) for joining the interviews in 2020, as we deemed them to be a difficult-to-reach population. Student and teacher consent was gathered either verbally and audio recorded for telephone- and digital-platform interviews or through written form in face-to-face interviews.

The SMP received ethical approval from the Norwegian Center for Research Data in 2014 for the quantitative data collection, and it received extended approval for the interviews in 2015 and 2020 (reference numbers 38980 and

514675; see Appendix I, in Norwegian). Approval was also obtained from the Research Ethics Committee at the Faculty of Health and Sport Sciences.

5.1.3 Measures

As shown in Table 1, the quantitative component was evaluated using a self-reported questionnaire defined as the school environment questionnaire; for the qualitative method, individual interviews were conducted.

Students responded to a comprehensive questionnaire at three time points: at baseline at the beginning of the school year in 2014, after one semester in January 2015 (not used in Paper I), and at the end of the school year in 2015. Parents also responded to a parent questionnaire, and their self-reported educational levels from this questionnaire were used as proxies for SES. The questionnaires were tested among six students and six parents prior to the baseline data collection and approved for feasibility accordingly. Anthropometric measures were also gathered, although they were not used in this thesis.

The school environment questionnaire

The questionnaire that the students responded to consisted of six parts (see Appendix III): a section about the students' home situations, questions about their meal patterns, a food frequency questionnaire for school lunch, a section measuring psychosocial variables which we defined as school environment, a section on activities and sedentary behavior, and a section with questions regarding the provided free school lunch (with the latter only used in the follow-up questionnaires). Data from the section on the school environment, which we defined as the school environment questionnaire, were included in Paper I. This was done as it was considered the most practical measure.

In the school environment questionnaire, students answered questions and statements, referred to as items in the following, regarding five school environment outcome variables: behavioral issues, inactiveness in class, self-efficacy, school enjoyment, and classroom environment. Respective examples of items are as follows: "Do you make so much noise in class that teachers yell at you?" (behavioral issues), "Do you raise your hand to answer questions in class?" (inactiveness), "I can master the subjects that is taught in school this year" (self-efficacy), "I like being at school" (school enjoyment), and "Most of

my fellow students are kind and helpful with one another" (classroom environment) (111). For behavioral issues, inactiveness in class, and school enjoyment, the students had five alternative responses, ranging from very often to never. For classroom environment and self-efficacy, the five response alternatives ranged from always to never and from completely true to completely untrue, respectively (see Paper I for more details). Three research assistants were present during data collection at all three time points, and one of them was the Ph.D. candidate. The questionnaire was pen and paper based, and the student response time was from 40 (the oldest participant) to 60 minutes (the youngest in the fifth grade). The school environment part of the questionnaire was not validated for use among 11-year-old students. However, some of the dimensions were used in previous research; see, for instance, the studies by Øverby and Høigaard (112) and Høigaard et al. (113).

Individual interviews

Those students who signed up for interviews in the SMP participated in individual interviews with a semi-structured interview guide; the interviews involved only the interviewer and the interviewee. Individual interviews were used because they were considered practical (see paragraph 7.2.3 for the methodological discussion). In 2015, all interviews were conducted face to face at the students' schools. Because of the COVID-19 pandemic outbreak in 2020, the interviews in 2020 were held over the telephone (N = 4), the digital platform Zoom (N = 2, only teachers), or face to face at the school (N = 2). The interviewers were women with a public health educational background and between 20 and 30 years old. In 2015, novice researchers conducted the interviews. In 2020, the interviewer (the Ph.D. candidate) had some interview experience and therefore focused on asking whether the understanding of a certain issue was correct to account for ambiguity in the data analysis.

The interview guide was developed by research assistants and the research leader in 2015 and by the Ph.D. candidate and her supervisors in 2020. Considering the interview guide in 2015, only relevant items for the aim, which was to explore students' and teachers' experiences, were included in Paper II. The rationale for this was that those items from 2015, in addition to the items regarding experiences with the SMP, were specifically related to the master's student's two research questions (109,110). In this regard, the plan was to analyze the

transcribed text in 2015 and 2020 separately. However, after the analysis of both sets of transcribed text, the same patterns were identified, so they were combined to avoid repetition throughout the findings. The interview guides had some predefined open-ended questions with prompts to bring an interviewee back to the topic if needed, as recommended by Draper and Swift (114). They included items that explored the respondents' experiences openly, in addition to specific items addressing the perceived importance of the school lunch in relation to their social environment, diet, and learning. See Appendix V for the detailed interview guides (in Norwegian) and Paper II for the relevant items included in the paper.

The interviews lasted between 20 and 40 minutes. All interviews were audio recorded and transcribed verbatim. Transcripts were uploaded and organized in NVivo, a qualitative data analysis software program used for structuring qualitative data (115). Paper II was written with the use of the consolidated criteria for reporting qualitative research (COREQ) checklist to enhance the credibility of the process and the findings (116).

5.1.4 Analysis

The results from Paper I were analyzed through linear regression, and thematic analysis was used for analyzing the transcribed text in Paper II.

Linear regression

For analysis purposes, the scores for each item included in the five school environment dimensions were summed up into sum-score variables for both baseline data and follow-up data. Eventually, change variables were made by subtracting the score from follow-up with the score at baseline. The sum-score variables were checked for reliability using Cronbach's alpha, and they showed acceptable values, confirming internal consistency with $\alpha = 0.7$ for behavioral issues and inactiveness in class, $\alpha = 0.9$ for self-efficacy and school enjoyment, and $\alpha = 0.8$ for the classroom environment (111). Descriptive statistics were presented as median with inter quartile range and mean with standard deviation, where appropriate. The effect of free school lunch on the school environment was assessed with linear regression. Change variables for behavioral issues, inactiveness in class, school enjoyment, self-efficacy, and classroom environment were inserted as dependent variables. Intervention versus control group (coded as 1 and 0 respectively) was inserted as independent variable and

adjustments were made for baseline values, gender, and SES. The analyses were conducted in IBM® SPSS® Statistics version 25.

Thematic analysis

Thematic analysis following guidelines from Braun and Clarke (117) was adapted when analyzing the qualitative interviews in Paper II. A combined inductive and deductive approach was used to analyze the data based on the items in the interview guide, in addition to identifying new ideas emerging from the data. In this way, important views from the participants were considered. The text was read and coded by two research team members. The data were then analyzed in three steps. The first step consisted of multiple rounds of reading and coding. Second, potential sub-themes were created. Third, the main themes were established after the research team members agreed upon them. As an example, the sentence from an interview with a teacher, "The students were less concerned whether they had brought packed meals when they were served free school meals," was coded as *availability of healthy food* in the second stage. For the third stage, this was coded as the theme of *School meals as an opportunity to improve equality* (118). From the analyses, four main themes were identified, and data were presented using pseudonyms to ensure the participants' anonymity (see Paper II).

5.2 The cross-sectional study PIRLS (Paper III)

Paper III was based on the cross-sectional PIRLS 2016 conducted by the International Association for the Evaluation of Education Achievement (IEA). In 2016, 50 countries participated. This study is conducted every five years to evaluate achievement and trends in reading literacy (119). A subsample of students from Denmark, Finland, Norway, and Sweden was used as the study sample for Paper III (Iceland did not participate in PIRLS 2016). The PIRLS applies a robust and complex method, draws representative samples, and uses weighted data to compute population estimates of student performance. In this chapter, the relevant considerations for Paper III are presented, in addition to a summary of the methods used in the PIRLS. Please see Martin et al. (119) for more information.

A two-stage sampling design with random selection but different sampling probabilities was used in the PIRLS. Schools were randomly selected first, and

then a random selection of a class or classes within the school was drawn. Sampling probabilities were used both to safeguard against sampling only specific subgroups of the population and to allow for estimates of reading literacy on subgroups, such as gender, private versus public schools, or rural versus urban areas (119). Each Nordic country had, to varying degrees, different sampling designs based on different sampling probabilities and exclusion criteria. Special needs schools, special language schools, and students from these schools were excluded from all Nordic countries. In Denmark, additional daycare and rehabilitation home schools and Rudolf Steiner schools were excluded. In Sweden, special program and international schools were also excluded. Finland was the only country that did not exclude very small schools (119).

As the PIRLS aims to draw population estimates, the sampling scheme in the PIRLS and the measurement of reading literacy require the use of sampling weights, item response theory (IRT), plausible values, and estimates of achievement scores. Finally, they require a specialized software program called the IDB Analyzer to interpret the data developed by the IEA (119,120).

5.2.1 Study sample

The students included in the study sample in Paper III were 10–11 years old. Students in Denmark, Finland, and Sweden attended fourth grade, while Norwegian students attended fifth grade; these students were age comparable to the fourth graders.

There were 3.508 students participating from Denmark, 4.896 students from Finland, 4.232 Norwegian students and 4.525 students from Sweden. Students were invited to participate in different ways within each country. In Denmark, parental informed consent was required for participation. For Finnish and Norwegian students, the PIRLS was considered part of the normal schoolwork, so parental consent was not required, although the students could decide not to participate. In Sweden, information was sent to parents or caretakers, and they had to opt out if their child was not to participate (see Appendix VI). The IEA and the PIRLS ensured that the exclusion rate and participation rate were sufficient to draw representative samples. The confidentiality of students and parents/caregivers was handled by the IEA, which removed all information that could identify a person upon posting the data available to the public (120).

5.2.2 Reading literacy test and context questionnaire

In the PIRLS, participating students conducted a reading test before they responded to a questionnaire that obtained information on their home- and school context[1]. The complete reading literacy test consisted of 16 booklets, which would be too time consuming and burdensome for both students and schools to conduct (119,121). Thus, the reading literacy test was distributed using a rotation design, and students responded only to a subset of the test items. Each student would therefore have some observed responses and some unobserved values. The PIRLS applies a scaling method based on IRT, which place each student a point on the overall reading literacy scale with the use of observed and unobserved values. This is done using mathematical models that measure the interaction between student ability and item discrimination. The method provides each student with an ability distribution, considering their background information as well, and from this distribution, plausible values of student estimated reading literacy score were provided and used for analysis purposes (119). Plausible values and IRT are commonly used in other comparable large-scale assessment studies, such as the Program for International Student Assessment (PISA), the Trends in International Mathematics and Science Study (TIMSS), and the National Assessment of Educational Progress (122). For the purpose of measuring unbiased standard error, the PIRLS uses Jackknife repeated replication, a method for manipulating and re-weighting the estimated weights. This is also a common method utilized to measure variance in large-scale surveys that use estimated weights, such as the TIMSS and PISA (119,123,124).

The time frame for conducting the reading test and answering the context questionnaire was three hours. The parents also responded to a home context questionnaire. In the student context questionnaire, the students responded to questions on their home and school lives. They indicated their breakfast habits by answering the question, “How often do you eat breakfast on school days?”, with the four response options being every day, most days, sometimes, and never or almost never. They were also asked whether they were a boy or a girl, about the number of books they had at home, and about their study support (whether they had access to their own room and internet connection). For the parents or

[1] These questionnaires can be retrieved at https://timssandpirls.bc.edu/pirls2016/questionnaires/index.html

caretakers' home context questionnaires, part of this questionnaire was used by the PIRLS to create a scale for *home resources for learning*, which was used as a proxy for SES in Paper III. This scale included information about parental educational level, parental occupation, and the number of children's books at home based on parental reporting, in addition to questions on the number of books at home and home study support in the students' questionnaires (119,121).

5.2.3 Analysis

The statistical analyses in Paper III were conducted using the IEA's IDB Analyzer version 4.0.42.0 and IBM SPSS Statistics version 25. The IDB Analyzer is necessary to use because the software considers the sampling weights and estimated weights of student performance to estimate population performance (125). Because of the sampling design, ignoring weights can give more importance to some students than to others (124) and is likely to produce incorrect results (120, 124). The IDB Analyzer has a limited toll box for analyses and does not provide significance levels (*p* values).

For analysis purposes in Paper III, the item on breakfast was dichotomized into having breakfast often, (coded as 1), including every day and most days, and having breakfast rarely (coded as 0), which included sometimes and never or almost never. Descriptive data were presented by weighted percentage or weighted mean and 95% confidence intervals, where appropriate. These confidence intervals were manually computed based on the standard error. Linear regression was conducted to investigate the association between having breakfast often versus rarely as the independent variable and reading literacy as the dependent variable. The analysis was adjusted for SES and gender.

6 Results

6.1 Effect of the SMP on school environment: Paper I

The aim of Paper I was to investigate the effects of a free school lunch on the school environment, which included behavioral issues, inactiveness in class, school enjoyment, self-efficacy, and the classroom environment. At baseline, 164 of the 219 invited students participated in the data collection (74% response rate). Six students were lost to follow-up: three in the intervention group (two who moved away and one who withdrew) and three in the control group (because of absence from school when the questionnaire was administrated). There were no significant effects of the free school lunch on either of the following school environment dimensions behavioral issues (B=0.01, *p* 0.86, 95% Confidence Interval (CI) -0.33-0.39), inactiveness in class (B=-0.05, *p* 0.51, 95% CI -1.87-0.93), school enjoyment (B=0.11,*p* 0.19, 95% CI -0.66-3.35), self-efficacy (B= -0.04, *p* 0.52, 95% CI -1.48-0.75) and classroom environment (B= -0.07, *p* 0.26, 95% CI -1.11-0.29) (111). Overall, the analysis showed wide confidence intervals, indicating that the study was underpowered (126), which will be discussed in detail later.

6.2 Students' and teachers' experiences with the SMP: Paper II

The findings of the interviews were presented into four main themes. These were experiencing the free school lunch I) as a social event that students used as an opportunity to make new friends and learn social skills, II) school lunch as potential for forming student healthy eating habits, III) as an opportunity to improve student school functioning and IV) to target social equality among students (118) (see Paper II for a more detailed outline of the results including quotes).

The first theme describes how students and teachers experienced the meal as a social event, identified both in 2015 and 2020. By sharing a free school lunch, students experienced increased social inclusion and that they got to know one another better. They talked about how they saw each other in a different way, and some mentioned that they made new friendships. The teachers talked about how the free school lunch introduced an opportunity to improve the students' social skills, which constituted a subtheme under theme I named *increased social*

learning. Students learned about table manners and how to behave with classmates around the table. Theme II describes how students learned to like new, healthier foods. They talked about that they replaced white bread and chocolate spread with whole-wheat bread, cheese and fruits- and vegetables. This was confirmed by teachers observing them. It was mentioned that new, healthier school lunch habits were sustained five years later. One student talked about how he learned to like vegetables on bread after the SMP and that he continued having vegetables on bread five years later. Thus, this theme was identified both in 2015 and 2020 in both student and teacher interviews. Theme III represents school functioning and how the students believed that the free school lunch improved their concentration, that they had more energy to pay attention during instruction time, and that they spent less energy focusing on how hungry they were. This theme was derived from the student interviews in 2015 and 2020. Some students related this improved school function to their improved diet; they experienced improved concentration because they ate healthier food at lunchtime. For theme IV, derived from the interviews in 2020, school lunch had an influence on social equality. The teachers talked about how the students were more alike. One teacher mentioned that they could observe that some students were ashamed of their packed meals, trying to hide that they had, for instance, dry bread. This was naturally avoided during the free school lunch. Paper II presents an example of a boy who talked about how one could see that some were better off than others through the packed meals they brought to school. That the free school lunch was viewed as socially equalizing was derived from both the student and the teacher interviews (118).

A few negative experiences were identified with the SMP. The teachers mentioned increased noise during the meal. This was experienced as students before the free school lunch would eat their packed meals without interacting with others and watching a screen. Some behavioral challenges were also observed during the meal, which teachers utilized as an opportunity to teach social skills and table manners (118). However, the free school lunch was overall positively valued among students and teachers. These positive experiences might be attributed to few interviewees, where those who participated could have been most positive. This is described in detail later (see chapter 7.2.3).

6.3 Association between breakfast and reading literacy: Paper III

The aim for Paper III was to investigate the association between having breakfast at home and reading literacy achievement in a sample of Nordic students. Descriptive analysis showed that most students had breakfast often, with over 90% of the students in Denmark, Finland, and Sweden and over 80% of those in Norway having breakfast. Compared with the other Nordic countries, Norwegian students had the highest number of students reporting to rarely have breakfast with 9% reporting to never have breakfast and 7% reporting to sometimes have breakfast. There was no difference in breakfast habits between girls and boys. Results from the linear regression showed that having breakfast was positively associated with reading literacy. After adjusting for SES and gender, the association remained although SES (and not gender) was identified as an important confounder. Danish, Finnish, Norwegian, and Swedish students who often had breakfast scored, on average, 23 points (95% CI 13-33), 22 points (95% CI 13-31), 13 points (95% CI 6-20) and 25 points (95% CI 16-34) higher, respectively, on the score for reading literacy compared to students who rarely had breakfast (127). Sensitivity analysis confirmed that the results were robust when analyzing breakfast responses with the four response alternatives (without dichotomization) and adjusting the results for SES and gender (data not shown).

7. Discussion

7.1 Discussion of the main findings

The aim of this thesis was to investigate the role of having breakfast at home and providing a free school lunch in students' educational outcomes in a public health perspective. The thesis also sought to assess the contribution of these meals to public health promotion. Main findings of this thesis indicate how breakfast and a free school lunch may be considered pathways for improving students' educational outcomes and for promoting public health by positively influencing students' reading, school functioning, diet, social environment, and social equality. This is described in more detail later.

7.1.1 School environment (Paper I)

The aim of Paper I was to investigate the effect of the SMP on the school environment. The results showed that a free, healthy school lunch did not have an effect on the school environment (111). This is in contrast to previous findings documenting a link between school lunch and other school environment related outcomes, such as students' social climate and a good social atmosphere, readiness to learn, satisfaction with schoolwork, ability to concentrate in learning activities, mood, school enjoyment, and behavior (53,88,93,96,100,128,129). However, a free school lunch intervention in Denmark, whose school lunch setting may be more comparable to that of Norway because students usually eat packed meals for lunch, showed mixed findings (92). School lunch improved students' reading performance while also negatively impacting students' attention and impulse control. Sørensen et al. (92) suggested that these mixed findings might be due to methodological limitations. As will be described later (see chapter 7.2), this issue might also be applicable to the SMP and Paper I. For instance, the analysis showed wide confidence intervals, an indication that the study might be underpowered (126). Although others have suggested the positive effects of school lunches on adolescents' development, it can also be argued that school lunch provision not in line with nutritional guidelines, might not necessarily be better than packed meals. For instance, packed meals that include fruits and vegetables might be better in terms of nutritional quality. Moreover, the school provision of lunches may bring additional expense and logistical challenges for some schools, such as those in Norway, where schools are not traditionally built for the purpose of serving lunch (111). Overall, the results

from Paper I did not identify a particular role of school lunch provision in students' educational outcomes and in public health. This is in contrast to previous findings suggesting dietary benefits following the SMP (59,107). Therefore, it is suggested that future research should consider the findings in Paper I in relation to the methodological limitations of the current paper.

7.1.2 Social environment, diet, school functioning, and social equality (Paper II)

The aim of Paper II was to explore students' and teachers' experiences with the SMP immediately after the project and five years later. In this regard, the findings suggest that the free school lunch was viewed as a social event in which students practiced their social skills and made new friends (118). The teachers observed increased noise during the meal, which was not surprising and was a natural consequence of transitioning from eating alone to sharing a meal together. Furthermore, the experience was identified as a means of forming healthy eating habits, improving school functioning, and creating benefits for social equality. Five years later, the students reflected on how the unifying feeling was important to them. This supports the finding from the SMP by Vik et al. (59) suggesting that free school meals may be considered an approach to reduce social inequalities in health because of benefits in students' diets. Furthermore, they and are in line with Kolve et al. (53) who reported that free school lunches benefitted students' social atmosphere. The findings are not surprising compared to international findings. Internationally, studies have suggested that the provision of school meals may positively influence students' concentration, mood, motivation, social climate, social learning, and social equality and improve students' diet quality, cognitive functioning, and academic performance (11,12,49,76,88,93,130,131). Interestingly, some students in the SMP indicated that their diet had improved five years later due to the school lunch intervention. To our understanding, this is new knowledge, and it shows the opportunity free school lunches may have for sustained public health benefits. However, a free school lunch is not required to create a good social environment and facilitate interaction. Fossgard et al. (75) indicated that students can enjoy their lunch break with packed meals and that this may also create an opportunity for socializing if teachers allow students to sit together with classmates.

The findings from Paper II may indicate that school lunch provision can be viewed as an intervention that influences several levels of health determinants, following The Dahlgren – Whitehead model of health determinants (45) (Figure 1). These are the educational level (through the availability of healthy food), social and community networks (through social benefits, including the influence of peers, social inclusion and friendship), and individual lifestyle factors (through changes in food preferences). However, this was a small study reliant on self-selection to participate, and we can only indicate the potential benefits following the provision of free school lunches. Considering the finding on the lack of effects of the SMP on the school environment (see chapter 6.1), further research on school meals in Norway is needed.

7.1.3 Reading literacy (Paper III)

For Paper III, the aim was to investigate the association between having breakfast and reading literacy. The results showed that having breakfast often was associated with higher reading literacy achievement among Nordic primary school students. This finding is in line with previous research findings suggesting an association between having breakfast and performance in reading and other outcome variables, such as performance in mathematics and science and self-reported grades (77,81,87). The increasing rate of breakfast skipping among Norwegian adolescents (see for instance Haug et al. (37)) might therefore be alarming. The results also showed that SES was an important confounder for the association between breakfast and reading, although the association remained after adjusting for SES. If having breakfast is of importance for reading performance regardless of SES, with the potential for benefiting performance in other subjects (see, for instance Mullis et al. (14)), then promotion of breakfast for all students should be given priority in a school context. Following Adolphus et al. (76), it is argued that the observed difference in reading literacy related to having breakfast often versus rarely is important as breakfast habits are modifiable and can be manipulated to influence student learning (76). Further, as Vik et al. (87) found an association between having breakfast and scores in math and science regardless of SES among Norwegian students, it is argued, in line with them, that prioritizing healthy eating should be included in discussions related to factors that may influence students' educational outcomes.

7.1.4 Breakfast and school lunch as pathways for improving educational outcomes and public health

Our diet is a product of an interplay between several influences from different contexts. School is one such context that can influence eating behaviors (22). Later, it is described that breakfast and school lunch may contribute to benefitting students' educational outcomes in a public health perspective and public health. Thus, school may not only be viewed as an important context for promoting healthy eating habits, but schools can also draw benefits from this practice. However, as mentioned, the studies included in this thesis have important methodological limitations that should be considered, and we can only indicate these potential pathways. It should also be stressed that the results of this thesis did not consider the provision of school breakfast (Paper III), so it can only indicate the benefits of promoting habitual breakfast intake.

While we found that the free school lunch did not have effects on the school environment, the students and teachers had overall positive experiences related to the SMP both immediately and five years later. We developed a figure to illustrate the potential pathways for breakfast and lunch to influence educational outcomes and public health, as relevant to a Norwegian context, based on the findings of this thesis (Figure 5). These findings can be used in further research to investigate causal relationships.

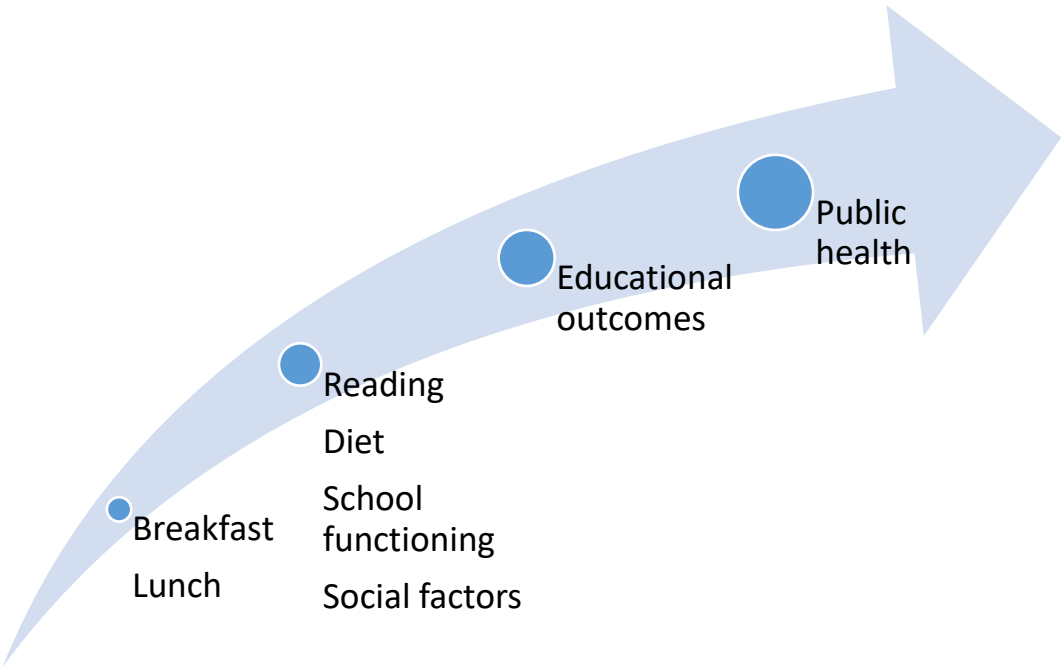

Figure 5. Illustration of the potential pathways for breakfast and lunch to impact educational outcomes and public health.

In terms of reading literacy, having breakfast (at home) may be important for reading achievement, as indicated in the findings of this thesis (Paper III). This is a relevant factor in potentially influencing educational outcomes, as reading is an important skill for obtaining knowledge and performing academically. This was illustrated by Mullis et al. (14) who showed that reading achievement was important for performance in other subjects at school that require reading competence, such as in mathematics and science. It has therefore been argued that reading is important for further learning (14). Regarding diet, students in the SMP reported to eat healthier, even five years after the SMP (Paper II). Improvement in diet can impact cognitive abilities which may further influence educational outcomes due to the link between cognitive function and learning (4, 10, 11). In the SMP, this was illustrated by one student who talked about how he felt an improvement in concentration when he ate healthier meals at lunchtime. The findings from the SMP also suggest that the provision of healthy meals influences students to adopt healthy diets by making healthy food consumption an easy choice. Through the influence of their peers and the social event taking place in the SMP, the students could see that others were eating healthy food, which enabled them to practice food-related autonomy and try out new foods. The social dining event also created an opportunity for interaction, friendship, and the practice of social skills. If sharing a meal can influence students' social

environments to the extent that it can contribute to positive emotions in learning tasks, then the experience can also enhance students' cognitive abilities in this way, as negative emotions can adversely impact the learning process (10). For school functioning (Paper II), the findings from the SMP indicate the potential to improve students' concentration and focus in class. In this way, students may be positively influenced to take part in the educational process. Furthermore, social factors, such as social learning, the social environment, and social equality (Paper II), may influence educational outcomes and public health in different ways. For instance, social skills are important for students to practice, as these may be valued in education and the labor market later in life (97,132,133). A good social environment with social inclusion as shown in the SMP (118) may also be supportive for students' educational outcomes as social exclusion in adolescence has been associated with poor educational outcomes and unemployment later on (98). Furthermore, findings from the SMP suggests that students reduced their need to compare themselves to each other, as shown when one student talked about how one could see that someone was better off with a better packed meal before the SMP. This is important, as Wilkinson and Pickett (2) emphasized the influence of the experienced social equality on educational performance. Revealing social identities among discriminated student groups (caste in India) reduced students' educational performance (2,134). Overall, this underpins the importance of the food environment in schools and supports the recommended action points for strengthening the implementation of school food policies and school meal provision in Norway (24).

Given the potential for breakfast and school lunch to influence students' educational outcomes, as indicated here, it may be argued, in line with Oberle et al. (97) who argued for a need to consider *the whole child* in the school setting, that these meals may contribute to improve students preconditions to take part in the educational process. This could in turn may enable them to perform their best at school. Therefore, prioritizing breakfast and lunch on the school agenda, rather than focusing on these meals solely as responsibilities of the home, may bring benefits that are relevant to both the educational and health sectors. However, there may be a risk for publication bias for this field of research.
Having discussed the main findings of this thesis, the following section will address how much confidence can be placed on these findings.

7.2 Methodological considerations

Important methodological limitations for the findings in this thesis include the non-randomized design of the intervention (Paper I), the small study samples (Papers I and II), and the use of a cross-sectional study (Paper III). Diet is complex as different factors that we did not adjust for can influence breakfast- and school lunch habits as well as school environment (Paper I) and reading literacy (Paper III). Self-selection for participation in the interviews and the risk of these participants being the most positive ones are also likely to impact the qualitative findings (Paper II). These issues are discussed further in the following sections of this chapter.

For quantitative methods, validity concerns whether an instrument measures what it is supposed to measure (135). In the case of the SMP, this refers to the degree to which the school environment questionnaire measures the school environment; for the PIRLS, this is the degree to which the reading literacy test measures reading literacy. Validity cannot be obtained without reliability, which refers to whether an instrument produces consistent results under similar conditions (135). The international team in the PIRLS and the IEA are responsible for the validation of the study (119). In this thesis, the methodological considerations for Paper III therefore include only a discussion of relevant factors for the paper-specific sample and results. For qualitative methods, many qualitative researchers refer to credibility instead of validity to avoid confusion (136) and the same is done in this thesis when addressing the interviews in the SMP. As for the methods section, methodological considerations relevant to the SMP will first be presented before a discussion relevant to Paper III, followed by the ethical considerations and suggestions for practice and research.

7.2.1 School environment questionnaire (Paper I)

For the school environment questionnaire, the data were collected through a pen- and paper-based questionnaire, and students were asked to think back to the previous two weeks when responding (59). Collecting data through self-reporting entails a risk of social desirability bias, especially for sensitive topics (137), which may apply to several dimensions (particularly behavioral issues) in the school environment questionnaire. We did not control for socially desirable responses, as recommended by Van de Mortel (138), which contributed to low

validity of this study. As done in a school behavioral study by Ertesvåg and Vaaland (139), including teacher evaluation of student behavior might have enhanced validity in Paper I.

Furthermore, part of the questionnaire used in Paper I was not validated for the age group of our sample, which was 11-year-old students. Although the internal scale consistency used for grouping the items in the school environment questionnaire was confirmed using Cronbach's alpha (111,126), the overall criterion for achieving validity and reliability according to Hilliard (135) was not met. The results from the interviews (Paper II) provided information that was not obtained with the school environment questionnaire, indicating that there might have been other factors that the students viewed as important but were not captured by the school environment questionnaire. Thus, there is a need for future research to validate the school environment questionnaire among 11-year-old students before further use in studies.

7.2.2 Sampling in the SMP (Paper I)

A non-randomized intervention was necessary because of practical considerations, and thus the intervention in the SMP was deliberately located to one school. This non-randomization increases the risk of systematic differences between the intervention and control group and ultimately the risk that a lack of effect might be due to unobserved differences rather than the influence of the SMP (140). During one school year, it is likely that factors other than school-provided lunches can explain (the lack of) changes related to the school environment. The finding on high-SES students increasing their self-efficacy more than low-SES students is an example of this (see Paper I (111) for details). Other factors that may impact the school environment could, for example, be related to students' health status, as health problems may limit students' learning motivation and ability (3), negative emotions, lack of motivation, or a poor learning environment that can negatively influence the learning process (10), and/or parental attachment linking the influence of family factors and the school (141). Overall, this limits the possible interpretation of any causal relationship between the school environment and the free school lunch.

The control group, which included fifth and seventh graders at the same school as the intervention group, is also a limitation of the study. However, students in

the fifth and seventh grades were located in a part of the school building that was different from the location of those in the intervention group. In this way, the presence of confounding was minimized among students in the control group because they did not watch other students receiving free meals, as has been argued previously (59).

A power calculation was not conducted prior to the recruitment for the SMP, which would have provided us with an estimated sample size sufficient enough to provide more confidence in whether the right conclusion was reached (142). However, because of both practical and financial limitations in the SMP, it was not possible with a larger intervention group. In comparison, a randomized school lunch intervention in Denmark calculated that it would need 673 students for a sufficient sample size (143). Another school meal intervention in Denmark had 984 participating students (130). A school intervention research by Sahota et al. (144) aimed at reducing the risk factors for obesity (with school lunches as one of the approaches used) in the UK, included 10 schools and a total of 634 students; the authors argued that this sample was very small and that more schools were needed to provide clear results. While there may be several other reasons that limit the comparisons between Norway and Denmark and between Norway and the UK, it is still likely that the SMP, with 164 students and two schools, was underpowered, increasing the risk for type II error. Following Nayak (142), absence of evidence in underpowered studies, such as the SMP, should not be interpreted as evidence of absence.

7.2.3 Credibility assessment for individual interviews (Paper II)

Paper II was written accordingly to Tong et al.'s (116) COREQ checklist with the aim of providing transparency in the research process and ensuring credibility of the findings. In this way, the data were presented so that readers could clearly see what had been done, as recommended by Giacomini et al. (136). Overall, in Paper II, we identified positive experiences related to the free school lunch. This was not surprising, as the students received the meals for free, and many of the previously identified challenges with school lunches were not applicable to the SMP. These issues included variety in the foods offered, allowing food-related autonomy, the absence of stigma related to subsidized school lunches, and not having the need to stand in a long line waiting for food (23,88,93,103,131,145-149). However, the findings might also be influenced by the interview setting,

the interviewers, the interview guide, and/or the study sample, which will be discussed below.

Self-selection bias was not possible avoid, in that participating students may differ from those that did not participate (150). For instance, the students we interviewed might have had more positive experiences relating to the free school lunch, whereas those who did not participate might have been more reluctant to sign up for the interviews. It is therefore important to note that the findings in Paper II were based on the experiences of the students and teachers who participated in the interviews. In addition, one of the teachers (Hannah) participated in both years and was particularly elaborative, providing more details in the interviews. Therefore, the findings were likely to give undue weight based on her experiences (118). The participants could have also been motivated by the gift cards they received for participating (more information in chapter 7.3).

The interviews provided valuable knowledge about how the students and teachers experienced the free meal and how they remembered it five years later. Semi-structured interviews were considered the most appropriate method to use, as we had a set of items we wanted to address but within a flexible frame, allowing the interviewee to elaborate and the interviewer to follow up on their answers (114). This was particularly experienced with the interviews in 2020, which were conducted by the Ph.D. candidate. Furthermore, individual interviews were considered highly practical, with a low participant burden, because the students and teachers could choose the interview form that suited them best. This led to different interview settings, which, in different ways, may be considered limitations. In 2015, all interviews were conducted at the school. In 2020, student interviews were conducted at school and by telephone, and the two teacher interviews were conducted on a digital platform. Interviews in person would have been preferable for capturing non-verbal communication (114). However, access to the participants and the COVID-19 pandemic restricted interviews in person. In retrospect, focus groups (including the control group) might have provided more conflicting findings. According to Draper and Swift (114), focus group interviews may facilitate a layer of meaning beyond what is capable of being captured in individual interviews based on group dynamics. Giacomini et al. (136), stated that individual interviews are suitable

for experiences, whereas focus group interviews are more appropriate for interpersonal dynamics. Still, a combination of other qualitative methods might have added rigor to this study, with an opportunity to capture information that may be overlooked by using one method (136). For instance, observations in the classroom during the school lunch break could have been conducted.

As argued by Draper and Swift (114), the researcher is the main tool in qualitative data collection. Although the analysis was conducted by two researchers, a limitation of Paper II is that the interview data were collected by different interviewers at two time points, five years apart. The interviewers did not keep reflexive diaries, which may have enhanced credibility (114). It is likely that the interviewer had some influence on the research process and the findings, as the interviewers were all women with public health educational backgrounds, mainly novice researchers, and around 20-30 years old. The interviews were also short, around 20-40 minutes. Draper and Swift (114) argued that a more experienced researcher might have been able to naturally lead the interviewees in more depth. Furthermore, the Ph.D. candidate contributed to the data collection in 2014 and 2015. She had previously published a paper on the SMP (see (15)), and had social work experience, which likely affected the direction of the interviews. This influence could be considered both positive and negative because of her familiarity with the project, and it is likely that a researcher without this familiarity with the SMP would have had a different take on the interviews.

Overall, the different interviewers, the different interview guides and different setting for interviews are likely to affect the duration of interviews as well as the tone of the interviews. Credibility would have been increased by keeping a reflexive diary, debriefing, and participant-checking to confirm whether the interpretation from the transcribed text reflected the students and teachers' experiences (114,151-153).

7.2.4 Measurement and analysis in the PIRLS (Paper III)

Compared with other subjects, such as mathematics and science, reading may be more difficult to measure, as it is context dependent and not explicitly articulated in school curricula (154). Thus, the PIRLS used a comprehensive framework ensuring reliability and validity of the study. National coordinators contributed to

all parts of the preparations for the sampling design and data handling. Please visit the reports by Martin et al. (119), Meinck (120), and Mullis et al.(121) for a detailed explanation of the methods and process. The following paragraphs will address methodological considerations relating to the specific sample and analysis used in Paper III.

The PIRLS had a cross-sectional study design, and the nature of this design limited the causal explanation for the impact of having breakfast on reading literacy (155). Students self-reported whether they usually had breakfast or not. As for the SMP, the use of self-report for breakfast and for measures in SES include a risk for social desirability bias (137) and should therefore be acknowledged as a limitation. Furthermore, students answered only one question regarding breakfast, not measuring what they had consumed. The content of their breakfast might be important for reading literacy (81) and should therefore be investigated further.

The analysis in Paper III was only adjusted for SES and gender. For future research, it might be relevant to adjust for variables that are measured in the PIRLS and that, in different ways, may also impact reading. These may include student confidence in reading, whether they were involved in literacy tasks early in life, whether their parents had expectations that they would reach a certain level of education, teachers perceptions of limitations in student's needs, student bullying and problems relating to disruptive students (102). Then, to investigate how much of the variance in reading achievement that can be explained by having breakfast. The PIRLS included breakfast habits for the first time in 2016, and it would therefore be interesting for further research to conduct trend analysis comparing the results from 2016 with newer results from 2022 (the PIRLS was conducted in 2021, and the results will be published in 2022). This was recently done for TIMSS data by Vik et al. (87).

The reading literacy test used in Paper III was pen and paper based. In 2016, the PIRLS was extended to include a digital version called the ePIRLS, with the recognition that the internet has become an increasingly used resource for reading which requires online reading skills (156). The sample in the ePIRLS is a subset of that in the PIRLS, which makes comparisons with the PIRLS possible. Denmark, Norway, and Sweden had students who participated in both the

ePIRLS and the PIRLS, and the results from the international PIRLS report showed that these students had higher reading achievement scores in the ePIRLS than in the PIRLS (156). Considering that the ePIRLS was conducted the day after the PIRLS with a subsample of the same students, one might argue that the students were more experienced in the testing and thus scored higher. Interestingly, the opposite results were shown in Portugal, Georgia, Italy, Slovenia, and Chinese Taipei, with higher reading literacy achievements shown in the PIRLS than in the ePIRLS (156). The higher online reading literacy achievement in Nordic countries may reflect the wide use of digital technology in Nordic school systems and a focus on strengthening students' digital competence (157). In this regard, it may also be relevant to consider that the SES scale included a measure of the number of books at home. More research is needed to clarify the degree to which book reading applies to measuring reading and whether the number of books at home is relevant to include in the measure of SES when online reading has increased, and digital skills have improved.

7.2.5 Sampling in the PIRLS and country comparisons (Paper III)

The Nordic countries differed to some degree in their sampling characteristics in the PIRLS which hindered a full comparison between the countries. For instance, while selected schools in Finland and Norway were obligated to participate, schools in Denmark and Sweden had voluntary school participation (see Appendix VI). Still, all the Nordic countries met the participation requirement set by the PIRLS which was a minimum of 85% of sampled students, 95% of sampled classes and 85% of sampled schools (119,120).

Furthermore, the results of the study are not applicable to students and schools excluded from the sample, which were special needs schools, special language schools, very smalls schools (except those in Finland) and Rudolf Steiner schools in Denmark. Another issue regarding country comparison is considering students attending different grades. The advantage of including Norwegian fifth graders in the sample was that they were age comparable to the rest of the Nordic sample in Paper III. This compromise may, however, cause bias, as Norwegian students had one more year of formal schooling compared with other Nordic students. Nevertheless, students in other Nordic countries usually attend preschool or preprimary school (158-160), which may limit the impact of the extra school year in Norway. A further limitation of the sampling design in the PIRLS was the

cluster sampling of schools and classrooms instead of students. Students in one classroom are prone to be more alike in terms of educational outcomes, as they share the same teacher and learning environment. To account for this, the PIRLS uses large sample sizes and requires from 3.000-4.000 participating students (120), a requirement met in the included samples in Paper III (127).

7.2.6 Strengths

Other than the established important methodological limitations presented, there are also some strengths to consider in this thesis. The SMP intervention lasted one school year (10 months), which is relatively long compared with the duration of previous school meal intervention research (research (e.g., three months in Sørensen et al. (92) and four months in two studies by Ask et al. (95) and Ask et al. (129). It also included a control group, had a high response rate, and had a few participants lost to follow-up. Another strength of the SMP was that students' voices were highlighted in Paper II. The interviews were conducted in a follow-up design, with the interviews conducted immediately after the intervention and five years later, which is rarely seen in qualitative research. In addition, the presence of researchers from two disciplines—public health/nutrition and the nursing sciences—might have strengthened the credibility of the findings, as argued by Giacomini et al (136). Finally, a large study sample was used with a standardized tool to measure reading in the association between reading and breakfast. Furthermore, the overall ethical risk and participant burden were considered low for both the SMP and the PIRLS. This is discussed in the following section.

7.3 Ethical considerations

According to The World Medical Association (161), participants' health, rights, and interests should be promoted and ensured in all research, and the possible risk or burden of participating should be addressed and reduced. The Helsinki Declaration adopted by the World Medical Association (161) provides ethical principles for research involving human participants, acknowledging that some groups are particularly vulnerable, and that these groups should receive special protection. Children and young adolescents may be considered vulnerable groups, and researchers need to ensure that these participants understand the research purpose and what involvement in research means for them, thereby safeguarding their freely informed consent (162,163). Ethical considerations will

therefore be discussed with reference to the recruitment process and study samples used in Papers I–III, namely, adolescents aged 11–16 years old.

7.3.1 Voluntary participation, freely informed consent, and participant burden

Participation in research must be voluntary, and this can be ensured by gathering informed consent from a person who is capable of giving it. When a person is considered uncapable, there is a need for a legally authorized representative to give consent. Children and adolescents below 16 years old are considered vulnerable groups, and parental consent must be obtained following principles from the Norwegian Centre for Research Data (162,164). In cases in which there are non-sensitive data, 15-year-olds are considered capable of consenting for themselves (165). However, their capacity to consent is debated, for instance, by Coyne (166). According to Coyne (166), problems with parental consent include the assumption that children and adolescents are unable to understand the research purpose and that parents can evaluate their children's risks and benefits. Further, a risk that parents could persuade or refuse their children's participation. For the SMP, food and the school environment were considered non-sensitive topics, although this does not exclude the possibility that such topics may be sensitive for some students. For the school environment study (Paper I) and the qualitative interviews in 2015 (Paper II), parental consent was required to participate, and students were informed about the possibility of withdrawing from the study before data collection. Those students who wanted to participate but did not have parental consent prior to the data collection were eventually allowed to participate if parents/caretakers provided consent over telephone; in these cases, written parental consent was obtained after data collection. In 2020, the students were above 16 years of age. They were informed about the project and the possibility of withdrawing, and that they could avoid answering questions if they felt like doing so. Those students participating in the qualitative interviews in 2020 were regarded as competent to consent for themselves, maintaining their self-determination.

A risk for all students included in all the papers in this thesis is the degree to which they felt obligated to participate. This risk applies to all research participants, whether children consent for themselves or parents' consents on

their behalf (166). Even if students were informed that participation was voluntary in the SMP, they did receive school lunches for free, and they might have felt obliged to participate in both the research and the free meals (instead of bringing their own packed meals, if they preferred). Students and parents in the PIRLS might also have felt the need to participate, as the project was government funded. In addition, the PIRLS was seen as part of the students' normal school activities in which all their other peers participated. Applying to both the SMP and the PIRLS, if students chose not to participate, they might have experienced this as exclusion from the rest of the group. As this thesis previously argued for the importance of the social environment, interaction, and inclusion for educational outcomes, this potential exclusion could have adverse effects on public health.

Another ethical issue concerning the interviews in 2020 and the interviewees' feeling of obligation to participate was that the students received a gift card for participating. This was done to enhance the recruitment in a difficult-to-reach population. According to Graham et al. (167), payment for participating in research should be carefully considered. This is especially important to consider among students from low-income households, as payment might impact whether participation indeed was voluntary. Gift card as an incentive to participate may also negatively impact the power dynamics between the interviewer and the interviewee; there might exist a deeper will to please the researcher if they receive information about payment in advance of the interviews (167), as was the case in the SMP. The students participating in the interviews might therefore have been more enthusiastic about the experience with the free school lunch than they actually were. It is unknown whether the students who participated in the interviews belonged to low-income households, and drawing conclusions based on this is therefore difficult. However, payment may also be regarded as a way to acknowledge their involvement in research (167). The amount of gift cards used in recruiting for the qualitative interviews in 2020 was carefully considered and was on a low amount so that they would, to a lesser extent, be considered a means of pressure. Overall, although ethical risk factors were present for all the studies, particularly related to the students' freely informed consent to participate, the overall risk and participant burden were considered low for both the SMP and the PIRLS.

7.4 Implications for practice and research

The results from this thesis indicate the potential of having breakfast at home and providing free school lunches in benefitting educational outcomes and public health This can be relevant for policy makers, the educational sector, the health sector, and researchers in the field of public health nutrition and education. Although no effect of the SMP on the school environment was found (Paper I), we have seen that having breakfast at home and providing school lunches may be important for students' reading literacy (Paper III), the social environment, diet, school functioning, and social equality (Paper II).

The provision of free school lunches in the SMP was managed by the local cook, who provided the meal, and the students, who were involved in organizing the set-up in the classroom. The students liked the bread meal because it was fresh, and they could have varied types of food on top of the bread, accompanied by fruits and vegetables, providing them with practice in food-related autonomy. (118). This gave the students a chance to make their own food choices, although all the options were healthy. Many schools in Norway do not have canteens or kitchen facilities to prepare food on a large scale. In this way, easy and manageable bread meals may pave the way for the provision of meals in schools. Illustrated in the SMP, school lunch with the provision of bread meals can be well liked, keeping students involved in organizing their meals in the classroom.

As mentioned earlier, there is a governmental plan (see (52)) to introduce school meal provision in Norway, and it is up to the municipalities to organize these meals. There was a positive experience related to the SMP documented in this thesis, and Kolve et al. (53) documented positive outcomes related to students' social environment following the provision of hot meals for two weeks in lower secondary schools. This was reported as they shared the meal together, even though many students did not like nor eat the hot meal (53), whereas packed meals may be well liked. Fossgard et al. (75) illustrated that packed meals may have many positive associations for students. When asked about what students associated with bad lunches, students linked for the most part meals with bread to be negative, which is in contrast to the finding that student liked the bread meal in the SMP. Furthermore, Fossgard et al. (75) suggested that students would like their lunch to taste good and to be enough for them, requirements that packed

meals cannot always fulfill (75). It was also suggested that students preferred freedom to decide what to do and whom to spend time with during their lunch break, and that they would like involvement of a teacher to reduce disturbing noise (75). Although these studies investigated different arrangements of school meals (provision of bread meals, hot meals or packed meals), they share evidence suggesting that students in Norway value the social aspect of lunches with an opportunity to interact with classmates (53,75,118). This should be given attention for further practice. Overall, more research is needed based on the Norwegian context, and evaluate the provision of meals in schools remains important. Studies that can assess (long term) effects among representative samples are needed, as well as studies that consider the views of students, stakeholders, and other key informants. Other points for future research may be to investigate what type of breakfast that may be most beneficial for reading and school achievements. There is also a need to determine whether older adolescents may respond differently to school food interventions, as their diet tends to get poorer, and they skip meals more frequently (36,37).

This thesis used both quantitative and qualitative methods to investigate the free school lunches offered in the SMP. The methods used were independent from one another, and a suggestion for further research is to use both methods in a mixed-methods approach. This could enrich meanings and experiences, enable process evaluation, and consider context; this could also provide an opportunity for cause–effect studies and the generalization of results (168). In this way, a richer description of breakfast and school meals in relation to education and public health might be provided, that also can be used to inform policy makers in Norway.

A topic that has been mentioned but not addressed in this thesis is related to the risk for overweight and obesity. There has been a concern on whether the provision of meals at schools may increase this risk, which is linked to whether a student may have a second breakfast or school lunch, resulting in increased energy intake (12). It was mentioned by one student in the interviews in the SMP that he consumed extra food in the SMP; five years later, he reflected on this experience and realized that he actually needed the food because he was thin (118). This concern was not supported in the review by Cohen et al. (12). Andreyeva and Sun (90) showed no adverse effect on weight status when the

CEP was adopted in schools. Rather, the authors suggested that students with a lower SES had lower risk for being overweight when offering breakfast and lunch free for everyone, simultaneously as the overall number of students participating in these meals had increased (90). However, Norwegian students in the intervention group in the SMP had an increase in their weight comparted with those in the control group (59). Similar results were seen among boys in another school lunch intervention in Norway, although not when breakfast was provided (95,129). As childhood overweight and obesity remain public health issues in Norway and other European countries as well (20), the potential risk for increased weight should not be neglected in future breakfast and lunch programs.

It may take decades to change policies and practices enabling students to eat healthy meals at school, as the provision of meals in schools is complex and policy driven (23,106). Furthermore, although great potential, effects in Norway are still unclear, and meals at home or packed meals may be better compared to school meal provision especially if nutritional standards for food provision are not followed. Still, provision of meals in school provides all students the opportunity to eat a meal during the day, which is relevant to Norway as some students does not have food to eat at all (29, 71). Based on the results of this thesis, municipalities, as school owners, are encouraged to prioritize healthy meals on the school agenda, seek and utilize information on the best practices, promote healthy breakfast and school lunch habits, and use resources they already have. This includes the need to strengthen schools' compliance with Norwegian guidelines for food and meals in schools. Cooperation among policymakers, schools, and researchers in designing and evaluating school meal programs to ensure that policy outcomes are met also remains important.

8.0. Conclusion

The overall aim of this thesis was to investigate the role of having breakfast at home and providing free school lunches in students' educational outcomes and public health promotion in Norway. Although breakfast and school lunch are traditionally viewed as family responsibilities in Norway, the positive outcomes following breakfast and school lunch may suggest these meals as pathways to enhance educational outcomes and public health. However, it is stressed that there was no significant effect of the free school meal on the school environment. The argument for potential pathways is based on the finding that having breakfast often was associated with higher reading literacy achievement. Furthermore, that students and teachers experienced that the school meal project provided at lunchtime benefitted the students' diets, social environment, friendship and social learning, their school function, and social equality. These meals could therefore also be considered a school domain, and thus, there may be a need to prioritize breakfast and lunch on the school agenda.

The findings in this thesis are a contributions to the research field of public health nutrition and represents a few pieces of the puzzle on breakfast and school lunch in relation to education and public health in the Norwegian context. However, several methodological considerations must be considered when interpreting the results and their implications. Further research should clarify possible causal pathways in this research field.

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Appendices

Papers I-III
Appendix I: Ethical approval from NSD
Appendix II: Information letter and consent forms for the SMP
Appendix III: Student questionnaire in the SMP
Appendix IV: List over foods allowed in the SMP
Appendix V: Interview guides in the SMP
Appendix VI: Mail contact with PIRLS coordinators regarding recruitment process (copy of e-mails)

Paper I

Possible effects of a Free School Meal on School Environment: The School Meal Intervention in Norway

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Abstract
Evidence suggests that a free school meal can improve children and adolescent diet, social environment, concentration, and school performance. This study aimed to investigate possible effects of a free, healthy school meal among students that usually eat packed meals on behavioral issues, inactiveness, self-efficacy, school enjoyment and classroom environment. A school meal according to the dietary guidelines was served to students in the intervention group (n=55) for one year. A control group consumed packed meals as usual (n=109). Students (10-12 years) responded to a questionnaire at baseline and after one year. We used linear regression analyses and did not find significant effects of a free school meal on behavioral issues (B= 0.01, *p* 0.86), inactiveness (B= -0.05, *p* 0.51), self - efficacy (B= -0.04, *p* 0.52), school enjoyment (B= 0.11, *p* 0.19) or classroom environment (B= -0.07, *p* 0.26). Methodological limitations might explain our lack of findings.

Keywords: Free school meal, school lunch, behavior, inactiveness, self-efficacy, school enjoyment, Norway, intervention

Background

A healthy nutritious diet as an integrated element of a healthy lifestyle provides optimal conditions for brain development, cognition and learning (Naveed, Lakka, & Haapala, 2020). In particular, a high intake of fish, fruit and vegetables is associated with improved academic achievement during childhood (Naveed et al., 2020). Healthy school meals are seen as important investments in children's wellbeing and for the future, as it provides an opportunity for social interaction and helps prepare them for the rest of the school day (Sarlio-Lähteenkorva & Manninen, 2010). The school meal offers a break from the formal

school day, and a setting where social bonds can strengthen, through a sense of commonality and through talking with and caring for each other (Fossgard, Wergedahl, Bjorkkjaer, & Holthe, 2018; Neely, Walton, & Stephens, 2014). A healthy meal environment can also improve student alertness at school (Golley et al., 2010).

There are no universal free school meals in Norway, and less than 10% of schools from 1st-10th grade have local arrangements for parent-paid school meals (breakfast and lunch)(Federici et al., 2017). Most students in Norway (96%) attend public schools (Statistics Norway, 2020). Public schools therefore constitute a setting where all children and adolescents regardless of social background and life circumstances, can be reached (Kairiene & Sprindziunas, 2016). Meals eaten at school during lunchtime constitute 23-29% of students total dietary intake (TDI), whereas if both breakfast and lunch are provided at school, this may contribute to nearly 50% of their TDI (Colombo, Patterson, Elinder, & Lindroos, 2020; Cullen & Chen, 2017; Prynne et al., 2013; Sanigorski, Bell, Kremer, & Swinburn, 2005).

Traditionally, Norwegian children and adolescents bring packed lunches from home. Like many other students from high income countries without provided school meals, parents/caretakers are responsible for providing school meals, resulting in varying nutritional quality (Evans, Cleghorn, Greenwood, & Cade, 2010; Prynne et al., 2013; Sanigorski et al., 2005). In a systematic review, Mekonnen et al. (2020) showed that self-efficacy, food preferences, knowledge, availability and accessibility at home, food rules and parental modeling are important mediating factors for socio-economic differences in youths' diet. Thus, the home environment is important for children's dietary behavior. Furthermore, a more favorable dietary pattern is seen among youth with higher educated parents; they consume more fruit and vegetables, and less sugar-sweetened beverages and energy dense food (Desbouys, Méjean, De Henauw, & Castetbon, 2020).

In Sweden, the national free school meal makes an important contribution to student diet with higher nutrient density compared to meals consumed outside school. This was particularly important for students with lower socio-economic status (SES) as the free meal at school compensated for a lower dietary quality at home (Colombo et al., 2020). Recently, Lundborg et al. (2021) documented that exposure to the Swedish school meal during school children's entire period in primary school had long-term positive effects on lifetime income, with greater effect among low SES households (Lundborg, Rooth, & Alex-Petersen, 2021).

In Norway, a study showed that serving a free school meal for one year increased students intake of healthy foods, particularly among students with lower socio-economic status (SES) and thereby suggested that free school meals may be an approach to reduce health inequalities (Vik, Van Lippevelde, & Øverby, 2019). However, these social and cultural differences do not only impact student dietary habits. A Norwegian report (The Church City Mission, 2019) triggered a public debate in the media, as it revealed that there is a stigma and a social divide related to packed school meals. Young people living in poverty during childhood experienced the school meal situation as something they were ashamed over because they did not have a packed meal with them; or they had packed meals that negatively stood out compared to 'normal' packed meals (The Church City Mission, 2019).

This corresponds to previous research suggesting that providing a free school meal only to students from disadvantaged families may generate stigma and segregation (Kairiene & Sprindziunas, 2016; Yu, Lim, & Kelly, 2019). As universal free school meals represent a great potential for benefits on several domains of childhood development, such as their social climate and well-being (Taylor, Garnett, Horton, & Farineau, 2020), for improved diet (Cohen, Hecht, McLoughlin, Turner, & Schwartz, 2021; Evans et al., 2010), academic performance (Cohen et al., 2021) and for reducing social inequalities (Lundborg et al., 2021; Vik, Van Lippevelde, et al., 2019), free school meals represent an important target in public health.

During one school year, students in a Norwegian 6th grade were served a free healthy school meal in a project named 'The School Meal Project'. The primary outcome of the project was dietary behaviors at school reported elsewhere (Illøkken et al., 2017; Vik, Næss, Heslien, & Øverby, 2019; Vik, Van Lippevelde, et al., 2019). Besides dietary behaviors, students in 'The School Meal Project' answered questions related to behavioral aspects of the school day such as behavioral issues, inactiveness in class, self-efficacy, school enjoyment and classroom environment. Thus, we wanted to investigate whether the free school meal had effects on behavioral issues, inactiveness, self-efficacy, school enjoyment and classroom environment as well, defined as school environment in the current study. Further if boys and girls, and students with higher or lower socio-economic status (SES), responded to the intervention in different ways.

The aim of this study was to investigate possible effects of a free, healthy school meal on reducing behavioral issues and inactiveness, increasing self-efficacy and school enjoyment, and improving classroom environment.

Methods

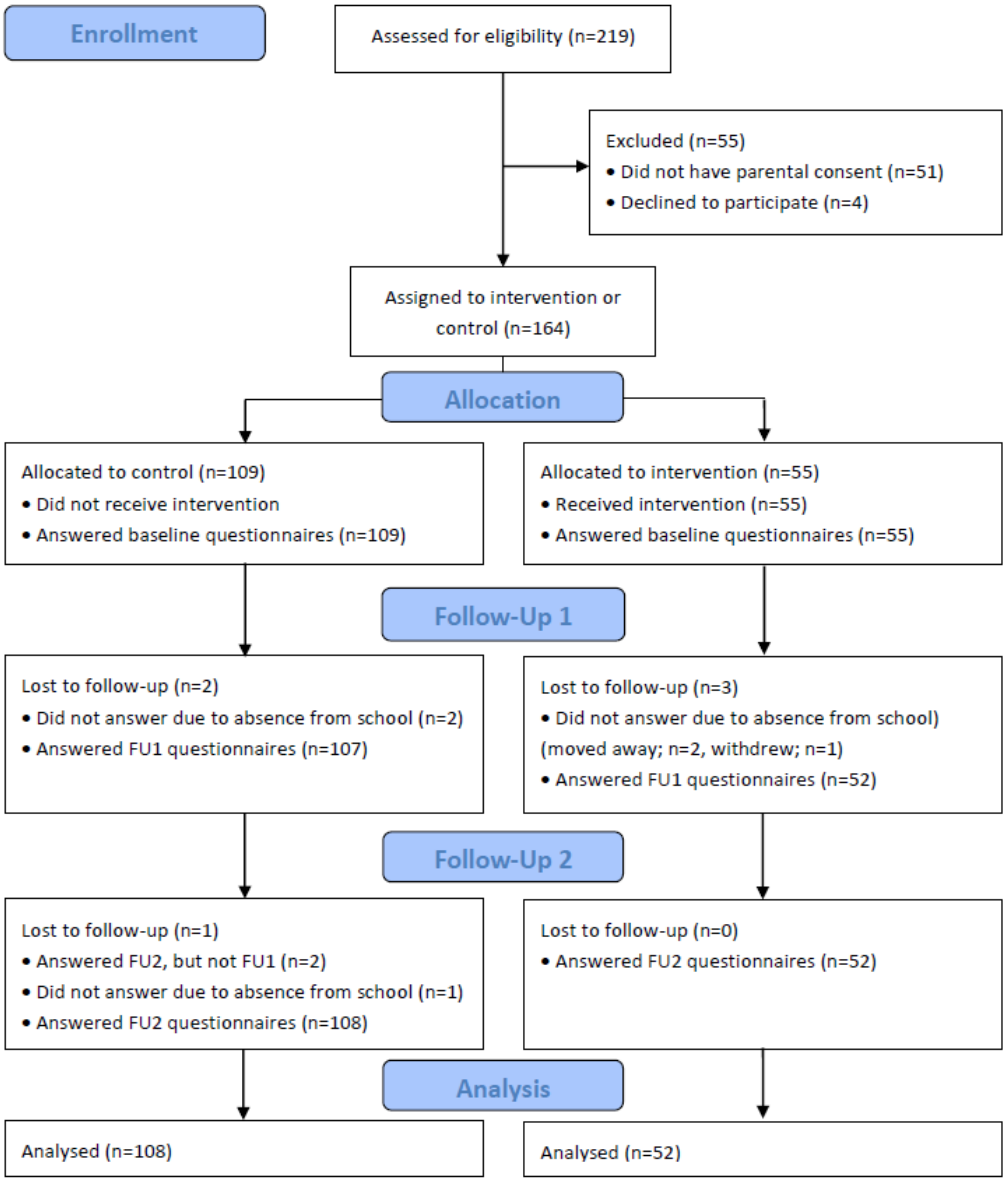
The School Meal Project

'The School Meal Project' was a non-randomized intervention conducted in two elementary schools in Norway. During one school year, Norwegian 6th grade students aged 11 years old (the intervention group) were served a daily free healthy school meal at lunch time (cold meal with bread, healthy spread, fruit and vegetables) according to the Norwegian Dietary Guidelines, while a control group continued with packed meals as usual. The project was initially proposed by a local cook who prepared and served the meal. The research team at the University of Agder designed and carried out the research activities. A convenience sample consisting of one control group (n=109) and one intervention group (n=55) was therefore chosen to make the intervention feasible.

The project had a participation rate of 75 % at baseline; participation rate in intervention group and control group was respectively 96 % and 67 % (Figure 1). Students in both groups answered a comprehensive pen and paper-based questionnaire at baseline (August 2014) and follow-up (June 2015). Consent to participate was gathered by active parental consent following principles from Wolfenden et al. (2009). The students were informed about the possibility to withdraw from the project. The project had few respondents lost to follow-up (n=3 in each group), these were due to absence from school, withdrawal

or moving to another school district (Figure 1). The design and methods have previously been described (Vik, Van Lippevelde, et al., 2019).

Figure 1
Flow chart of the enrollment process (Vik, Van Lippevelde, et al., 2019)



Measures

A likert-scale questionnaire was used to measure our school environment outcome variables: behavioral issues, inactiveness, self-efficacy, school enjoyment and classroom environment. Table 1 presents the survey questions in the questionnaire

Table 1

Survey questions for school environment, main variables indicated in bold.

Behavioral issues
Do you make so much noise in class that the teachers yell at you?
Are you expelled from class because you make too much noise?
Does your teacher write down your name because of bad behavior?
Do you disturb the class to such an extent that other students in your class can't pay attention?
Inactiveness
Do you find it uncomfortable to speak up in class?
Do you raise your hand to answer questions in class? †
Do you feel shy in class?
How often does it happen that you haven't said anything in class for one day?
When I have to say something in class, I'm afraid that I will say something stupid
How often do you feel shy in meeting with people of the opposite gender?
Occasionally you do not raise your hand even though you know the answer, because it is uncomfortable to speak up in class
School enjoyment
I like being at school
The school is interesting
I look forward to going to school
I like school activities
We do a lot of fun things at school
I wish I didn't have to go to school †
I do not like school activities †
I learn a lot at school
It is many things at school which I don't like †
The teachers assist me when I need it
Self-efficacy
I can master the subjects that is taught in school this year
I can do even the most demanding work if I try
If I have enough time, I can do a good job with all my schoolwork
I can do almost any schoolwork if I don't give up
I can learn schoolwork although it is demanding
I'm sure that I can figure out how to do the most demanding work
Classroom environment
The students in my class enjoy being together
Most of my fellow students are kind and helpful with each other
My fellow students accept me as I am
When a classmate is upset, the others comfort him / her

†reversed item.

Each item had 5 response alternatives ranging from very often, often, sometimes, rarely, to never, except from self-efficacy (responses completely true, true, partly true, untrue and completely untrue) and classroom environment (responses always, often, sometimes, rarely, never). The questionnaire was pilot-tested prior to data collection, and parts of the questionnaire is used in previous research (Øverby & Høigaard, 2012).

Sum- score variables were made for each outcome variable by summarizing the score from each question. Change variables for each outcome variable were made by subtracting follow-up score with baseline values to investigate possible change in the outcome variables.

Parental educational level was reported by parents in a separate questionnaire and used as proxy

for SES. The scores for SES were dichotomized into lower or higher SES based on two items. First "what is your highest level of completed education" and second "what is your partner's highest level of completed education"? The response options were "primary school", "upper secondary school", "3-4 years higher education and "5 or more years of higher education" (and "do not have a partner" for the second item).

Lower SES was identified as both parents (or one single parent) having completed primary school and upper secondary school, and higher SES with at least one parent completed higher education (Vik, Van Lippevelde, et al., 2019).

Statistics

The sum-scores for behavioral issues, inactiveness, self-efficacy, school enjoyment and classroom environment were all found reliable with respectively α= 0.7, 0.7, 0.9, 0.9 and 0.8 Cronbach's alpha values, confirming internal consistency (Bland, 2015). Baseline- and descriptive characteristics are presented as proportion, mean and standard deviation (SD) or median and interquartile range (25%-75%) where appropriate. Preliminary analyses were performed to check that assumptions of normality, linearity, homoscedasticity, and multicollinearity were reasonably met. Linear regression was performed for each of the outcome variables to assess the effect of the free school meal (intervention/control group as the independent variable) on change in the outcome variables behavioral issues, inactiveness, school enjoyment, self-efficacy, and classroom environment. The regression analysis for each of the outcome variables are presented together in the complete regression model (Table 4). The model is adjusted for baseline measures (model 1), adding adjustment for gender in model 2 and adding gender and SES in model 3. Gender and SES were inserted as categorical variables (0= girl, 1=boy, SES:0=lower, 1=higher), while the change variable and baseline sum-score were indexed as continuous variables. Analyses were performed using IBM® SPSS® Statistics 25.

Results

Out of 219 invited students, 164 (74%) gave consent and participated at baseline. There were more boys in the intervention group compared to the control group (*p* 0.07), and there were higher educated parents in the control group compared to the intervention group (*p* 0.23) (Table 2).

Table 2

Baseline demographic characteristics (n=164)

Characteristics	All	Intervention group (n=55)	Control Group (n=109)	Group comparison
Gender, n (%)				
Boys	85 (52)	34 (62)	51 (47)	
Girls	79 (48)	21 (38)	58 (53)	$p = 0.007$
Age				
Mean (SD)	11.00 (0.78)	11.10 (0.32)	11.14 (0.92)	$p = 0.86$
SES, n (%)				
Lower	53 (39)	21 (46)	32 (35)	
Higher	63 (41	25 (48)	38 (38)	*p = 0.23*

Pearson's chi square for gender and SES (socio-economic status). Independent sample t-test for age.

The intervention- and the control group were comparable with regards to behavioral issues, inactiveness in class, self-efficacy and classroom environment at baseline and follow-up (Table 3). There was a significant change in school enjoyment in favor of the intervention group at follow-up (*p* 0.04). This change was not adjusted for baseline (Table 3). Analysis adjusting for baseline presented in Table 4 did not show significant effects of free school meals on reduced behavioral issues or inactiveness, increased school enjoyment or self-efficacy or improved classroom environment. Overall, the analysis showed wide confidence intervals (Table 4). Furthermore, not related to intervention effect, analysis showed that girls reduced their inactiveness in class more than boys (B= -0.21, *p* 0.02), and that there was a significant change in self-efficacy according to SES: students with higher educated parents increased their self-efficacy more compared to students with lower educated parents (B= 0.20, *p* <0.01).

Table 3 *Descriptive scores for outcome variables as md (IQR) and mean (SD) for change*

Outcome variables	**Baseline**			**Follow-up**			**Change**		
	Inter-vention	**Control**	**p-value ***	**Inter-vention**	**Control**	**p-value ***	**Inter-vention**	**Control**	**p-value****
Behavior	5 (4,7)	5 (4,6)	0.36	5 (4,7)	5 (4,6)	0.12	-0.08 (1.1)	0.00 (1.1)	0.68
Inactiveness	13 (10,16)	12 (10,15)	0.83	12 (9,15)	12 (9,16)	0.74	-0.29 (4.3)	0.22 (4.0)	0.49
Self-efficacy	22 (20,26)	24 (19,27)	0.11	24 (23,26)	24 (22,28)	0.33	1.13 (3.6)	1.21 (4.5)	0.92
School enjoyment	36 (30,41)	40 (35,44)	0.27	38 (33,44)	39 (33,39)	0.08	0.91 (5.9)	-1.28 (5.7)	0.04
Classroom environment	17 (16,19)	18 (16,19)	0.69	17 (16,18)	18 (16,19)	0.35	-0.14 (1.7)	0.67 (2.9)	0.58

*Pearson's chi square
** Independent samples t-test

Table 4

Effect of a free school meal on change in behavioral issues, inactiveness, school enjoyment, self-efficacy and classroom environment using linear regression

Outcome variables	Model 1		Model 2		Model 3	
	Beta (95%CI)	*p*-value	Beta (95%CI)	*p*-value	Beta (95%CI)	*p*-value
Behavioral issues						
Control/Intervention	0.01 (-0.33-0.39)	0.86	0.02 (-0.33-0.41)	0.84	0.01 (-0.36-0.39)	0.94
Girls/boys			-0.04 (-0.50-0.30)	0.63	-0.04 (-0.48-0.32)	0.69
Lower/Higher SES					-0.13 (-0.65-0.08)	0.12
Inactiveness						
Control/Intervention	-0.05 (-1.87-0.93)	0.51	-0.03 (-1.61-1.17)	0.75	-0.04 (-1.75-1.10)	0.65
Girls/boys			-0.19 (-2.95-(-0.21))	**0.03**	-0.21 (-3.14(-0.33)	**0.02**
Lower/Higher SES					-0.16 (-2.73-0.08)	0.07
School enjoyment						
Control/Intervention	0.11 (-0.66-3.35)	0.19	0.11 (-0.65-3.39)	0.18	0.11 (-0.67-3.50)	0.18
Girls/Boys			-0.02 (-2.16-1.64)	0.79	-0.02 (-2.20-1.71)	0.80
Lower/Higher SES					0.05 (-1.32-2.60)	0.52
Self-efficacy						
Control/Intervention	-0.04 (-1.48-0.75)	0.52	-0.05 (-1.58-0.68)	0.43	-0.03 (-1.43-0.83)	0.60
Girls/Boys			0.07 (-0.50-1.64)	0.29	0.07 (-0.49-1.66)	0.28
Lower/Higher SES					0.20 (0.57-2.81)	**<0.01**
Classroom environment						
Control/Intervention	-0.07 (-1.11-0.29)	0.26	-0.08 (-1.18-0.25)	0.20	-0.08 (-1.15-0.31)	0.26
Girls/Boys			0.07 (-0.29-1.05)	0.26	0.08 (-0.29-1.09)	0.25
Lower/Higher SES					0.09 (-0.20-1.23)	0.16

Significant *p*-values indicated in bold. Dependent variable: Outcome variable. Model 1: Adjusted for baseline. Model 2: Adjusted for baseline and gender. Model 3: Adjusted for baseline, gender, and SES.

Discussion

This study did not demonstrate that a free healthy school meal for one year significantly reduced behavioral issues or inactiveness, increased school enjoyment or self-efficacy, or improved classroom

environment.

Previous research has documented that healthy free school meals following nutritional guidelines can have a positive impact on several aspects in childhood and adolescence (Cohen et al., 2021). These include for instance social benefits, improved social climate, and making students more ready to learn (Taylor et al., 2020). Furthermore, previous research has demonstrated that a free school meal can improve satisfaction with schoolwork (Ask et al., 2010). Benn & Carlsson (2014) showed how a free school meal can be beneficial for concentration and less disturbing noise in class. Berggren et al., (2017) explored how school meals can operate as a positive influence on children and adolescent wellbeing, concentration in school activities and their mood. Moreover, cross-sectional studies have shown an association between sub-optimal energy-dense diets high in sugar and behavior- and mental health problems (Lien, Lien, Heyerdahl, Thoresen, & Bjertness, 2006; Oellingrath, Svendsen, & Hestetun, 2014; Øverby & Høigaard, 2012). However, Sorensen et al. (2015) showed inconsistent findings when investigating effect of free school meals on concentration and school performance, with improved reading performance but also increased inattention and impulsivity. The researchers relate these findings to methodological issues (Sorensen et al., 2015). Given our results as well, this indicates that evaluating free school meals is a complex issue. The lack of effects in the present study could therefore be due to methodological issues. More research is needed with improved study design and methods, as well as a larger study sample.

Given the wide Confidence Intervals we detected in our analyses, the study may be underpowered (Bland, 2015). In our case, this increases the risk of uncertain estimates and thus of the results being false negative. With 55 students in the intervention group, it is likely that we have a too small, and imbalanced (for gender and SES) sample size to show that a difference might exist (Bland, 2015). Furthermore, lack of randomization, as well as using self-reported unvalidated measurement tools and the narrow age-range in our sample limits the representativeness and generalizability of the results.

Significant changes as we found in our analysis for inactiveness between girls and boys, and for self-efficacy between lower and higher parental education status, may indicate that there are different things going on during the school year that we were not able to control for, regardless of receiving free healthy school meals. 'The School Meal Project', as this current study was a part of, has previously shown effective in promoting a healthy diet and reducing social health inequalities (Illøkken et al., 2017; Vik, Van Lippevelde, et al., 2019).

The lack of results that a free school meal might influence the school environment might be due to the survey questionnaire being unsuitable for measuring school environments. Therefore, rigorous interventions with a large study sample using a cluster randomized control design and validated measurement tools and a focus on increased understanding through qualitative measures are needed to explore the possible impact of free, healthy school meals on school environment. The long intervention period and high participation rates represents strengths of this study.

Although we did not find significant effects in our current study, others have, as mentioned earlier, showed that free school meals are beneficial for several domains of childhood development. A recent systematic review conducted by Cohen et al. (2021) documented that most studies investigating universal

free school meals at lunch time following nutritional standards can promote a healthy diet, food security and academic performance. Further, as a healthy lifestyle with a healthy diet is associated with optimal learning (Naveed et al., 2020), we argue that school meals are of importance in an educational setting, for teachers and in teacher education as well.

However, Benn & Carlsson (2014) illustrated a potential gap on the view of school meals in their research: they showed that a free school meal can function as a pedagogical platform where children can practice social skills and learn about food, while some teachers viewed school meals as relating to school health policy rather than education and learning (Benn & Carlsson, 2014). Additionally, free school meals can be harmful by creating stigma if not offered as a universal free meal (Kairiene & Sprindziunas, 2016; Yu et al., 2019) and organizational factors such as lack of time, noise, standing in line, and having limited offer of food choice can influence uptake of free school meals and the dining experience (Day, Sahota, Christian, & Cocks, 2015; Sahota, Woodward, Molinari, & Pike, 2014).

It may also be argued that school meals are not necessarily better than a packed lunch from home. A nutritious packed lunch with fruit and vegetables may for instance be a better choice than a free school meal of low quality. Free school meals may also be expensive for the municipalities and introduce logistics that may be challenging for schools that are not built for this purpose. We therefore suggest that future school meal programs and research should consider the limitations with our current study, focus on teacher involvement, implement policy for nutritional guidelines, consider universal free school meals, and further explore best possible local solutions for serving varied types of food and for reducing organizational barriers.

Conclusion

Serving of healthy, free school meals at lunchtime did not reduce behavioral issues or inactiveness in class, increased school enjoyment or self-efficacy, neither did it improve classroom environment in this study. Methodological issues might explain the lack of findings in our study. We encourage further research to enhance the understanding of universal free healthy school meals among different age groups, with a larger study sample, and with study designs involving perspectives of school children, family, staff, and policymakers.

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Paper II

Free school meals as an opportunity to target social equality, healthy eating, and school functioning: experiences from students and teachers in Norway

food & nutrition research

ORIGINAL ARTICLE

Free school meals as an opportunity to target social equality, healthy eating, and school functioning: experiences from students and teachers in Norway

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Popular scientific summary

- We provide novel insights into students' and teachers' experience with a 1-year free school meal intervention shortly after the intervention and 5 years later.
- The students and teachers felt that the free school meals were beneficial for a healthy diet, social equality, school function, energy to pay attention, social interaction, and social learning.
- Action should be taken to investigate viewpoints of stakeholders and facilitators and barriers related to the implementation and uptake of free school meals.

Abstract

***Background*:** There are no national arrangements for free school meals provision in Norway despite this being an important opportunity to improve children's and adolescents' nutritional status and ultimately their physical and cognitive development. During a one academic year (2014–2015), a group of Norwegian sixth graders were served a free healthy school meal in a project called 'The School Meal Project'.
***Objective*:** To explore students' and teachers' experiences of receiving free school meals after the free school meal in 2015 and 5 years later.
***Design*:** In-depth, semi-structured interviews with separate groups in 2015 and in 2020 were conducted face to face or via telephone or digital platforms. The findings are based on 13 students (aged 12–16) and 5 teacher interviews.
***Findings*:** Thematic analysis identified four main themes that describe the perceived benefits of receiving free school meals: 1) the meal as a social event where students made new friends and learned new skills; 2) as an aid to forming healthy eating habits; and as an opportunity to 3) improve school functioning and 4) increase social equality among students.
***Discussion*:** Our analysis suggests that the free school meal may influence healthy behaviors not only at the individual level but also at the social-, physical-, and macro-levels. Methodological limitations, including self-selection bias, should be considered when interpreting our findings.
***Conclusion*:** This study provides unique insights into the social benefits for students of receiving free school meals. Our findings illustrate the potential of free school meals: eating healthy foods, sharing a meal together, and interaction between students and teachers at mealtime, to promote health, learning, and equality. In order to maximize these benefits through national implementation of free school meals, more understanding is needed of possible facilitators and barriers related to the provision and uptake of free school meals.

Keywords: *free school meal, lunch, Norway, intervention, interviews, social inequality, learning, social environment, diet, school function*

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Across Europe, school meals are becoming increasingly important target for public health programs. European policymakers widely agree upon school food policy objectives; school food should improve child nutrition, facilitate the development of healthy eating habits, and reduce or prevent obesity (1). Although it is well-documented that provision of healthy school meals improves the nutritional quality of children's diets in comparison with meals brought from home (2–7), schools across Europe do not yet offer healthy meals to all students (8). Different school meal arrangements exist across Europe. These range from universal free school meals provision as seen in Sweden and Finland (9), free school meals offered to students in low-income households as in UK and Lithuania (10, 11), meals brought from home as is common in Denmark and Norway (9), going home for lunch as is common in Germany and Switzerland (12, 13), or a combination of packed lunches and eating at home as seen in the Netherlands (14). In Norway, there are no national arrangements for provision of a free school meals, and the majority of Norwegian students bring packed bread-based meals from home (15). Challenges with the school lunch in Norway are that many children watch a screen during mealtime, few students bring fruit and vegetables, and some students does not have a packed meal with them (15).

In 2016, the Lancet 'Commission on Adolescent Health and Wellbeing' highlighted the importance of investing in young people's health; it brings a triple dividend of benefits to young people's health now, as they progress into adulthood, and to their future children (16). Indeed, focusing on facilitating healthy eating patterns in the early stages of life, a time when habits are formed increases the likelihood of sustaining a healthy dietary pattern (17). A healthy diet during adolescence is important for brain health and cognitive development (18). Improving nutritional status during adolescence can, in the long term, lower the risk for cardiovascular and metabolic diseases (17). It has been estimated that globally, one in five deaths could be prevented through improvements in diet (19). Healthy school meals have the potential to impact both these health outcomes as they make an important contribution to students' total daily energy intake (10, 20).

Evidence suggests that providing free school meals can contribute to an overall healthier diet, especially for students living in socioeconomically disadvantaged households (4, 5, 21). Free school meals have been linked to increased fruit and vegetable intake, and improved attention and energy in students. Universal free school meal provision has also been found to reduce stigma associated with means-tested eligibility for free school meals (22–24). Furthermore, free school meals have the potential to promote a varied diet, as students are given the opportunity to try new foods and dishes. There is some suggestion that they also provide a setting where students have the opportunity to acquire social skills by enjoying a meal together, and thus experience an improved school environment (25).

Between 2014 and 2015, 55 sixth-grade students (11–12 years old) from a Norwegian primary school were provided a free school meal every day during the school year in a project called 'The School Meal Project'. The project also had a control group (n = 109) who continued with eating their packed meals as before (5). Findings from the 'The School Meal Project' project showed that students receiving the free school meal had a more varied diet through increased intake of fish, fruits, and vegetables compared to the control group (5, 23). Overall, the intervention in students quality of diet had improved at 1 year follow-up, and this was particularly true of students with lower socioeconomic backgrounds (5).

Aim

The study reported in this paper was carried out in order to understand how students experienced the free school meal, and the impact it had on their diets and other aspects of their lives both immediately and 5 years later. It also aimed to explore teachers' experiences of the free school meal. The findings are presented here as they address the following question: How did students and teachers experience the free school meal?

Materials and methods

The school meal project

The School Meal Project was an intervention study that investigated the effect of providing free school meals across one academic year. Students (n = 55) aged 11 years old at a Norwegian primary school in a rural area in southern Norway were served a free healthy school meal, which met Norwegian dietary guidelines at lunch during the school year 2014–2015. A local cook provided and funded the school meals during the intervention. A few local sponsors also contributed.

The free school meal consisted of whole-grain bread, a variety of healthy foods and fruit and vegetables that were served on large platters in the classroom (5). Yogurt was served on some occasions. Students helped themselves to the food they wanted and prepared the classroom for lunch by organizing their desks so that they sat around one or two tables consuming the meal together. A teacher or an assistant was present during the school meal (5). When there was no intervention (both before and after the study period), students consumed their packed lunch from home alone at their desks in the classroom, usually while watching a screen (such as YouTube videos) or listening to a teacher reading a book. A control group (n = 109) continued bringing packed meals from home as usual. The intervention was evaluated using both quantitative

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and qualitative methods with the findings from the former reported elsewhere (5, 23, 26). This paper reports an analysis of interviews with students and teachers that were carried out immediately post-intervention (2015), and follow-up interviews with teachers and students carried out 5 years later in 2020. In-depth interviews were chosen as the method of data collection in order to encourage participants to reflect upon their thoughts, feelings, and experience of, the free school meal intervention (27). The project received ethical approval from The Norwegian Centre for Research Data in 2015 and 2020 (reference number: 38980 and 514675, respectively). This article was structured using the 'COnsolidated criteria for REporting Qualitative research' (COREQ checklist) to ensure transparency in describing methods and findings (28, 29).

Subjects and recruitment

In 2015, after the end of the free school meal and at the beginning of a new semester, the project leader sent out information and consent letters inviting students and teachers to participate in interviews. Students brought the letter home to a parent/caregiver who signed the consent letter, and then students had to return the consent letter back to the school. The letters were then collected by project workers. Of the 55 eligible students and 5 eligible teachers, 7 students and 3 teachers consented to participate in interviews.

The participants in 2015 and 2020 were two separate groups. The identity of those who were interviewed in 2015 was neither recorded, except for one of the teachers, nor asked (in 2020) if they had participated in interviews in 2015. It was therefore not possible to follow-up the same group at the two time points.

In 2020, students were in their first year of upper secondary school, and therefore not in the same class anymore. Their primary school which participated in 'The School Meal Project' had access to their previous registered address from lower secondary school. Project worker KEI delivered the letters to the school, and the school assisted in the recruitment process by sending out letters including project information and consent forms. These letters were sent out to the former students, asking them if they would be willing to be interviewed about their experience with ordinary school meals and with the free school meal they received 5 years earlier. They contacted project worker KEI by telephone for signing up for interviews. Teachers were recruited by e-mail sent from the school head teacher. In total, six students and two teachers who had taken part in the intervention in 2015 agreed to be interviewed in 2020. All participants were 16 years or older at the time of recruitment in 2020. After consulting with the Norwegian Centre for Research Data, it was decided that the students were competent to consent to participating in this research, and permission from parents was not therefore sought. Verbal consent was audio-recorded at the time of the telephone and digital interviews. A written informed consent was obtained from face-to-face meetings.

Data collection

Interview guides included questions that focused on exploring students' and teachers' experiences and their perceptions of the importance of the school meal for their diet, social environment, and learning. The interview guide was pilot tested at both time points on one student in 2015 and one student in 2020, at the same age as the recruited students both years, and a few changes were made considering rewording and structural changes in 2020. Only the relevant items from the interview guide in 2015 related to the aim in this present study are included (Table 1). Items in the interview guide from 2015 evaluating the organization and the implementation of the free school meal (such as student involvement in organizing the meal and practical collaboration) and items measuring student–teacher relations (such as if the student knows what the teacher expects and how teachers communicate) are not presented in the current study.

In 2020, the interview guide was developed by KEI, a PhD student. Members of the research team (FNV, BJ, and NCØ) reviewed the guide and provided suggestions for improvement (Table 2). The interviewers were KEI in 2020, and two master students in 2015, all women (aged 20–30 years) with a public health background. Participants in the study did not have a prior relationship with the interviewers. The interviews were audio recorded and carried out with only the interviewer and participant present.

All interviews in 2015 were conducted face to face at the school, and their duration was between 25 and 46 min. Interviews in 2020 with students were conducted over the phone, face to face, or as digital interviews and were between 20 and 40 min long. The teacher interviews in 2020 were conducted digitally using the platform Zoom because the COVID-19 pandemic made face-to-face meetings impossible. Participant characteristics and interview methods are given in Table 3. In 2020, students and teachers were sent a gift-card on 250 NOK (≈25 EUR) following the interviews.

Analysis

The interviews were transcribed verbatim, and transcripts were uploaded to NVIVO for data management. A thematic analysis following Braun and Clarke's guidelines (30) was carried out using a combined deductive and inductive approach. The deductive approach was used to produce a first analysis of the data based on the research questions and the topics in the interview guide; inductive analysis permitted identification of themes underlying what was said in the interviews and allowed new ideas and interpretations to emerge from the data.

Table 1. Relevant items from the interview guide in 2015.

	Students	Teachers
1	What is your perceptions of the free school meal? *Positive? Negative?* *Any changes in your packed meals now after the free school meal?*	How well did the organization of the school meal work? *Positive? Negative?* *What would you do different?*
2	Challenges during the free school meal? *What challenges did you face and how did you solve them?*	What are your perceptions of the free school meal? *Positive? Negative? What differences did you observe?*
3	Did the school meal lead to any changes in your class? *Positive? Negative?*	How do you perceive that the students experienced the school meal?
4	What is your main experience from the project?	What was your role as a teacher during the free school meal?
5	Belonging and friendship: *Are there any changes in who you spend time with? And if so, what changes?* *Do you believe that the school meal can impact who you spend time with? If so, how?* *Do you talk more/less when you share a meal together?* *How can a shared meal impact how you behave with one another?*	How can a free school meal impact the social climate in the class? *Did you observe any changes in who the students preferred to spend time with?* *Did they talk more/less during a shared meal?* *Differences in how the students behaved with one another?*
6	What did you learn from the project? *What value do you believe school meals have?*	How can a shared meal impact student learning? *Did you observe any new sides of the students?* *Changes in their concentration, motivation, activity in class, or general behavior during the free school meal?*
7	Comments/other things you would like to add?	Challenges during the free school meal? *What challenges did you face and how did you solve them?*
8		Did the school meal lead to any changes? If so, what changes? *Positive? Negative?*
9		What did you learn from the project? *What value do you believe school meals have?*
10		Comments/other things you would like to add?

Questions in ***italic*** illustrate example of prompt questions.

Table 2. Interview guide 2020.

	Students	Teachers
1	Tell me about your experience with school meals *Experiences from the free school meal 5 years earlier?* *Experience from school meals besides the free school meal?*	Tell me about your experiences with the free school meal *What do you remember?*
2	What do you eat for school meals now and how has this changed during your years at school?	How did you experience the importance of the free school meal for *The social environment, diet, behavior, concentration, learning, you teachers?*
3	What did you eat for the free meal in 2015? *What was different with the free school meal compared to your packed meals?*	What would you do differently? *Which challenges can you identify with a free school meal?*
4	What do you think about free school meals? *Positive? Negative?*	What do you think about free school meals? *Positive? Negative?* *What worked well in 2015?*
5	Which importance do you believe the free school meal means for: *The social environment, diet, behavior, concentration?*	If you decided, how would the school meal look like? *Organization and content of the meal?*
6	If you decided, how would the school meal look like? *Organization and content of the meal?*	Comments/other things you would like to add?
7	What would you do differently in the school meal project?	
8	What worked well in the school meal project?	
9	Comments/other things you would like to add?	

Questions in ***italic*** illustrate prompt questions.

The transcripts from interviews in both 2015 and 2020 were read, reread, coded, and recoded by two research team members: KEI and FNV. Codes were compared, and discrepancies were discussed and resolved. Table 4 shows a section of the coding frame, with themes, codes, and illustrative quotation.

First, the data from 2015 to 2020 were analyzed separately. We then compared the data looking for differences

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Table 3. Participants characteristics (n = 18).

	Student 2015 (n = 7)	Student 2020 (n = 6)	Teacher 2015 (n = 3)	Teacher 2020 (n = 2)
Boy/man	4	4	1	1
Girl/woman	3	2	2	1
Telephone	0	4	0	0
Digital video	0	0	0	2
Face to face	7	2	3	0

Table 4. Examples of quote, code, and main theme from the coding frame.

	Code	Main theme
The students were less concerned whether they had brought a packed meal when they were served a free school meal (teacher interview)	Availability of healthy food	School meals as an opportunity to improve equality
My brain function and alertness improve if I eat healthy	Improved function	Improved school functioning

Table 5. Experiences of receiving free school meals according to year and participant group.

Main theme (in bold) and subthemes	2015		2020	
	Teachers	Students	Teachers	Students
School meals as a social event	X	X	X	X
Increased social learning	X		X	
School meals as potential for forming healthy habits	X	X	X	X
Improved school functioning		X		X
School meals as an opportunity to improve equality			X	X

and similarities across the groups and concluded that the results should be presented together as the themes from both sets of interviews were similar. The few exceptions to this are also presented. The themes were not considered as definitive until the data had been read and coded at least twice by two members of the research teams, and when there was agreement that the data were organized in a meaningful and useful way (29). The findings of this analysis are presented as they answer to each theme, using direct quotations with participant pseudonym to illustrate.

Findings

The overarching themes described the benefits of receiving free school meals from the perspectives of both students and teachers. Participants viewed the free school meal as a social event where they could make new friends and learn new skills and considered the free school meal to have a positive impact on quality of student diet, school functioning, and social equality (Table 5).

School meals as a social event: making new friends and learning new skills

Many of the participants at each stage of interview discussed how the free school meal was beneficial in terms of social functioning at school. As the students, during the intervention, moved from eating packed meals alone at their desk in the classroom watching video or listening to a teacher reading a book, to sitting together and sharing the meal, they experienced increased interaction. This increased interaction was mentioned both in 2015 and in 2020. Teachers stated that eating the free school meals together created a comfortable atmosphere during which students became more friendly toward each other. By sharing a meal together, they got to know each other better and experienced increased social inclusion. In 2015, some students even said this was important for making new friends, illustrated by Christopher:

> '… when we talk to each other, we get to know more about one another. We know each other better and then I start to become friends with them'.

Although students' social experiences during lunchtimes were mostly described as positive, some negative experiences were reported. For example, the teachers described more noise during the lunch break as the students sat together and talked loud to each other. Furthermore, in 2020, some students remembered that their peers commented negatively on what they were eating. As Penny, a student talked about:

> 'You were afraid of eating fish spread even if you liked it, because others would say that it was unpleasant. That it was smelly…'

Teachers would typically correct unwanted behavior, as Hannah, a teacher said in 2015:

> 'The thing is, they actually had to learn to not make a big deal out of it if someone opens a fish spread, right. Don't make a big deal out of it because it is actually bullying'.
>
> Some of the students felt inhibited by such comments and stopped eating such foods.

School meals as an opportunity to learn social skills

This theme derived mainly from the teachers. Teachers experienced the students in a new setting and got to know them better. The teacher Hannah illustrated this in a conversation in 2015:

> 'Some of them actually started talking more. They used to be quiet [during class] … And, some students that seemed polite and kind, or just dutiful, some of them were almost a little rude. Right, so you could see, there were some things they could not actually do. Like sharing and passing [food] and stuff like that. They are good at school, but they were actually a little silly at the table … These are not things you see when you have them in class. You could see it during the meal'.

From the teacher's perspective, free school meals were an important opportunity for the students to learn how to talk and interact with one another, as illustrated above in the example with the fish spread. Students practiced table manners, learned about food culture, and learning, for example, to show gratitude and to be polite when they were served food. Examples of this were given by Kate in 2015 when she was asked about the teacher role during the meal:

> '… That you [teach them to] talk in a calm way, that you don't shout at the table, that you can't only think of yourself when you're taking food … That they learn to stand in queue'.

In 2020, when asked to elaborate on her thoughts on the free meal and learning, the other teacher Hannah commented:

> 'It's what I said about ordinary table manners. Sharing, to see each other, right? … The meal is not as important in the Norwegian culture as it is in other cultures, right? But there is a lot of learning from sitting together and talking together. To see each other … and to see that there should be enough [food] for everyone. To not be greedy. To say 'thanks' or 'can you pass me ...?' These are things we take for granted, but that they have not actually practiced. They have to learn to see that 'wow, it is really nice that there is enough for everybody and not just me'.

The importance of the free school meals as a potential platform for learning social skills should in the view of the teacher Hannah outweigh the extra workload they generate for teachers. Indeed, she suggested that involving students in organizing the meal might reduce the workload for teachers.

> '… In a busy school day, there are many teachers that are thinking 'is there yet another thing we have to think about now?'…But what you are not thinking of, is the little things they actually learn from a meal like this. That … it is like wearing a uniform, everybody eats the same food, that it is actually important, that they are equal …. In my opinion, if this [free school meal] continued, it should be a school thing, with high student involvement, organized in a way that brings learning'.
>
> Only one student, James in 2020, talked about how the free school meal made them improve their behavior at the table:
>
> 'You learn table manners …, you really have to behave, … especially when you know somebody made an effort to prepare the meal for us'.

School meals as a potential for forming healthy eating habits

At both sets of interviews, students expressed that the free school meal encouraged them to eat more healthily. Specifically, they suggested that the exposure to fruit and vegetables in the free school meals increased their liking of them. An example of this was seen in a student interview with Leon from 2020:

> 'I started eating more bell pepper and cucumber. I did not like it before I started eating it at school. But then, I ate it at school almost every day for about one year, and then I started liking it'.
>
> Interviewer: 'Do you still eat it?'
>
> 'Yes I do. Every day'.

Several students even traded out their white bread and chocolate spread for whole grain bread, cheese, and salad, illustrated by Christopher in 2015:

> 'Before the food project, I always had "Nugatti" [chocolate spread] and stuff -but after … the food

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project and for a while afterwards, I started to eat more healthy food'.

It was important to the students that they had some choice about what they ate, and that they had the chance to eat varied foods and to eat until they felt full. Carl, in 2020, said that:

'Some students might bring a packed meal, or it might be prepared by a parent, and they do not want to eat it. The parents might think that they eat it, but it can get thrown away in the garbage. When you received it for free, you can decide yourself what you want to eat … For me, I ate more. I believe this was a good thing for me, because I was thin when I was younger'.

Furthermore, they preferred food that was fresh and visually appealing, in contrast to the packed meal that was in their backpack for 3–4 h before they ate it. Sarah, in 2015, talked about that:

'It was a difference in the amount of food I ate when we received it for free. Before, I ate one slice of bread, maybe two. When we received it for free, I could eat 3–4 slices of bread. We could eat nice, fresh cheese, instead of the sweaty cheese in my packed meal. Or, like with banana, it would get brown'.

Many of the students in 2020 also remembered that the food was fresh and that this was a part of why they liked it. Carl, in 2020, said that:

'It was different food, and we knew that it was fresh.. what made the packed meal unappealing, was that we usually eat the same every day. Or that it could take 3–4 hours from we prepared it until we ate it'.

Students interviewed in 2015 believed that the free school meal increased their knowledge of healthy eating. Students interviewed in 2020 did not mention this in their interviews. Rachel, in 2015, stated that:

'It is just as tasty with healthy [food] as it is with unhealthy, and it is better to eat healthy. So, I think that many started to realize, or some of them they understood that healthy [food] was much better'.

Teachers also perceived a change in students' eating habits as a consequence of the new social dynamic at mealtimes. Seeing what their peers were eating encouraged some students to try new food. This is illustrated by teachers Hannah in 2020:

'In the beginning, some of them had their own packed meal with white bread and chocolate spread. After a while, this became strange. It did not fit within the group…'

and Kate in 2015:

'I remember when we started with the school meal project, that some of them did not like whole wheat bread …But when the school meal project started, they had to eat the bread. So, they ate it, something they learned during the school meal project'.

School meals as an opportunity for improved school functioning

Both in 2015 and 2020, students reported that free school meals increased their concentration and enabled them to have energy throughout the rest of the school day. Sarah, a student in 2015, said that:

'I believe we were more active in class the last semester'.

Interviewer: 'Why do you believe you were more active in class?'

'Maybe it was because we had eaten and that we were more used to eat healthier …'

Later in the interview, the interviewer asked:

'Did you learn anything from being a part of the school meal project?'

Sarah answered: 'I learned that you can improve your concentration by eating healthy…'

The students stated that they felt more awake and paid more attention, and the teachers reflected that students took a more active role in class. Ron, a student in 2020, said that:

'The food was good, it was fresh and tasty. I don't think anybody disliked it.… It [the free school meal] … made you more awake, and ... actually gave you energy'.

Interviewer: 'Why do you believe it is important to have food that gives energy and makes you awake?'

'Because when you sit there in class …it is easy to lose focus and doze off. But if you have a really good meal and eat until you are full, then you feel more awake, you improve your concentration, and can actually start to pay attention. At least I noticed

> that… Before 6th grade, I ate a lot of chocolate spread. Yes, I was, like, less able to concentrate. Like, felt tired'.

Free school meals were also considered to be important for a calmer learning environment during class, especially after the meal break. Instead of focusing on how hungry or unwell they felt, they could focus on the class activities, and the students spoke about the fact that they were not as hungry as they used to be after the school ended. Paula, a teacher in 2015, describes how important this is during class:

> 'If they don't eat at school, the [school] performance will decline. If they are hungry … they can't stop thinking about it. It gets all the attention'.

School meals as an opportunity of reducing inequalities between students

The potential for free school meals to reduce social and health inequalities between students was an important theme in the conversations with students in 2020; they talked about how important the free meal was for children who did not eat lunch or whose parents could not afford to give them lunch. Students were worried about the availability and affordability of healthy food in such households. As Leon said about the free school meal:

> 'What worked best was that everybody got to eat food. Not everybody ate before we received the free school meal (…) It [free school meals] was positive for, like, not everybody can afford food. So, it would be nice to be served free food at the school'.

Furthermore, the students talked about how important it was to eat the same food, to feel equal and not compare the contents of packed lunches from home, illustrated by Carl:

> 'In my opinion, it was a very good thing that everybody got the same food …. [Before] we could see that … some people brought, for instance, a chicken salad. You could see that some people were better off than others. At least, the food looked better'.

In an interview with the teacher Hannah from 2020, she commented that the free school meal equalized the students' food experiences and that because of this, the poorer students could relax during the meal.

> 'I am aware of what they had in their packed meals, but they did not always show it to the others. I think, that with the [free] meal, they could relax and eat what everybody else was eating. I believe this was important to their wellbeing. The fact that nobody can see that I had the worst bread, maybe it was moldy… Some are almost embarrassed because they had a store-bought sandwich or a pack of pastries… Like, for some it was embarrassing that they did not have a nice, packed meal'.

Discussions of the impact of free school meals in reducing social inequalities were more a feature of the interviews carried out in 2020, suggesting that this benefit became more obvious and important to students as they matured and reflected on the experience. Leon said that:

> 'I don't know if it was necessarily hugely relevant in my class, but when I think of Norway at large, it is not a given that everybody can afford a good, packed meal every single day'.

Discussion

The aim of this study was to explore how students and teachers experienced the free school meal and what they perceived as its benefits and challenges both immediately after and 5 years later. This study found that free school meals offered an arena for making new friends and learn social skills, as an aid for forming healthy eating habits, and an opportunity for improving school function and increasing social equality, thus viewing the free school meal as a positive impact on their school life and health. Furthermore, our study suggests that free school meals may represent an opportunity to support students in their social development as well as to improve their diets and capacity for learning. Indeed, school meals have gained more attention the past decade for their potential as a pedagogical tool contributing to learning about nutrition, sustainability, culture, and social- and political systems (25, 31, 32). Oostjinder and colleagues (31) give an example of how school meals can also influence public health and sustainability through interaction with education, food, environment, social relationships, policies, and to produce optimal and sustainable food behavior.

The findings from this study suggest that the learning of social skills during free school meals may be maximized if teachers play a role in managing the eating experience. Previous research has also shown that the interaction between students and the teacher responsible for supervising the meal is important for creating learning during the meal (25). Research indicates, however, that there is a tension between school meals as a pedagogic situation and the school meal as a break for students; an opportunity for them to occupy their own space without an adult agenda (33). The study reported here highlights the possibility for free school meals to be both, with students enjoying the meal together while also learning how to behave and talk to each other from interactions with the teacher and other students.

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As in previous research, this study found that free school meals can create a feeling of equality and solidarity (34, 36). It seems important that the meal is served as a universal free school meal, as free meals offered to students with low socioeconomic status (SES) can generate stigma and a sense of segregation (22, 36). This was seen in our study illustrated in comments from students who were well aware that some other students were unable to afford good quality packed lunches, and in the experiences of a teacher who noticed the embarrassment of children with poor quality packed lunches. This study adds new knowledge in that students remembered 5 years later how it felt to be equal, something that was much clearer for them in retrospect. This highlights how students seemed to value social equality as an important aspect of free school meals.

Free school meals have, as mentioned previously, also been found to improve the quality of young people's diets especially those of low SES young people (5, 21). An explanation for this may be that low-income families might be more reluctant to purchase unfamiliar foods and risk waste. Parents with low income tend to buy foods they know children like, often calorie-dense, nutrient-poor food, to reduce food waste (37). This denies children the chance to try unfamiliar foods and may prevent them from forming new tastes since repeated exposure is known to be important in forming new taste preferences (38). Our findings are in line with those from Benn and Carlsson (25), which show that the free school meal offered, to everyone regardless of income, a variety of foods and facilitated repeated exposure to new tastes. In addition, it is likely that students' were influenced by eating with classmates and may have tried new foods because others were eating them (39). This may be partly responsible for the perception that social equality was enhanced, and diets improved by the free school meal in our current study.

Students in this study claimed they felt better able to concentrate, had more energy, and improved learning when they were served a free school meal. This is not surprising, as it is line with previous research, indicating a link between free school meals and cognitive performance, connecting food and meals to improved concentration, reading performance, attention, fullness, and readiness to learn (22, 25, 40).

During lunchtimes throughout the free school meal, both students and teachers perceived that interaction levels between the students increased. For the most part, this contributed with social benefits such as getting to know each other better and making new friends. This is supported in previous research showing that free school meals can create a good classroom atmosphere by sharing and enjoying a meal together (25). At the same time, the increased interaction also led to increased noise during the lunch break and negative comments. It appeared evident with teacher involvement in the lunch break to stop and correct this negative behavior. In line with previous research (25, 41), we recommend teacher involvement in future free school meal programs as their role appears to be important in creating a good atmosphere and for social learning, thus increasing the learning potential of school meals.

To our knowledge, negative findings relating to free school meals have mainly been related to poor quality of meals and lack of variation and autonomy (25, 34, 42, 43), stigma or segregation for student with low SES (22, 36, 44, 45), and organizational factors as, for instance, standing in line and having too short time for eating (31, 43, 46). None of this was described by the students and teachers interviewed in the study reported in this paper.

Even though there were many similarities in how teachers and students experienced the free meal program, some differences were identified. As mentioned above, students in 2020 were 5 years older, and therefore more prone to reflect on free school meals in relation to social equality. To our surprise, most of the students, in contrast to teachers, stated that the free school meal contributed to their improved function at school. For teachers, it seemed more important to talk about how the free school meal was beneficial for promoting social skills among students. Increased social skills and a socially inclusive environment are important, as Hale and Viner (47) identified an association between social exclusion and poor education and employment outcomes. This suggests that interventions such as free school meals offered as they were in our project might result in improved educational-, employment-, and health outcomes later in life. Findings from this present study are consistent with previous research, showing great potential of free school meals (4, 5, 22).

Free school meals as a socioecological intervention

Our findings indicate that a free school meal may achieve improvements in diet, health, and well-being through action at multiple levels. Our diets and health are the product of an interplay of individual factors (cognition, skills, biological, and demographic factors), the social environment (role modeling and social support), the physical environment (availability of healthy food), and macro-level environment (social and cultural norms, and policy) (48). Free school meals can be viewed as an intervention that exerts its influence at all these levels and requires action to be taken at all these levels. Students in our study claimed that the school meal increased their liking and intake of healthy food, indicating a change at the level of the individual which improved their diets. In addition, the school meal improved their school function, with increased concentration, energy, and social skills. Improvements in their diets and school function were also influenced through changes to the social environment, whereby increased

interaction was necessitated by sharing food with other students at lunch times, changes to the physical environment through the provision of healthy food and creation of meal-time environments which supported interaction and learning. As an intervention to support learning healthy habits, the free school meal may be seen as one way of changing social and cultural norms governing healthy eating, and of delivering European school food policies which aim to improve nutrition and teach healthy habits to young people (1). As a small qualitative study, our research can only indicate these potential benefits from free school meals. Larger trials of the long-term impacts of free school meal provision at all these levels are needed to establish whether they are effective in achieving public health improvements.

Strengths and limitations

There were potentially 55 participants able for recruitment in this study, but it was not possible to contact them directly as their contact information from 2015 was deleted after the intervention. As for needing the school to assist in the recruitment, and the participants chose whether to participate, we do not know how many that received the invitation in 2020. The voluntary participation, which is a fundamental research ethics principal, constitutes a risk of self-selection bias, a risk for the study sample to differ from those who did not participate. Participants who sign up for interviews can, therefore, be more open and more interested in the research topic (49). Furthermore, there is a probability for the students who participated in interviews in 2020 to not be especially vulnerable, as more psychologically vulnerable young people might hesitate to take initiative and contact a stranger to volunteer in interview-based research (50, 51). Thus, it could be that participants who signed up for interviews particularly remembered and liked the free meal, that they were motivated by receiving the gift card, or that they were reluctant to sign up, and therefore not accurately reflecting the view of all the students who received the free school meal. As 5 years is a long time, especially for children, there might be a risk for recall bias that could impact their memory as well. Furthermore, some of the informants, particularly the teacher Hannah, were more elaborative in their responses to questions, resulting in longer, more detailed interviews, and therefore more quotes than the other teachers. Based on Hannah's interviews, it seems clear that this teacher was positive toward free school meals. This might give undue weight to her opinions and experiences.

Differences in data collection methods are likely to alter the duration and depth of the interviews. Telephone interviews tend to be shorter compared to face-to-face methods, and participants tend to provide less detail over the telephone (52). This might be the case for our study as there was a combination of different data collection methods. Moreover, students may have been influenced by the interview guide, and the items from the 2015 interview guide that we did not present in the current study might have affected the tone and duration of the interviews. There were also distractions during three of the interviews, one having noise at school and two having bad reception over telephone interviews, which could lead to misunderstandings. However, the interviewer asked back to get their answers confirmed, and statements that were unclear when transcribed were excluded from the analysis.

This was a small study that might raise questions about the possibility of data saturation. Braun and Clarke (53) have questioned the assumption that large numbers of participants producing more valuable data and claiming data saturation are necessary for validity. Indeed, we identified few dissenting viewpoints in the student interviews, which we expected: students had overall positive experiences related to the free school meal. Furthermore, they did not have to stand in a long line for food, they had a variety of food choices, and it was free for all, all of which previous research has identified as negative with free school meals. We reached the point where after several interview, no new themes were emerging, and therefore we feel that, based on student interviews, data saturation was likely to be met. However, we did only interview four teachers, and the teacher 'Hannah' indicated in her quote that many teachers are busy (e.g. 'many teachers that are thinking "is there yet another thing we have to think about now?"'). There is therefore more likely that dissenting views among teachers and other stakeholders such as school leaders and food providers exist. Furthermore, these views are likely to affect the implementation of free school meals and should be investigated in future research.

In relation to the study described in this paper, we argue that the value of the interviews is in understanding in a detailed way the experiences of this small group of informants who were interviewed in two groups 5 years apart, giving us insight into the long-term effects of a free school meal program on young people. In addition, the youth perspective on free school meals is poorly represented studies of the topic. We did not include debriefing or participants checking, as the topic was non-sensitive, and therefore not deemed necessary to do so. However, this may limit the credibility of the interpretation. On the other hand, credibility was enhanced by having two research members systematically reading and analyzing the data (29).

Other strengths of this study include the follow-up interviews 5 years later, something that is rarely represented in qualitative research. The challenges with this study and different school meal traditions and arrangements in

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different parts of the world may ultimately mean that our study findings may not be transferable to all schools.

Conclusion

The free school meal was perceived by students and teachers as beneficial for an overall healthy diet and social and health equality. Regardless of income, the free school meal provided healthy, filling meals that students wanted and needed for growth and optimal function at school. A socioecological perspective indicates the multiple levels at which a free school meal intervention operates to promote young people's health and well-being.

Regardless of free school meals being offered or not, we recommend interaction between teacher and students at mealtimes to enhance student's social skills. Further research should investigate facilitators and barriers related to provision and uptake of free school meals.

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Conflict of interest and funding

University of Agder.

Authorship

FNV, NCØ, and KEI designed the study. KEI collected the data in 2020 and drafted the manuscript. KEI analyzed the data under the supervision of FNV and BJ. All authors were involved in interpreting the data and critically revised the manuscript. All authors approved the final version of the manuscript.

Ethical standards disclosure

This study was conducted according to the guidelines laid down in the Declaration of Helsinki, and all procedures involving research study participants were approved by the Norwegian Centre for Research Data and the Ethical Committee of Faculty of Health and Sport Sciences Research Ethics Committee at the University of Agder. A written (or verbal in telephone interviews) informed consent was obtained from all subjects. A verbal informed consent was formally recorded.

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Paper III

Associations between having breakfast and reading literacy achievement among Nordic primary school students

Associations between having breakfast and reading literacy achievement among Nordic primary school students

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Authorship: KEI, DR, NCØ and FNV designed the study. KEI drafted the manuscript. Statistical analyses were performed by KEI and ML. All authors were involved in interpreting the data and critically revised the manuscript. All authors approved the final version of the manuscript.

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ABSTRACT

Having breakfast is associated with improved diet quality, cognitive- and academic performance, and can therefore positively impact learning and health, although the impact on reading literacy is unknown in the Nordic countries. The aim of this study was to assess the association between having breakfast often versus rarely and reading literacy achievement based on Progress in International Reading Literacy Study (PIRLS) from 2016. The sample consisted of Danish (N=3508), Finnish (N=4896), Norwegian (N=4232) and Swedish (N=4525) students, 10-11 years old. Students self-reported their frequency of having breakfast. Linear regression analysis (adjusted for socio-economic status and gender) showed that those who often vs. rarely had breakfast achieved a higher reading literacy score. More specifically, Danish students who often had breakfast scored on average 23 points (95% CI 13-33) higher on the reading literacy score compared to those who rarely had breakfast. Finnish, Norwegian, and Swedish students who often had breakfast scored on average 22 points (95% CI 13-31), 13 points (95% CI 6-20) and 25 points (95% CI 16-34) higher compared to those who rarely had breakfast, respectively. These results suggest that having breakfast may be important for reading literacy even after adjusting for socioeconomic status.

KEYWORDS: breakfast, reading, academic achievement, socioeconomic status, PIRLS

Introduction

Reading is a basic prerequisite for learning and for acquisition of knowledge (McLauhglin et al., 2005; I. V. S. Mullis & M. O. Martin, 2015; Ogino et al., 2017; Schröter & Bar-Kochva, 2019). A high level of reading skills is needed in order to function effectively in the information society, for participation in the working life and to succeed in economic and personal adult life (Eyre, 2003; OECD, 2017). A challenge in this regard is the disparities in learning opportunities students with health problems and different socio-economic backgrounds have (Basch, 2011; Chmielewski, 2019). Students' socio-economic background is linked to their parents' education and income level, and differences in socioeconomic status (SES) can influence their health status and potential for achieving other objectives in life, such as education and employment (Whitehead & Dahlgren, 2006). Differences in SES and social inequalities in health are important public health challenges in low- middle and high income countries (World Health Organization, 2018), and remains as public health challenges in the egalitarian welfare-driven Nordic countries known as the welfare paradox (Fosse & Helgesen, 2019). During schooling, differences in SES are demonstrated through an 'achievement gap' i.e., students with health disparities and low SES tend to score poorer in academic achievement tests (Basch, 2011; Chmielewski, 2019). Even in Norway and Sweden, as examples of countries with high enrollments rates in primary school, there is an increase in the achievement gap between students with higher and lower SES (Chmielewski, 2019). It is therefore important to find possible solutions to reduce this achievement gap and provide students with equal learning opportunities (Chmielewski, 2019).

Breakfast habits have gained attention among researchers and in the public health area, as one of several factors that may impact academic performance (Adolphus, Lawton, & Dye, 2015; Cohen, Hecht, McLoughlin, Turner, & Schwartz, 2021; Lundqvist, Vogel, & Levin, 2019; Rani, Dharaiya, & Singh, 2020). The Health Behavior in School-aged Children (HBSC) study showed that, while the rate of daily consumption of breakfast remained stable among students in Denmark, Finland and Sweden from 2002-2010, a decrease was observed among Norwegian students (Lazzeri et al., 2016). Nearly 70% of students in Denmark, 61% in Finland, 64% in Norway and 70% of students in Sweden had breakfast daily (Lazzeri et al., 2016). Thus, promoting breakfast remains important for all Nordic countries. The HBSC study also showed

that there may be differences in breakfast habits among boys and girls in the Nordic countries: boys had daily breakfast more often than girls (Lazzeri et al., 2016).

Breakfast and learning

A positive association of having breakfast and academic performance has been suggested in the scientific literature. Adolphus et al. (2021) showed that having cereals for breakfast versus having no breakfast had positive acute effect on cognitive function in a sample of predominantly lower socio-economic status students in the UK. Having breakfast has also been associated with lower self-reported tiredness and hunger, positive feelings of alertness, satiety and improved cognitive function measured by different cognitive function tests among students in the UK (Cooper, Bandelow, & Nevill, 2011; Defeyter & Russo, 2013). Burrows and colleagues (Burrows, Goldman, Olson, Byrne, & Coventry, 2017) documented that regular consumption of breakfast and fruits was associated with lower odds of learning difficulties in reading and writing, whereas a high intake of sugar-sweetened beverages was associated with lower test scores in reading among Australian students (Burrows et al., 2017). Ptomey and colleagues (Ptomey et al., 2016) showed that having breakfast versus skipping and having breakfast including whole grains were associated with improved scores in reading comprehension in a US student sample, indicating that both having breakfast and quality of the content might be of importance. Furthermore, the school breakfast program in the US has been associated with improved scores in reading and mathematics and higher attendance rate particularly when breakfast was offered for free for all students (Bartfeld, Berger, Men, & Chen, 2019). Despite its potential, a review by Cohen et al. (2021) showed mixed results on the impact of free breakfast on academic performance, potentially related to low uptake of these breakfast provision programs (Cohen et al., 2021). Still, many students in Australia, the UK and the US receive breakfast at school through school breakfast programs or clubs (Hoyland, McWilliams, Duff, & Walton, 2012; MacDonald, 2019; U.S. Department of Agriculture Food and Nutrition Service, 2017), while there is no national provision of school breakfast in Nordic primary schools (Dahl & Jensberg, 2011). It may therefore be difficult to extrapolate the international research to a Nordic setting.

Having breakfast versus breakfast skipping has been associated with higher self-reported academic achievement (Lien, 2007; Stea & Torstveit, 2014) among Norwegian students.

Furthermore, having breakfast has, among Norwegian students, been associated with decreased odds for self-reported writing and reading difficulties and mathematical difficulties (Øverby, Lüdemann, & Høigaard, 2013). A Norwegian pilot study showed that serving a free school breakfast for four months increased boys' school contentment, and some teachers reported improved school attention and social behavior (Ask, Hernes, Aarek, Johannessen, & Haugen, 2006). However, no effect was found for self-reported school performance (Ask et al., 2006). Overall, some associations for breakfast and academic performance have been documented, however these are heavily based on self-reported academic performance. There is a lack of studies investigating having breakfast and reading achievement in the Nordic countries (Dahl & Jensberg, 2011) and further research is needed. Therefore, this current study adds to this research gap by investigating a Nordic subsample of Danish, Finnish, Swedish and Norwegian students in a large international study, Progress in International Reading Literacy Study (PIRLS), assessing having breakfast (self-reported) and associations with reading literacy through a comprehensive standardized reading test.

PIRLS 2016

PIRLS, the Progress in International Reading Literacy Study conducted by the IEA (International Association for the Evaluation of Educational Achievement), is an international study that every 5th year assesses trends in reading literacy. The study is conducted among 4th graders who are usually 10-11 years old. At this age, students typically shift from learning how to read towards reading to learn in other subjects in school (I. V. S. Mullis & M. O. Martin, 2015).

The reading literacy test is designed to measure processes of comprehension: retrieving information, making inferences, interpreting, and evaluating textual content, thereby providing the students to demonstrate a range of reading related abilities and skills (I. V. S. Mullis & M. O. Martin, 2015). In PIRLS, reading literacy is defined as:

> "… the ability to understand and use those written language forms required by society and/or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment" (I. V. S. Mullis & M. O. Martin, 2015).

Based on the overall results from PIRLS 2016, a total of 1 out of 4 students reported that they often arrived at school feeling hungry (Mullis, Martin, Foy, & Hooper, 2017). Furthermore, reading achievement was lower among children that often arrive in school feeling hungry compared to children who never felt hungry when arriving in school. These results are based on all the participating countries and does not provide information about the Nordic countries specifically (Mullis, Martin, Foy, et al., 2017).

The rationale for comparing the Nordic countries besides their geographical proximity, is that they have a common a comparable educational system with national regulations, free compulsory basic education, the majority of students attend public schools, high enrollment rates in early childhood education, a highly developed labor marked, a highly educated population, similar culture and language and similar challenges related to social inequalities in health (Fosse & Helgesen, 2019; Mejding, Neubert, & Larsen, 2017; Mullis, Martin, Goh, & Prendergast, 2017; Nordic Co-operation, 2020a, 2020b; Statistics Denmark, 2014; Statistics Norway, 2020).

Aim

The aim of the current study was to explore the association between having breakfast and reading literacy among 10-11-year-old students Denmark, Finland, Norway, and Sweden by secondary analysis using PIRLS 2016 data. We hypothesized that students who reported to often have breakfast would be more likely to achieve a higher score in reading literacy compared to students who reported to rarely have breakfast.

Materials and methods

The materials and methods in PIRLS were completed in collaboration with national research coordinators, Statistics Canada, experts, reading specialists and IEA specialists (Martin, Mullis, & Hooper, 2017; I. V. S. Mullis & M. O. Martin, 2015). Students that participated in PIRLS responded to a reading literacy test and a context questionnaire, and their parents/caretakers answered on a home context questionnaire. The complexity of the sampling design in PIRLS and measurement of reading literacy requires use of estimated weights and estimated population size. A short description of the reading literacy test and included variables for this current paper is provided below, please visit the international PIRLS report (Martin et al., 2017) for a more detailed methods outline.

PIRLS use a 2-stage sampling scheme, with random selection but different sampling probabilities depending on the characteristics of the school (see Martin et al. (2017) for details on the sampling probabilities). In the first sampling stage, schools were randomly selected. In the second sampling stage, a random selection of class(es) within the school were drawn. The sampling design using sampling weights finally produce results that are representative for the population (Martin et al., 2017).

The reading literacy test in PIRLS consisted of 16 booklets that was distributed systematically and each student responded to a subset of the assessment items (Martin et al., 2017). PIRLS uses a scaling method based on Item Response Theory (IRT), that, by using observed and unobserved values, can assign each student a position on the overall reading literacy scale (Martin et al., 2017). When calculating student overall performance, PIRLS uses estimated weights that take into account the sampling scheme (i.e. different selection probabilities), non-response and the estimated population size.

The target sample for PIRLS 2016 was, for most countries, students in the 4th year of formal schooling with a recommended lower age limit on 9.5 years old. However, children's age in the 4th year varies for some countries due to different structures in practices and policies (Mullis, Martin, Foy, et al., 2017). In Norway, 5th graders were age-comparable to the other Nordic 4th graders, and we therefore use data from Norwegian 5th graders in this present paper.

Instruments

For the reading literacy test, each of the 16 booklets in PIRLS consisted of two assessment blocks with a text and a combination of multiple-choice questions and open-ended questions following the text. Students responded to a context questionnaire after the reading test (Martin et al., 2017). The student context questionnaire was designed to measure student's home and school lives. In this questionnaire, children were asked "How often do you eat breakfast on school days?" with the response alternatives "every day", "most days", "sometimes", "almost never" and "never".

Parents/caregivers also responded to a home context questionnaire. A 'Home Resources for Learning' scale consisting of five different items from the student and parent questionnaires was developed by PIRLS and applied as proxy for SES in this current paper (Martin et al., 2017).

The included items in the SES scale were, from the parent questionnaire, number of books in the home, number of children's books in the home (both without e-books), highest level of education of both parents/caregivers, highest level of occupation among parents/caregivers and, from the student questionnaire, number of home study supports which included access to internet and their own room. For a technical description as to how the scale was constructed and validated, please see Chapter 14 in the 'Methods and Procedures in PIRLS 2016' report (Martin et al., 2017).

Analysis

All analyses in this current paper were carried out in IDB Analyzer version 4.0.42.0 , a program developed to analyze data from IEA surveys (International Association for the Evaluation of Educational Achievement, n.a), and IBM SPSS Statistics version 25. THE IDB Analyzer takes into account the sampling design, estimated weights and estimated population size (Wagemaker, 2020).

Having breakfast and student gender were measured as categorical variables, while reading literacy and the index for SES were measured as continuous variables. Having breakfast was dichotomized as 1 = often including "every day" and "most days" and 0= rarely, including "sometimes", "almost never" and "never". This is a common way to assess breakfast habits: comparing having breakfast rarely versus often, intake versus omission or skipping breakfast (Lundqvist et al., 2019). Gender was coded 0 for girls and 1 for boys. The international SES scale was calculated by PIRLS for all participating countries and had an international average on 10 and a standard deviation of 2. The SES scale was based on over responses from over 85 % of parents in Denmark, Finland and Norway and 70-85 % of parents in Sweden (Martin et al., 2017). Reading literacy was reported on a scale ranging from 300-700 with an international center-point at 500 and a SD of 100, where higher values indicate better reading literacy (Mullis, Martin, Foy, et al., 2017). Descriptive analyses are presented by weighted percentage in Figure 1. We used hierarchical linear regression to examine whether having breakfast was associated with student reading literacy score (dependent variable) adjusted for SES and gender as potential confounding factors. Main results from the regression are presented as regression coefficients with 95% confidence intervals and explained variance (R squared). The regression analysis is presented in three models. Model 1 presents the unadjusted analysis of having breakfast and reading literacy, model 2 includes model 1 adjusted for SES and model 3 includes model 2

adjusted for SES and gender. A sensitivity analysis was performed to check that the results were robust when analyzing reading literacy achievement without grouping breakfast responses and adjusting for SES and gender (Data not shown).

Results

In Table 1, sample characteristics are provided. The Nordic students scored above the average on the international SES scale and had comparable SES estimates (Table 1).

Table 1: Sample characteristics

Country	N (17161)	SES	Girls	Boys
	Unweighted	*Mean(95%CI)*	*Percentage(95%CI)*	
Denmark	3508	11.35 (11.25-11.45)	52 (50-54)	48 (46-50)
Finland	4896	11.20 (11.14-11.23)	51 (49-53)	49 (47-51)
Norway	4232	11.45 (11.37-11.53)	51 (49-53)	49 (47-51)
Sweden	4525	11.44 (11.34-11.54)	50 (48-52)	50 (48-52)

Note: Weighted data for SES and boys and girls. SES Scale: international ± average of 10 2 SD (Martin et al., 2017).

All the included Nordic countries scored above the international average for reading literacy score (500) with mean scores on 551, 570 and 562 for Danish, Finnish, Norwegian and Swedish students, respectively. Boys scored slightly worse than girls inn all the Nordic countries (Table 2).

Table 2: Reading literacy score

Country	All		Girls		Boys	
	Mean	*95% CI*	*Mean*	*95%CI*	*Mean*	*95%CI*
Denmark	551	547-555	556	551-561	545	540-550
Finland	570	566-573	579	575-583	560	556-564
Norway	562	557-566	572	567-577	551	545-556
Sweden	562	557-567	569	564-574	555	549-561

Note: Weighted data. Mean country scores range from 320 (South Africa) to 581 (Russian Federation) (Mullis, Martin, Foy, et al., 2017).

The descriptive data presented in Figure 1 illustrate that most students had breakfast often. It was more common to have breakfast every day compared to most days, sometimes and never or almost never. More Norwegian students had breakfast ‘never or almost never’ compared to Danish, Finnish and Swedish students. We also identified that there were no differences between girls and boys regarding having breakfast (Data not shown).

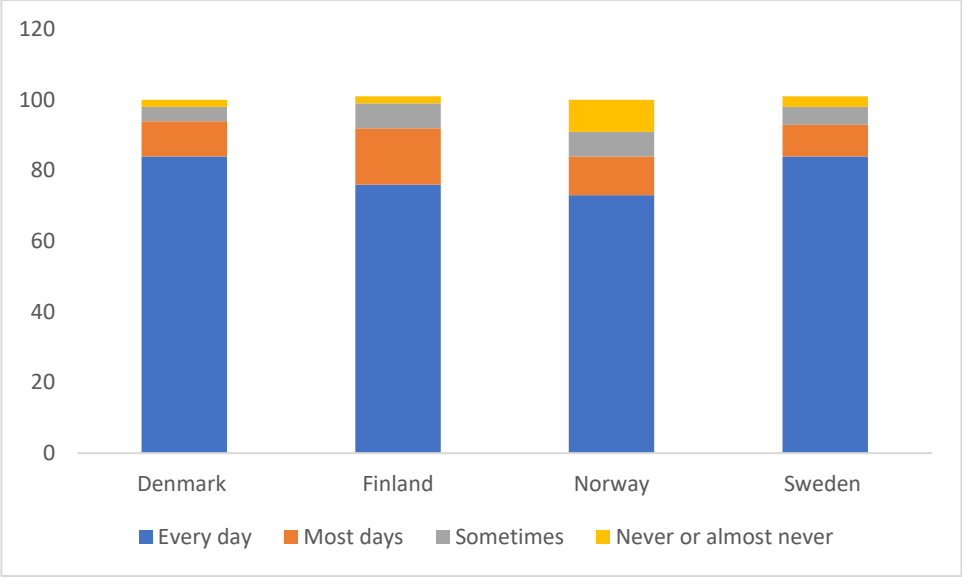

Figure 1: How often do you have breakfast on schooldays? Response pr country
Note: Data is based on weighted percentage.

In Table 3, unadjusted and adjusted estimates of differences in reading literacy according to breakfast habits are presented for each included Nordic country. Unadjusted analysis showed that students who had breakfast often vs rarely scored on average higher on the reading literacy scale by 36 points in Denmark, explaining 2% in the variance in reading literacy. Finnish, Norwegian, and Swedish students who had breakfast often vs rarely scored respectively 34, 20 and 39 points higher on average on the reading literacy score, explaining 2%, 1% and 3% of the variance in reading literacy. Students who often vs rarely had breakfast still, on average, achieved higher reading literacy score by 23 points in Denmark, 22 points in Finland, 13 points in Norway and 25 points in Sweden when adjusting for SES and gender. SES appears to be an important confounder, although having breakfast often was associated with higher reading literacy score even after adjusting for SES. The explained variance for the adjusted model (Model 3) was 15% in Denmark, 17% in Finland, 13% in Norway and 18% in Sweden (Table 3). Adjusting for gender did not change the estimates substantially. Figure 2 illustrates the association of having breakfast and reading literacy comparing the unadjusted and adjusted model. The same pattern of results was seen across all the Nordic countries, although a higher reading literacy score and a smaller association between having breakfast and reading literacy were observed among Norwegian students (Table 3).

Table 3: Differences in reading literacy according to self-reported having breakfast often versus rarely, unadjusted (Model 1) and adjusted for SES and gender (Model 3), regression coefficients with ± 95% CI and R squared.

	Model 1	Model 2	Model 3
Denmark			
Often breakfast	36 (26-46)	22 (12-32)	23 (13-33)
SES		16 (14-18)	16 (14-18)
Gender			-12 (-16(-6))
Constant	517 (507-527)	354 (330-378)	359 (335-383)
R squared	2%	14%	15%
Finland			
Often breakfast	34 (25-44)	24 (15-33)	22 (13-31)
SES		17 (15-19)	17 (15-19)
Gender			-19 (-23(-15)
Constant	538 (528-548)	353 (329-377)	364 (388-340)
R squared	2%	15%	17%
Norway			
Often breakfast	20 (12-28)	13 (6-20)	13 (6-20)
SES		15 (14-16)	15 (14-16)
Gender			-18 (-22(-14))
Constant	545 (537-553)	379 (359-399)	393 (374-412)
R squared	1%	13%	15%
Sweden			
Often breakfast	39 (28-50)	25 (16-34)	25 (16-34)
SES		16 (14-18)	16 (14-18)
Gender			-12 (-17(-7))
Constant	525 (515-536)	356 (336-376)	364 (343-385)
R squared	3%	17%	18%

Note: Constant: Model 1: Breakfast coded 0= rarely, 1= often, Model 2: Adjusted for SES. Model 3: Adjusted for SES and gender. Gender coded 0=girl, 1=boy. Unstandardized coefficients and weighted data and R square were used for explained variance.

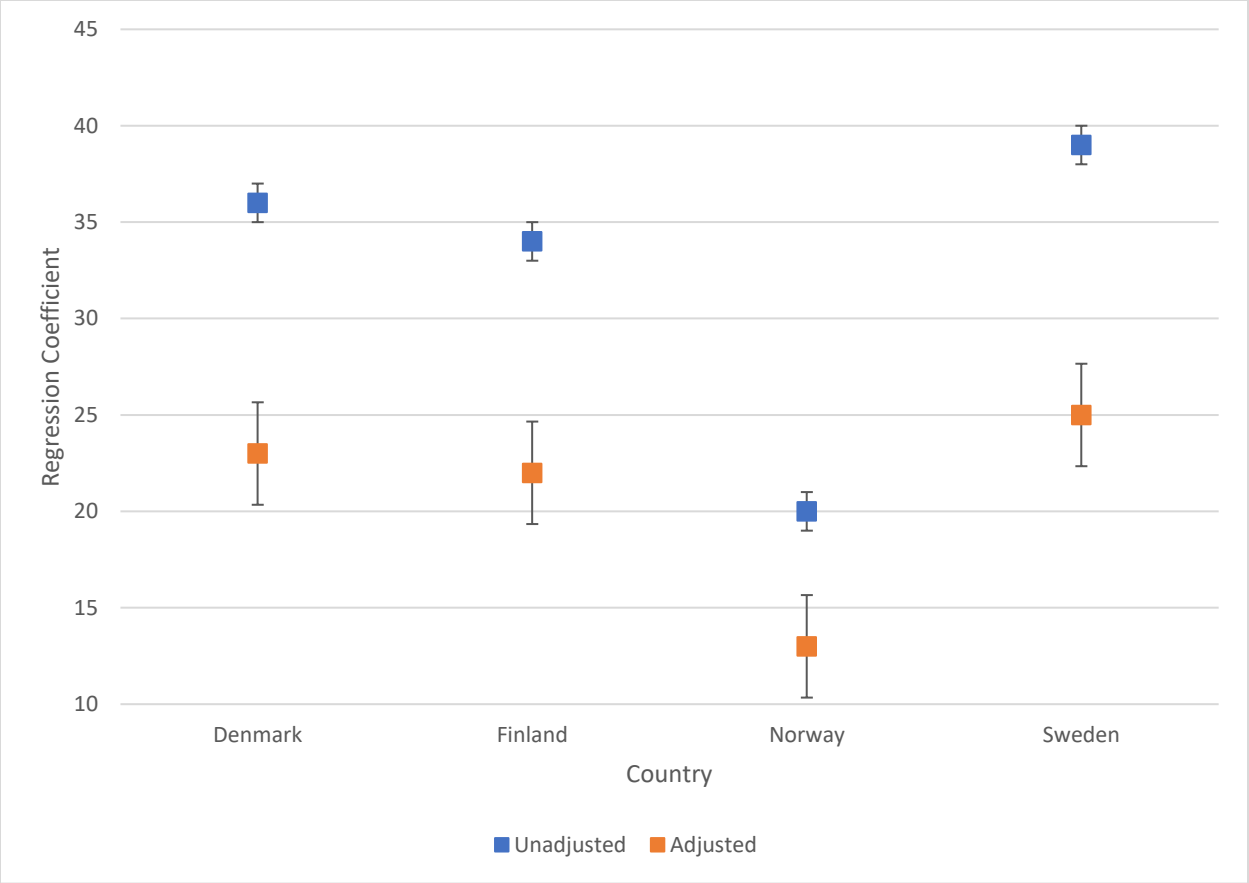

Figure 2: The association between having breakfast often vs rarely and reading literacy .
Note: Weighted data. Unadjusted = Model 1 and adjusted= Model 3. The error bars show 95% CI.

Discussion

The findings of this study demonstrated that having breakfast often was associated with higher achievement in reading literacy, based on an objectively measured reading test among a large cross-sectional sample of Nordic primary school students. Having breakfast was associated with higher reading literacy score also after adjusting for SES. Our finding is in line with previous research showing an association between having breakfast and reading (Ptomey et al., 2016) and other studies where outcome variables were academic performance, educational outcomes, mental health or learning difficulties (Burrows et al., 2017; Lien, 2007; Littlecott, Moore, Moore, Lyons, & Murphy, 2016; Sampasa-Kanyinga & Hamilton, 2017; Stea & Torstveit, 2014; Øverby et al., 2013).

Furthermore, the results showed that SES was more important for reading literacy than having breakfast. This was not surprising, as most of the students had breakfast often, with a

slightly higher percentage consuming breakfast every day compared to results from the HSBC study (Lazzeri et al., 2016). We argue that the observed difference in reading literacy associated with having breakfast is still important as breakfast habits are something that can be improved and intervened on. The rational for comparing the Nordic countries was that they were comparable in terms of education policy and practices, with high educational enrollment rate, highly educated people and similar challenges with social inequalities in health (Fosse & Helgesen, 2019; Mejding et al., 2017; Mullis, Martin, Goh, et al., 2017; Nordic Co-operation, 2020a, 2020b; Statistics Denmark, 2014; Statistics Norway, 2020). The finding that breakfast may be of importance for academic performance regardless of SES is also supported in a review by Adolphus et al. (2015), which makes our results plausible. As having breakfast may be of importance for all students, policy makers may consider placing promotion of breakfast and breakfast provision on the school agenda.

Although the pilot-study from Norway providing a free school breakfast for 4 months, showed no effect on self-reported school performance, it showed a potential for breakfast provision to increase school contentment, school attention and social behavior (Ask et al., 2006). This pilot study lacked an objective measure of school performance and breakfast was only provided for a short period of time (Ask et al., 2006). An example from the UK showed that breakfast provision at school provided an opportunity for students to have an enjoyable start of the school day, potentially making them feel more alert, increasing their social interaction and supporting them in developing favorable social skills (Graham, Russo, & Defeyter, 2015). This is also supported in Nordic examples when lunch was provided at school replacing packed meals. A free school meal offered i) an opportunity for Norwegian students to improve their school functioning, concentration, social interaction and practice social skills (Illøkken et al., 2021), and ii) an arena for social learning and learning about foods and dishes among Danish students (Benn & Carlsson, 2014). However, the recent systematic review by Cohen et al. (2021) showed mixed findings on the impact of universal free breakfast on academic performance and that studies investigating breakfast provision is limited in their short-term exposure. Longitudinal intervention studies with breakfast provision or well-designed observational studies including objective measures of academic performance should therefore be given priority in further research.

Interestingly, our results also suggested that the association between having breakfast and reading literacy among Norwegian students was weaker compared to the other Nordic countries included in this study. An explanation of this might be that Norwegian students had higher reading literacy scores, and that students in Norway had one more year of attainment in elementary school compared to the other countries. Further studies are needed to clarify this issue.

Methodological considerations

Due the cross-sectional nature of this study design (Kesmodel, 2018), we cannot draw causal conclusions of the effect that having breakfast may have on reading achievement. The association between having breakfast and reading literacy might be due to several other unobserved factors we did not adjust for. This could for instance be student social environment and parental support as argued by Lundqvist et al. (2019). Having breakfast was self-reported based on one question that was not very detailed, which relies on perception and memory that could lead to recall bias (Stone et al., 2009). Further, we did not measure what kind of food the students had for breakfast. As Ptomey et al. (2016) indicated that both having breakfast and the content of breakfast were associated with reading performance, an investigation of the optimal breakfast habits for reading achievement may be a point for future research. However, it would be unethical to randomize students to receive a healthy vs. an unhealthy breakfast. This can be partly solved by for instance including a short dietary questionnaire for breakfast in PIRLS and by conducting long-term observational studies. A main strength of this study is that an objective measure of reading performance was used in a large sample from Denmark, Finland, Norway and Sweden among students at the same age.

Conclusion

Based on a sample of Nordic primary school students, this study showed that those who reported to have breakfast often had higher reading literacy achievement. This association was still present when adjusting for SES and gender. Promotion of breakfast and further observational studies and RCTs assessing effect of breakfast provision in school on reading literacy should therefore be given further priority in practice and research.

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Appendix I

Ethical approval from NSD for the SMP

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Harald Hårfagres gate 29
N-5007 Bergen
Norway
Tel: +47-55 58 21 17
Fax: +47-55 58 96 50
nsd@nsd.uib.no
www.nsd.uib.no
Org.nr. 985 321 884

Frøydis Nordgård Vik
Institutt for folkehelse, idrett og ernæring Universitetet i Agder
Serviceboks 422
4604 KRISTIANSAND S

Vår dato: 25.06.2014 Vår ref: 38980 / 3 / LT Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 06.06.2014. Meldingen gjelder prosjektet:

38980	*Skolematprosjektet i Aust-Agder*
Behandlingsansvarlig	*Universitetet i Agder, ved institusjonens øverste leder*
Daglig ansvarlig	*Frøydis Nordgård Vik*

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 01.07.2016, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77
Vedlegg: Prosjektvurdering

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 38980

Formålet er å evaluere i hvilken grad et sunt skolemåltid hver dag i ett år kan ha positive effekter på vektutvikling, læringsmiljø og motivasjon for læring. Per i dag eksisterer det lite systematisk kunnskap og erfaringer knyttet til skolemåltider i Norge, og det er derfor viktig at ny forskning gjennomføres.

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivet er godt utformet. Foreldre/foresatte samtykker til at deres barn kan delta. Barna/unge gis også egen skriftlig informasjon.

Det behandles sensitive personopplysninger om etnisk bakgrunn eller politisk/filosofisk/religiøs oppfatning, .

Personvernombudet legger til grunn at forsker etterfølger Universitetet i Agder sine interne rutiner for datasikkerhet. Dersom personopplysninger skal lagres på mobile enheter, bør opplysningene krypteres tilstrekkelig.

Forventet prosjektslutt er 01.07.2016. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)

Masterstudenter Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad Petersson er prosjektmedarbeidere på prosjektet og skal også bruke innsamlede opplysninger til å skrive masteroppgaver.

Svar Svar til alle Videresend Direktemelding

LT Lis Tenold <Lis.Tenold@nsd.uib.no> Frøydis Nordgård Vik

TILBAKEMELDING PÅ ENDRINGSSKJEMA Prosjekt 38980 Skolematprosjektet i Aust-Agder

Du videresendte denne meldingen 28.04.2016 10.12.

Hei

Viser til mottatt endringsskjema 15.08.2015, samt til vårt godkjenningsbrev 26.06.2014.

Vi tar til orientering og godkjenner at det skal gjennomføres dybdeintervju med deltakere i intervensjonsdelen. Utvalget omfatter et utvalg elever, foreldre og lærere.

Det gis skriftlig informasjon og innhentes skriftlig samtykke. Personvernombudet finner skrivet tilfredsstillende. Skrivet til lærere var imidlertid ikke vedlagt, ber om at dette ettersendes.

Ny prosjektslutt for anonymisering vil være 01.072017.

For den del av utvalget som ikke blir med i dybdeintervju, finner personvernombudet at det dersom opplysninger om disse ikke kan anonymiseres senest 01.06.2016, at de gis informasjon om forsatt lagring av personopplysninger.

Vennlig hilsen
Lis Tenold

Frøydis Nordgård Vik skrev den 15.08.2015 12:58:

> Endringsskjema for Skolematprosjektet er vedlagt inkludert nytt informasjonsskriv og intervjuguide, prosjektnummer: 38980
>
> Mvh Frøydis N. Vik, PhD
> Programansvarlig: Folkehelsearbeid Bachelorprogrammet
>
> Universitetet i Agder
> Fakultet for helse- og idrettsvitenskap
> Postboks 422
> 4604 KRISTIANSAND
>
> Tlf: 38141855
> Kontor: I 1-022

--
Vennlig hilsen

Lis Tenold
Spesialrådgiver

Norsk samfunnsvitenskapelig datatjeneste AS
Personvernombud for forskning
Harald Hårfagres gate 29, 5007 BERGEN

Tlf. direkte: (+47) 55 58 33 77 - Tlf. sentral: (+47) 55 58 81 80
Email: Lis.Tenold@nsd.uib.no - www.nsd.uib.no/personvern

NSD NORSK SENTER FOR FORSKNINGSDATA

Vurdering

Referansenummer

514675

Prosjekttittel

Skolematprosjektet

Behandlingsansvarlig institusjon

Universitetet i Agder / Fakultet for helse- og idrettsvitenskap / Institutt for ernæring og folkehelse

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Frøydis Nordgård Vik, froydis.n.vik@uia.no, tlf: 48218746

Type prosjekt

Forskerprosjekt

Prosjektperiode

02.01.2020 - 28.02.2022

Vurdering (2)

20.03.2020 - Vurdert

NSD har vurdert endringen registrert 18.03.2020.

Det er lagt til et nytt utvalg, utvalg 2. NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 20.03.2020. Behandlingen kan fortsette.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!
Kontaktperson hos NSD: Karin Lillevold
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

03.01.2020 - Vurdert

BAKGRUNN
Prosjektet er tidligere meldt og vurdert av NSD, referansenummer 38980. Ny innmelding gjelder oppfølgingsstudie. Denne vurderingen erstatter den forrige vurderingen.

Det er NSD sin vurdering at behandlingen er i samsvar med personvernlovgivningen, så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet 03.01.2019 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan fortsette.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde:

https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 28.02.2022.

LOVLIG GRUNNLAG
Prosjektet har innhentet samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at behandlingen av personopplysninger følger prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

Informasjonsskrivet er godt utformet, og i tråd med gammelt lovverk. Vi gjør likevel oppmerksomme på at for å oppfylle forordningens krav til innhold jf. art 13 burde kontaktinformasjon til personvernombud og informasjon om retten til å klage til datatilsynet være med. NSD vurderer likevel at informasjonen som er gitt er tilstrekkelig for å innhente et gyldig samtykke. Innhenting av nytt samtykke fra de registrerte er ikke nødvendig.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET

NSD vil følge opp underveis (hvert annet år) og ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet/pågår i tråd med den behandlingen som er dokumentert.

Lykke til med prosjektet!

Kontaktperson hos NSD: Karin Lillevold
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

Appendix II

Information letters and consent forms for the SMP

UNIVERSITETET I AGDER

Forespørsel om deltakelse i forskningsprosjektet

Skolematprosjektet i Aust-Agder

En tiltak studie med servering av et daglig sunt skolemåltid i ett år

Bakgrunn og formål

Dette er en forespørsel til deg og ditt barn om å delta i en forskningsstudie hvor 6. trinn ved Birkeland skole vil få servert et gratis sunt skolemåltid daglig i skoleåret 2014/2015. Hensikten med denne studien er å evaluere i hvilken grad et sunt skolemåltid hver dag i ett år kan ha positive effekter på vektutvikling, læringsmiljø og motivasjon for læring. Per i dag eksisterer det lite systematisk kunnskap og erfaringer knyttet til skolemåltider i Norge, og det er derfor viktig at ny forskning gjennomføres. Helse- og omsorgsminister Bent Høie er orientert om prosjektet, og har støttet prosjektet i et eget brev. Han uttaler: «Dette vil kunne gi nyttig kunnskap i arbeidet med å styrke det forebyggende helsearbeidet og stimulere til et sunnere kosthold, slik det er slått fast i regjeringsplattformen. Gode vaner legges tidlig, og barnehage og skole er viktige aktører i folkehelsearbeidet der ikke minst dialog med foreldrene og skolehelsetjenesten er viktig».

Birkeland skole og Froland skole i Aust-Agder er valgt ut som deltagende skoler, hvor 6. trinn ved Birkeland skole vil få servert et gratis sunt skolemåltid gjennom skoleåret 2014-2015 av Trude Karlsen ved Kylland Gård. Det vil bli tatt høyde for allergier og religiøse hensyn.
Alle elever i 5. 6. og 7. klassetrinn ved Birkeland skole, samt en av elevens foreldre/foresatte, inviteres til å delta i prosjektet. 5. og 7. trinn vil være kontrollklasser, samt 6. trinn ved Froland skole hvor skoleåret forløper som normalt. Alle klassetrinn er like viktige for at prosjektet skal kunne evalueres på en god måte.

Det skal i første omgang skrives tre mastergradsoppgaver i prosjektet. Prosjektleder og studenter er tilknyttet mastergradsprogrammet folkehelsevitenskap ved institutt for folkehelse, idrett og ernæring ved Universitetet i Agder.

Hva innebærer deltakelse i studien?

For elevene:
Elevene svarer på et spørreskjema om kosthold og måltidsvaner, med særlig vekt på skolemåltidet, samt kjønn og alder. I tillegg måles vekt, høyde og livvidde hos elevene. Målingene utføres i lett innetøy (bukse og T-skjorte/topp) og elevene får ikke vite sine egne mål. Dette foregår i løpet av en skoletime i august 2014, og i januar og juni 2015. En prosjektmedarbeider er tilstede for å svare på eventuelle spørsmål fra elevene. De elevene som ikke skal delta i prosjektet, vil få annet opplegg av skolen mens klassen svarer på spørreskjemaet.

For foreldre/foresatte:
En av elevens foreldre/foresatte inviteres til å svare på et spørreskjema om kosthold, utdanningsnivå og selvrapportert vekt og høyde. Det vil ta ca. 20 minutter å svare, og spørreskjemaet sendes hjem i skolesekken på de tre tidspunktene som elevene svarer på sin undersøkelse. Dette returneres med

eleven til kontaktlærer på skolen i lukket konvolutt, og foreldreskjemaene sendes til Universitetet i Agder.

Mulige fordeler og ulemper

Studien vil ikke føre til noen ulemper for deg eller ditt barn, utover punktene som er skissert over. Fordelen med studien er at den vil gi ny og nyttig kunnskap i arbeidet med å styrke det forebyggende helsearbeidet og stimulere til et sunnere kosthold i skolen.

Hva skjer med informasjonen om deg?

All informasjon angående barn og foreldre/foresatte vil utelukkende bli brukt til forskning i henhold til gjeldende nasjonal lovgivning. Opplysningene som innhentes i denne studien er konfidensielle og ingen uvedkommende vil få tilgang til dem. Studien er basert på avidentifiserte opplysninger. Med dette menes opplysninger der navn og andre personlige kjennetegn er fjernet. Kun deltagere i forskningsteamet har adgang til navnelister. Disse oppbevares innelåst og separat fra datafilen, og vil ikke bli brukt på noen måte i resultatene fra undersøkelsen eller frigitt på noen annen måte. Det vil ikke være mulig å identifisere verken foreldre/foresatte eller barn i resultatene av studien når disse publiseres. Prosjektet skal etter planen avsluttes juli 2016.

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du har spørsmål til studien, ta kontakt med førsteamanuensis Frøydis Vik (prosjektleder) på telefon/mail: 38141855/froydis.n.vik@uia.no eller mastergradsstudenter/ prosjektmedarbeidere: Kristine Engebretsen Illøkken: 93865630, Renate Høiland: 91521167, Kirsten Olstad Petersson: 47632573

Studien er meldt til Personvernombudet for forskning, Norsk Samfunnsvitenskapelig Datatjeneste AS.

Prosjektleder: Førsteamanuensis Frøydis N. Vik, UiA

Mastergradsstudenter: Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad Petersson

UNIVERSITETET I AGDER

Samtykke til deltakelse i studien (returneres med eleven til kontaktlærer)

Jeg har mottatt informasjon om studien, og er villig til å la mitt barn delta i skolematprosjektet.

Jeg har blitt informert om at mitt barns deltagelse og foreldre/foresattes deltagelse er frivillig. Jeg kan når som helst trekke meg selv og/eller mitt barn fra studien uten å oppgi noen grunn. Hvis jeg og mitt barn ikke velger å delta, eller trekker oss fra studien, så vil det ikke medføre noen form for ulemper.

Barnets navn (store bokstaver) og klasse

_____

Forelders/foresatts navn (store bokstaver)

_____

Sted og dato/Underskrift til forelder/foresatt

_____

Førsteamanuensis Frøydis N. Vik, UiA
Mastergradsstudenter: Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad Petersson

UNIVERSITETET I AGDER

Forespørsel om deltakelse i en oppfølging av forskningsprosjektet

"Skolematprosjektet i Aust-Agder"

Bakgrunn og formål

Dette er en forespørsel til deg og/eller din ektefelle/partner og/eller ditt barn om å delta i en oppfølging av skolematprosjektet som foregikk skoleåret 2014/15. Fokuset i skolematprosjektet var sunne skolematvaner hos ditt barn. Vi er to masterstudenter i folkehelsevitenskap ved Universitetet i Agder som deltar i denne oppfølgingen, og vår veileder er førsteamanuensis Frøydis N. Vik.

Hensikten med *denne delen av studien* er å få mer innsikt og kunnskap om gjennomføringen av, og erfaringene med skolematprosjektet, f.eks. hvordan det har vært å delta i prosjektet enten som elev eller foresatt. Disse erfaringene ønsker vi å få gjennom dybdeintervjuer med ulike deltagere i prosjektet. Noen tema er allerede tidligere belyst gjennom spørreskjema, som f.eks. om et sunt skolemåltid hver dag i ett år kan ha positive effekter på vektutvikling, læringsmiljø og motivasjon for læring. Per i dag eksisterer det lite systematisk kunnskap og erfaringer knyttet til skolemåltider i Norge, og det er derfor viktig at ny forskning gjennomføres.

Vi ønsker å snakke med elever og foreldre som har vært en del av tiltaksklassene (de som fikk servert skolemat i fjor). Vi vil høsten 2015 kontakte Birkeland skole med en forespørsel til elever og foreldre om å delta i intervjuene.

Hva innebærer deltakelse i studien?

En eller begge foreldre/foresatte inviteres til å være med på et dybdeintervju som varer ca. 30-45 minutter. Intervjuene vil foregå i løpet av september-oktober på et tidspunkt som passer de(n) enkelte deltager(e) på et egnet sted. I tillegg inviteres noen av elevene i de tre klassene som fikk skolematservering til å delta på et kort intervju som gjennomføres på skolen på et egnet tidspunkt som avtales i samråd med lærer.

Intervjuet vil ha noen spørsmål som er utarbeidet på forhånd f.eks. angående deltagelse i skolematprosjektet, gjennomføringen, og hvilke holdninger og erfaringer foreldre/foresatte og elever har om skolematserveringen i prosjektet. I tillegg vil det bli anledning til å komme med egne erfaringer og synspunkt. Informasjonen fra intervjuene blir tatt opp på en båndopptaker for at de skal kunne danne grunnlaget for analyser i etterkant.

Mulige fordeler og ulemper

Forskningsprosjektet vil ikke føre til noen ulemper for deg eller ditt barn, utover selve deltagelsen i intervjuet som er skissert over. Fordelen med studien er at den vil kunne gi verdifull erfaring og evaluering av skolematprosjektet som er et unikt prosjekt i Norge, samt nyttig kunnskap i arbeidet med forebyggende folkehelsehelsearbeid når det gjelder barn og sunne skolematvaner.

Hva skjer med informasjonen om deg?

Alle personopplysninger vil bli behandlet konfidensielt. Opptakene av intervjuene oppbevares som lydopptak på passordbeskyttet datamaskin tilknyttet nettverket på UiA. Bakgrunnsinformasjon oppbevares atskilt fra andre opplysninger. Kun masterstudentene, samt veileder har tilgang til lydfilene. Deltagerne vil ikke kunne gjenkjennes i en eventuell publisering av studien.

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom har spørsmål til studien, ta kontakt med prosjektleder Frøydis Nordgård Vik, førsteamanuensis, UiA, tlf. arbeid: 38141855 eller e-post: froydis.n.vik@uia.no

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Vi håper at deltagere i skolematprosjektet er positive til å dele sine erfaringer!

Tonje Hellum Foyn
Mastergradstudent UiA

Ingvild Kristiansen
Mastergradstudent, UiA

Frøydis N. Vik
Førsteamanuensis, UiA Prosjektleder

Samtykke til deltakelse i studien (foreldre/foresatte)

Jeg har mottatt informasjon om studien, og jeg/vi er villige til å delta i ett intervju på et tidspunkt som vi blir enige om.

(Signatur foreldre/foresatt, dato og navn/klasse til ditt barn)

(Mitt mobilnummer eller e-post adresse slik at jeg kan kontaktes for å avtale tid og sted for intervjuet)

Samtykke til deltakelse i studien (elev)

Jeg har mottatt informasjon om studien, og jeg samtykker til at mitt barn kan bli spurt om å delta i ett intervju på skolen på et egnet tidspunkt som avtales med lærer.

(Navn på eleven, klasse, signatur foreldre/foresatte, dato)

Dette samtykkeskjemaet kan leveres til skolen i sekken til ditt barn.

UiA Lifecourse nutrition
Priority Research Center

Vil du delta i et intervju om skolematprosjektet som du var med på i 6. klasse?

Hei. Dette brevet sendes til deg som gikk i 6. klasse året 2014-2015 på Birkeland skole, det året det ble servert gratis skolemat til lunsj av Trude Karlsen. Jeg (Kristine på bildet) var i klassen med spørreskjema i 2014/2015. Jeg ønsker å vite mer om dine erfaringer med skolemat og å høre hva du tenker om gratis skolemat. Håper du har lyst til å være med på en intervjusamtale med meg som tar 20-30 minutter. Jeg vil ha noen spørsmål klare på forhånd, og du vil få muligheten til å fortelle om dine opplevelser, meninger og anbefalinger.

Du kan selv bestemme tid og sted for samtalen, men det er ønskelig å gjennomføre samtalen i tidsrommet februar-april i år. Jeg kan for eksempel komme til din skole, eller vi kan snakke sammen på telefonen. Jeg tar lydopptak og notater fra samtalen, men du vil ikke kunne gjenkjennes i det jeg skal skrive i etterkant. Hvis du velger å delta, så vil du få et universalgavekort som kan brukes på flere butikker og sentre i Kristiansand på kroner 250 som takk for hjelpen. Det er frivillig å delta, og du kan du når som helst trekke deg uten å oppgi noen grunn. Det vil ikke ha noen negative konsekvenser for deg.

Dine rettigheter
Du har rett til: innsyn i hvilke personopplysninger som er registrert om deg, å få rettet personopplysninger om deg, få slettet personopplysninger om deg, få utlevert en kopi av dine personopplysninger (dataportabilitet), og å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Vi behandler opplysninger om deg basert på ditt samtykke.
Prosjektet skal etter planen avsluttes 28.02.2022. Opplysninger og lydopptak er det kun forskningsgruppen som har tilgang til, og det vil bli slettet etter at studien er gjennomført.

På oppdrag fra Universitetet i Agder har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Prosjektet er en del av mitt doktorgradsarbeid ved Universitetet i Agder. Hvis du har spørsmål til studien, så kan du ta kontakt med meg: Kristine Engebretsen Illøkken (kristine.illokken@uia.no, tlf. 93865630) eller prosjektleder Frøydis N. Vik (froydis.n.vik@uia.no). Ta kontakt med personvernombudet ved Ina Danielsen (ina.danielsen@uia.no) om du ønsker å benytte deg av dine rettigheter. NSD kan kontaktes på nsd@nsd.no eller tlf. 55582117.

Birkenes barneskole har sendt ut dette brevet til din adresse basert på sitt register. Jeg vet derfor ikke hvem du er før du eventuelt melder deg på prosjektet. Hvis du har fått dette brevet, og ikke fikk gratis skolemat i 6.klasse, så kan du bare kaste brevet.

Med vennlig hilsen

Kristine Engebretsen Illøkken
Doktorgradsstipendiat, UiA

Frøydis N. Vik, prosjektleder
Førsteamanuensis, UiA

Samtykkeerklæring

For å bli intervjuet kan du sende en SMS til meg, så kan vi avtale tid og sted for samtalen. Mitt nummer er: **93865630. Du kan også kontakte meg på e-post: kristine.illokken@uia.no.**

Du kan gjerne signere under med navn og dato, og ta med denne samtykkeerklæringen når vi møtes. Jeg tar med noen ekstra så det gjør ikke noe om du glemmer det. Om vi snakkes over telefon vil jeg be om ditt muntlige samtykke.

Jeg har mottatt og forstått informasjon om prosjektet. Jeg samtykker til:

- ☐ å delta i intervjusamtale

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. 28.02.2022.

Signatur og dato:

(Signert av prosjektdeltaker, dato)

UiA Lifecourse nutrition
Priority Research Center

Vil du delta i et intervju om skolematprosjektet fra 2014-2015?

Hei. Dette brevet sendes til deg som var lærer eller assistent på 6. trinn skoleåret 2014-2015 ved Birkeland skole, det året det ble servert gratis skolemat til lunsj. Jeg var med i skolematprosjektet, og tar nå en doktorgrad ved UiA hvor jeg blant annet intervjuer tidligere elever og lærere som var involvert i skolematprosjektet. Vi ønsker å vite mer om dine erfaringer med gratis skolemat samt høre hva du tenker om gratis skolemat nå i etterkant. Jeg håper du har lyst til å være med på en intervjusamtale med meg (Kristine på bildet) som tar 20-30 minutter. Jeg vil ha noen spørsmål klare på forhånd, og du vil få muligheten til å fortelle om dine opplevelser og meninger.

Du kan selv bestemme tid for samtalen, men det er ønskelig å gjennomføre samtalen i tidsrommet april-mai i år. Pga korona/covid 19 ønsker vi telefonintervju. Jeg tar lydopptak og notater fra samtalen, men du vil ikke kunne gjenkjennes i det jeg skal skrive i etterkant. Hvis du velger å delta, så vil du få et gavekort (dittgavekort.no) som kan brukes på blant annet Sørlandssenteret på kroner 250 som takk for hjelpen. Det er frivillig å delta, og du kan du når som helst trekke deg uten å oppgi noen grunn. Det vil ikke ha noen negative konsekvenser for deg.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til: innsyn i hvilke personopplysninger som er registrert om deg, å få rettet personopplysninger om deg, få slettet personopplysninger om deg, få utlevert en kopi av dine personopplysninger (dataportabilitet), og å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.
Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.
Prosjektet skal etter planen avsluttes 28.02.2022. Opplysninger og lydopptak er det kun forskningsgruppen som har tilgang til, og det vil bli slettet etter at studien er gjennomført.

På oppdrag fra Universitetet i Agder har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Prosjektet er en del av mitt doktorgradsarbeid ved Universitetet i Agder. Hvis du har spørsmål til studien, så kan du ta kontakt med meg: Kristine Engebretsen Illøkken (kristine.illokken@uia.no, tlf. 93865630) eller prosjektleder Frøydis N. Vik (froydis.n.vik@uia.no). Ta kontakt med personvernombudet ved Ina Danielsen (ina.danielsen@uia.no) om du ønsker å benytte deg av dine rettigheter. NSD kan kontaktes på nsd@nsd.no eller tlf. 55582117.

Birkenes skole har tatt kontakt med deg på mine vegne. Jeg vet derfor ikke hvem du er før du eventuelt melder deg på prosjektet. Hvis du har fått dette brevet, og ikke var lærer/assistent på 6.trinn da skolematprosjektet foregikk, så kan du bare kaste brevet.

Med vennlig hilsen

Kristine Engebretsen Illøkken
Doktorgradsstipendiat, UiA

Frøydis N. Vik, prosjektleder
Førsteamanuensis, UiA

Kontaktinformasjon

For å bli intervjuet kan du sende en SMS til meg, så kan vi avtale tid for telefonsamtalen. Mitt nummer er: **93865630. Du kan også kontakte meg på e-post: kristine.illokken@uia.no.**

Jeg vil be om ditt muntlige samtykke over telefon og be deg bekrefte at du har mottatt og forstått informasjon om prosjektet.

Hilsen Kristine Engebretsen Illøkken

Appendix III

Student questionnaire in the SMP

Skolematprosjektet

Institutt for folkehelse, idrett og ernæring
v/ Frøydis N. Vik
Postboks 422
4604 Kristiansand

Telefon 38 14 1855

Skolematprosjektet 2014/15

Elevspørreskjema om skolemat og kosthold og motivasjon for læring

Kjære elev

Vi håper at du kan svare på dette spørreskjemaet om hva du pleier å spise. I tillegg er det noen spørsmål om hvordan du lærer best, og noen spørsmål om deg. Det tar omtrent en skoletime. Det er kun forskerne som jobber med prosjektet som vil få vite hva du har svart, så du trenger ikke tenke på at hverken læreren din, foreldre eller andre elever får se hva du har svart. Det er ingen rette eller gale svar. Bare fyll ut det som passer best for deg og svar så ærlig du kan. Det er frivillig å delta. Hvis du ikke vil fylle ut spørreskjemaet, så kan du si ifra.

Hvordan skal du besvare spørreskjemaet?

- Bruk en blå eller svart penn.
- Svar med en tydelig ☒ i svaralternativet.
- Du skal bare svare *ett svar* per spørsmål for de fleste spørsmålene.
- Noen spørsmål kan besvares med mer enn ett svar (da står det skrevet i selve spørsmålet).

TAKK FOR HJELPEN!

Kristine Engebretsen Illøkken
Masterstudent, UiA

Renate Høiland
Masterstudent, UiA

Kirsten Olstad Petersson
Masterstudent, UiA

Frøydis Vik
Førsteamanuensis, UiA
Prosjektleder

Spørsmål om deg

1. **Er du jente eller gutt?**
   - ☐ Jente
   - ☐ Gutt

2. **Hvilke voksne bor du sammen med?**
   (Du kan svare mer enn ett svar)
   - ☐ Både min mor og min far hele tiden
   - ☐ Bare min mor
   - ☐ Bare min far
   - ☐ Min mor og hennes nye partner
   - ☐ Min far og hans nye partner
   - ☐ Besteforeldre
   - ☐ Andre voksne

3. **Bor du sammen med brødre og/eller søstre?**
   (Du kan svare mer enn ett svar)
   - ☐ Ja, en eller flere eldre brødre
   - ☐ Ja, en eller flere yngre brødre
   - ☐ Ja, en eller flere eldre søstre
   - ☐ Ja, en eller flere yngre søstre
   - ☐ Nei, jeg bor ikke i samme hus som min bror/brødre eller søster/søstre
   - ☐ Jeg har ikke brødre eller søstre

4. **Når er du født? (f.eks. 5. mai 2004)**

   _____

Del A

De neste spørsmålene er om måltider. Når du fyller ut disse spørsmålene skal du tenke på hvor ofte du vanligvis spiser måltidene det spørres om. Tenk på de siste ukene. Kryss av i den ruten du føler passer best for deg.

1. **Hvor ofte spiser du frokost i ukedagene?**
   - ☐ Aldri
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ Hver dag

2. **Hvor ofte spiser du frokost i helgene?**
   - ☐ Jeg spiser ikke frokost i helgene
   - ☐ Lørdag *eller* søndag
   - ☐ Både lørdag og søndag

3. **Hvor ofte spiser du lunsj/skolemat i ukedagene?**
   - ☐ Aldri
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ Hver dag

4. **Hvor ofte spiser du lunsj i helgene?**
   - ☐ Jeg spiser ikke lunsj i helgene
   - ☐ Lørdag *eller* søndag
   - ☐ Både lørdag og søndag

5. **Hvor ofte spiser du middag i ukedagene?**
   - ☐ Aldri
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ Hver dag

6. **Hvor ofte spiser du middag i helgene?**
   - ☐ Jeg spiser ikke middag i helgene
   - ☐ Lørdag *eller* søndag
   - ☐ Både lørdag og søndag

7. **Hvor ofte spiser du kveldsmat i ukedagene?**
   - ☐ Aldri
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ Hver dag

8. **Hvor ofte spiser du kveldsmat i helgene?**
   - ☐ Jeg spiser ikke kveldsmat i helgene
   - ☐ Lørdag *eller* søndag
   - ☐ Både lørdag og søndag

Del B

Hva spiser du vanligvis? Når du fyller ut disse spørsmålene skal du tenke på hva du vanligvis spiser og drikker både hjemme, på skolen og på fritiden. Kryss av i den ruten du føler passer best for deg.

1. **Hvor ofte spiser du grønnsaker til middag?**
   - ☐ Aldri
   - ☐ Sjeldnere enn 1 gang i uken
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ 5 ganger i uken
   - ☐ 6 ganger i uken
   - ☐ Hver dag
   - ☐ Flere ganger hver dag
2. **Hvor ofte spiser du grønnsaker på brødskivene? (f.eks. agurk, paprika, tomat)**
   - ☐ Aldri
   - ☐ Sjeldnere enn 1 gang i uken
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ 5 ganger i uken
   - ☐ 6 ganger i uken
   - ☐ Hver eneste dag
   - ☐ Flere ganger hver dag
3. **Hvor ofte spiser du andre grønnsaker (f.eks. gulrot)?**
   - ☐ Aldri
   - ☐ Sjeldnere enn 1 gang i uken
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ 5 ganger i uken
   - ☐ 6 ganger i uken
   - ☐ Hver dag
   - ☐ Flere ganger hver dag
4. **Hvor ofte spiser du eple, appelsin, pære og banan?**
   - ☐ Aldri
   - ☐ Sjeldnere enn 1 gang i uken
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ 5 ganger i uken
   - ☐ 6 ganger i uken
   - ☐ Hver dag
   - ☐ Flere ganger hver dag
5. **Hvor ofte spiser du annen frukt og bær (andre frukter og bær enn eple, appelsin, pære og banan)?**
   - ☐ Aldri
   - ☐ Sjeldnere enn 1 gang i uken
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ 5 ganger i uken
   - ☐ 6 ganger i uken
   - ☐ Hver dag
   - ☐ Flere ganger hver dag

6. Hvor ofte spiser du potetgull?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

7. Hvor ofte spiser du godterier (sjokolade, smågodt osv.)?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

8. Hvor ofte spiser du nudler (som f.eks. Mr Lee)?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

9. Hvor ofte spiser du boller, muffins, kake eller annen søt gjærbakst?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

10. Hvor ofte drikker du juice?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

11. Hvor ofte drikker du saft?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

12. Hvor ofte drikker du melk?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

13. Hvor ofte drikker du brus MED sukker (f.eks. Solo, Pepsi, Fanta, Coca-Cola)?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

14. Hvor ofte drikker du brus UTEN sukker (f.eks. Solo lett, Solo pluss, Pepsi MAX, Coca-Cola light, Tab X-tra)?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

15. Hvor ofte drikker du vann?

- ☐ Aldri
- ☐ Sjeldnere enn 1 gang i uken
- ☐ 1 gang i uken
- ☐ 2 ganger i uken
- ☐ 3 ganger i uken
- ☐ 4 ganger i uken
- ☐ 5 ganger i uken
- ☐ 6 ganger i uken
- ☐ Hver dag
- ☐ Flere ganger hver dag

Del C

De neste spørsmålene handler **KUN om det du spiser og drikker til skolematen** i matfriminuttet på skolen.

1. **Hvor ofte spiser du følgende *til skolemat*?** (sett ett kryss for hver linje)

Brød og annet	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Grovbrød/grove rundstykker	☐	☐	☐	☐	☐	☐
Fint brød (f.eks. loff)/fine rundstykker	☐	☐	☐	☐	☐	☐
Mørkt knekkebrød	☐	☐	☐	☐	☐	☐
Lyst knekkebrød	☐	☐	☐	☐	☐	☐
Lomper/tortilla lefser	☐	☐	☐	☐	☐	☐
Kjeks	☐	☐	☐	☐	☐	☐
Hurtignudler (f.eks. Mr. Lee)	☐	☐	☐	☐	☐	☐
Pasta	☐	☐	☐	☐	☐	☐
Pannekaker/lapper	☐	☐	☐	☐	☐	☐
Boller, vafler, muffins	☐	☐	☐	☐	☐	☐

Pålegg	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Sjokoladepålegg (f.eks. Nugatti, Nutella, Nøtte)	☐	☐	☐	☐	☐	☐
Peanøttsmør	☐	☐	☐	☐	☐	☐
Rekesalat, italiensk salat e.l.	☐	☐	☐	☐	☐	☐
Leverpostei	☐	☐	☐	☐	☐	☐
Kjøttpålegg	☐	☐	☐	☐	☐	☐
Fiskepålegg (f.eks. makrell i tomat, røykelaks)	☐	☐	☐	☐	☐	☐
Syltetøy	☐	☐	☐	☐	☐	☐
Kaviar	☐	☐	☐	☐	☐	☐
Majones	☐	☐	☐	☐	☐	☐
Egg	☐	☐	☐	☐	☐	☐
Gulost, smøreost	☐	☐	☐	☐	☐	☐
Brunost, prim	☐	☐	☐	☐	☐	☐
Smør på skiva	☐	☐	☐	☐	☐	☐

1. **Hvor ofte spiser du følgende *til skolemat*?** (sett ett kryss for hver linje)

Frukt, grønt og annet	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Frukt (f.eks. eple, pære, banan)	☐	☐	☐	☐	☐	☐
Bær (f.eks. blåbær, jordbær)	☐	☐	☐	☐	☐	☐
Grønnsaker (f.eks. agurk, tomat, paprika, gulrot)	☐	☐	☐	☐	☐	☐
Yoghurt	☐	☐	☐	☐	☐	☐
Nøtter/mandler	☐	☐	☐	☐	☐	☐

2. **Hvor ofte drikker du følgende *til skolematen*?** (sett ett kryss for hver linje)

	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Melk, vanlig	☐	☐	☐	☐	☐	☐
Melk med smak (sjokolade eller jordbær)	☐	☐	☐	☐	☐	☐
Juice	☐	☐	☐	☐	☐	☐
Saft/iste	☐	☐	☐	☐	☐	☐
Brus MED sukker (f.eks. Fanta, Coca- Cola, Solo, Pepsi)	☐	☐	☐	☐	☐	☐
Brus UTEN sukker (f.eks. Solo Super, Pepsi MAX, Coca-Cola light)	☐	☐	☐	☐	☐	☐
Vann	☐	☐	☐	☐	☐	☐

Del D

De neste spørsmålene handler om **hvordan du har det på skolen** (sett ett kryss for hver linje)

1. Din oppførsel i timene	Aldri	Sjelden	Noen ganger	Ofte	Svært ofte
Bråker du i timene slik at du får tilsnakk fra lærer	☐	☐	☐	☐	☐
Blir du utvist fra timer fordi du bråker	☐	☐	☐	☐	☐
Får du anmerkninger for dårlig oppførsel	☐	☐	☐	☐	☐
Forstyrrer du i timene slik at andre ikke kan følge med	☐	☐	☐	☐	☐
Synes du det er ubehagelig å snakke høyt i timene	☐	☐	☐	☐	☐
Rekker du opp hånda for å svare på spørsmål	☐	☐	☐	☐	☐
Føler du at du er sjenert i klassen	☐	☐	☐	☐	☐
Hvor ofte skjer det at du ikke har sagt noe i timene en hel dag	☐	☐	☐	☐	☐
Når jeg skal si noe i timene er jeg redd for å si noe dumt	☐	☐	☐	☐	☐
Hvor ofte føler du at du er sjenert overfor personer med det motsatte kjønn	☐	☐	☐	☐	☐
Hender det at du ikke rekker opp hånda selv om du vet svaret fordi det er ubehagelig å snakke høyt i klassen	☐	☐	☐	☐	☐

2. Din trivsel på skolen	Aldri	Sjelden	Noen ganger	Ofte	Svært ofte
Jeg liker å være på skolen.	☐	☐	☐	☐	☐
Skolen er interessant.	☐	☐	☐	☐	☐
Jeg gleder meg til å gå på skolen.	☐	☐	☐	☐	☐
Jeg liker skoleaktiviteter.	☐	☐	☐	☐	☐
Vi gjør mye gøy på skolen.	☐	☐	☐	☐	☐
Jeg skulle ønske jeg ikke måtte gå på skolen.	☐	☐	☐	☐	☐
Jeg liker ikke skoleaktiviteter.	☐	☐	☐	☐	☐
Jeg lærer mye på skolen.	☐	☐	☐	☐	☐
Det er mange ting på skolen jeg ikke liker.	☐	☐	☐	☐	☐
Lærerne hjelper meg når jeg trenger det.	☐	☐	☐	☐	☐

3. Om skolearbeidet	Helt usant for meg	Ganske usant for meg	Delvis sant for meg	Ganske sant for meg	Helt sant for meg
Jeg kan mestre fagene det blir undervist i på skolen dette året.	☐	☐	☐	☐	☐
Jeg kan utføre selv det tyngste skolearbeidet hvis jeg prøver.	☐	☐	☐	☐	☐
Hvis jeg har nok tid kan jeg gjøre en god jobb med alt skolearbeidet mitt.	☐	☐	☐	☐	☐
Jeg kan gjøre nesten alt arbeid på skolen hvis jeg ikke gir opp.	☐	☐	☐	☐	☐
Selv om skolearbeidet er tungt, kan jeg lære det.	☐	☐	☐	☐	☐
Jeg er sikker på at jeg kan finne ut hvordan man kan gjøre det vanskeligste arbeidet.	☐	☐	☐	☐	☐

4. Elevene i min klasse	Aldri	Sjelden	Noen ganger	Ofte	Alltid
Elevene i klassen min liker å være sammen.	☐	☐	☐	☐	☐
Flesteparten av elevene i klassen min er snille og hjelpsomme.	☐	☐	☐	☐	☐
Andre elever godtar meg som jeg er.	☐	☐	☐	☐	☐
Når en klassekamerat er lei seg trøster de andre ham/henne.	☐	☐	☐	☐	☐

Del E

1. **Pleier du å spise eller drikke noe *etter* skolen og *før* middag?**
   - ☐ Ja
   - ☐ Nei
2. **Hvis ja, skriv det her:**

……..

……..

3. **Er du med i melkeordningen?**
   - ☐ Nei
   - ☐ Ja, jeg drikker vanlig melk
   - ☐ Ja, jeg drikker melk med smak (f.eks. sjokolade eller jordbær)
4. **Er du med i noen form for organisert trening eller idrett utenom skoletid?**
   - ☐ Ja
   - ☐ Nei

   Hvis ja, skriv ned hva:

5. **Hvor mange GANGER i uken driver du idrett eller aktivitet så mye at du blir andpusten og/eller svett *utenom skoletid*?**
   - ☐ Hver dag
   - ☐ 4 - 6 ganger i uken
   - ☐ 2 - 3 ganger i uken
   - ☐ En gang i uken
   - ☐ En gang i måneden
   - ☐ Mindre enn en gang i måneden
   - ☐ Aldri
6. **Hvor mange timer per dag pleier du å se på TV *utenom skoletid*?**
   - ☐ Ingen
   - ☐ Mindre enn en ½ time om dagen
   - ☐ ½ - 1 time
   - ☐ 2 - 3 timer
   - ☐ 4 timer
   - ☐ Mer enn 4 timer
7. **Hvor mange timer per dag pleier du å sitte foran PC'en og bruke spillkonsoll (ta også med tid til I-pad og spille på mobilen) *utenom skoletid*?**
   - ☐ Ingen
   - ☐ Mindre enn en ½ time om dagen
   - ☐ ½ - 1 time
   - ☐ 2 - 3 timer
   - ☐ 4 timer
   - ☐ Mer enn 4 timer
8. **Hvor ofte ser du på TV mens du spiser?**
   - ☐ Aldri
   - ☐ Sjeldnere enn 1 gang i uken
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ 5 ganger i uken
   - ☐ 6 ganger i uken
   - ☐ Hver dag
   - ☐ Flere ganger hver dag

Del F

1. **Hva synes du om å få gratis skolelunsj hver dag?**
   - ☐ Jeg liker det veldig godt
   - ☐ Jeg liker det ganske godt
   - ☐ Jeg liker det ikke så godt
   - ☐ Jeg liker det ikke i det hele tatt
2. **Hvor ofte spiser du gratis skolelunsj som er blitt servert i klassen?**
   - ☐ Aldri
   - ☐ 1 gang i uken
   - ☐ 2 ganger i uken
   - ☐ 3 ganger i uken
   - ☐ 4 ganger i uken
   - ☐ Hver dag
3. **Har du likt maten som blir servert til skolelunsjen klassen?**
   - ☐ Ja, veldig godt
   - ☐ Ja, ganske godt
   - ☐ Sånn passe
   - ☐ Nei, ikke så godt
   - ☐ Nei, ikke i det hele tatt
4. **Har skolelunsj hver dag ført til noen endringer i klassen?** (du kan svare mer enn et svar)
   - ☐ Ja, det er hyggelig å sitte sammen rundt bordet med de andre elevene
   - ☐ Ja, vi snakker mer sammen mens vi spiser enn før
   - ☐ Har ikke merket noe forskjell
5. **Har skolelunsj hver dag ført til noen endringer hjemme, f.eks. at du spiser andre ting til frokost og kveldsmat enn før?** (fyll inn hva endringene er)
   - ☐ Ja, jeg spiser mer av

     _____

     _____enn før
   - ☐ Ja, jeg spiser mindre av

     _____

     _____enn før
   - ☐ Nei, jeg spiser omtrent det samme
   - ☐ Har ikke merket noe forskjell

Takk for hjelpen!
Er det noe du vil legge til så kan du skrive det her:

Appendix IV

List over foods allowed in the SMP

Hva skal serveres	Hva skal IKKE serveres		Merknad
Frukt			Hver dag – oppkuttet (f. eks banan til å ha på skiva som en variasjon til pålegg)
Bær			Hver dag/innimellom
grønnsaker			Hver dag, f.eks. oppkuttet gulrot en dag, noe annet en annen dag (salat, kålrot, selleri, blomkål, etc.)
Grovbrød, mellomgrovt brød Grove rundstykker Grove tortillalefser	Loff, fine rundstykker		Minst 50% grovt
Grove knekkebrød	Fine knekkebrød (f.eks. type «frokost»)		Kan være en variasjon til brød
Smør/margarin	Lomper		To typer: Bremykt og vita hjertegod
Nøtter, mandler	Kjeks		
Kjøttpålegg	pannekaker		
Makrell i tomat	Nudler		
Fiskekaker som pålegg	Syltetøy		
Røykelaks el annet fiskepålegg	Boller, muffins, vafler		
Egg	Pasta - fin		
Pasta, grov			f.eks. i salat
Kaviar	Sjoko-pålegg, mm		
Gulost/smøreost	Rekesalat, italiensk		
	yoghurt		Mange typer er tilsatt sukker, og derfor tenke vi at det bør droppes som hovedregel. Men det går an med naturell m/friske bær/dryss av honning som en variasjon
Brunost/prim	Majones		
leverpostei	peanøttsmør		
	Snop, godteri		
	Potetgull, salt snacks		
Vann			
melk	Brus		
	Juice		

Allowed servings	Not allowed	Comments
Fruits	Candy and all types of savory snacks	Every day
Berries		Every day (or some days)
Vegetables		Every day
Bread and crackers, whole wheat	White bread and white crackers	At least 50% whole wheat
Butter and margarin		Two specific types: Bremykt og vita hjertegod
Nuts and almonds	Sweet crackers, pancakes, noodles, sweet pastries and cakes	
Meat (ham, chicken, turkey, salami)	Jam, peanut butter and chocolate spread	
Fish		
Egg and caviar	Mayonnaise and mayonnaise based salads	
Pasta, whole wheat	Pasta, not whole what	For instance in salads
Egg		
Cheese	Brown cheese and prim	
Liver pate		
Water	Juice and soda	
Milk	Yogurt	Many types of yogurt contains added sugar, and should be avoided. Yogurt without added sugar can be served with berries and honey as a variation.

Appendix V

Interview guides in the SMP

2015
Intervjuguide – lærere (1 av 2)

Påvirker et sunt og felles skolemåltid i løpet av dagen læringsmiljøet i klassen hos norske elever i 6. klasse?

Før intervjuet

- (navn på person som gjennomfører intervjuet) studerer folkehelse ved Universitetet i Agder
- Jeg skal skrive masteroppgave om hvordan skolemåltidet kan påvirke læringsmiljøet i klassen, både ut ifra hvilken mat elevene spiser og hvordan de sitter under måltidet
- Intervjuet tar ca. 45 minutter og blir tatt opp. Jeg tar også muligens noen notater underveis, men dette er bare for å kunne huske ting bedre
- Alt du sier er konfidensielt og det er også frivillig å svare på alle spørsmålene
- Først kommer vi til å snakke litt om læringsmiljøet i klassen og innenfor det kommer vi til å snakke om relasjoner mellom elevene og din relasjon til elevene. Deretter ønsker jeg å snakke litt om selve skolemåltidet

Skru på båndopptaker.

Læringsmiljøet

Elevrelasjoner

- Tilhørighet og vennskap
  - Hvordan er samholdet i klassen?
  - Er det de samme elevene som omgås hverandre, eller er det stor variasjon?
  - Har det vært noen endringer i hvem som omgås hverandre eller hvordan elevene omgås hverandre etter at de fikk servert skolemat? Evt. hvilke endringer?

- Pratet elevene mer eller mindre med hverandre under lunsjen da de satt sammen? Hvis ja; har du inntrykk av at elevene kan ha blitt bedre kjent med hverandre på grunn av dette?
- Tror du et felles skolemåltid kan påvirke det sosiale miljøet i klassen? Hvordan?

➢ Faglig og sosial læring

- Opplever du at elevene er trygge på hverandre? Mener du at et felles servert skolemåltid kan påvirke hvor trygge elevene er på hverandre? Hvordan?
- Hvordan inkluderer elevene hverandre? Var det noen endring i dette i løpet av sjette klasse? Hvordan?
- Hvordan aksepterer elevene hverandre? Var det noen endring i dette i løpet av sjette klasse? Hvordan?
- Har du merket noen forskjell på måten elevene er med hverandre før og etter skolematprosjektet? Hvilke forskjeller?
- Hvordan opplever du at et felles skolemåltid kan påvirke elevenes læring?

➢ Sosial kompetanse

- Samarbeider elevene i de forskjellige fagene? Hvordan fungerer samarbeid i klassen? Har det vært noen forskjell på samarbeid i klassen før og etter skolematprosjektet?
- Hvordan er fordelingen av grupper når elevene samarbeider? Faste/tilfeldige grupper, bestemmer du som lærer eller bestemmer de selv? Endringer?

- Hva er terskelen for å spør hverandre om hjelp i fagene på skolen blant elevene? Kan du si noe om det har endret seg på noen måte etter skolematprosjektet?

Lærer-elev-relasjoner

- Hvordan vil du beskrive ditt forhold til klassen?
  - Hvordan er kommunikasjonen mellom deg og klassen? Har det vært noen endringer i måten dere kommuniserer på etter skolematprosjektet?
  - Har ditt inntrykk av enkeltelevene endret seg på noen måte i løpet av sjette klasse? Er noen elever som har vist nye sider ved seg som følge av at de sitter sammen og spiser?
  - Er det noen elever i klassen som krever mer eller mindre oppmerksomhet av deg i undervisningen? Har det vært noen endringer i hvem som har fått oppmerksomhet i klassen i løpet av sjette klasse? Hvilke endringer? Hvorfor?
  - Virker det som elevene forstår hvilke forventninger du har til dem i de forskjellige fagene? Har det vært noen endring i dette i løpet av sjette klasse?
  - Har ditt forhold til elevene endret seg noe i løpet av sjette klasse? Hvordan? Hva tror du det skyldes?
- Struktur og regler
  - Opplever du noen forskjell på hvordan er å gi beskjeder før og etter skolelunsjen? Har dette endret seg på noen måte i løpet av skolematprosjektet? Hvordan?

- Er det noen forskjell i regelbrudd før og etter skolelunsjen? Har det vært noen endring i dette i løpet av skolematprosjektet? Hvilke?
- Har undervisningssituasjonen endret seg noe i løpet av skolematprosjektet? Hvordan?

Skolemåltidet

- Hvordan har det vært å fått servert skolemat til klassen hver dag i ett år?
  - Hva er ditt inntrykk av hva elevene syntes om å sitte sammen istedenfor å sitte hver for seg?
  - Hva er ditt inntrykk av hvilken mat elevene hadde med seg hjemmefra sammenlignet med maten de fikk på skolen? Var det stor forskjell på innholdet i de forskjellige måltidene?
- Tror du skolematen kan påvirke hvordan elevene gjør det på skolen? Hvordan?
  - Hvordan konsentrerte elevene seg på slutten av året i sjette klasse, sammenlignet med begynnelsen av året?
  - Hvor motiverte virket elevene på slutten av året i sjette klasse, sammenlignet med begynnelsen av året?
  - Hva tror du eventuelle endringer kan skyldes?
- Var det noen forskjell på hvordan elevene oppførte seg etter lunsj sammenlignet med før lunsj i sjette klasse?
  - Var det forskjell på hvor mange som var urolige og som eventuelt fikk tilsnakk?
  - Var det forskjell på hvor aktive elevene var i undervisningen?
  - Merket du noen forskjell på hvor konsentrerte elevene var før og etter lunsj?

- Hva tror du er årsaken til eventuelle endringer hos elevene før og etter lunsj?
- Var det noen forskjell på elevenes atferd før og etter lunsj i sjette klasse sammenlignet med før og etter lunsj i femte klasse? Hvilke forskjeller? Hva tror du dette kan skyldes?
- Opplevde du at elevenes oppførsel under selve måltidet endret seg noe i løpet av sjette klasse?

- Da har jeg ingen flere spørsmål fra min side. Er det noe du synes vi burde snakke som vi ikke har vært innom?

Skru av båndopptaker.

Takk for at du ville være med på intervjuet!

2015
Intervjuguide – lærere (2 av 2)

Innledning:

- Hvem er jeg?
  - *(navn på person som gjennomfører intervjuet)*
  - *Master i Folkehelsevitenskap*
  - *Masteroppgave – prosessevaluering; evaluere skolematprosjektet gjennom erfaringer*

- Informasjon om prosjektet og hensikten med intervjuet
  - *Ønsker å snakke nærmere med dere som deltakere*
  - *Erfaringer; hva har vært bra og hva har vært dårlig*

- Avklaringer
  - *Spør dersom uklare spørsmål*
  - *Intervjuet er frivillig*
  - *Intervjuet vil bli tatt opp på bånd*

- Er det noe du lurer på før vi begynner intervjuet?

Problemstilling:
«Hvilke erfaringer ved implementeringen av skolematen har de ulike deltakerne av skolematprosjektet gjort seg?»

Spørsmål:

1. Informasjon: Hvordan har informasjonen om prosjektet vært?
   → Informasjon om: maten som ble servert, spørreskjemaer og vekt/høyde/livvidde, prosjektets varighet, prosjektets hensikt?
   → Var du godt informert om skolematprosjektet før det startet i fjor høst?
   → Tilsvarte informasjonen på forhånd det du/dere ble møtt med når prosjektet startet?
   → Hvem har holdt dere informert/hatt ansvaret for å orientere dere?
   → Har det vært nok/tilstrekkelig informasjon?
   → Var informasjonen god nok?
   → Manglet det informasjon om noe? Var det noe informasjon du savnet?
   → Dersom det manglet/var lite informasjon om noe, førte det til noen problemer?
   → Hvordan opplevde du informasjonen til elevene? Var den god/dårlig? På elevenes nivå?

2. Den praktiske gjennomføringen/organiseringen: Hvordan var den praktiske gjennomføringen av skolemåltidet?

- → Hva var din rolle som lærer i den praktiske delen (få maten på bordet, omorganisere pulter etc)?
- → Hva hadde elevene ansvar for?
- → Hvordan fungerte det?
- → Hva var positivt og hva var negativt?
- → Hva syns du om at elevene selv hadde ansvar?
- → Hva syns du om at måltidet ble inntatt felles rundt et langbord? Positive og negative erfaringer med dette?
- → Var det noe som burde vært gjort annerledes i den praktiske gjennomføringen? Av enten dere lærerne og elevene, eller av de som er ansvarlig for prosjektet (Trude og UiA)?

3. Skolemåltidet: Hva syns du om selve måltidet og maten som ble servert?
   - → Hva var bra/positivt med maten som ble servert?
   - → Hva var dårlig/negativt med maten som ble servert?
   - → Manglet det noen matvarer?
   - → Har du lagt merke til om det er noen forskjeller i maten elevene har med seg nå sammenlignet med maten de hadde med seg før prosjektet?
   - → Har du lagt merke til om det var noen forskjell på maten som ble servert sammenlignet med maten elevene hadde med seg før prosjektet startet? Hvilke forskjeller?
   - → Hva har vært positivt og hva har vært negativt med at elevene ikke har hatt med seg matpakke?

4. Lærerrollen: Hvordan har skolematprosjektet vært for deg som lærer?
   - → Hvordan har det vært at din klasse har fått servert skolemat hver dag gjennom 6. klasse?
   - → Hvordan opplever du at det har vært for elevene?
   - → Hva har vært din rolle som lærer under prosjektet?

5. Utfordringer: Har dere kommet over noen utfordringer/vanskeligheter underveis i prosjektet?
   - → Klarte dere å løse disse? Hvordan?
   - → Kunne de aktuelle utfordringene/vanskelighetene vært unngått?

6. Organisering: Hva syns du om hvordan skolematprosjektet ble lagt opp og organisert?

7. Samarbeid: Hvordan har samarbeidet fungert for deg som lærer?
   - → Hvordan var samarbeidet mellom lærer(ne) og UiA?
   - → Hvordan var samarbeidet mellom lærer(ne) og Trude?
   - → Hvordan var samarbeidet mellom lærer(ne) og foreldrene?
   - → Hvordan var samarbeidet mellom lærer(ne) og elevene?
   - → Hvordan var samarbeidet elevene imellom?

8. Involvering: I hvor stor grad ble du som lærer involvert i prosjektet?
   → Hvor delaktig har du/dere som lærere vært? For mye eller for lite?
   → Har du som lærer hatt mulighet til å påvirke prosjektet? Medvirket til endringer underveis?

9. Etter prosjektets slutt: Hvordan har det vært å gå tilbake til å ha med seg medbrakt matpakke?
   → Hva savner du mest med skolemåltidet? Hva savner du minst?
   → Har skolemåltidet ført til noen forandringer i klassen deres? Enten underveis eller nå etter at prosjektet er ferdig? Positive/Negative?
   → Har skolematprosjektet ført til noen forandringer for deg? Hvilke forandringer? Positive/negative?
   → Nå etter prosjektets slutt, er alt tilbake til «normalen»?

10. Læring/erfaringer: Hvilke erfaringer sitter du igjen med ved prosjektslutt?
   → Har du lært noe av å være med på skolematprosjektet? Hva?
   → Hva sitter du igjen med av kunnskap og erfaring?
   → Hva er dine tanker om betydningen av skolemat? Har du lært noe nytt om dette?
   → Hvordan har det vært for deg å være med i et forskningsprosjekt? Positive og negative erfaringer?
   → Har du noe forslag til noe som burde vært gjort annerledes eller forbedret?

11. Er det noe du vil snakke om som vi ikke har kommet inn på?

Etter intervjuet:

- Skru av båndopptaker

- Takk for deltakelsen

2015
Intervjuguide elever (1 av 2)

Påvirker et sunt og felles skolemåltid i løpet av dagen læringsmiljøet i klassen hos norske elever i 6. klasse?

Før intervjuet

- (navn på person som gjennomfører intervjuet) studerer folkehelse ved universitetet og skal skrive en oppgave om hvordan skolematen kan påvirke hvor godt elevene trives i klassen og om dere kan lære bedre på grunn av det.
- Intervjuet tar ca. 45 minutter og blir tatt opp på bånd. Det er også mulig jeg tar noen notater underveis, men det er bare for å huske ting litt bedre
- Hele intervjuet er frivillig, så hvis det er noe du ikke vil svare på, så må du bare si ifra. Det er ingen andre enn meg og veilederne våre som vet hvem som har sagt hva. Jeg bruker for eksempel ingen navn i oppgaven.
- Dersom det er noe du ikke forstår eller lurer på, så må du bare si ifra med en gang
- Først kommer vi til å snakke litt om hvordan dere elevene er med hverandre og hvordan deres forhold til læreren er, deretter kommer vi til å snakke litt om selve skolemåltidet

Skru på opptaker

Læringsmiljøet

Elevrelasjoner

- Tilhørighet og vennskap
    - Hvordan er vennskapet (samholdet) i klassen?
    - Omgås du som regel de samme medelevene, eller er du sammen med mange forskjellige elever?
    - Har det vært noen endringer i hvem som omgås hverandre etter at dere fikk servert skolemat sammenlignet med før? Evt. hvilke endringer?

- Satt dere sammen med forskjellige personer under lunsjen i sjette klasse, eller hadde dere som regel "faste plasser"? Var det noen endringer i dette i løpet av skoleåret?
- Tror du skolemåltidet kan påvirke hvem dere er sammen i klassen? Evt. hvordan?
- Pratet dere mer eller mindre med hverandre under lunsjen når dere satt sammen, eller var det omtrent likt da dere satt hver for dere? → Hvis ja; føler du at du har blitt bedre kjent med de andre på grunn av dette?

➢ Faglig og sosial læring

- Opplever du at du selv og de andre i klassen er trygge på hverandre?
- Tror du et servert skolemåltid kan påvirke hvor trygge dere er på hverandre? Hvordan?
- Hvordan inkludere dere hverandre i klassen? Har det vært noen endring i hvordan dere inkluderer hverandre i løpet av sjette klasse? Hvordan?
- Hvordan aksepterer dere hverandre i klassen? Har det vært noen endring i måten dere aksepterer hverandre i løpet av sjette klasse? Hvordan?
- Tror du et felles skolemåltid kan påvirke måten dere er med hverandre? Evt. hvordan? Har du merket noen forskjell på måten dere er med hverandre i klassen før og etter at dere fikk servert skolemat? Hvis ja; hvilke forskjeller?

➢ Sosial kompetanse

- Samarbeider dere i de forskjellige fagene i klassen? Hvordan fungerer samarbeid i klassen? Har det vært noen forskjell på samarbeidet i klassen før og etter dere fikk servert skolemat?

- Hvordan er fordelingen når dere samarbeider om oppgaver på skolen? Har dere faste grupper? Deler læreren inn i grupper? Har det vært noen endring i gruppefordelingen før og etter dere fikk servert skolemat? Hvilke? Hvorfor?
- Hvordan er det å spør de andre elevene om hjelp i fagene når dere er på skolen? Har det blitt lettere/vanskeligere å spør de andre elevene om hjelp etter dere fikk servert mat på skolen?

Lærer-elev-relasjoner

- Hvordan vil du beskrive klassens forhold til læreren?
  - Gir læreren lik oppmerksomhet til alle i klassen? Var det noen endringer i dette i løpet av sjette klasse? Hvilke?
  - Hvordan forstår du hvilke forventninger læreren har til deg i de forskjellige fagene? Er det enkelt/vanskelig å forstå? Endret dette seg noe i løpet av sjette klasse? Hvordan?
  - Har ditt forhold til læreren endret seg noe i løpet av sjette klasse? Hva tror du det skyldes?

Skolemåltidet

- Hvordan har det vært å få servert skolemat hver dag i ett år?
  - Hvordan var det å sitte sammen å spise istedenfor å sitte hver for deg?
  - Er det forskjell på maten du fikk på skolen i sjette klasse i forhold til den maten du har med deg hjemmefra? Hvilke forskjeller er det?
- Tror du skolematen kan påvirke hvordan dere som elever gjør det på skolen? Evt. hvordan?

- Hvordan konsentrerte du deg på slutten av året i sjette klasse, da dere hadde fått skolemat i ett år, sammenlignet med før dere fikk skolemat?
- Hvordan mener du at du selv gjør det på skolen nå sammenlignet med før dere fikk skolemat? Tror du dette kan ha noen sammenheng?

- Var det noen forskjell på hvordan elevene i klassen oppførte seg etter lunsj sammenlignet med før lunsj i sjette klasse?
  - Var det forskjell på hvor mange som fikk tilsnakk fra læreren?
  - Hvor aktiv var du og de andre elevene i undervisningen etter lunsj sammenlignet med før lunsj? Forskjell? Hva kan det skyldes?
  - Hvordan konsentrerte du deg etter lunsj sammenlignet med før lunsj?
  - Hva tror du var årsaken til eventuelle endringer i oppførselen til deg og de andre elevene før og etter lunsj?
  - Var det noen endring i måten klassen oppførte seg på under skolemåltidet i løpet av sjette klasse?
- Lærte noe ved å være med på skolematprosjektet? Hva?

- Er det noe annet du vil snakke om som vi ikke har vært innom?

Skru av båndopptaker

Tusen takk for at du ville være med på intervjuet!

2015
Intervjuguide elever (2 av 2)

Innledning:

0. Hvem er jeg?
   - *(navn på person som gjennomfører intervjuet) masterstudent*
   - *Skriver en oppgave om skolematprosjektet*

1. Informasjon om prosjektet og hensikten med intervjuet
   - *Ønsker å snakke nærmere med dere som deltakere i prosjektet*
   - *Deres erfaringer; hva har vært bra, hva har vært dårlig*

2. Avklaringer
   - *Si ifra dersom uforståelig/vanskelig ord, eller dersom du ikke skjønner spørsmålet*
   - *Intervjuet er frivillig. Si ifra dersom det er noe du ikke vil svare på*
   - *Intervjuet vil bli anonymisert, personlige opplysninger vil ikke komme fram i oppgaven*
   - *Intervjuet blir tatt opp på bånd*

3. Er det noe du lurer på før vi begynner intervjuet?

4. Start båndopptaker

Spørsmål:

1. <u>Informasjonen</u> om prosjektet:
   → Hvordan var informasjonen om maten som ble servert før prosjektet startet og underveis?
   → Hvordan var informasjonen om spørreskjemaer og mål av vekt/høyde/livvidde før prosjektet startet og underveis? Ble dere informert på forhånd hver gang UiA kom for å gjennomføre dette?
   → Hvordan var informasjonen om prosjektets varighet og hensikten med prosjektet før prosjektet startet?
   → Hadde du hørt om skolematprosjektet og fått nok informasjon om det før det startet i fjor høst?
   → Tilsvarte informasjonen forventningene? Ble det slik du hadde sett for deg ut i fra informasjonen på forhånd?
   → Dersom det har vært noen beskjeder eller informasjon underveis, hvem er det som har gitt dere den informasjonen?
   → Var det nok/tilstrekkelig informasjon underveis?
   → Var informasjonen god nok?
   → Manglet det informasjon om noe? Var det noe informasjon du savnet?

- → Dersom det manglet/var lite informasjon om noe, førte det til noen problemer?

2. Organiseringen i klasserommet:
   - → Kan du fortelle kort hvordan organiseringen av måltidet i klasserommet foregikk og hvordan dere gjorde det fra og med Trude plasserte maten i bakker utenfor klasserommet?
   - → Hvordan fungerte dette?
   - → Hva var bra/positivt?
   - → Hva var vanskelig/negativt?
   - → Hvordan syns du det var å spise felles rundt et langbord? Positive og negative erfaringer med dette? (Hvordan var det å spise hver for seg?)
   - → Var det noen spesielle utfordringer eller vanskeligheter dere kom ovenfor? Klarte dere å løse disse? Hvordan?
   - → Var det noe som burde vært gjort annerledes i den praktiske gjennomføringen? Av enten dere elevene og lærerne eller av de som er ansvarlig for prosjektet (Trude og UiA)?

3. Skolemåltidet og matpakke:
   - → Hva syns du om selve måltidet og maten som ble servert?
   - → Hva var bra/positivt med maten som ble servert?
   - → Hva var dumt/negativt med maten som ble servert?
   - → Manglet det noen matvarer? Var det noe du savnet?
   - → Hvordan har det vært å ikke ha med seg matpakke?
   - → Hva har vært bra/positivt og hva har vært dumt/negativt med å ikke ha med seg matpakke?
   - → Er det noen forskjell i matpakken du hadde med deg før prosjektet sammenlignet med den du har med nå etter prosjektet? Hvilke forskjeller?
   - → Var det noen forskjell i maten du fikk servert på skolen sammenlignet med matpakka du hadde med før prosjektet? Hvilke forskjeller?
   - → Vet du hva dine foreldre syns om at du fikk servert gratis mat på skolen? Hva syns de om at du ikke trengte medbrakt matpakke?

4. Utfordringer/vanskeligheter underveis i prosjektet:
   - → Har du eller dere som klasse kommet over noen utfordringer/vanskeligheter underveis i prosjektet?
   - → Klarte dere å løse disse? Hvordan?
   - → Kunne de aktuelle utfordringene/vanskelighetene vært unngått?

5. Samarbeid med andre involverte:
   - → Hvordan fungerte samarbeidet dere elevene imellom?
   - → Hvordan fungerte samarbeidet mellom elevene og lærerne?
   - → Hvordan fungerte samarbeidet mellom elevene og Trude?
   - → Hvordan fungerte samarbeidet mellom elevene og UiA?

6. Involvering av elevene:
   - → I hvilken grad ble du/dere som elever involvert i skolematprosjektet? For mye eller for lite?
   - → Har du som elev hatt mulighet til å påvirke prosjektet? Medvirket til endringer underveis?

7. Etter prosjektets slutt:
   - → Hvordan har det vært å gå tilbake til å ha med seg medbrakt matpakke?
   - → Hvordan syns du det har vært å få servert gratis skolemat hver dag i 6. klasse?
   - → Hva savner du mest med det å få servert skolemat? Hva savner du minst?
   - → Har skolematprosjektet ført til noen forandringer i klassen deres? Enten underveis eller nå etter at prosjektet er ferdig? Syns du dette er positive eller negative forandringer?
   - → Har skolematprosjektet ført til noen forandringer hjemme hos deg og din familie? Eventuelt hvilke forandringer? Syns du dette er positive eller negative forandringer?
   - → Nå etter prosjektets slutt, er alt tilbake til «normalen»? På hvilken måte?

8. Læring/erfaring av prosjektet:
   - → Hva er de viktigste erfaringene du sitter igjen med etter skolematprosjektet?
   - → Har du lært noe ved å være med på prosjektet? Hva?
   - → Har er dine tanker om betydningen av skolemat? Har du lært noe nytt om dette?
   - → Hvordan har det vært å være deltaker i et forskningsprosjekt? Hva var bra/positiv og hva var dumt/negativt?
   - → Har du noen forslag til noe som burde vært gjort annerledes i prosjektet?

9. Er det noe annet du mener er viktig som vi ikke har snakket om?

Etter intervjuet:

- Stopp båndopptaker

- Takk for deltakelsen

2020
Intervjuguide – lærere (1 av 1)

Innledning:

- Hvem er jeg?
- Informasjon om prosjektet og hensikten med intervjuet
- Avklaringer
  - *Intervjuet er frivillig.*
  - *Si ifra dersom det er noe du ikke vil svare på*
  - *Intervjuet vil bli anonymisert, personlige opplysninger vil ikke komme fram i det jeg skriver*
  - *Intervjuet blir tatt opp på bånd*
  - *Forklar gangen i intervjuet*
- Er det noe du lurer på før vi begynner intervjuet?
- Start båndopptaker
- Evt muntlig samtykke ved intervju over telefon

1. Hvis du kan begynne å fortelle meg generelt om erfaringene dine med gratis skolemat i skolematprosjektet
   a) Hva husker du fra prosjektet?
   b) Hvordan opplevde du skolemåltidet sånn som det var i prosjektet for 5 år siden?
   c) refleksjoner fra skolematprosjektet nå 5 år etter?

2. Hvordan erfarte du betydningen av et gratis skolemåltid for:
   a. trivsel, sosialt rundt bordet, samhold i klassen
   b. kosthold
   c. oppførsel (bråking)
   d. konsentrasjon
   e. læring
   f. dere lærere

3. Hva ville du gjort annerledes i skolematprosjektet?
   a. hvilke utfordringer kan du se med et gratis skolemåltid?

5. Hva synes du om gratis skolemat?
   a. hva er positivt?
   b. hva fungerte bra?
   c. hva er negativt?

5. Hvis du skulle bestemt, hvordan hadde skolemåltidet vært?

a. Organiseringen av maten
b. Organisering av elever
c. Innhold i måltidet

7. Hvilke andre tanker/innspill/kommentarer sitter du på som kan være nyttig for meg å vite?

Etter intervjuet:

- Stopp båndopptaker
- Takk for deltakelsen
- Informasjon om gavekortet

2020
Intervjuguide – elever (1 av 1)

Innledning:

- Hvem er jeg?
- Informasjon om prosjektet og hensikten med intervjuet
- Avklaringer
  - *Intervjuet er frivillig.*
  - *Intervjuobjekter er elever som deltok på skolematprosjektet i 2014-2015.*
  - *Si ifra dersom det er noe du ikke vil svare på*
  - *Intervjuet vil bli anonymisert, personlige opplysninger vil ikke komme fram i det jeg skriver*
  - *Intervjuet blir tatt opp på bånd*
  - *Om deltaker: vgs nå eller annet?*
  - *Forklar gangen i intervjuet*
- Er det noe du lurer på før vi begynner intervjuet?
- Start båndopptaker
- Evt muntlig samtykke med **navn og alder.** Samtykke til å ha lest informasjonsskrivet og forstått prosjektet.

Bakgrunn

3. **hvis du kan begynne å fortelle meg generelt om erfaringen din med skolemat gjennom din skolegang?**
   1a) erfaringen fra skolematprosjektet
   1b) erfaringer fra skolemåltid ellers (matpakke, rammene rundt osv).
   1c) Har du før eller i etterkant opplevd å få servert gratis mat eller subsidiert mat i skolen? Hva inneholdt evt det?
4. Hva spiser du til skolemåltidet (lunsj) ditt nå?
   4b. hvordan har dette eventuelt endret seg gjennom din skolegang? Hvordan har skolemåltidet sett ut for deg gjennom skolegangen av det du kan huske?
5. Hvor mye spiste du av det gratis skolemåltidet i 2014-2015? (hver dag, av og til…annerledes/vanlig/uvanlig for deg?) Hva spiste du som var annerledes?

Skolemat

6. Hva synes du om gratis skolemat?
   5a. hva er positivt?
   5b. hva er negativt?
7. Hva hadde gratis a) skolemat å si for og b) skolemåltidet generelt av betydning forr (evt hva tenker du at gratis skolemåltid kan bety for):
   5a. trivsel? (sosialt rundt bordet?)
   5b. ditt kosthold? (har du endret noe på hva du spiser? Frukt? Grønnskaker? Annet?)
   5c. din atferd? (konsentrasjon)
8. Hvis du skulle bestemt, hvordan hadde skolemåltidet vært?
   6a) mtp måltidet

6b) rammene rundt måltidet

9. hva ville du gjort annerledes i skolematprosjektet?
10. hva fungerte bra i skolematprosjektet?
11. Hvilke andre tanker/innspill/kommentarer sitter du på som kan være nyttig for meg å vite?

Etter intervjuet:

- Stopp båndopptaker
- Takk for deltakelsen
- Informasjon om gavekortet
- Dersom du har kontakt med noen du gikk i klasse med så kan du gjerne spre ordet om prosjektet

Appendix VI

Mail contact with PIRLS coordinators regarding recruitment process in PIRLS (copy of e-mails)

Kristine Engebretsen Illøkken

From: PIRLS <pirls@iea-hamburg.de>
Sent: onsdag 8. desember 2021 09:53
To: Kristine Engebretsen Illøkken; Dr. Sabine Meinck
Subject: RE: A short question about participating in PIRLS

Dear Kristine,

Good to hear, that you are already in contact with the responsible teams in each country. I just wanted to confirm that what Sabine writes is true: Countries had to mainly comply with their national regulations.

Kind regards,
Viktoria

PIRLS
IEA Progress in International Reading Literacy Study
pirls@iea-hamburg.de

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From: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Sent: Mittwoch, 8. Dezember 2021 09:36
To: Dr. Sabine Meinck <sabine.meinck@iea-hamburg.de>; PIRLS <pirls@iea-hamburg.de>
Subject: RE: A short question about participating in PIRLS

Thank you. I have contact with coordinators in Norway, Finland, Sweden and Denmark but this was clarifying.

Best,

Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Dr. Sabine Meinck <sabine.meinck@iea-hamburg.de>
Sent: tirsdag 7. desember 2021 16:18

To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>; PIRLS <pirls@iea-hamburg.de>
Subject: RE: A short question about participating in PIRLS

Dear Kristine, (dear PIRLS colleagues),

As to my knowledge, before GDPR countries had to apply procedures complying with their national regulations at the time, so not every (European) country applied the same procedure. If you are specifically interested in the procedures applied in Norway, it would be better to ask the Norwegian PIRLS team.

I'm copying my colleagues from the international PIRLS team here who will jump in if they have more information on this or if I'm missing something here. They can also bring you in contact with the team from Norway if requested.

Best wishes,
Sabine

Dr. Sabine Meinck
Head of Sampling Unit / Co-Head of Research and Analysis Unit
sabine.meinck@iea-hamburg.de

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From: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Sent: Tuesday, December 7, 2021 2:42 PM
To: Dr. Sabine Meinck <sabine.meinck@iea-hamburg.de>
Subject: A short question about participating in PIRLS

Dear Sabine.
I am currently working on some data from PIRLS2016 and I am writing to you as I have a question regarding the recruitment in PIRLS.
For the students- did they require parental consent to participate or was this based on an opt-out approach? This was before the GDPR – did this change for the recruitment for PIRLS this year?

Thank you for helpful text you have provided regarding the chapter (7) in 'Reliability ad Validity of International Large-Scale Assessment' and for the informative lecture provided on IEA's database.

Best,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

Kristine Engebretsen Illøkken

From: Simon Skov Fougt <sifo@edu.au.dk>
Sent: fredag 10. desember 2021 12:02
To: Kristine Engebretsen Illøkken
Subject: SV: Quick question about sampling in PIRLS2016 Denmark

I 2016 var elevdeltagelse med forældresamtykke (informreret samtykke)

I 2021 har vi kørt den på information (artikel 13-14 i gdpr under forskningshjemmel i artikel 5 litra e mener jeg det er

Simon Skov Fougt
Lektor ph.d.

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AARHUS UNIVERSITET

Fra: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Sendt: 10. december 2021 12:00
Til: Simon Skov Fougt <sifo@edu.au.dk>
Emne: RE: Quick question about sampling in PIRLS2016 Denmark

Kjære Simon. Jeg har et lite spørsmål knyttet til meldingen under angående PIRLS2016.
Deltakelse frivillig ved skolene- men hva med de danske elevene? Var det samtykke fra foreldrene eller en opt put – eller annet?

Med vennlig hilsen,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Simon Skov Fougt <sifo@edu.au.dk>
Sent: torsdag 21. oktober 2021 13:55
To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Subject: SV: Quick question about sampling in PIRLS2016 Denmark

Kære Kristine
Deltagelse i Danmark er frivillig, og vi kan ikke tvinge skolerne til det. Vi gør alt hvad vi kan for at overtale dem – men det er ikke pligt.

Eksklusion var på lærers/læsevejleders indstilling i dialog med PIRLS-Ikontoiret i Danmark

Simon Skov Fougt
Lektor ph.d.

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AARHUS UNIVERSITET

Fra: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Sendt: 18. oktober 2021 19:37
Til: Simon Skov Fougt <sifo@edu.au.dk>
Emne: Quick question about sampling in PIRLS2016 Denmark

Dear Simon.

My name is Kristine and I am a Norwegian PhD student writing an article about PIRLS2016, using data from other Nordic countries as well. In this regard, I was wondering if you could help me with a question regarding the sampling in Denmark?

In Norway, it was mandatory for the schools to participate in PIRLS2016. The head teacher decided exclusion based in exclusion criteria. How was the participation procedure in Denmark? Hope you can help me with this, and thanks in advance,

Best,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

Kristine Engebretsen Illøkken

From: Leino, Kaisa <kaisa.j.leino@jyu.fi>
Sent: fredag 10. desember 2021 12:04
To: Kristine Engebretsen Illøkken
Subject: VS: A quick question about PIRLS2016 Finland

Hi Kristine,
for students, participating in these ministry funded large scale evaluations is considered as a normal school work and therefore parents consent is not required. Of course students can refuse to participate, but that is only a few individual cases.

Kaisa

Kaisa Leino
Yliopistotutkija / Senior researcher
Koulutuksen tutkimuslaitos / Finnish Institute for Educational Research
Jyväskylän yliopisto / University of Jyväskylä

Lähettäjä: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Lähetetty: perjantai 10. joulukuuta 2021 12.56
Vastaanottaja: Leino, Kaisa <kaisa.j.leino@jyu.fi>
Aihe: RE: A quick question about PIRLS2016 Finland

Hi again Kaisa. Just a quick followup form below. How did students in PIRLS2016 participate? Did students in Finland require parental consent to participate or was it based on opt-put / seen as a part of the mandatory teaching? Or other?

Kind regards,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Leino, Kaisa <kaisa.j.leino@jyu.fi>
Sent: tirsdag 19. oktober 2021 10:44
To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Subject: VS: A quick question about PIRLS2016 Finland

Dear Kristine,
unfortunately you can't find this in this exact form, but the basis is given in Basic Education Act, chapt. 5, section 21 in reference to external evaluation.

https://www.finlex.fi/en/laki/kaannokset/1998/en19980628.pdf

Kaisa

Kaisa Leino
Yliopistotutkija / Senior researcher
Koulutuksen tutkimuslaitos / Finnish Institute for Educational Research
Jyväskylän yliopisto / University of Jyväskylä

Lähettäjä: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Lähetetty: tiistai 19. lokakuuta 2021 11.13
Vastaanottaja: Leino, Kaisa <kaisa.j.leino@jyu.fi>
Aihe: RE: A quick question about PIRLS2016 Finland

Thank you for the quick reply. It helps a lot. Can if find this information in a paper somewhere? I guess it would be on Finnish but that is OK,

Best,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Leino, Kaisa <kaisa.j.leino@jyu.fi>
Sent: tirsdag 19. oktober 2021 09:22
To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Subject: VS: A quick question about PIRLS2016 Finland

Dear Kristine,

our procedure is quite similar.

In Finland, all education providers (municipalities and private schools) are obligated to participate assessments funded and pointed by the Ministry of Education and Culture. PIRLS is one of those. Schools implement the education for municipalities, so basicly it is mandatory for schools.

The school coordinator together with class teacher (and principal) suggest exclusions for us based on given criteria. We require reasoning (not just code) for exclusion and our research team makes individual decision for every exclusion.

I hope this helps you.

Best regards, Kaisa

Kaisa Leino
Yliopistotutkija / Senior researcher
Koulutuksen tutkimuslaitos / Finnish Institute for Educational Research
Jyväskylän yliopisto / University of Jyväskylä

Lähettäjä: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Lähetetty: maanantai 18. lokakuuta 2021 20.34
Vastaanottaja: Leino, Kaisa <kaisa.j.leino@jyu.fi>
Aihe: A quick question about PIRLS2016 Finland

Dear Kaisa.

My name is Kristine and I am a Norwegian PhD student writing an article about PIRLS, using data from other Nordic countries as well. In this regard, I was wondering if you could help me with a question regarding the sampling in Finland?

In Norway, it was mandatory for the schools to participate in PIRLS2016. The head teacher decided exclusion based in exclusion criteria. How was the participation procedure in Finland? Hope you can help me with this, and thanks in advance,

Best,
Kristine Engebretsen Illøkken
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UiA Lifecourse nutrition
Priority Research Center

Kristine Engebretsen Illøkken

From: Egil Gabrielsen <egil.gabrielsen@uis.no>
Sent: søndag 12. desember 2021 09:30
To: Kristine Engebretsen Illøkken
Subject: SV: PIRLS2016- et kort spørsmål

Hei

Nei, PIRLS har aldri operert med samtykke fra foreldre/foresatte.
Foreldre som av en eller annen grunn ikke vil la sitt barn delta, har vel holdt han eller henne hjemme. Resultatene er jo heller ikke interessante på individnivå; elevene i deltakerklassene jobber f.eks ikke med de samme oppgavene.
Mvh
Egil Gabrielsen

Fra: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Sendt: lørdag 11. desember 2021 13:36
Til: Egil Gabrielsen <egil.gabrielsen@uis.no>
Emne: RE: PIRLS2016- et kort spørsmål

Hei igjen. Jeg har et raskt oppfølgingsspørsmål. Obligatorisk deltakelse for skoler/klasser- men hva med elevene? Krevdes det foreldresamtykke?
Klarer ikke finne info om dette i rapporten du nevnte,

Hilsen
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Egil Gabrielsen <egil.gabrielsen@uis.no>
Sent: mandag 27. september 2021 19:44
To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Subject: SV: PIRLS2016- et kort spørsmål

Hei Kristine

Deltakelse i PIRLS 2016 var for første gang i PIRLS-historien obligatorisk for de uttrukne skolene/klassene. Rektor ved deltakerskolene hadde mulighet til å frita elever etter gitte kriterier. Utgangspunktet er at alle skal delta, men fritak kan gjøres etter skjønn dersom eleven har psykisk eller fysisk handicap som gjør det urimelig å delta. For dårlige norskkunnskaper som har sin bakgrunn i kort botid i landet kan også være et gyldig kriterium for fritak. I 2016 utgjorde dette 3 prosent i Norge.

96 prosent svar på spørreskjemaet til foreldrene antyder stor støtte til PIRLS i foreldregruppen (vakte oppsikt internasjonalt).

Du finner flere opplysninger om utvalgsprosedyrer i artikkelsamlingen «Klar framgang! Leseferdighet på 4. og 5. trinn i et femtenårsperspektiv» Universitetsforlaget (s. 18-20) – Open Acess.

Lykke til med arbeidet ditt.

Beste hilsen

Egil

Fra: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Sendt: mandag 27. september 2021 13:13
Til: Egil Gabrielsen <egil.gabrielsen@uis.no>
Emne: PIRLS2016- et kort spørsmål

Hei Egil.

Jeg jobber med en Doktorgrad hvor jeg blant annet bruker data fra PIRLS2016. Jeg har forsøkt å finne frem til dette men det viste seg å være litt vanskelig, så jeg blir takknemlig om du kan hjelpe meg her. Evt henvise meg til noen som kan.

Hvordan fungerte det med samtykke for elevene som deltok i PIRLS i 2016? Var det Opt out- eller var det foreldresamtykke? Eller annet?

Med vennlig hilsen,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

Kristine Engebretsen Illøkken

From: Cecilia Stenman <Cecilia.Stenman@skolverket.se>
Sent: fredag 10. desember 2021 13:22
To: Kristine Engebretsen Illøkken
Subject: Sv: Questions concerning PIRLS 2016 in Sweden

Hi Kristine,

In Sweden participation in international assessments is never mandatory at the student level. However, all students in PIRLS 2016 needed parental consent to participate. A letter, with information about the study and the participation, was delivered to parents/guardians, via the student in the chosen class, and the parent/guardian responded back to the school if the student was not to participate.

Best regards,

Cecilia

Från: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Skickat: den 10 december 2021 11:59
Till: Cecilia Stenman <Cecilia.Stenman@skolverket.se>
Ämne: RE: Questions concerning PIRLS 2016 in Sweden

Hi again Cecilia. Just a quick followup form below. How did students in PIRLS2016 participate? Did students in Sweden require parental consent to participate or was it based on opt-put / seen as a part of the mandatory teaching? Or other?

Kind regards,

Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Cecilia Stenman <Cecilia.Stenman@skolverket.se>
Sent: torsdag 21. oktober 2021 08:30
To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Subject: Sv: Questions concerning PIRLS 2016 in Sweden

Dear Kristine,

In Sweden students are graded from year 6, but in PIRLS 2016 we used the mean from the final grade in year 9 in the compulsory school as a stratification variable. There is no grading in year 4 and also not all schools have all years, so we could not use this variable for all schools in the frame. The variable was tested and approved before the sample was drawn. The reason for using this variable was to be able to get a sample reflecting the frame in terms of stronger/weaker schools.

In PIRLS 2016 16 subjects were graded and the scale was 0-320 points.

Kind regards,
Cecilia

Från: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Skickat: den 20 oktober 2021 09:54
Till: Cecilia Stenman <Cecilia.Stenman@skolverket.se>
Ämne: RE: Questions concerning PIRLS 2016 in Sweden

Thank you for your answer Cecilia. I just want to follow up on the first point about grade average. I guess this has something to do with how you grade students in Sweden. What is the minimum and max of the scale?
And- you write grade 9- do you mean grade 4? Or am I misunderstanding something?

I will take a look at the Swedish report you sent me.

Thank you, this is really helpful.

Best,
Kristine Engebretsen Illøkken
PhD @ Department for Nutrition & Public Health,
Faculty of Health and Sport Sciences
UiA Lifecourse nutrition
Priority Research Center

From: Cecilia Stenman <Cecilia.Stenman@skolverket.se>
Sent: onsdag 20. oktober 2021 09:38
To: Kristine Engebretsen Illøkken <kristine.illokken@uia.no>
Subject: Questions concerning PIRLS 2016 in Sweden

Dear Kristine,

Thank you for reaching out to us with your questions.
My name is Cecilia Stenman and I am responsible for PIRLS 2021 at Skolverket. Since Elina Ekberg and Agnes Tongur are not working at Skolverket any longer I will try to answer your questions.

1. In the Swedish sampling process, after consultation with Statistics Canada, we added the average grade 9 points of grade 9 students (at school level and only for schools with grade 9) as a stratification variable to be used together with the international stratification variables.
2. In Sweden participation is voluntary. The total national participation rate was 95 %, and at school level even higher. Some schools were excluded before the sample was drawn based on the exclusion criteria. Exclusion of students was based on the exclusion criteria and made at school level by the school coordinators. Total exclusion rate was 5 %.

You can find more information in the Swedish national report https://www.skolverket.se/publikationsserier/rapporter/2017/pirls-2016?id=3868.

Kind regards,
Cecilia Stenman

Director of Education
Swedish National Agency for Education/International large-scale assessments
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