Evaluation of instruments for investigating adolescents' food environment

Master thesis in public health nutrition

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Summary

Background: Adolescent overweight and obesity rates are increasing in Norway. Adolescents spend a lot of time at school, and school and school neighbourhood food environment may affect adolescents' dietary behaviour and occurrence of overweight and obesity. For investigating the association between the impact of school and school neighbourhood food environment on adolescents' diet, there is a need of valid and reliable instruments for investigating food environments. Some instruments have been developed and tested, but the majority of research has been carried out in the USA. These instruments are not directly transferable Norwegian school and school neighbourhood conditions as a consequence of the fundamental differences between school and neighbourhood food environments in Norway and the USA. Consequently, there is a need of valid and reliable instruments for investigating food environment of adolescents attending Norwegian schools.

Objective: To evaluate instruments for investigating factors in Norwegian schools and their neighbourhoods that may affect the diet and body weight of adolescents in 6th grade.

Design: This master thesis is part of the HEIA project, and it is divided into three parts. The first part is on investigating the predictive validity of factors in the school food environment on diet and overweight among adolescents in 6th grade. The second and third part is on developing and testing an observational instrument for measuring adolescents' food environment.

Methods and subjects: Data collected in the baseline data collection of the HEIA project were used when investigating predictive validity. Data on school food environment were collected by questionnaire from 35 school principals. Data on adolescents' diet were collected by questionnaire from 1527 6th graders and body measurements of the adolescents were carried out. Predictive validity of school food environment on adolescents' diet and overweight occurrence was investigated by

looking for associations between a developed school food environment score and developed indicators for adolescents' diet and overweight. A literature review was conducted to get an overview of the existing literature on observation of neighbourhood food environments, and an observational instrument was developed. The observational instrument was tested by investigating its inter-rater and test-retest reliability visiting nine and twenty food sales outlets, respectively.

Results: No significant associations were found between the school political food environment score and adolescent diet and overweight indicators. Significant associations were found between the school sosiocultural food environment score and adolescents' consumption of soft drinks and squash without sugar, and fruit nectar. The percentage of adolescents consuming sweets and savoury snacks 1-2 times per week or less frequent was found to be significantly higher in schools with food sales outlets present in the school neighbourhood. An observational form was developed based on NEMS-S developed by Glanz et al. The observational form was designed to be used for investigating the availability of food items and beverages in food sales outlets in school neighbourhoods by counting number or measuring shelf space of food items and beverages. Significant differences between the findings of the two observers when investigating inter-rater reliability were found only for number of buns/muffins and shelf space of soft drinks without sugar. Significant differences between the two observation sessions were found only for number of buns/muffins and number of fruit juice and squash when investigating test-retest reliability.

Conclusions: The predictive validity of school food environment on the diet and overweight of adolescents in 6th grade was found to be moderate to low. An observational form was developed for investigating the availability of food items and beverages in food sales outlets in school neighbourhoods, and its reliability were found to be high. Further research should be carried out on how to measure the food environment of adolescents attending Norwegian schools. Topics suggested for further investigation are the significance of price for adolescents' consumption of food items, and adolescents' actual use of food sales outlets in school neighbourhood.

Norsk sammendrag

Bakgrunn: Forekomsten av overvekt og fedme blant barn og ungdom i Norge er økende. Barn tilbringer mye tid på skolen, og matmiljøet på skolen og i skolens nærområde kan påvirke kosthold og forekomst av overvekt blant barn og ungdom. For å kunne undersøke sammenhengen mellom matmiljø på skolen og i skolens nærområde og kostholdet til barn og ungdom, trenger man valide og pålitelige måleinstrumenter. Noen instrumenter har blitt utviklet og testet med tanke på å måle matmiljø, men mesteparten av forskingen har blitt utført i USA. Som følge av grunnleggende forskjeller mellom matmiljø på skoler og i skolers nærmiljø i Norge og USA, er ikke amerikanske måleinstrumenter tilpasset til å kunne måle matmiljøet til barn og ungdom i Norge. Det er derfor behov for valide og pålitelige måleinstrumenter som kan brukes til å måle barn og ungdoms tilgang på mat og drikke på norske skoler og i skolenes nærområde.

Problemstilling: Å evaluere måleinstrumenter som kan brukes til å kartlegge faktorer i matmiljøet til skoler og i skolenes nærområde som kan påvirke kostholdet og vekten til barn i 6. klasse.

Design: Denne masteroppgaven en del av HEIA-prosjektet, og er delt inn i tre deler. Den første delen går ut på å undersøke prediktiv validitet av faktorer i skolemiljøet på kostholdet til og forekomsten av overvekt blant barn i 6.klasse. Den andre og tredje delen går ut på å henholdsvis utvikle og evaluere et måleinstrument for å kartlegge matmiljøet til barn og ungdom.

Utvalg og metode: Baseline data samlet inn i HEIA-prosjektet er brukt i undersøkelsene av prediktiv validitet av skolers matmiljø på kostholdet til og forekomsten av overvekt blant barn i 6.klasse. Data på matmiljøet i barneskoler ble samlet inn fra 35 rektorer ved bruk av spørreskjema. Kostholdsdata ble samlet inn fra 1527 barn ved bruk av spørreskjema, og barnas høyde og vekt ble målt. Prediktiv validitet av skolers matmiljø på kostholdet til og forekomsten av overvekt blant barn

ble undersøkt ved å se etter assosiasjoner mellom en score som ble utviklet for matmiljø i barneskoler og utviklede indikatorer for kostholdet til barn og forekomsten av overvekt. Et litteratursøk ble gjennomført for å få oversikt over eksisterende litteratur på direkte observasjon, og resultatene fra litteratursøket ble brukt sammen med erfaringer fra HEIA-prosjektet ved utviklingen av et måleinstrument. Det utviklede måleinstrumentet ble testet ved å undersøke inter-rater og test-retest reliabilitet ved besøk i henholdsvis ni og 20 utsalgssteder for mat.

Resultater: Ingen signifikante sammenhenger ble funnet mellom scoren for det politiske skolemiljøet og indikatorene for kosthold og overvekt blant 6.klassinger. Signifikante sammenhenger ble funnet mellom sosiokulturelt skolemiljø og inntak av brus uten sukker, saft uten sukker og nektar blant barn. Andelen av barn som spiste godterier og salt snacks 1-2 ganger i uken eller sjeldnere ble funnet å være signifikant høyere på skoler som ikke hadde utsalgssteder for mat i nærområdet. Basert på et måleinstrument som er utviklet og testet av Glanz et al.; Nutrition Environment Measurement Study in Stores (NEMS-S), utviklet vi et måleinstrument som er ment å kunne brukes til å måle tilgjengeligheten av mat og drikke i utsalgssteder for mat rundt barneskoler. Tilgjengelighet av 12 ulike matvarer og drikker ble undersøkt ved å måle hyllemeter og telle antall produkter. Det ble funnet signifikante forskjeller mellom funnene til de to observatørene for antall søte bakverk og hyllemeter med brus uten sukker når observasjonsskjemaets inter-rater reliabilitet ble undersøkt. Signifikante forskjeller mellom funnene i observasjon en og to ble funnet for antall søte bakverk og antall juice og saftliknende drikker når test-retest reliabilitet ble undersøkt.

Konklusjon: Det ble ikke funnet noen sterke sammenhenger mellom matmiljøet i norske barneskoler og kostholdet til barn i 6.klasse. Observasjonsskjemaet som ble utviklet ble funnet å ha høy inter-rater og test-retest reliabilitet. Videre forskning bør fokusere på hvordan man best kan måle matmiljøet til barn og ungdom. Interessante tema for videre forsking er betydningen av pris for barns bruk av utsalgssteder for mat, og hvilke av utsalgsstedene for mat og drikke som blir brukt av barn og ungdom.

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Abbreviations and definitions

Adolescents: 10-18 years of age.

BMI: Body Mass Index.

Predictive validity: The degree of consistency between a measure and theoretical hypotheses (1).

Inter-rater reliability: The extent to which the same results are obtained by different field workers (2).

Test-retest reliability: The extent to which the same results are obtained by a field worker at different time points (2).

The HEIA project: An intervention study in Norwegian primary schools with the main goal to achieve healthy weight development among adolescents through healthy dietary habits and physical activity.

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1. Introduction

Food environments may affect the diet of adolescents, but little research has been carried out in connection with developing instruments for investigating adolescents' food environment, especially instruments that can be used for investigating adolescents' food environment in Norway. This master thesis consists of three parts. The first part is on investigating the predictive validity of factors in the school food environment on the diet of adolescents in 6th grade. This part is based on data collected in the HEIA project by a school principal questionnaire and a questionnaire filled in by the 6th graders, and also body measurements of the adolescents. The second and third parts are about the development and evaluation of an observational instrument for investigating adolescents' food environment by assessing availability of food items and beverages in food sales outlets in school neighbourhoods.

2. Background

2.1 Adolescent overweight and obesity as health problems

Overweight and obesity have become the most serious public health challenges in Europe (4). Recent data from the World Health Organisation (WHO) show that 30-80 % of adults in Europe are overweight or obese (4). The worldwide prevalence of overweight and obesity among adolescents is rapidly increasing (4;5). In the Northern and Western part of Europe, about one fifth of adolescents are considered overweight or obese (4;6). The current obesity rate in adolescents is 10 times that in the 1970s (4). Overweight and obesity in adolescence have impact on both psychological and physiological health (7), and are among the leading risk factors for developing chronic lifestyle related diseases, as for example diabetes type 2 (4;8). Adolescent overweight and obesity are associated with increased morbidity and mortality related to chronic diseases in adulthood (9;10). Overweight or obese adolescents have increased risk of becoming overweight or obese adults (5;10;11). According to estimations by the WHO, about 60 % of overweight or obese adolescents will remain overweight or obese in adulthood (4). Persistence of overweight or obesity in adulthood is greater with increasing level of overweight or obesity (11).

A limited amount of research has been performed on adolescent overweight and obesity in Norway. The research that has been carried out has found a high prevalence of overweight and obesity among Norwegian adolescents, reaching a level similar to what have been observed in other Northern and Western European countries (12;13). Based on self-reported height and body weight, the prevalence of overweight and obese adolescents in Norway was found to have increased significantly from 1993-2000 (12). Overweight prevalence had increased by 3.7 and 4.2 percentage points for girls and boys in 8th grade, respectively, and obesity prevalence by 0.5 and 1.3 percentage points for girls and boys respectively (12). These data have been supported by data based on objective body measurements of

adolescents (14;15). In a Norwegian study on physical activity among 9-and 15-year-olds, a total of 19.4 % of the 9-year-old girls and 15.6 % of the 9-year-old boys were found to be overweight or obese based on objective height and body weight measurements (14). Among the 15-year-olds, 12.9 % of the girls and 13.6 % of the boys were considered overweight or obese. Another Norwegian study found that in Oslo, the capital of Norway, about 21 % of a sample of 12-year-old adolescents have been estimated to be overweight or obese based on measurements carried out by public health nurses (15).

2.2 Determinants of adolescents' dietary behaviour

Adolescence is a critical period in shaping dietary behaviour and making the basis for weight and Body Mass Index (BMI) later in life (16). Causes of adolescent overweight and obesity are not yet completely understood, but significant changes in energy intake and energy expenditure among adolescents the last decades are believed to have contributed to the increasing prevalence of adolescent overweight and obesity (7). Dietary behaviour has impact on energy intake and may be affected by individual and environmental determinants (7;16). Both individual and environmental determinants, including home environment and school environment, have therefore been suggested to play a role in development of adolescent overweight and obesity (7;16).

2.2.1 Individual determinants of adolescents' dietary behaviour and body weight

The research on adolescents' dietary behaviour has so far predominantly been focused on individual determinants (17-20), including factors such as taste preferences, nutrition knowledge, personal attitudes and intentions (21). Individual factors have been found to describe only little of the variation in dietary behaviour and energy intake, and individual factors are not alone able to explain the high prevalence of adolescent overweight and obesity (22;23). As a consequence of the

weaknesses of individual factors to describe the high prevalence of adolescent overweight and obesity, there has recently been a shift in research on determinants of dietary behaviour and BMI towards focus on environmental determinants (19).

2.2.2 Environmental determinants of adolescents' dietary behaviour and body weight

The interest in environments' role in shaping dietary behaviour of adolescents is increasing, due to the fact that environmental factors have been shown to affect adolescents' diet (20;24-26). Home environment and school environment are the environments that have been suggested to have the largest impact on adolescents' dietary behaviour (20). Family and home environment are the most important environments in shaping food behaviour in childhood and early adolescence (8;16). As children grow up, environments outside home gradually become more important (8;16). Schools and school neighbourhoods have been viewed upon as important settings for improving the physical availability of healthy foods for adolescents (21). School food environments have the potential of being highly influential on adolescents' diet (27).

School food environment

No other institutions have the same continuous and intensive contact with adolescents and their parents as schools (28). Access to unhealthy foods at school can contribute to high intake of unhealthy food items and beverages during the school day (29;30). Adolescents spend a lot of time at school and consume a substantial portion of their daily energy intake at school (31). In countries where the adolescents are provided warm lunches at school, as much as 37 % of a weekday's energy intake has been found to be consumed at school (31). It has to be taken into account that most of the research on associations between school food environment and adolescents' dietary behaviour has been carried out in the USA and other countries where the school food environment is fundamentally different from the conditions in Norwegian schools. The focus of research has mostly been on food items provided in school lunches and

vending machines, and à la carte foods (32). These aspects of the school food environment are not comparable to Norwegian schools. School lunches are not provided and vending machines are not present in Norwegian primary schools (33).

The ANGELO framework

Environment can be defined as "all that is external to the individual" (34). The ANGELO (Analysis grid for environments linked to obesity) framework was developed by Swinburn et al. in order to map and understand obesogenic environments and identify potential environmental research and interventions (3). The ANGELO framework may be useful in identifying and categorising different environmental factors that may affect dietary behaviour and health (21). The framework is a 2×4 grid with two axes, distinguishing two sizes of the environment on the first axis and four types of environments on the second axis (figure 1) (3). An individual interacts with the environment on micro level (for example neighbourhoods, schools, homes), which in turn is affected by environmental macro level factors (for example governments, education systems). Micro and macro level of environment are in the ANGELO framework further categorized into four different types of environments; political, sosiocultural, physical, and economic (figure 1) (3).

Figure 1: Dissecting the different types of school environment using the ANGELO (Analysis grid for environments linked to obesity) framework developed by Swinburn et al. (3).

Size of environment	Types of environment			
	Political	**Sosiocultural**	**Physical**	**Economic**
Micro level				
School	School food and nutrition guidelines	Attitudes on food and nutrition	Canteen	Price of foods in canteens/ food sales outlets in the neighbourhood
		Social norms	Food sales outlets in school neighbourhood	
Macro level				

Based on the ANGELO framework, political, sosiocultural and physical aspects of the school environment may have impact on the dietary behaviour of adolescents. Economic school environment has not been further assessed in this master thesis, as a result of lack of data collected on economic factors of the school environment.

Political school environment and adolescents' dietary behaviour and BMI

School political environment may affect the diet of adolescents, but there is little research available on school food policies and school food policies' potential effects on adolescents' dietary behaviour (35). Moreover the association between school food policies and adolescents' BMI has been investigated to a low degree (36). Food policies have been found to be low on the list of priorities in many schools (27;29). Carter et al. found that few schools in New Zealand had school food policies (37). However, the majority of the schools which had school food policies reported that the school food policies were moderately to very effective in promoting healthy eating among adolescents (37). In Norway, about 60 % of primary schools have been found to be aware of the existing Norwegian guidelines for school food environment published by the Norwegian Directorate for Health and Social Affairs (33). In the USA, based on data from nationally representative samples, adolescents attending schools with restrictions for snack availability during the school day have been found to be consuming fruits and vegetables significantly more frequent than adolescents attending schools not having restrictions for snack availability (38).

Kubik et al. investigated the association between adolescents' BMI and schools' food practices in Minneapolis in the USA (27). They found increasing BMI values among adolescents' with increasing number of unhealthy food practices permitted in schools (27).

Sosiocultural school environment and adolescents' dietary behaviour

Sosiocultural environment refer to interpersonal relationships, i.e. persons of the community and society surrounding us, and the existing attitudes and social norms of

the persons surrounding us (3;16). Evidence states that sosiocultural environment and what is socially acceptable, desirable and appropriate in connection with food behaviour may have impact on dietary behaviour (3;16;21). The sosiocultural environment changes as children grow up becoming adolescents (16). Most of the research on sosiocultural environment has been carried out for assessing the impact of sosiocultural factors in home environments on adolescents' dietary behaviour (20). Home environments and parents' attitudes, beliefs and values are gradually becoming less important with adolescents' increasing age, and environments outside of home, as for example school sosiocultural environment and peers, play a gradually bigger role in shaping adolescents' dietary behaviour (16;39). School sosiocultural factors may for example be food and nutrition attitudes of teachers and the school administration (40). Teachers are role models for adolescents, and in a study performed in Minneapolis, USA, a significant part of the teachers were found not to act as good role models for adolescents in connection with dietary behaviour (41). Carter et al. investigated obesogenic elements in primary schools in New Zealand (37). About 60 % of the investigated schools stated that they felt food and nutrition issues were high on the school's list of priorities (37).

Physical school environment and adolescents' dietary behaviour and BMI

Physical environment can be defined as a person's human-made surroundings, and refers to the design of the physical environment; roads, buildings, food sources, recreational facilities, urban design, and public transport (22;26;34). Physical environment is believed to be contributing to the high occurrence of adolescent overweight and obesity (22;25;26).

School neighbourhood physical environment is an important part of the physical school environment (8;42). The main food sources in school neighbourhoods include food sales outlets and restaurants (43). The availability of food sales outlets in school neighbourhoods may be of great importance for adolescents' dietary behaviour, especially when adolescents are growing older and to a larger extent are using the

food sales outlets (44). In the USA, the availability of food sales outlets and healthy products in a neighbourhood has been found to be able to affect the dietary behaviour of the residents (43). The diet has been found to be more healthy among residents living in neighbourhoods with greater access to supermarkets, and when the supermarkets in a neighbourhood provide more healthy products (43;45;46).

Associations have also been found between the availability of food sales outlets and adolescent's BMI (47). In the USA, based on data from nationally representative samples, BMI has been found to be significantly lower among adolescents living in neighbourhoods with greater availability of supermarkets (43;45-47). To the contrary, BMI has been found to be significantly higher among adolescents living in neighbourhoods with higher availability of convenience stores (47;48).

2.3 The challenge of measuring physical school and school neighbourhood food environments

Measuring physical food environments is a relatively new research field (32). Little research has been carried out on how to measure physical food environments, and no guidance on measurement of food environments exists (25). Most of the research on the connection between neighbourhood food environment and adolescents' dietary behaviour has been carried out in the USA. Some research has been performed in Sweden (49), but none in Norway.

2.3.1 Instruments for measuring physical food environments

Different instruments have been used for investigating adolescents' food environment. Paper-based instruments have been used in combination with observation (32). Paper-based instruments may be a food item and beverage check list; a market basket of food items; inventory or reporting of all food items and beverages within an area; or interviews carried out based on a list of food environment questions (32). Analytic measurement tools have also been used, such as

sales analysis, nutrient analysis, menu analysis or geographic analysis (32). Geographic analysis, by using for example Geographical Information Systems (GIS) technology, is the overall most frequently used food environment instrument, together with interview/questionnaire and market basket (32).

Measurement of physical school food environments

Schools have been used as the starting point for getting an overview of adolescents' food environment in several studies (43). School food environment has mostly been investigated in connection with evaluating the effects of interventions directed towards school food environment (32). For assessing school food environment, analyses (sales, nutrient and menu analysis) have been most frequently used but also interviews/questionnaires have been used (32).

Measurement of physical school neighbourhood food environments

The main sources of food items and beverages in school neighbourhoods include food sales outlets and restaurants (43). Physical neighbourhood food environments have most frequently been investigated by assessing the total availability of food sales outlets within a defined area (34;45). The availability of food sales outlets has been assessed by measuring distance to the nearest food sales outlet, or by measuring the density or number of food sales outlets within a defined area (34). A challenge when mapping neighbourhood environments is how to define and limit the neighbourhood environment geographically, and how to decide the size of the area of interest (34). A radius of 400-500 metres has been used for limiting the area of interest when investigating adolescents' neighbourhood food environment, because this area refers to the walking distance of adolescents (49).

2.3.2 Quality of existing instruments for measuring physical food environments

For making progress in the research on physical environments' impact on adolescents' diet, there is a need of valid and reliable instruments which can objectively and directly measure physical food environments (20;43;50).

Reliability of instruments for investigating physical food environments

There is a lack of evaluated instruments for measuring factors in physical environments that may affect dietary behaviour of adolescents (21). Far from all methods developed and used for measuring factors in neighbourhood food environment have been evaluated (21).

Inter-rater and test-retest reliability have been shown to be useful parameters when investigating the practical function of instruments used for investigating physical food environments (2). These are the most commonly used concepts for evaluating instruments for investigating food environments (1). Inter-rater reliability is assessed by two different field workers visiting the same neighbourhood the same day, and thereafter investigating the agreement between the observations of the two field workers (50). Test-retest reliability is assessed by the same field worker visiting one neighbourhood twice, with some week' interval, investigating the agreement between the observations from the first and second visit (50). High test-retest and inter-rater reliability indicate that the neighbourhood environment is stable, clearly set out and feasible to measure, and that the field workers have gone through adequate training and are precise in the data collection (2). High inter-rater and low test-retest reliability can indicate a neighbourhood environment in change and with low stability. The opposite, low inter-rater and high test-retest reliability, can indicate the need for better training of the field workers (2).

Few instruments for investigating physical environments have been evaluated, but most of the evaluated instruments designed for investigating food availability in food sales outlets and restaurants have been shown to have high reliability (1). High test-

retest and inter-rater reliability have been found for instruments assessing presence or quantity of food items and beverages in food sales outlets (1). Reliability of instruments investigating subjective elements of the physical food environment, such as quality of foods, have been found to have lower reliability (1).

Direct measurement of physical food environments

The weakness of a significant part of the research that has been carried out for investigating physical environments is that the environment has not been directly measured. Instead, subjective perceptions of the environment have been investigated (20). It has been suggested that objective instruments for investigating physical food environments are more suitable than subjective instruments, because objective instruments have been found to less likely intercept subjective perceptions of the environment compared to subjective instruments (32).

Predictive validity of school food environment on adolescents' dietary behaviour

Predictive validity has been defined as the ability of a measure to predict future events; the "degree to which scores of predictor variables can accurately predict criterion scores" (51;52). Consequently, predictive validity of school food environment on adolescents' diet can be investigated by looking for associations between food environment indicators and indicators on adolescents' dietary behaviour and body weight.

2.4 Summary of background

Adolescent overweight and obesity rates are increasing in Norway. Environmental factors have been found to be able to affect dietary behaviour of adolescents. Adolescents spend a lot of time at school, and school and school neighbourhood food environment may be important in affecting adolescent dietary behaviour and body weight. For investigating the association between school and school neighbourhood food environment and the diet of adolescents', there is a need of valid and reliable

instruments for measuring school and school neighbourhood food environments. In Norway, little research has been carried out in connection with investigating food environments. Most of the research on instruments for investigating food environments has been carried out in the USA. As a result of the fundamental differences between American and Norwegian school and school neighbourhood environments, there is a need of valid and reliable instruments investigating the food environment of adolescents attending Norwegian schools.

3. Main objective and aims

3.1 Main objective

The main objective of this master thesis is to evaluate instruments for investigating factors in Norwegian schools and their neighbourhoods that may affect the diet and body weight of adolescents in 6th grade.

3.2 Aims

The main objective is divided into three aims that will be further investigated:

1. To investigate the predictive validity of school food environment factors in Norwegian schools on the diet and overweight occurrence of adolescents in the 6th grade.

2. To develop an observational instrument for investigating factors in school neighbourhoods possibly affecting the diet of adolescents.

3. To investigate inter-rater and test-retest reliability of the observational instruments developed.

4.   Methods and subjects

This chapter is divided into three main parts, corresponding to the aims described above. The first part of the chapter is on investigating the predictive validity of factors in the school food environment on the diet and overweight prevalence of adolescents in 6th grade. The second and third part of the chapter are on developing and testing an observational instrument for measuring adolescents' food environment. This master thesis is part of the HEIA project, and data from the HEIA project baseline data collection have been used when investigating predictive validity.

4.1 Predictive validity

4.1.1 The HEIA project

The HEIA project, "HEIA – mat og aktivitet for god helse" ("Promoting healthy weight among school children"), is an intervention study initiated in 2007. The project is a collaboration between the University of Oslo and the Norwegian School of Sport Sciences. The main goal of the HEIA project is to achieve healthy weight development among adolescents in 6th and 7th grade, corresponding to adolescents on the age of 11-13 years, by promoting healthy diet and physical activity.

4.1.2 Subjects

The target group of the HEIA project is adolescents in the age of 11-13 years. To reach the target group, primary schools were chosen as the setting for recruiting participants and actuate the intervention programme. Recruitment of schools to the HEIA project was conducted by the research team in 2007. Primary schools in the counties near Oslo were invited to participate. This area was chosen because schools within these counties are easily reachable by car. The schools located in the largest communities and towns in the counties were chosen, and the schools were supposed

to have at least a total of 40 pupils in the 6th grade by the time of recruitment. A total of 177 primary schools were invited to participate in the HEIA project, of which 37 schools (20 %) from six different counties (Akershus, Buskerud, Oppland, Telemark, Vestfold and Østfold) around Oslo, the capital of Norway, agreed to participate. A total of 35 school principals participated in the baseline data collection. All adolescents being in the 6th grade in the participating schools in the autumn of 2007, a total of 2165 adolescents, and their parents were invited to participate in the HEIA project. A total of 1527 adolescents (70 %) participated in the baseline data collection.

4.1.3 Design of the baseline data collection

The baseline data collection was initiated in the autumn of 2007. Adolescents in 6th grade, aged 11 years, and their parents were invited to participate in the HEIA project in August. The baseline data collection took place in 37 schools in September 2007.

The school principal, eventually another person in the school administration or a teacher, was requested to complete a baseline questionnaire on school environment. The school principal questionnaire consisted of 75 questions on school environment in connection with physical activity and food, and it was returned to the HEIA project research team by regular mail.

The adolescents completed an Internet based questionnaire during the school hours. The questionnaire consisted of 121 questions, amongst others on dietary behaviour. The adolescents were anthropometrically measured (body weight, height, hip-and waist circumference) by trained field workers from the research team of the HEIA project. Waist circumference was measured in centimetres with a flexible measuring tape at the level of the umbilicus. Hip circumference was measured in centimetres with a flexible measuring tape at the level of the upper hip bone. Height was measured in centimetres, and during the measurement the adolescents were standing at straight posture, with relaxed arms, body weight equally distribute on both legs, and breathing normally. Body weight and body composition (percentages of body fat)

were measured by a Tanita scale (Tanita TBF-300). The field workers being responsible for the measurements had a gentle manner and the measurement results were not given to the adolescents for reducing potential discrimination and peer pressure related to body weight and body image.

Observations of the physical school and school neighbourhood environment were carried out by field workers from the HEIA project research team as a part of the baseline data collection. An observational form was developed and used for the observation sessions. The purpose of the observations was to investigate the possibilities of being physically active and the presence of food sales outlets and advertising in the school yard and the school neighbourhood.

4.1.4 Methods

Predictive validity of factors in the school food environment on the adolescents' diet and overweight prevalence was examined by investigating the associations between school food environment data obtained by school principal questionnaire and data on adolescents' dietary behaviour and overweight prevalence obtained by adolescent questionnaire and body measurements.

School food environment indicators

The questions on school food environment in the school principal questionnaire were on food and nutrition rules and practices, attitudes and social norms among the school administration and teachers in connection with food and nutrition, and availability of healthy and unhealthy foods at school and in the school neighbourhood. Based on the ANGELO framework (3), some of the questions from the principal questionnaire were selected to be used as school food environment indicators in the analyses of predictive validity (appendix 1). The questions selected were the following; dedicated time for eating lunch; supervision during lunch break; fruit, vegetable and milk subscription; presence of canteen and the canteen assortment; access to cold drinking water; presence of food sales outlets in the school neighbourhood; permissions for

bringing unhealthy food items and drinks to school; and food and nutrition attitudes and norms of the school administration with regards to food and nutrition.

Development of a school food environment score

The chosen school food environment indicators from the school principal questionnaire corresponded to three of the four types of environments described in the ANGELO framework; political, sosiocultural and physical environment (figure 1). Based on the three types of environments and the corresponding school food environment indicators, a school food environment score was developed by recoding the indicator variables into dichotomous variables. The three parts of the school food environment score and the corresponding school food environment indicators are described in further detail below.

School political food environment

This part of the score was developed based on the official guidelines for school food environment published by the Norwegian Directorate for Health and Social Affairs; "Retningslinjer for skolemåltidet i grunnskole og videregående skole" (appendix 2). These guidelines are directed to the administration of elementary schools and secondary schools and are supposed to guide the school administration in food and nutrition related work at school. Some of the recommendations from "Retningslinjer for skolemåltidet i grunnskole og videregående skole" were corresponding to the school food environment indicators selected from the school principal questionnaire, and these recommendations were picked out to comprise the first part of the food environment score (table 1). The variables were recoded into dichotomous variables. One point was obtained for each of the listed recommendations of the guidelines the school fulfilled, and zero points for each of the listed recommendations of the guidelines the school did not fulfil. Maximum obtainable score was 9 points.

Table 1: The political school food environment score (The HEIA project, n = 35 schools).

Schools should offer the pupils the following:		
	Yes	**No**
Meal time should be at least 20 minutes	1 point	0 point
Supervision by a teacher during the lunch break	1 point	0 point
Fruit and vegetable subscription	1 point	0 point
Milk subscription	1 point	0 point
Access to cold and fresh drinking water	1 point	0 point
Canteen at least once a week	1 point	0 point
Schools should not offer the pupils the following:		
	Yes	**No**
Soft drinks and squash	0 point	1 point
Crisps and sweets	0 point	1 point
Cakes, waffles and buns on a daily basis	0 point	1 point
Maximum obtainable points: 9 points		

School sociocultural food environment

The following school food environment indicators belonged to this part of the school food environment score; the school administration's perceived responsibility with regards to the diet of the students; the degree of priority given to food and nutrition related work beyond the mandatory; and to which extent food and nutrition had been discussed in different forums at school (table 2). The variables were recoded into dichotomous variables. The schools obtained one point for each forum where food and nutrition topics were discussed, one point if their perceived responsibility according to the adolescents' diet was high, and one point if food and nutrition were given priority beyond the mandatory. Zero points were obtained if food and nutrition were not discussed, and if perceived responsibility for the adolescents' diet and priority given to food and nutrition were low. Maximum obtainable points were 7 points.

Table 2: The sosiocultural school food environment score (The HEIA project, n = 35 schools).

Attitudes and social norms of the school administration regarding food and nutrition		
	Yes	**No**
Food and nutrition rules have been discussed…		
…at staff meetings	1 point	0 point
…at parent-teacher meetings	1 point	0 point
…with the school children	1 point	0 point
…in the parental panel	1 point	0 point
	4-5 (in high degree)	**1 (not at all)-3**
"In which degree do you think that school is responsible for the children's diet"	1 point	0 point
	Agree	**Disagree/ neutral**
"In our school, food and nutrition is a prioritized working area beyond the mandatory"	1 point	0 point
Maximum obtainable points: 7		

Physical school neighbourhood food environment

The school principal was asked if there were any places where foods or beverages could be purchased within walking distance from the school. This question was used as an indicator of the physical school neighbourhood food environment. The variable was recoded into a dichotomous variable. The schools obtained one point if there were no food sales outlets present in the school neighbourhood and zero points if food sales outlets were present (table 3). Maximum obtainable points were 1 point. However, it has to be taken into account that the adolescents were not allowed to leave the school area during the school hours in any of the schools.

Table 3: The physical school neighbourhood food environment score (The HEIA project, n = 35 schools).

The physical school neighbourhood food environment		
	Yes, one or more	**No**
Presence of food sales outlets within walking distance	0 point	1 point
Maximum obtainable points: 1		

Adolescent diet indicators

The questions on intake of selected food items and beverages from the adolescent questionnaire used in the HEIA project baseline data collection were chosen as indicators of the adolescents' diet in the analyses of predictive validity, called adolescent diet indicators. The chosen indicators were the variables on consumption of fruits; vegetables; sweets; savoury snacks; biscuits; buns/muffins; soft drinks with sugar; soft drinks without sugar; squash with sugar; squash without sugar; fruit juices; and fruit nectar. For the exact queries, see appendix 3.

The chosen indicator variables were recoded for obtaining variables appropriate for further analysis. The indicator variables on intake of fruits, vegetables, sweets, savoury snacks, biscuits and buns/muffins were recoded into dichotomous variables. For fruit and vegetables, the official recommendations for intake were used as the basis for the variable recoding. Recommended intake of fruits is two items per day. Fruit juice was here not included as one of the daily recommended fruits, as a result of the possible difficulties for the adolescents to distinguish fruit juice from other fruit drinks, as squash and fruit nectar. Recommended intake of vegetables is three items per day. However, intake of two vegetables or more per day was used in the recoding of the variable on vegetable intake because fulfilment of the recommendations for vegetable intake was believed to be rare. Consequently, for fruits and vegetables consumption of two or more fruits or vegetables per day was coded as 1, while consumption of fruits and vegetables less than twice per day was coded as 0. For consumption of sweets, savoury snacks, biscuits and buns/muffins, consumption of the food items 1-2 times per week or less frequent was chosen as the starting point for the recoding of the variables. Daily consumption of these food items is not recommended. Consumption of these food items < 1-2 times per week was coded as 1 and more frequent consumption were coded as 0. The variables for intake of beverages were recoded into continuous variables for further analysis. Mean daily intake of the different beverages was estimated using the variables on frequency and amounts of consumed beverages on weekdays and weekends.

Adolescent overweight indicator

The share of overweight or obese adolescents in the schools was also used as an indicator in the analysis of predictive validity, called adolescent overweight indicator. The measurements of height and body weight from the HEIA project baseline data collection were used as basis for calculating the adolescents' BMI (BMI= (kg)/ (height (m)*height (m)) (kg/m^2)). This indicator variable was recoded to the percentage of adolescents being overweight or obese according to the international age and gender specific cut-off points of child and adolescent overweight and obesity defined by International Obesity Taskforce (IOTF) (53). For adolescents on the age of 11, the BMI cut-off points for child overweight are 20.55 and 20.74 for boys and girls, respectively. These values are corresponding to an BMI of 25 and overweight in adults in the age of 18 or older (53). A dichotomous variable was created; BMI higher than the cut-off points corresponding to an adult BMI of 25 were coded as 1, and BMI lower than the cut-off points corresponding to an adult BMI of 24.9 or less was coded as 0.

4.1.5 Ethics and permissions in the HEIA project

The study protocol of the HEIA project was submitted to the regional branch of The National Committee for Medical Research Ethics in Norway and Norwegian Social Science Data Service. All the children and parents received an initial written informed consent, and one parent or legal guardian provided written informed consent. Care was taken throughout the baseline data collection of the HEIA project, to reduce discrimination and peer pressure related to weight and body image among the children. The public health nurses at the schools were informed about the project before the data collection started.

4.2 Developing an observational instrument for investigating school neighbourhood food environments

An observational instrument for investigating physical food environment in school neighbourhoods was developed, based on former experience from the HEIA study and review of the existing literature on observational instruments for investigating food environments. The purpose of the instrument was to investigate the availability of different food items and beverages in food sales outlets in school neighbourhoods.

4.2.1 Data collection

Experiences from the HEIA project

An observational form was developed and used in the baseline data collection of the HEIA project. The questions of this form were mostly focused on the school yard and school physical neighbourhood environment regarding physical activity. Two of the questions were on physical school neighbourhood food environment. One of the two questions was on presence and number of food advertisements in the school neighbourhood. The second question was on the presence of food sales outlets in the school neighbourhood, and the availability of some food items and beverages in the present food sales outlets.

Literature review

A search in the existing literature was performed to get an overview of the research on instruments for investigating food environments. The PubMed database (www.pubmed.gov) was used. Combinations of environmental, nutritional and food item keywords were used to find research articles of interest. Key words used were: neighbourhood, availability, local, school, physical, built, environment, accessibility, walking distance, stores, BMI, children, adolescents, intake, food, fruit, vegetable, consumption, soft drink, diet, nutrition, behaviour, measurement, tool, instrument. Research on adolescent populations was most interesting, but research on children

and adult populations was included as well, owing the fact that little research has been performed in connection with investigating adolescents' food environment.

4.3 Testing the observational instrument developed

The observational instrument developed for measuring availability of food items and drinks within food sales outlets in school neighbourhoods was tested to investigate its usefulness in future research. Test-retest and inter-rater reliability were chosen as parameters for the testing of the observational instrument.

4.3.1 The school neighbourhoods

The school neighbourhoods used as the setting for the testing of the observational instrument were picked among the schools participating in the HEIA project. Ten schools were selected by a couple of persons in the HEIA project research team, with the location of the schools being the most important selection criteria. Schools located nearby Oslo were chosen to facilitate the testing process, since the testing involved visiting all the school neighbourhoods at least twice. The schools selected were a mix of intervention and control schools, they were located in areas with low and high socio-economic status, and they were located in different directions from Oslo. The school neighbourhood was defined as the area within a 500 metres radius around the school, and the food sales outlets within this area were subjects for further investigation.

4.3.2 Creating maps of the school neighbourhoods

A map of each school neighbourhood was created to get an overview of the number and types of food sales outlets within the school neighbourhood (appendix 4). Different sources were used for creating the maps.

Internet map services

Maps on the Internet pages of local authorities were used for recognizing and restricting the neighbourhood of each school. These maps were printed out in several specimens. The scale used was 1:75 (1 centimetre = 75 metres). The radius of 500 metres around the school was drawn on the maps using dividers. Several different map services on the Internet were used for locating food sales outlets (www.finn.no, www.1881.no, www.maps.google.no, www.gulesider.no). The food sales outlets located within each school neighbourhood were marked on the printed maps. Each food sales outlet in a school neighbourhood was numbered, and the full name and address of the food sales outlets were written on a sheet of paper that was pinned to the map.

Telephone interviews

The next step in the process of creating the maps was to talk to a person working at each of the schools; a teacher, a secretary or a person working in the school administration. The main criterion for the selection of this person was acquaintance with the localities. The objective of this conversation was to obtain information on the presence of food sales outlets in the school neighbourhood, and eventually the adolescents' use of the food sales outlets. The conversations were conducted as telephone interviews. An interview guide was generated to be used during the telephone conversations, to make sure that no information was missed (appendix 5). All the telephone interviews were carried out by the same person. The created maps were controlled and eventually modified according to the information obtained from the telephone interviews. The schools received an information letter by fax or e-mail before the telephone interview was carried out (appendix 6).

Group conversations with adolescents

For completing the maps, group conversations were carried out with 4-5 adolescents in 7th grade in four of the ten schools; in the three schools having the highest number of food sales outlets in its neighbourhood, and in one of the schools having only one food sales outlet in its neighbourhood. Group conversations were not carried out with

adolescents in all the ten schools as a result of time limitations. The adolescents in 7th grade are the oldest students in primary school, and they are most likely to carry money to spend in food sales outlets. The map of the school neighbourhood was shown to and discussed with the adolescents in a break during the school day. The adolescents were supposed to tell which food sales outlets they were familiar with within the school neighbourhood, and which food sales outlets they were aware of being frequently used by adolescents in their school. The created maps were modified based on the information obtained from the adolescents during the group conversations. One or two of the food sales outlets being most frequently used by the adolescents were coloured yellow on the maps. The schools received an information letter by fax or e-mail before the group conversation with adolescents was carried out (appendix 6).

Visiting the school neighbourhoods

When the school neighbourhoods were visited for testing the observational instrument, it turned out that some of the food sales outlets did not exist. This was true for nine food sales outlets in a total of three neighbourhoods. Four of the food sales outlets were not open in the daytime. Three of the food sales outlets were disused. One food sales outlet was not open for the public, but you could purchase food items and beverages through a window. One food sales outlet was not located. The food sales outlets that turned out to not exist or not being open at day time were only restaurants and kiosks.

4.3.3 Food sales outlets in the school neighbourhoods

The ten school neighbourhoods picked among the schools participating in the HEIA project were used as the setting for testing inter-rater and test-retest reliability of the observational instrument developed. In two of the school neighbourhoods, no food sales outlets were present. In the eight remaining school neighbourhoods, there were one or more food sales outlets present. The highest number of food sales outlets in

one school neighbourhood was six, and the lowest number of food sales outlets was zero.

- One school neighbourhood had six food sales outlets

- One had four

- One had three

- Two had two

- Three had one

- Two school neighbourhoods had no food sales outlets

The food sales outlets present in the eight school neighbourhoods were twelve supermarkets, one fuel station, four kiosks, one bakery and two fast food restaurants. All the school neighbourhoods and the present food sales outlets were assessed when investigating test-retest reliability, corresponding to a total of 20 food sales outlets. Only five of the school neighbourhoods and the present food sales outlets were investigated when assessing inter-rater reliability as a consequence of time limitations, corresponding to a total of nine food sales outlets; seven supermarkets and two kiosks.

4.3.4 Test design

Inter-rater reliability

Inter-rater reliability was investigated by two different field workers visiting the same food sales outlets on the same day, using the observational instrument developed for investigating the availability of food items and beverages.

Test-retest reliability

Test-retest reliability was investigated by one field worker visiting the school neighbourhoods twice with a three weeks' interval, using the observational instrument for investigating the availability of food items and beverages.

4.3.5 Data collection

Two field workers participated in the data collection. The data collection was carried out by the field workers using the observational instrument developed. The field workers visited all the food sales outlets marked on the map of the school neighbourhood. Measuring tape was used to record shelf length. The managers of the food sales outlets were contacted when the field workers arrived at the food sales outlets. An information letter was handed out and a short oral description of the master thesis and the observation session was given (appendix 7).

4.4 Statistics

The statistical programme SPSS 16.0 was used for all the statistical analyses. The Kolmogorov-Smirnov Test of Normality and histograms were used to assess whether the variables were normally distributed.

4.4.1 Predictive validity

Through the variable recoding, the variables on consumption of fruits, vegetables, sweets, savoury snacks, biscuits, and buns/muffins were aggregated to simple variables for the percentage of the adolescents fulfilling the recommendations for intake of food items and beverages in each school. The data on intake of beverages were aggregated to mean total daily intake of the beverages by the adolescents in each school. The data on BMI were aggregated to a variable describing the percentage of the adolescents being overweight or obese according to the definition by IOTF in each school.

Descriptive statistics were used initially for getting an overview of the adolescents' diet, overweight prevalence and the school food environment. For investigating the predictive validity of factors in the school food environment on adolescents' diet, comparative statistics were used. For investigating the association between the political school food environment score and the adolescent diet and overweight indicators (two continuous variables), Scatter plot and Pearson's correlation coefficient were used. The same statistical analyses were carried out for investigating the association between the sosiocultural school food environment score and the adolescent diet and overweight indicators (two continuous variables). One way analysis of variance (ANOVA) was used for investigating the association between the physical school neighbourhood food environment score and the adolescent diet and overweight indicators (one continuous and one dichotomous variable). Multi level analyses were not conducted to investigate predictive validity as a result of time limitations and the fact that multi level analyses are beyond the expected level of a master thesis.

4.4.2 Inter-rater reliability

Descriptive statistics were used for identifying the median and the 25 and 75 percentiles of the median for the number of food items counted and metres of shelf space measured by the two field workers within each neighbourhood. Since the data were not characterized by normal distribution, correlation analyses with Spearman's correlation coefficient and non-parametric statistical tests were used for examining inter-rater reliability. Correlation analyses with Spearman's correlation coefficient and simple scatter plots were carried out for investigating the degree of correlation between the number of food items counted and the metres of shelf space measured by the two field workers. Wilcoxon signed rank test was carried out for testing if there were any significant differences between the observations carried out by the two field workers. One samples t-test was conducted for assessing if there were any differences in time consumption by the two field workers when using the observational instrument, as a consequence of the normal distribution of the data.

4.4.3 Test-retest reliability

Descriptive statistics were used for finding the median and the 25 and 75 percentiles of the median for the number of food items counted and metres of shelf space measured by the same field workers in the first and second observation session. Since the data were not characterized by normal distribution, correlation analyses with Spearman's correlation coefficient and non-parametric statistical tests were carried out for examining test-retest reliability. Correlation analyses with Spearman's correlation coefficient and simple scatter plots were carried out for investigating the degree of correlation between the number of food items counted and the metres of shelf space measured by the same field worker in the two observation sessions. Wilcoxon signed rank test was conducted for examining if there were any significant differences between the first and second observation session. One samples t-test was carried out for investigating if there were any differences in time consumption in the first and second observation session when using the observational instrument, as a consequence of the normal distribution of the data.

5. Results

5.1 Predictive validity

5.1.1 School and school neighbourhood food environment

Political school food environment

In almost half the schools, more than 20 minutes was allocated for the adolescents to eat lunch (table 4). In about 11 % of the schools, less than 14 minutes were allocated for the adolescents to eat lunch. In all the schools, the adolescents were supervised by a teacher during lunch break. The adolescents were offered milk subscription in all the schools, while fruit and vegetable subscription was offered in roughly half the schools. Only five of the schools (14 %) had a school canteen for the adolescents once a week or more frequent. In almost half the schools, the adolescents in 6th grade were allowed to bring squash weekly. The adolescents were allowed to bring buns and muffins, and biscuits to school weekly in only one school. The adolescents were not allowed to bring soft drinks or sweets weekly in any of the schools.

Sosiocultural school food environment

In almost all the schools, school rules for food and nutrition had been discussed recently in one or more forum (table 4). In about half the schools the principal stated that the school to a great extent has responsibility for the adolescents' diet. Less than one fourth of the school principals stated that food and nutrition were prioritized beyond the mandatory.

Physical school neighbourhood food environment

In the neighbourhood of more than 75 % of the schools, food sales outlets were present within walking distance (table 4). However, the adolescents were not allowed to leave the school area during the school day in any of the schools.

Table 4: The school food environment indicators and the percentage of the schools where the indicators were present (The HEIA project, n = 35 schools).

School food environment indicators	Schools where the indicators were present (%)
Political school food environment	
More than 20 minutes for eating lunch	48.6
Supervision by a teacher during the meal break	100.0
Fruit and vegetable subscription	54.8
Milk subscription	100.0
Canteen once a week or more frequent	14.3
Access to cold and fresh drinking water	91.4
Bring squash to school weekly	46.9
Bring biscuits to school weekly	2.9
Bring buns and muffins to school weekly	2.9
Bring sweets to school weekly	0
Bring soft drinks to school weekly	0
Sosiocultural school food environment	
Discussion of school rules for food and nutrition recently	90.9
Discussion of school rules for food and nutrition at staff meetings	62.9
Discussion of school rules for food and nutrition at parent – teacher meetings	54.3
Discussion of school rules for food and nutrition with the pupils	54.3
Discussion of school rules for food and nutrition in the parental board	54.3
Discussion of school rules for food and nutrition in school environment board	17.1
The schools responsibility of the adolescents' diet (to great extent)	48.6
Priority of food and nutrition beyond the mandatory (agree)	22.9
Physical school neighbourhood food environment	
One or more food sales outlets in the school neighbourhood	76.5

School food environment score

The median score of the schools according to the three different parts of the score was six, three and zero points (table 5).

Table 5: Median obtained score with 25 and 75 percentiles for the three parts of the school food environment score (The HEIA project, n = 35 schools).

School food environment score	Median score	Percentiles (25, 75)	Maximum obtainable score
Political school food environment score	6.00	5.00, 7.00	9
Sosiocultural school food environment score	3.00	2.00, 5.00	7
Physical school neighbourhood food environment score	0.00	0.00, 0.00	1

5.1.2 Dietary behaviour and overweight of adolescents in 6th grade

A total of 14 % of the adolescents were overweight or obese (table 6). About 40 % and 30 % of the adolescents fulfilled the recommendations for intake of fruits and vegetables, respectively. Roughly 90 % of the adolescents consumed sweets and chocolate, buns and muffins, savoury snacks and biscuits 1-2 times a week or less frequent. Among beverages, water and milk not included, fruit juice was consumed to the greatest amount on a daily basis (table 7). The intake of fruit juice among the adolescents was on average 78 ml/day. The mean daily intake of fruit nectar was 24 ml/day, and fruit nectar was the beverage consumed in the smallest daily amounts among the adolescents.

Table 6: Adolescent diet and overweight indicators and the percentage of the 6th graders following the defined recommendations (The HEIA project, n = 1527).

Adolescent diet and overweight indicators	Defined recommendations	6th graders following the defined recommendations (%)
Fruits	Two or more a day	41.6 %
Vegetables	Two or more a day	27.9 %
Sweets/chocolate	Twice a week or less frequent	86.1 %
Savoury snacks	Twice a week or less frequent	89.3 %
Buns/muffins	Twice a week or less frequent	93.0 %
Biscuits	Twice a week or less frequent	93.5 %
BMI	Adolescent BMI defined as overweight by International Obesity Taskforce (IOTF) (53)	14.1 %

Table 7: Mean daily intake with standard deviation for different beverages among the 6th graders when both weekdays and weekends are taken into account (The HEIA project, n = 1527).

Beverage type	Mean daily intake (ml/day)	Standard deviation
Soft drinks with sugar	63	57
Soft drinks without sugar	61	63
Squash with sugar	45	56
Squash without sugar	46	61
Fruit juice	78	78
Fruit nectar	24	44

5.1.3 Predictive validity of school food environment on adolescents' diet and overweight prevalence

Political school food environment

No significant correlations were found between the political school food environment score and the adolescent diet and overweight indicators (table 8). A borderline negative correlation was seen between the political school food environment and the percentage of the adolescents eating savoury snacks 1-2 times a week or less frequent (correlation coefficient -0.135, p = 0.07).

Sosiocultural school food environment

Significant positive correlations between intake of soft drinks without sugar (correlation coefficient 0.502, p = 0.002), squash without sugar (correlation coefficient 0.476, p = 0.004), and fruit nectar (correlation coefficient 0.469, p = 0.004) and the sosiocultural school food environment were observed (table 8). The association between intake of soft drinks with sugar and sosiocultural school food environment was found to be borderline significant (correlation coefficient 0.304, p = 0.08).

Physical school neighbourhood food environment

Significant associations were found between physical school neighbourhood food environment score and the adolescent diet and overweight indicators (table 8). However, the results were to the contrary of the expected. The percentage of adolescents eating sweets 1-2 times per week or less frequent was significantly higher in the schools with food sales outlets present in its neighbourhood (p = 0.03). About 87 % of the adolescents were eating sweets 1-2 times per week or less frequent in the schools with food sales outlets in its neighbourhood, compared to about 81 % of the adolescents in the school neighbourhoods without food sales outlets present. The same was seen for consumption of savoury snacks (p = 0.05). The percentage of adolescents eating savoury snacks 1-2 times a week or less frequent was about 90 % in schools with one or more food sales outlets present in its neighbourhood,

compared to 85 % of the adolescents in the schools without food sales outlets in its neighbourhood.

Table 8: Correlation between the three parts of the school food environment score and the adolescent diet and overweight indicators (The HEIA project, n = 35 schools).

| | School food environment score | | | | |
| | Political school food environment score [1] | | Sosiocultural school food environment score [1] | | Physical school neighbourhood food environment score [2] |
Adolescent diet and overweight indicators *	Pearson's correlation coefficient	P-value	Pearson's correlation coefficient	P-value	P-value
Percentage:					
Overweight adolescents	0.136	0.43	0.101	0.56	0.37
Eating two or more fruits per day	0.026	0.88	0.076	0.66	0.78
Eating two or more vegetables per day	-0.103	0.56	-0.011	0.95	0.68
Eating sweets < 1-2 times a week	-0.245	0.16	-0.126	0.47	0.03
Eating savoury snacks < 1-2 times a week	-0.135	0.07	-0.157	0.37	0.05
Eating biscuits < 1-2 times a week	-0.084	0.63	0.075	0.67	0.33
Eating buns/muffins < 1-2 times a week	-0.229	0.19	-0.214	0.22	0.72
Mean daily intake of:					
Soft drinks with sugar	0.091	0.60	0.304	0.08	0.42
Soft drinks without sugar	0.201	0.25	0.502	0.002	0.94
Squash with sugar	0.233	0.18	0.201	0.25	0.22
Squash without sugar	0.243	0.16	0.476	0.004	0.42
Fruit juice	0.071	0.69	0.173	0.32	0.57
Fruit nectar	0.097	0.58	0.469	0.004	0.34

[1]: Correlation analysis
[2]: One way ANOVA
*: Mean data on school level

5.2 Development of an observational instrument for investigating school neighbourhood food environment

5.2.1 Experiences from the HEIA project

The experiences from the HEIA project in relation to the use of the observational form were that the questions on food environment were not precise and detailed enough. The food items and beverages requested were common food items and beverages, and were all present in most of the food sales outlets investigated. As a consequence, the observational form was not precise enough for differentiating the food sales outlets and school neighbourhoods with regards to the presence of unhealthy food items and beverages. The questions did not produce information of interest according to further analysis of the school neighbourhood food environment. As a consequence, the observational form used in the HEIA project baseline data collection was not used as the starting point for the observational instrument to be developed in this master thesis.

5.2.2 Literature review

Findings

A total of 11 articles were found on direct observation of neighbourhood environments in the literature search in the PubMed database. These findings were assembled in a table (appendix 8). The availability of food items within food sales outlets has been explored to a lesser extent. In most of the direct observation that has been carried out for directly investigating neighbourhood food environments, a food item check list has been used for recording the absence or presence of different food items or market basket of food items. Measuring tape and counting number of food items and beverages have also been used to assess in store availability of food items and beverages. Very little research has focused on recording the total available amounts of different food items within an area. None of the articles found was specially designed for investigating adolescents' food environment. After the

literature review was completed, the observational instrument developed and tested by Glanz et al. (50), Nutrition Environment Measures Survey in Stores (NEMS-S), was to be used as the starting point of the observational instrument to be developed in this master thesis.

NEMS-S

The observational instrument developed by Glanz et al. was chosen to serve as the basis for the observational instrument to be developed in this master thesis. This instrument was chosen as a result of its high inter-rater and test-retest reliability, and the fact that the structure of this instrument was believed to be transferable to Norwegian conditions (50).

The observational instrument developed and evaluated by Glanz et al. was an observational form for investigating the availability of food items and beverages in food sales outlets. The observational form included a food item check list with ten indicator food categories contributing with high amounts of fat and calories to the diet of the population in general. The food items in the check list were fruits, vegetables, milk, ground beef, hot dogs, frozen dinners, baked goods, beverages (soft drinks, fruit juice), whole grain bread and baked chips. The presence, price and quality of the food items, and the availability of more healthy choices, were investigated by using the observational form in food sales outlets. The instrument was tested by Glanz et al. in four different neighbourhoods, and the test-retest reliability (κ scores ranging 0.73-1.00) and inter-rater reliability (κ scores ranging 0.84-1.00) of the instrument was found to be high (50).

5.2.3 The design of the observational instrument developed

The observational instrument developed here was an observational form (appendix 9), and it was supposed to be used by a field worker when observing food sales outlets in school neighbourhoods. It was based on the observational form developed by Glanz et al. (50), but it was adapted to be applicable to Norwegian conditions and

adolescents' food environment. Food sales outlets were categorized into five different categories; kiosks, fuel stations, supermarkets, specialized stores (as bakeries, grocery stores) and restaurants. Restaurants were included to get an overview of the adolescents' total availability of food items and beverages within the school neighbourhood. Number of cash registers was counted and used as a measure of the size of the food sales outlets. Twelve different food items and beverages were included in the observational form; sweet and salty biscuits; chocolate and sweets; buns/muffins; rolls; fruits; vegetables; savoury snacks; soft drinks with sugar; soft drinks without sugar; still and sparkling water; juice and squash and similar drinks; and flavoured milk. We were mainly interested in products of a size likely to be consumed at the time of purchase. For some of the food items and beverages, the field workers were asked to measure metres of shelf space (biscuits, chocolate and sweets, savoury snacks, soft drinks with sugar, soft drinks without sugar, and still and sparkling water). For other food items and beverages, the field workers were asked to count the number of available sorts within each product category (buns/muffins, rolls, juice and squash and similar drinks, and flavoured milk). The observers were also asked if the range of fruits and vegetables looked appetizing, and if some convenient types of vegetables were available. In the end of the observational form, the observers were asked to write down all food items and drinks available near one random cash register in the food sales outlet. The time for starting and completing the observation sessions was also requested.

Food items to be investigated by use of the observational instrument developed here were food items and drinks believed to be eaten by adolescents as a snack between meals. In most Norwegian primary schools, adolescents are not allowed to leave school during the school day (33). Consequently, it is assumed that the adolescents make use of the food sales outlets in the school neighbourhood before or after school. The food items and drinks bought by the adolescents in the food outlets sales in the school neighbourhood are believed to be convenient food items, suitable as a small meal or snack between lunch and dinner, typically cheap and may have a sweet or salty taste. The food items and drinks included in the food item check list of the

observational instrument were from the basis assortment of the food sales outlets. Seasonal items, as for instance Christmas cookies, were not taken into account.

5.3 Testing the observational instrument developed

5.3.1 Description of the food sales outlets investigated

A total of 20 food sales outlets were investigated. Number of cash registers was used as an image of the size of the food sales outlets. The mean number of cash registers in the food sales outlets was 2.2 (standard deviation 1.3), with one cash register being the lowest and five cash registers being the highest number of cash registers. No significant differences were found between the two observers in the counting of the number of cash registers in the food sales outlets when investigating inter-rater reliability, or between the counted number of cash registers in the first and second observation session when investigating test-retest reliability. The food items present nearby the cash registers were mostly chewing gum and pastilles without sugar. Other food items frequently available near the cash registers were convenient vegetables and fruits, different types of sweets and chocolate and small portion bags of nuts and dried fruits.

5.3.2 Time used for investigating one food sales outlet

Inter-rater reliability
The mean time used by the first observer for investigating one food sales outlet using the observational form was 35 minutes (table 9). The mean time used by the second observer was 29 minutes. The two observers used significantly different amounts of time when using the observational instrument for investigating one food sales outlet ($p < 0.001$).

Table 9: Mean time with standard deviation and minimum and maximum time used for observing one food sales outlet using the observational instrument when investigating inter-rater (n = 9 food sales outlets) and test-retest reliability (n = 20 food sales outlets).

Inter-rater reliability	Mean time (minutes)	Standard deviation	Minimum time	Maximum time
Observer 1	35.0	16.8	10	70
Observer 2	29.4	9.8	15	40
Test-retest reliability	**Mean time (minutes)**	**Standard deviation**	**Minimum time**	**Maximum time**
Observation session 1	23.5	12.0	5	40
Observation session 2	19.3	9.5	5	40

Test-retest reliability

Significant difference was found between the time used for investigating food and beverage availability in one food sales outlet in the first and second observation session ($p < 0.001$) (table 9). The mean time used for investigating one food sales outlet was 24 minutes in the first observation session, and it was reduced to 19 minutes in the second observation session.

5.3.3 Inter-rater reliability

For most of the food items, there were no significant differences between the findings of the two field workers (table 10). Significant differences between the findings of the two field workers were only seen for number of buns/muffins ($p = 0.03$) and shelf space of soft drinks without sugar ($p = 0.05$). For number of flavoured milk ($p = 0.06$), shelf space of biscuits ($p = 0.08$), and number of fresh fruit ($p = 0.09$), the differences between the findings of the two field workers were borderline significant.

Table 10: Median shelf space and number of food items and beverages measured by the two field workers, and p-value for the test of significant differences between the observations of the two field workers when investigating inter-rater reliability (n = 9 food sales outlets).

Food item (unit)	Median (25, 75 percentiles)		P-value [2, 3]
	Field worker 1	Field worker 2	
Biscuits (shelf space)	16.6 (8.1, 17.9)	16.6 (8.6, 19.0)	0.08
Sweets/chocolate (shelf space)	59.5 (44.0, 70.2)	51.5 (44.0, 72.5)	0.37
Buns (number) [1]	31.5 (8.0, 36.8)	12.0 (3.5, 15.0)	0.03
Rolls (number)	6.0 (2.5, 9.0)	6.0 (2.5, 9.0)	1.00
Whole grain rolls (number)	2.0 (0.5, 3.0)	2.0 (0.5, 3.0)	1.00
Fresh fruit (number)	13.0 (5.0, 14.0)	13.0 (6.0, 16.5)	0.09
Vegetables (number)	25.0 (9.5, 28.0)	25.0 (10.5, 29.5)	0.34
Savoury snacks (shelf space)	52.0 (19.8, 61.4)	38.5 (20.2, 46.5)	0.21
Soft drinks with sugar (shelf space)	31.8 (4.4, 63.8)	31.4 (5.9, 57.1)	0.14
Soft drinks without sugar (shelf space)	25.1 (12.5, 57.3)	22.2 (10.4, 48.1)	0.05
Still and sparkling water (shelf space)	18.1 (3.8, 22.5)	15.8 (5.0, 17.9)	0.11
Fruit juice and squash (number)	14.0 (8.0, 21.5)	16.0 (8.0, 26.0)	0.40
Flavoured milk (number)	8.0 (3.5, 10.0)	6.0 (3.0, 7.0)	0.06

[1]: n = 8
[2]: Wilcoxon signed rank test
[3]: level of significance is 0.05

Highly significant correlations between the findings of the two field workers were seen for all food items, with correlation coefficients being 0.73-1.00 (median correlation coefficient = 0.87), except for shelf space of sweets/chocolate (correlation coefficient 0.63, p = 0.07) and number of flavoured milk (correlation coefficient 0.42, p = 0.26 (table 11). The correlations between the findings of the two field workers were strongest for shelf space of soft drinks with sugar (correlation coefficient 1.00, p < 0.001), shelf space of biscuits (correlation coefficient 0.97, p < 0.001), and number of rolls (correlation coefficient 0.94, p < 0.001).

Table 11: Spearman's correlation coefficient for the correlation between the findings of the two field workers when investigating inter-rater reliability (n = 9 food sales outlets).

Food item (unit)	Correlation coefficient	P-value [2]
Biscuits (shelf space)	0.97	< 0.001
Sweets/chocolate (shelf space)	0.63	0.07
Buns (number) [1]	0.73	0.04
Rolls (number)	0.94	< 0.001
Whole grain rolls (number)	0.89	< 0.001
Fresh fruit (number)	0.78	0.01
Vegetables (number)	0.79	< 0.001
Savoury snacks (shelf space)	0.87	< 0.001
Soft drinks with sugar (shelf space)	1.00	< 0.001
Soft drinks without sugar (shelf space)	0.88	< 0.001
Still and sparkling water (shelf space)	0.87	< 0.001
Fruit juice and squash (number)	0.82	0.01
Flavoured milk (number)	0.42	0.26

[1]: n = 8
[2]: level of significance is 0.05

5.3.4 Test-retest reliability

For most of the food items and beverages investigated by using the observational instrument, there were no significant differences between the findings in the first and second observation session (table 12). Significant differences between observation one and two were only seen for number of buns/muffins (p = 0.01) and number of fruit juice and squash (p = 0.03). For number of vegetables, the difference was borderline significant (p = 0.09).

Table 12: Median shelf space and number of food items and beverages measured in the first and second observation session, and p-value for the test of significant differences between the first and second observation session when investigating test-retest reliability (n = 20 food sales outlets).

Food item (unit)	Median		P-value [2,3]
	Observation 1	**Observation 2**	
Biscuits (shelf space)	16.4 (0.1, 18.2)	15.6 (0.5, 18.0)	0.67
Sweets/chocolate (shelf space)	48.9 (24.4, 72.9)	44.1 (14.0, 72.8)	0.47
Buns (number) [1]	10.0 (2.0, 15.0)	14.0 (2.0, 17.8)	0.01
Rolls (number)	6.0 (0.0, 9.0)	5.0 (0.0, 9.8)	0.43
Whole grain rolls (number)	2.0 (0.0, 3.0)	2.0 (0.0, 3.0)	0.13
Fresh fruit (number)	12.0 (0.0, 16.0)	13.0 (0.0, 15.0)	0.56
Vegetables (number)	22.0 (0.0, 29.8)	24.5 (0.0, 28.5)	0.09
Savoury snacks (shelf space)	36.0 (2.7, 48.3)	43.1 (2.3, 56.9)	0.33
Soft drinks with sugar (shelf space)	18.1 (3.8, 46.5)	21.3 (2.8, 47.9)	0.77
Soft drinks without sugar (shelf space)	20.1 (1.6, 32.3)	26.0 (1.6, 36.8)	0.60
Still and sparkling water (shelf space)	10.2 (1.8, 17.1)	11.7 (1.3, 24.8)	0.55
Fruit juice and squash (number)	14.0 (9.3, 23.8)	18.0 (10.8, 26.0)	0.03
Flavoured milk (number)	4.5 (1.0, 6.8)	4.5 (1.0, 6.0)	0.72

[1]: n = 19
[2]: Wilcoxon signed rank test
[3]: level of significance is 0.05

Highly significant correlations between observation one and two were seen for all food items (p < 0.001), with correlation coefficients in the range of 0.78-0.98 (median correlation coefficient = 0.93) (table 13). The correlation coefficient was found to be highest for shelf space of savoury snacks (correlation coefficient 0.98, p < 0.001), and lowest for number of flavoured milk (correlation coefficient 0.78, p < 0.001).

Table 13: Spearman's correlation coefficient for correlation between the findings in the first and second observation session by the same field worker when investigating test-retest reliability (n = 20 food sales outlets).

Food item	Correlation coeffisient	P-value [2]
Biscuits (shelf space)	0.97	< 0.001
Sweets/chocolate (shelf space)	0.81	< 0.001
Buns (number) [1]	0.93	< 0.001
Rolls (number)	0.96	< 0.001
Whole grain rolls (number)	0.91	< 0.001
Fresh fruit (number)	0.83	< 0.001
Vegetables (number)	0.96	< 0.001
Savoury snacks (shelf space)	0.98	< 0.001
Soft drinks with sugar (shelf space)	0.97	< 0.001
Soft drinks without sugar (shelf space)	0.93	< 0.001
Still and sparkling water (shelf space)	0.94	< 0.001
Fruit juice and squash (number)	0.83	< 0.001
Flavoured milk (number)	0.78	< 0.001

[1]: n = 19
[2]: level of significance is 0.05

6. Discussion

The main objective of this master thesis was to evaluate instruments for investigating factors in schools and school neighbourhoods that may affect the diet and body weight of Norwegian adolescents in 6th grade. No significant associations were found between political school food environment and the adolescent diet and overweight indicators. Significant associations were found between sosiocultural school food environment and adolescents' consumption of soft drinks and squash without sugar, and fruit nectar. For the physical school neighbourhood food environment, the findings were to the contrary of what was expected. A school neighbourhood environment with no food sales outlets present was found to be associated with higher consumption of sweets and savoury snacks. The instrument developed for assessing adolescents' food environment was an observational form to be used for investigating the availability of food items and beverages in food sales outlets in school neighbourhoods. The observational form included a check list with twelve different food items and beverages, and was designed to be used in combination with observation for assessing food and beverage availability by counting number or measuring shelf space food items and beverages. Both test-retest and inter-rater reliability of the observational form developed were found to be high.

6.1 Strengths and weaknesses of the methods

6.1.1 Predictive validity

Baseline data collection in the HEIA project

Data collected on school food environment and adolescents' dietary behaviour and body measurements in the baseline data collection of the HEIA project were used when investigating predictive validity. Questionnaires were used for obtaining information from the adolescents on dietary behaviour, and for obtaining information

on school food environment from the school principals. Food frequency questionnaire (FFQ) is one of the most frequently used methods for investigating diet, and the method has been shown to provide sufficient accuracy when investigating the association between for example adolescents' diet and health outcomes (54;55). Questionnaires have also widely been used for investigating food environments (32). Carter et al. developed a questionnaire designed for investigating school food environment in primary schools in New Zealand (37). The questionnaire was on physical, economical, sosiocultural and political environment in schools (37). The conclusion from this study was that data collected by questionnaire give a good picture of school food environment (37). However, it has been suggested that objective instruments are more appropriate than subjective instruments as for example questionnaires when investigating food environments (20;32;43;50).

Data aggregation

The limited associations between the school food environment score and the adolescent diet and overweight indicators may have been caused by the low number of subjects included in the analyses of predictive validity a (n = 35). Data on adolescents' diet and body measures were collected from a total of 1527 adolescents. However, the variables describing adolescent diet and BMI were aggregated to mean variables for all the adolescents in each school. As a consequence, the number of subjects was only 35 when investigating predictive validity. Simple correlation analyses were carried out for investigating predictive validity. Ideally, multi level analyses should have been conducted to investigate predictive validity. Nevertheless, multi level analyses were not carried out because it was considered beyond the expected level of a master thesis. The high degree of data aggregation may have limited the possibilities of finding associations between the school food environment score and the adolescent diet and overweight indicators.

School characteristics

The lack of significant associations between school food environment score and the adolescent diet and overweight indicators may have been caused by the high resemblance and homogeneity of Norwegian schools. If the schools included were too equal, it may have been difficult to discover variation between the schools and consequently hard to discover associations between school food environment score and adolescent diet and overweight indicators.

Adolescent diet indicators

Consumption of food items and beverages at school and out of school was not distinguished in the analyses of predictive validity. School food environment may affect the consumption of food items and beverages at school, but out of school other factors are believed to affect dietary behaviour. Consequently, school food environment may affect the consumption of foods and beverages on weekdays, but not in weekends. There might be significant differences between the consumption of some food items and beverages on weekdays and in weekends, and between consumption of food items and beverages at school and at home. An association between school food environment and adolescents' dietary behaviour might have been seen if the food items and beverages consumed at school and out of school had been separated in the questionnaire and the statistical analyses.

School food environment indicators

The low predictive validity may also have been caused by the fact that there might be other factors of the school food environment that have impact on adolescents' dietary behaviour than the chosen school food environment indicators. When investigating if school food environment is able to predict the diet of adolescents, different factors of the school food environment should be taken into account (1). We still do not know if any single school food environment variable can represent the whole school food environment when investigating predictive validity, or if several variables must be taken into account (1).

The political school food environment score was exclusively based on to what extent

the schools were following the recommendations of "Retningslinjer for skolemåltidet i grunnskole og videregående skole". Other indicators could have been included, such as if the schools were having their own guidelines or policies on food and nutrition. It could also have been taken into consideration whether the schools were actually following the given guidelines or not.

When investigating the predictive validity of the physical school neighbourhood food environment on adolescents' diet and overweight, only the presence or absence of food sales outlets in the school neighbourhood was included. The physical school neighbourhood food environment score could have been more detailed, distinguishing between different types of food sales outlets, such as fast food restaurants, convenience stores and supermarkets.

When investigating the predictive validity of the sosiocultural school food environment on the adolescents' diet and overweight, only the attitudes of school principals were taken into account. Indicators on attitudes of teachers and social norms of the pupils could also have been included. The adolescents have more contact with teachers and fellow students compared to the school principal, and the attitudes of the school principals may not necessarily affect the attitudes of the schools' teachers and students.

School food environment scores have been developed by others and have been found to be useful in describing school food environment (56). Masse et al. developed a school nutrition-environment state policy classification system (SNESPCS) for being systematically able to assess school food environment policies and the way school food environment policies are affected by state policies (56). Different political aspects of the school food environment were included in the score, and the score was found to be suitable for investigating the effect of state policies on school food environment and adolescents' diet (56).

6.1.2 The testing the observational instrument devloped

Schools and school neighbourhoods

The schools and school neighbourhoods used as the setting for the testing of the observational form were not randomized or blindly selected. The schools and their neighbourhoods were picked by persons in the HEIA project research team based on the schools' location; the schools were supposed to be located near Oslo. However, the schools selected were a mix of intervention and control schools, they were located in areas with low and high socio-economic status, and they were located in different directions from Oslo. Therefore the non-randomized, non-blinded selection of the schools is not believed to have had any impact on the results when testing the reliability of the observational instrument. Only ten schools and their neighbourhoods were investigated as a result of time limitations. School neighbourhood was defined as the area within a radius of 500 metres around a school. The same demarcation has been used by others, as this can reflect adolescents' walking distance (57;58).

The creation of the maps of the school neighbourhoods

The food sales outlets in the selected school neighbourhoods were identified using Internet map services, having a short telephone interview with a person in the school administration, and also carrying out group interviews with adolescents in some of the schools. All actual food sales outlets were identified using these methods. Internet map services have been used by others for identifying food sales outlets within a neighbourhood (50;59;60). However, Internet map services have mostly been used in combination with for example national registers of food sales outlets, and for verifying the actual existence of the food sales outlets identified from national registers (50;59;60). We did not get admission to national or other registers of food sales outlets, and consequently Internet map services were used as the starting point when creating the maps of the school neighbourhoods. Moreover we ensured the existence of the food sales outlets identified by Internet map services in some of the schools by talking to students and a person acquainted with the locality working at

school. This verification was not conducted for all the schools, but we experienced that the data obtained by Internet map services largely agreed with the information obtained by the students and the person being acquainted with the locality. This method was found to be an effective way of making the maps, as we experienced that no food sales outlets were lacking on the maps. However, nine of the food sales outlets identified when making the maps did not actually exist. To avoid searching for non-existing food sales outlets, we could have phoned the food sales outlets prior to visiting them, for ensuring their existence.

Number of food sales outlets investigated

The number of food sales outlets investigated for assessing the reliability of the observational instrument was low; a total of 20 food sales outlets were investigated for assessing test-retest reliability, and a total of nine food sales outlets were visited when assessing inter-rater reliability. In this study, the number of subjects was low as a result of limited time. Usually the number of subjects is much higher when reliability is assessed. A total of 85 food sales outlets were visited when Glanz et al. investigated test-retest and inter-rater reliability of the observational instrument (NEMS-S) developed by them (50). Cheadle et al. visited a total of 37 and 61 food sales outlets when investigating inter-rater and test-retest reliability, respectively, of a protocol for assessing availability of food items in grocery stores (61). Cohen et al. visited a total of 51 food sales outlets when investigating inter-rater reliability of an observational tool for measuring availability of selected foods in food sales outlets (62).

In our study, all types of food sales outlets were included in the testing of the observational form developed, also special stores and restaurants. All types of food sales outlets were included for getting the total overview of food item and beverage availability in each school neighbourhood. Restaurants and specialized stores could have been excluded as a result of their limited product range for the investigated food items and beverages. Glanz et al. excluded special stores and restaurants when their observational instrument was tested (50). They developed a separate observational

instrument, Nutrition Environment Measures Study in Restaurants (NEMS-R), to be used for investigating restaurants (63). However, in our study only two fast food restaurants and one special store (bakery) were identified in the selected school neighbourhoods and included in the testing of the reliability of the observational form. We did not develop a separate instrument for investigating restaurants because restaurants are not believed to be used to a great extent by adolescents. As a result of the low number (n = 3), the inclusion of restaurants and specialized stores in our study is not believed to have affected the results when investigating reliability.

6.2 Interpretation of the results

6.2.1 Predictive validity

Political school food environment

No significant correlations were observed between the political school food environment score and the adolescent diet and overweight indicators in our study. This may have been caused by the fact that the political school food environment to a small degree has an impact on adolescents diet, and that other environments have more impact, such as home environments or leisure time activities. A significant amount of research on associations between political school food environment and adolescents' diet has been carried out in the USA. However, this research has mostly been focused on policies in connection with food provided in vending machines at school and the sale of competitive foods (29;32;64;65). In Norway, no vending machines and very few canteens are present in primary schools (33). A Norwegian study conducted by Bere et al. found that adolescents attending schools with rules concerning soft drink consumption tended to have lower self-reported consumption of soft drinks at school (66). To the contrary, Fernandes et al. found that reduced access to soft drinks at school had limited impact on the adolescents' overall consumption of soft drinks (67).

Kubik et al. investigated the association between school food policies in connection

with access to healthy foods at school and BMI of adolescents (27;65). They found that BMI was significantly higher among adolescents attending schools not having school food policies (27;65).

Sosiocultural school food environment

We found significant correlations between sosiocultural school food environment and intake of soft drinks and squash without sugar and fruit nectar. With increasing score for sosiocultural school food environment, the intake of beverages without sugar and fruit nectar increased. The higher intake of beverages without sugar may be caused by the fact that soft drinks with sugar are not permitted or accepted at school. When it comes to fruit nectar, it has to be taken into account that this beverage is quite similar to other non-carbonated fruit drinks as fruit juice and squash, and the fact that adolescents may have problems with distinguishing non-carbonated fruit drinks. The reason we did not find other significant associations may be that attitudes and social norms are difficult to measure, and it is hard to assess if they are affecting behaviour or not. Little research has been carried out in order to investigate the association between adolescents' dietary behaviour and sosiocultural school food environment (20). Bere et al. found in a Norwegian study that modelling and attitudes of parents, friends and siblings are predictors of adolescents' soft drink consumption (66). To the contrary, Van der Horst et al. did not find strong evidence for associations between sosiocultural school environment and adolescents' self-reported consumption of soft drinks and snacks (58).

Physical school food environment

Consumption of sweets 1-2 times a week or more often was significantly more frequent among adolescents' attending schools with no food sales outlets in the school neighbourhood. Consumption of savoury snacks 1-2 times a week or more often was also found to be significantly more frequent among adolescents' attending schools with no food sales outlets in its neighbourhood. These findings were to the contrary to what we expected. Van der Horst et al. found the same when investigating

the associations between presence of food sales outlets in school neighbourhoods and adolescents' dietary behaviour (58). They found that adolescents in schools with high access to food sales had a lower self-reported consumption of soft drinks compared to adolescents in schools with lower access to food sales outlets (58).

6.2.2 The observational form developed

The design of the observational form

NEMS-S, which was used as the starting point of the observational form, was developed and tested in the USA and it is adapted to American conditions (50). In our study, NEMS-S was adjusted to fit for investigating Norwegian conditions and the food environment of adolescents. The observational form developed in this study was an observational form with a check list of twelve food items. Check lists have been found to be widely used for investigating food environments (32).

The observational form developed was designed to be used for direct and objective investigation of food sales outlets in school neighbourhoods. Objective measurements have been found to be the best way of assessing food environments, because subjective assessment may lead to varying interpretation of the food environment (20;43;50).

Measurement of shelf space and counting of number of food items and beverages have been used by others for assessing availability of food items and beverages in food sales outlets (45;62). Cheadle et al. were one of the first to investigate the availability of healthy food items within a neighbourhood, by developing a grocery store measurement protocol with food items as fresh produce, milk, meat and bread (45). Shelf space occupied by the different food items was measured for assessing the availability of the food items within a defined area (45). Cohen et al. developed and tested an observational instrument for investigating availability of food items having an impact on health in stores by assessing amongst others shelf space of food items (62).

The use of the observational form

The observational instrument could have been clearer on some points. Both field workers failed on one occasion to count number of buns/muffins, and instead measured shelf space. The products belonging within some of the food items or beverage categories could have been defined more clearly. This was true for buns/muffins, flavoured milk, and squash/fruit juice. How to count number of fruits and vegetables could also have been defined more clearly. There was no guidance on how to count for instance apples or peppers with different colours or different types of salad and onion.

Field worker training

A user's manual was not developed for the use of the observational instrument, and the field workers were not trained prior to the observation sessions. Development of a user's manual and field worker training could have resulted in more equal qualifications of the field workers in the observation sessions and therefore more similar observations. Horowitz et al. implemented six hours of training of field workers prior to investigating food availability in food sales outlets using a check list (68). Glanz et al. conducted two days of training of the field workers and a test observation with feedback when NEMS-S was tested (50), while Cohen et al. conducted three days of training of the field workers (62).

6.2.3 Testing of the observational form developed

Time expenditure when using the observational instrument

The significant difference found in time used by the two different observers when investigating inter-rater reliability may be caused by a lack of training of the two field workers. One of the field workers had completed a couple of days of observation in food sales outlets before inter-rater reliability data collection started. Consequently this field worker was more experienced and more familiar with the observational form and the products to look for.

The significant difference in time expenditure found between observation session one and two when investigating test-retest reliability may also be caused by lack of training of the field worker prior to the observation sessions. Probably, the field worker became more familiar with the observational form after having used it for observing some food sales outlets, and became more familiar with the products belonging to each of the food item and beverage categories. Consequently, the observation session became more efficient and less time consuming when the field worker became more experienced.

Inter-rater reliability

Inter-rater reliability was found to be high when using the observational instrument for assessing availability of food items and drinks in food sales outlets. However, for some food items and beverages there was not agreement between the observations of the two field workers. Lack of training and unclear definitions of the products within each category may with probability have caused the significant differences between the measurements carried out by the two different observers. The significant difference found between the two observers for number of buns/muffins may be caused by lack of definition of the food items and products belonging within this category. The significant difference between the two observers with respect to measured shelf space of soft drinks without sugar may be caused by inaccurate measurement. Significant differences between shelf space of other beverages, as soft drinks with sugar and water, were not found. The borderline significant difference between the observers when measuring flavoured milk may be caused by lack of pre-defining the products belonging within this group of food items. Others have developed observational instruments for investigating in store availability of food items and beverages, and have found inter-rater reliability to be high (50;62;68). However, in all these studies, thorough training of the field workers has been conducted prior to the use of the observational instrument.

Test-retest reliability

Test-retest reliability was found to be high when using the observational instrument for assessing availability of food items and drinks in food sales outlets. The significant difference between the measurements of observation session one and two for number of buns may be caused by varying product range in the food sales outlet according to the time of the day when the observation took place, or lack of or late delivery of the products on one of the days. Delivery of foods may be determined to specific week days. The weekday for the accomplishment of the observation was not the same for observation session one and two. As mentioned earlier, test-retest reliability was found to be high for the observational instrument developed and tested by Glanz et al., and they did neither visit the food sales outlets on the same day and at the same time in the first and second observation session (50).The significant difference between observation session one and two for measurement of number of fruit juice and squash in this study may have been caused by the lack of pre-defining the products within this category. The field worker may have discovered more products belonging to the food item category after having visited several food sales outlets and learned to recognise the range of products.

6.2.4 Revising the observational instrument developed

There were several aspects of the observational form developed here that could have been different. Based on the experiences from the testing of the observational instrument and the results from the statistical analyses of reliability, the observational instrument was revised (appendix 10). We experienced that a user's manual would have been useful to make the observations by the two different field workers more equal. Based on these experiences, a detailed user's manual was developed (appendix 10).

7.   Implications for further research

For investigating predictive validity of school food environment on adolescents' diet, more research is needed on identifying environmental factors that may affect dietary behaviour and body weight of adolescents. The instruments used for investigating school food environment should be valid and reliable and able to identify the factors of the school and school neighbourhood food environment assumed to have the greatest impact on adolescents' diet and body weight. The instruments should be adaptable to be used for measuring adolescents' food environment in several countries. Instruments developed for investigating food environments by assessing availability of different food items and beverages should be tested for reliability, and focus should be on training of the field workers before observations are carried out. Which food sales outlets in school neighbourhoods that are actually being used by adolescents is an interesting topic that could be subject for further investigation. The significance of food item and beverage prices is also a topic of great interest in relation to investigating adolescents' use of food sales outlets. Knowledge about adolescents' use of food sales outlets can lead to development of instruments that with greater probability are able to measure the true aspects of the adolescents' food environment.

8. Conclusions

The predictive validity of school food environment on the diet and overweight occurrence of adolescents' in 6th grade was found to be moderate to low. A healthier sosiocultural school food environment was found to be associated with higher consumption of soft drinks and squash without sugar, and fruit nectar among adolescents in 6th grade. On the contrary of what we expected, a more healthy physical school neighbourhood food environment was found to be associated with higher consumption of sweets and savoury snacks.

An observational form was developed based on experiences from the HEIA project data collection and a review of the literature on direct observation. The observational form was designed to be used for investigating the food and beverage availability in food sales outlets of in school neighbourhoods by measuring shelf space and counting number of twelve food items and beverages.

The observational form developed was tested in food sales outlets in school neighbourhoods, and inter-rater and test-retest reliability were found to be high. This observational form can be used in future research for investigating adolescents' availability of food items and beverages in food sales outlets in school neighbourhoods. Topics suggested for further investigation are the significance of price for adolescents' consumption of food items and beverages and use of food sales outlets, and adolescents' actual use of school neighbourhood food sales outlets.

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Appendixes

Appendix 1: Relevant questions from the school principal questionnaire (page 79).

Appendix 2: The official guidelines for school food environment published by the Norwegian Directorate for Health and Social Affairs; "Retningslinjer for skolemåltidet i grunnskole og videregående skole" (page 89).

Appendix 3: Relevant questions from the adolescent questionnaire (page 91).

Appendix 4: Example of the maps developed. One of the school neighbourhood maps and the food sales outlets present within a radius of 500 metres (page 102).

Appendix 5: The interview guide used in the telephone interviews with a person working at school being acquainted with the localities (page 105).

Appendix 6: The information letter sent to the schools by fax or e-mail in connection with carrying out group conversations with the adolescents and telephone interviews (page 108).

Appendix 7: The information letter handed out to the general manager when visiting the food sales outlets (page 110).

Appendix 8: Table showing the results from the literature review; articles found on direct observation of physical neighbourhood food environments (page 112).

Appendix 9: The observational instrument developed (page 118).

Appendix 10: Revised version of the observational instrument developed and the user's manual (page 125).

Appendix 1

Relevant questions from the school principal questionnaire.

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Norges idrettshøgskole og
Universitetet i Oslo, Avdeling for ernæringsvitenskap

HEIA - mat og aktivitet for god helse

Til rektor/inspektør,

Dette spørreskjemaet inngår i et forskningsprosjekt som har som mål å fremme gode kostvaner og fysisk aktivitet. Hovedhensikten med prosjektet er å oppnå en sunn vektutvikling blant barn. Dette spørreskjemaet inneholder spørsmål knyttet til forhold ved skolen som har med mat, fysisk aktivitet og helse å gjøre.

All informasjon du gir vil bli behandlet konfidensielt, og informasjonen vil bli rapportert og offentliggjort på en slik måte at ingen individuelle skoler eller ansatte ved skolen kan gjenkjennes.

Dette er den første av to spørreundersøkelser, og vi bruker en id-kode kun for å kunne koble dataene fra de to undersøkelsene sammen.

Vi setter stor pris på at du tar deg tid til å besvare denne undersøkelsen. Vennligst sett tydelige kryss med svart eller blå kulepenn.

Om du har spørsmål, vennligst ta kontakt på telefon 948 91 416, eller e-post: HEIA-prosjektet@medisin.uio.no

Takk for hjelpen!

Nanna Lien   Sigmund A. Anderssen
prosjektkoordinator   Norges idrettshøgskole
Avdeling for ernæringsvitenskap
Universitetet i Oslo

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NOEN SPØRSMÅL OM DEG SELV OG SKOLEN

1. Navn på skolen:

_____

2. Hvilken stilling har du?

☐ Rektor
☐ Inspektør
☐ Annen adm. stilling; vennligst spesifiser: _____

3. Er du?

☐ Mann
☐ Kvinne

4. I hvor mange år har du hatt denne stillingen?

☐ Mindre enn 1 år
☐ 1-5 år
☐ 6-10 år
☐ Mer enn 10 år

5. Er din skole?

☐ Ren barneskole (1.-7. trinn)
☐ Kombinert barne- og ungdomsskole (1.-10. trinn)

6. Hvor mange elever går det på skolen din?

Antall elever

7. I hvilket år ble skolen bygget?

Byggeår

8. Dersom skolen senere er rehabilitert (minst 25% av bygningsmassen),
   når skjedde dette?

1. gang:

2. gang:

3. gang:

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NOEN SPØRSMÅL OM SKOLEMILJØUTVALG

9. Har skolen et skolemiljøutvalg?

☐ Ja, og det er godt i gang med arbeidet
☐ Ja, men det har nylig kommet i gang
☐ Nei, men det skal opprettes i nær fremtid ⇒ *Gå direkte til spørsmål 13*
☐ Nei ⇒ *Gå direkte til spørsmål 13*

10. Har skolemiljøutvalget regelmessige møter?

☐ Ja, oftere enn en gang i måneden
☐ Ja, ca. en gang i måneden
☐ Ja, 5-6 ganger i løpet av skoleåret
☐ Ja, 3-4 ganger i løpet av skoleåret
☐ Ja, 1-2 ganger i løpet av skoleåret
☐ Ja, sjeldnere enn 1-2 ganger i løpet av skoleåret
☐ Nei

11. Hvem og hvor mange er representert i skolemiljøutvalget?

Antall:

☐☐ Representant(er) fra skolens ledelse

☐☐ Representant(er) fra pedagogisk personale

☐☐ Representant(er) fra andre ansatte ved skolen (ikke pedagogisk personale)

☐☐ Elevrepresentant(er)

☐☐ Representant(er) fra foreldreutvalget

☐☐ Annen/andre foreldrerepresentant(er)

☐☐ Representant(er) fra skolehelsetjenesten

☐☐ Representant(er) fra skolekantinepersonell

☐☐ Representant(er) fra kommunen

☐☐ Representant(er) fra andre samfunnsinstitusjoner eller organisasjoner

12. Er følgende temaer på agendaen i skolemiljøutvalget?

	Ja	Nei
Fremming av fysisk aktivitet	☐	☐
Fremming av sunn mat og drikke	☐	☐

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NOEN SPØRSMÅL KNYTTET TIL MAT OG DRIKKE PÅ SKOLEN

20. Hvor mye tid er daglig satt av til matpause for elevene på 6. årstrinn?

☐ Mindre enn 10 minutter
☐ 10-14 minutter
☐ 15-19 minutter
☐ 20 minutter eller mer
☐ Varierer

21. Har elevene på 6. årstrinn tilsyn av voksne mens de spiser og drikker?

☐ Ja, fullt tilsyn
☐ Ja, delvis tilsyn
☐ Nei, ikke tilsyn

22. Er følgende abonnementsordninger tilgjengelig for elevene på 6. årstrinn på din skole?

	Nei	Ja, mot foreldrebetaling/ egenandel	Ja, gratis
Frukt/grønnsaker	☐	☐	☐
Melk	☐	☐	☐
Annet; vennligst spesifiser:	☐	☐	☐

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23. Har skolen en kantine/matbod hvor 6. klassinger kan få kjøpt mat og drikke (UTENOM abonnementsordninger)?

☐ Ja
☐ Nei ⇨ *Gå direkte til spørsmål 26*

24. Hvor ofte kan 6. klassinger kjøpe mat og drikke i kantine/matbod?

☐ 1 dag i uken
☐ 2 dager i uken
☐ 3 dager i uken
☐ 4 dager i uken
☐ Hver dag

25. Hva kan elevene kjøpe av mat og drikke i skolens kantine/matbod (UTENOM abonnementsordninger)?

☐ Melk
☐ Sjokolade- og jordbærmelk
☐ Brus med sukker
☐ Brus uten sukker
☐ Saft med sukker
☐ Saft uten sukker
☐ Iste
☐ Vann
☐ Fruktjuice
☐ Nektar
☐ Brødmat
☐ Frukt
☐ Grønnsaker/salat
☐ Boller/kaker/vafler
☐ Yoghurt
☐ Potetgull/godteri/sjokolade
☐ Dessertprodukter (risdesserter, gelé/puddinger etc.)
☐ Toast/pizza
☐ Annen varm mat; vennligst spesifiser: _____

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26. Hvordan har elevene på 6. årstrinn tilgang på rent drikkevann?
(Her kan du sette flere kryss)

☐ Fra drikkefontener inne

☐ Fra drikkefontener ute

☐ Fra vannuttak/springer

☐ Fra vanntanker/-dispensere

☐ Fra vannmugger i kantine/spiserom

☐ Skolen deler ut vannflasker/krus som kan gjenbrukes

☐ Annet; vennligst spesifiser:

_____

27. Hvordan vil du vurdere elevenes <u>tilgang</u> på rent drikkevann, totalt sett?

☐ Svært god

☐ God

☐ Verken god eller dårlig

☐ Dårlig

☐ Svært dårlig

28. Hvordan vil du vurdere <u>kvaliteten</u> på elevenes drikkevann, totalt sett?

☐ Svært god

☐ God

☐ Verken god eller dårlig

☐ Dårlig

☐ Svært dårlig

29. Finnes det butikker/kiosker/ bensinstasjoner i gangavstand fra skolen?

☐ Ja, flere

☐ Ja, en

☐ Nei

30. Har elevene lov til å forlate skolens område i friminuttene?

☐ Ja, alle elevene

☐ Ja, noen av elevene, inkludert 6. årstrinn

☐ Ja, noen av elevene, men ikke 6. årstrinn

☐ Nei

31. Vet du om det finnes nasjonale retningslinjer for mat/ernæring i skolen?

☒ Vet ikke

☐ Nei, det er ingen nasjonale retningslinjer

☒ Ja, men jeg kjenner ikke til dem

☐ Ja, og jeg kjenner til dem

32. Har dere diskutert regler for mat/ernæring ved din skole i løpet av de siste par årene?
(Her kan du sette flere kryss)

☐ Ja, på personalmøter

☐ Ja, på foreldremøter

☐ Ja, med elevene

☐ Ja, i foreldreutvalget på skolen

☐ Ja, i skolemiljøutvalget på skolen

☐ Nei

33. Hvor ofte kan elevene ha med følgende mat-/drikkevarer på skolen?

	Aldri	1-2 ganger i året	3-10 ganger i året	Ukentlig
Kaker	☐	☐	☐	☐
Kjeks	☐	☐	☐	☐
Godteri/sjokolade	☐	☐	☐	☐
Saft	☐	☐	☐	☐
Brus	☐	☐	☐	☐

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34. Hvor ofte bruker lærere ved din skole sjokolade/godteri/kaker/kjeks som premiering eller til kos?

☐ Aldri/sjelden
☐ Månedlig
☐ Ukentlig
☐ Vet ikke

35. Hvor ofte bruker lærere ved din skole brus som premiering eller til kos?

☐ Aldri/sjelden
☐ Månedlig
☐ Ukentlig
☐ Vet ikke

36. Hvor ofte bruker lærere ved din skole frukt eller andre sunne matvarer som premiering eller til kos?

☒ Aldri/sjelden
☐ Månedlig
☒ Ukentlig
☐ Vet ikke

37. Har din skole retningslinjer for mat/ernæring?

☐ Ja, vi har skriftlige retningslinjer
☐ Ja, vi har muntlige retningslinjer
☐ Nei
☐ Nei, men det er enighet blant skolens ansatte om at sunn mat skal fremmes

Dersom skolen ikke har retningslinjer:

⇒ Gå direkte til spørsmål 41

38. Dersom skolen har retningslinjer, hva inneholder disse?
(Her kan du sette flere kryss)

☐ Regler/retningslinjer knyttet til USUNN mat/drikke på skolen

☐ Regler/retningslinjer knyttet til SUNN mat/drikke på skolen

☐ Annet; vennligst spesifiser:

39. Dersom skolen har retningslinjer, hvor lenge har dere hatt dem?

☐ Mindre enn 1 år
☐ 1-2 år
☐ 3-4 år
☐ 5 år eller mer

40. Dersom skolen har retningslinjer, i hvilken grad tror du de blir fulgt opp i praksis?

Ikke i det hele tatt				I stor grad
1	2	3	4	5
☐	☐	☐	☐	☐

Dersom skriftlige retningslinjer foreligger på skolen, setter vi stor pris på om disse kan legges ved når dette spørreskjemaet returneres.

41. I hvilken grad mener du at skolen har et ansvar for barn og unges kosthold?

Ikke i det hele tatt				I stor grad
1	2	3	4	5
☐	☐	☐	☐	☐

42. I hvilken grad opplever dere i skolens ledelse hindringer i forhold til å skulle forbedre mat-/spisesituasjonen på skolen?

Ikke i det hele tatt				I stor grad
1	2	3	4	5
☐	☐	☐	☐	☐

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43. I hvilken grad mener du de følgende faktorene virker som hindringer for å bedre forhold knyttet til mat/ernæring på din skole?

Sett ett kryss på hver linje	Ikke i det hele tatt 1	2	3	4	I stor grad 5
Økonomi	☐	☐	☐	☐	☐
Tid	☐	☐	☐	☐	☐
Mangel på aksept/engasjement blant personalet	☐	☐	☐	☐	☐
Mangel på aksept/engasjement blant foresatte/FAU	☐	☐	☐	☐	☐
Mangel på aksept/engasjement blant elevene	☐	☐	☐	☐	☐

Hvor enig eller uenig er du i de følgende påstandene?

44. Jeg kan i stor grad påvirke avgjørelser/ retningslinjer knyttet til mat/ernæring på vår skole.
- ☐ Helt uenig
- ☐ Litt uenig
- ☐ Verken enig eller uenig
- ☐ Litt enig
- ☐ Helt enig

45. På skolen vår er mat og ernæring et prioritert område utover det obligatoriske.
- ☐ Helt uenig
- ☐ Litt uenig
- ☐ Verken enig eller uenig
- ☐ Litt enig
- ☐ Helt enig

46. Jeg opplever at mange elever på vår skole er overvektige.
- ☐ Helt uenig
- ☐ Litt uenig
- ☐ Verken enig eller uenig
- ☐ Litt enig
- ☐ Helt enig

47. Skoler som har utarbeidet egne retningslinjer for mat og drikke har et nyttig virkemiddel i arbeidet med å fremme et sunt kosthold blant elevene.
- ☐ Helt uenig
- ☐ Litt uenig
- ☐ Verken enig eller uenig
- ☐ Litt enig
- ☐ Helt enig

48. Dersom vår skole hadde mer ressurser, ville helsefremmende arbeid innen mat/ernæring være et prioritert satsningsområde.
- ☐ Helt uenig
- ☐ Litt uenig
- ☐ Verken enig eller uenig
- ☐ Litt enig
- ☐ Helt enig

Dersom "helt enig", har du noen ideer til hvordan pengene ville bli brukt?

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26122

NOEN SPØRSMÅL OM ELEVENES BAKGRUNN

74. Kan du anslå omtrent hvor stor andel av elevene ved skolen som kommer fra familier med lav inntekt?

☐ Mindre enn 5% av elevene
☐ 5-9% av elevene
☐ 10-19% av elevene
☐ 20-29% av elevene
☐ 30-39% av elevene
☐ 40% eller flere av elevene

75. Kan du anslå omtrent hvor stor andel av elevene ved skolen som har etnisk minoritetsbakgrunn (begge foreldre født i ikke-vestlig land)?

☐ Mindre enn 5% av elevene
☐ 5-9% av elevene
☐ 10-19% av elevene
☐ 20-29% av elevene
☐ 30-39% av elevene
☐ 40% eller flere av elevene

Har du kommentarer til skjemaet, vennligst skriv dem her:

Tusen takk for hjelpen!

Appendix 2

The official guidelines for school food environment published by the Norwegian Directorate for Health and Social Affairs; "Retningslinjer for skolemåltidet i grunnskole og videregående skole".

Retningslinjer for skolemåltidet
i grunnskole og videregående skole

Skolemåltidet

- er et sentralt element i skolehverdagen når det gjelder å skape et godt lærings- og oppvekstmiljø for elevene.
- har betydning for barn og unges kosthold og helse på kort og lang sikt.
- bygger på at elevene har med seg matpakke, og at skolen tilbyr melk, frukt, grønnsaker og mat til dem som ikke har med seg matpakke hjemmefra.
- innebærer at elevene er sikret nok tid til å spise og tilsyn i matpausen.

Skolene bør tilby elevene:

- Minimum 20 minutter matpause
- Fullt tilsyn i matpausen i 1.–4. klasse, helst også på høyere klassetrinn
- Frukt og grønnsaker
- Lettmelk, ekstra lett lettmelk eller skummet melk
- Enkel brødmat
- Tilgang på kaldt drikkevann
- Et trivelig spisemiljø
- Måltider med maksimalt 3–4 timers mellomrom
- Kantine eller matbod på ungdomsskole og videregående skole

Skolene bør ikke tilby elevene:

- Brus og saft
- Potetgull, snacks og godteri
- Kaker, vafler og boller til daglig

Skolekantina bør ha et mattilbud basert på:

- Varierte og grove brødvarer
- Lettmargarin eller myk margarin
- Variert pålegg
- Frukt – hele, i stykker eller som pålegg og tilbehør
- Grønnsaker – skåret opp og lagt i vann, som pålegg, salat eller varmrett
- Skummet melk, ekstra lett lettmelk og lettmelk
- Juice og kaldt drikkevann

Forankring i regelverket:

Lov om grunnskolen og den videregående opplæringen (Opplæringsloven) av 17. juli 1998.
Kapittel 9a. Elevene sitt skolemiljø, med § 9a-1 til § 9a-9, blir føyd til ved lov etter resolusjon av 20. desember 2002 nr. 1735 og trer i kraft 1. april 2003. Innholdet i kapittel 9a presiseres i de materielle kravene i Forskrift om miljørettet helsevern i barnehager og skoler m.v.

Forskrift om miljørettet helsevern i barnehager og skoler m.v.
1.desember 1995 med hjemmel i lov av 19. november 1982 nr. 66 om helsetjenesten i kommunene § 4a-1 annet ledd og §4a-4 annet ledd samt lov av 9. mars 1973 nr. 14 om vern mot tobakkskader § 6 åttende ledd.

Kapittel III Spesielle bestemmelser § 11. Måltid
Det skal finnes egnede muligheter for bespisning som også ivaretar måltidets sosiale funksjoner. Virksomheten skal i nødvendig utstrekning ha tilfredsstillende muligheter for lagring, tilberedning og servering av mat i samsvar med næringsmiddellovgivningen.

Merknader til § 11. Måltid
Sosial- og helsedirektoratets retningslinjer for matservering og måltider i skole og barnehage bør legges til grunn ved matservering slik at den ernæringsmessige verdi av måltidet sikres. Lov av 19. mai 1933 nr. 3 om tilsyn med næringsmidler m.v. med forskrifter, herunder generell forskrift av 8. juli 1983 nr. 1251 for produksjon og frambud m.v. av næringsmidler, forskrift av 15. desember 1994 nr. 1187 om internkontroll for å oppfylle næringsmiddellovgivningen og forskrift av 12. november 1997 nr. 1239 om næringsmiddelhygiene, gjelder for tilberedning og servering av næringsmidler. Måltidets sosiale funksjon bør ivaretas ved at det er fysisk tilrettelagt for spising og avsatt tilstrekkelig tid til at trivsel oppnås.

Sosial- og helsedirektoratet
www.shdir.no

Appendix 3

Relevant questions from the adolescent questionnaire.

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HEIA - mat og aktivitet for god helse

Spørreskjema om kosthold og fysisk aktivitet

Takk for at du hjelper oss med å svare på disse spørsmålene om kosthold og fysisk aktivitet.

Det er frivillig å svare på disse spørsmålene, og alle svarene du gir er hemmelige. Ingen på skolen din, eller andre du kjenner, får vite hva du har svart.

Spørsmål som er markert med stjerne (*) er obligatoriske og må besvares før du kan gå videre.

Husk å sjekke at alle spørsmålene på siden er besvart før du går videre - når du klikker i ringen ved det svaret du ønsker, skal det komme opp en svart prikk.

Lykke til!
Ditt svar vil være anonymt
(QuestBack ivaretar din anonymitet)

Skriv skolens navn *

Skriv ID-nummeret ditt *

[#4713]

Hvilket år er du født? *

- ○ 1994
- ○ 1995
- ○ 1996
- ○ 1997
- ○ Annet år:

I hvilken måned har du fødselsdag? *

- ○ Januar
- ○ Februar
- ○ Mars
- ○ April
- ○ Mai
- ○ Juni

C Juli
C August
C September
C Oktober
C November
C Desember

[x] [#4713]

Er du jente eller gutt? *

C Jente
C Gutt

Er du født i Norge?

C Ja
C Nei

I hvilket land er moren din født?

C Norge
C Annet land |

I hvilket land er faren din født?

C Norge
C Annet land |

[x] [#4713]

Hvilke voksne bor du sammen med nå?

Sett kun ett kryss

C Mor og far
C Bare mor
C Bare far
C Omtrent like mye hos mor og far
C Mor og hennes nye samboer/ektefelle
C Far og hans nye samboer/ektefelle
C Fosterforeldre
C Andre voksne |

[x] [#4713]

Hvor mange dager i uka går eller sykler du TIL skolen?

C Ingen, jeg blir kjørt med bil/motorsykkel
C Ingen, jeg tar buss, trikk, t-bane eller tog
C 1 dag
C 2 dager
C 3 dager
C 4 dager
C 5 dager

[x] [#4713]

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○ Hver dag

Hvor ofte spiser eller drikker du UTENOM DISSE MÅLTIDENE?

○ Aldri
○ Sjeldnere enn 1 gang i uken
○ 1-2 ganger i uken
○ 3-4 ganger i uken
○ 5-6 ganger i uken
○ 1 gang per dag
○ 2 ganger per dag
○ 3 eller flere ganger per dag

[x] [#4713]

Hvor ofte spiser du vanligvis FRISK FRUKT?

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke
○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

**Hvor ofte spiser du vanligvis RÅ GRØNNSAKER
(f.eks. gulrot, tomat, salat)?**

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke
○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

**Hvor ofte spiser du vanligvis VARME GRØNNSAKER (IKKE
poteter)?**

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke
○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

[x] [#4713]

Hvor ofte spiser du vanligvis SJOKOLADE/GODTERI?

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke

○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

Hvor ofte spiser du vanligvis SALT SNACKS (f.eks. potetgull, popkorn og lignende)

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke
○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

[×] [#4713]

Hvor ofte spiser du vanligvis SØTE KJEKS?

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke
○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

Hvor ofte spiser du vanligvis BOLLER, SKOLEBRØD, MUFFINS og lignende?

○ Aldri/sjeldent
○ Mindre enn 1 gang i uken
○ 1-2 ganger pr uke
○ 3-4 ganger pr uke
○ 5-6 ganger pr uke
○ 1 gang pr dag
○ 2 ganger eller mer pr dag

[×] [#4713]

På de neste sidene kommer det noen spørsmål om hva du drikker på HVERDAGER.

Senere spør vi om hva du drikker i HELGEN.

[×] [#4713]

På HVERDAGER (mandag til fredag): Hvor ofte drikker du vanligvis følgende typer drikke?

Sett ett kryss for hver linje

	Aldri/ sjeldent	1 dag	2 dager	3 dager	4 dager	Hver hverdag

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	Aldri/ sjeldent	1 dag	2 dager	3 dager	4 dager	Hver hverdag
Brus, med sukker (f.eks. Cola, Solo)	○	○	○	○	○	○
Brus, uten sukker (f.eks. Cola light, Pepsi Max)	○	○	○	○	○	○
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft)	○	○	○	○	○	○
Saft, uten sukker (kunstig søtet)	○	○	○	○	○	○

[x] [#4713]

På HVERDAGER (mandag til fredag):
Hvor ofte drikker du vanligvis følgende typer drikke?

Sett ett kryss for hver linje

	Aldri/ sjeldent	1 dag	2 dager	3 dager	4 dager	Hver hverdag
Iste (f.eks. Lipton ice tea)	○	○	○	○	○	○
Vann	○	○	○	○	○	○
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake)	○	○	○	○	○	○
Juice (f.eks. ren appelsinjuice, ren eplejuice)	○	○	○	○	○	○
Nektar (juice tilsatt sukker)	○	○	○	○	○	○

[x] [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Brus, med sukker (f.eks. Cola, Solo) - 1 dag
eller
Brus, med sukker (f.eks. Cola, Solo) - 2 dager
eller
Brus, med sukker (f.eks. Cola, Solo) - Hver hverdag
eller
Brus, med sukker (f.eks. Cola, Solo) - 4 dager
eller
Brus, med sukker (f.eks. Cola, Solo) - 3 dager

Når du drikker brus MED sukker på hverdager, hvor MYE pleier
du å drikke?
(1/2 liter = 3 glass)

○ 1 glass
○ 2 glass
○ 3 glass
○ 4 glass eller mer

[x] [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Brus, uten sukker (f.eks. Cola light, Pepsi Max) - 1 dag
eller
Brus, uten sukker (f.eks. Cola light, Pepsi Max) - 2 dager
eller
Brus, uten sukker (f.eks. Cola light, Pepsi Max) - Hver hverdag

eller
Brus, uten sukker (f.eks. Cola light, Pepsi Max) - 4 dager
eller
Brus, uten sukker (f.eks. Cola light, Pepsi Max) - 3 dager

Når du drikker brus UTEN sukker på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

- ○ 1 glass
- ○ 2 glass
- ○ 3 glass
- ○ 4 glass eller mer

☒ [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft) - 1 dag
eller
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft) - 2 dager
eller
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft) - Hver hverdag
eller
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft) - 4 dager
eller
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft) - 3 dager

Når du drikker saft MED sukker på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

- ○ 1 glass
- ○ 2 glass
- ○ 3 glass
- ○ 4 glass eller mer

☒ [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Saft, uten sukker (kunstig søtet) - 1 dag
eller
Saft, uten sukker (kunstig søtet) - 2 dager
eller
Saft, uten sukker (kunstig søtet) - Hver hverdag
eller
Saft, uten sukker (kunstig søtet) - 4 dager
eller
Saft, uten sukker (kunstig søtet) - 3 dager

Når du drikker saft UTEN sukker på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

- ○ 1 glass
- ○ 2 glass
- ○ 3 glass
- ○ 4 glass eller mer

☒ [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Iste (f.eks. Lipton ice tea) - 1 dag
eller
Iste (f.eks. Lipton ice tea) - 2 dager
eller
Iste (f.eks. Lipton ice tea) - Hver hverdag
eller
Iste (f.eks. Lipton ice tea) - 4 dager
eller
Iste (f.eks. Lipton ice tea) - 3 dager

Når du drikker ISTE på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

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○ 1 glass

○ 2 glass

○ 3 glass

○ 4 glass eller mer

[×] [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Vann - 1 dag
eller
Vann - 2 dager
eller
Vann - Hver hverdag
eller
Vann - 4 dager
eller
Vann - 3 dager

Når du drikker VANN på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

○ 1 glass

○ 2 glass

○ 3 glass

○ 4 glass eller mer

[×] [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake) - 1 dag
eller
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake) - 2 dager
eller
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake) - Hver hverdag
eller
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake) - 4 dager
eller
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake) - 3 dager

Når du drikker SJOKOLADE- eller JORDBÆRMELK på hverdager,
hvor MYE pleier du å drikke? (1/2 liter = 3 glass)

○ 1 glass

○ 2 glass

○ 3 glass

○ 4 glass eller mer

[×] [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:
Juice (f.eks. ren appelsinjuice, ren eplejuice) - 1 dag
eller
Juice (f.eks. ren appelsinjuice, ren eplejuice) - 2 dager
eller
Juice (f.eks. ren appelsinjuice, ren eplejuice) - Hver hverdag
eller
Juice (f.eks. ren appelsinjuice, ren eplejuice) - 4 dager
eller
Juice (f.eks. ren appelsinjuice, ren eplejuice) - 3 dager

Når du drikker JUICE på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

○ 1 glass

○ 2 glass

○ 3 glass

○ 4 glass eller mer

[×] [#4713]

Denne informasjonen vises kun i forhåndsvisningen.
Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

Nektar (juice tilsatt sukker) - 1 dag
eller
Nektar (juice tilsatt sukker) - 2 dager
eller
Nektar (juice tilsatt sukker) - Hver hverdag
eller
Nektar (juice tilsatt sukker) - 4 dager
eller
Nektar (juice tilsatt sukker) - 3 dager

Når du drikker NEKTAR på hverdager, hvor MYE pleier du å drikke?
(1/2 liter = 3 glass)

- ○ 1 glass
- ○ 2 glass
- ○ 3 glass
- ○ 4 glass eller mer

× [#4713]

På de neste sidene spør vi om hva du drikker i HELGEN.

× [#4713]

I HELGEN:
Hvor mye drikker du vanligvis av følgende drikker? (1/2 liter = 3 glass)
Legg sammen det du drikker lørdag og søndag, og sett ett kryss for hver type drikke.

Sett ett kryss for hver linje

	Aldri eller sjeldent	1 glass	2 glass	3 glass	4 glass	5 glass	6 glass	7 glass eller mer
Brus, med sukker (f.eks. Cola, Solo)	○	○	○	○	○	○	○	○
Brus, uten sukker (f.eks. Cola light, Pepsi Max)	○	○	○	○	○	○	○	○
Saft, med sukker (f.eks. husholdningssaft, appelsinsaft)	○	○	○	○	○	○	○	○
Saft, uten sukker (kunstig søtet)	○	○	○	○	○	○	○	○

× [#4713]

I HELGEN:
Hvor mye drikker du vanligvis av følgende drikker? (1/2 liter = 3 glass)
Legg sammen det du drikker lørdag og søndag, og sett ett kryss for hver type drikke.

Sett ett kryss for hver linje

Aldri

7 glass

100

	eller sjeldent	1 glass	2 glass	3 glass	4 glass	5 glass	6 glass	eller mer
Iste (f.eks. Lipton ice tea)	○	○	○	○	○	○	○	○
Vann	○	○	○	○	○	○	○	○
Sjokolade- og jordbærmelk (f.eks. Litago, milkshake)	○	○	○	○	○	○	○	○
Juice (f.eks. ren appelsinjuice, ren eplejuice)	○	○	○	○	○	○	○	○
Nektar (juice tilsatt sukker)	○	○	○	○	○	○	○	○

[x] [#4713]

Nå kommer det noen spørsmål om vekten din.

[x] [#4713]

Hva synes du om vekten din?

○ Vekten er OK
○ Veier litt for mye
○ Veier alt for mye
○ Veier litt for lite
○ Veier alt for lite

Hvor ofte veier du deg?

○ Nesten hver dag
○ Omtrent en gang i uken
○ Omtrent en gang i måneden
○ Et par ganger i året
○ Nesten aldri

[x] [#4713]

Hvor viktig er vekten for hva du synes om deg selv?

○ Svært viktig
○ Ganske viktig
○ Litt viktig
○ Ikke viktig

I løpet av det siste året, har du prøvd å:

○ Gå ned i vekt
○ Holde vekten
○ Gå opp i vekt
○ Jeg har ikke prøvd å gjøre noe med vekten min

[x] [#4713]

KOSTHOLD

Når du tenker på ditt eget kosthold, vil du si at det er bedre eller dårligere enn kostholdet til andre på din alder?

○ Mye bedre
○ Bedre
○ Verken bedre eller dårligere
○ Dårligere
○ Mye dårligere

Hva tror du foreldrene dine synes om kostholdet ditt?

○ Veldig bra
○ Bra
○ Verken bra eller dårlig
○ Dårlig
○ Veldig dårlig

[x] [#4713]

FRUKT OG GRØNNSAKER

Hvor mange porsjoner frukt og grønnsaker tror du at du SPISER hver dag?

○ Ingen
○ 1
○ 2
○ 3
○ 4
○ 5
○ Mer enn 5

Hvor mange porsjoner frukt og grønnsaker ANBEFALES DET at en på din alder spiser hver dag?

○ Ingen
○ 1
○ 2
○ 3
○ 4
○ 5
○ Mer enn 5

[x] [#4713]

FYSISK AKTIVITET

Hvor lenge tror du at du ER fysisk aktiv (går, sykler, trener, leker, driver med idrett) i løpet av en vanlig dag?

○ Mindre enn 15 minutter
○ 15-29 minutter
○ 30-59 minutter

Appendix 4

Example of the maps developed. One of the school neighbourhood maps and the food sales outlets present within a radius of 500 metres.

Utsalgssteder for mat rundt x skole
Adresse: x

1) Rema 1000

2) Narvesen

3) Mazari Spill & Snacks

4) Balkan pizza og Kebabhouse

Appendix 5

The interview guide used in the telephone interviews with a person working at school being acquainted with the localities.

Intervjuguide

Ring skolens administrasjon og be om å få snakke med en i administrasjonen eller en lærer som er lokalkjent. Det kan gjerne være personen som sitter i sentralbordet dersom hun/han er lokalkjent. Når du kommer til den rette personen, gjør avtale om intervju:

a) På skolen
b) Per telefon

Introduksjon:

Takk for at du tar deg tid til denne telefonsamtalen/dette intervjuet. Det vil ta 10 – 15 minutter. Jeg heter Kaja Kigen og studerer ernæring ved Universitetet i Oslo. Jeg går på det 5. og siste året av studiet, og jobber for tiden med masteroppgave. Grovt sett handler masteroppgaven min om betydningen av tilgang på mat i skolens nærområde for elevenes kosthold. Vi ønsker å lage et observasjonsinstrument for å kartlegge butikker i skolens nærområde. Ti skoler er valgt ut til å bli brukt i utprøvingen av dette instrumentet. Skolen du jobber på er en av dem. Dette krever ikke noe mer av skolen enn at du deltar på dette telefonintervjuet og svarer på de spørsmålene jeg har. Svarene du gir er tenkt å bidra til å gi meg et bedre bilde av skolens nærområde og hva slags utsalgssteder for mat som finnes og brukes i nærheten av skolen.

Gjør et intervju med utgangspunkt i de følgende spørsmålene:

Problemstilling:	Spørsmål:
Ligger det utsalgssteder for mat eller drikke på skoleveien til noen av elevene?	- Hva slags område ligger skolen i? Boligområde? Sentrumsområde? - Bor skolens elever svært spredt eller i et mindre område? - Er det flere ulike veier fra skolen elevene kan velge mellom når de skal hjem fra skolen? - Ligger det utsalgssteder for mat langs skoleveien til noen av elevene?
Finnes det utsalgssteder som selger en eller annen form for mat eller drikke i skolens nærområde?	Se for deg området rundt skolen. - Finnes det utsalgssteder for mat eller drikke som kan sees fra skolen? - Finnes det utsalgssteder for mat eller drikke innen et par minutters gangavstand rundt skolen? - Finnes det utsalgssteder for mat eller drikke innen 5 – 10 minutters gangavstand fra skolen?

Hva slags utsalgssteder for mat finnes i skolens nærområde?	- Finne det kiosker i skolens nærområde? - Finnes det bensinstasjoner som selger mat/drikke i skolens nærområde? - Finnes det matbutikker i skolen nærområde? - Finnes det spesialbutikker i skolen nærområde, som bakerier eller grønnsaksforretninger? - Finnes det andre typer av utsalgssteder for mat i skolens nærområde?
Kjenner du til om elevene bruker utsalgsstedene for mat eller drikke, og når på dagen de gjør det?	- Er det noen utsalgssteder for mat eller drikke du kjenner til at elevene bruker? Hvorfor? - Er det noen utsalgssteder du kjenner til at elevene IKKE bruker? Hvorfor ikke? - Bruker elevene disse utsalgsstedene på vei til skolen? - Bruker elevene disse utsalgsstedene på vei fra skolen?
Er det noe annet du føler er relevant og som jeg bør vite med tanke på utsalgssteder for mat eller drikke i nærheten av skolen som elevene bruker?	
Andre ting du ønsker å tilføye?	

Tusen takk for hjelpen!

Svarene noteres stikkordsvis på pc eller papir i løpet av intervjuet. Intervjuet bør skrives ut så raskt som mulig etter at intervjuet er over, for å sikre at man får med alt.

Appendix 6

The information letter sent to the schools by fax or e-mail in connection with carrying out group conversations with the adolescents and telephone interviews.

UNIVERSITETET I OSLO
DET MEDISINSKE FAKULTET

Til rektor

Institutt for medisinske basalfag
Avdeling for ernæringsvitenskap
Postboks 1046, Blindern
0316 Oslo

Besøksadresse
Domus Medica
Sognsvannsveien 9

Telefon: 22 85 13 78
Telefaks: 22 85 13 41
e-post: nanna.lien@medisin.uio.no

Nettadresse: www.nutrition.uio.no/

Gaustad 3.desember 2008

Ønske om samtale med lokalkjent til HEIA-prosjektet.

I forbindelse med prosjektet "HEIA-mat og aktivitet for god helse" som skolen deres deltar i, har vi fått en masterstudent, Kaja Kigen, som skal gjøre sin oppgave på prosjektet. Oppgaven går ut på å forbedre observasjonsskjemaet vi brukte ved første datainnsamling for å kartlegge muligheter for å kjøpe mat og drikke i skolens nærområde.

I forbindelse med videreutviklingen av skjemaet ønsker hun å kontakte skolen for å avtale og gjennomføre et kort intervju (10-15 minutter) med noen som er lokalkjent i skolens nærområde. Formålet med intervjuet er å lokalisere utsalgssteder for mat og drikke. Denne personen kan være noen i administrasjonen eller en sosiallærer, det viktigste er at de kjenner nærområdetog har tid til et kort intervju.

Informasjonen vil bli lagt inn på et kart over skolens næreområde. Dette kartet er det ønskelig å vise til noen elever i 6. og 7. trinn ved skolen for å få bekreftet hvilke av disse utsalgsstedene som faktisk brukes av elevene. Dette tenker vi kan gjøres uformelt og helt anonymt i et friminutt. Kaja vil selvsagt melde seg hos dere før hun tar kontakt med elevene i skolegården.

Både intervjuet og informasjonsinnhentingen fra elevene er planlagt gjennomført i uke 50/51 eller i uke 2.

Det er 10 av de 37 skolene i HEIA-prosjektet som vil bli brukt i denne forbedringsprosessen av observasjonsskjemaet. De er valgt ut på bakgrunn av kort avstand til Oslo, men det er også to og to skoler fra hvert sted. Det er derfor svært ønskelig for oss å gjennomføre dette ved deres skole. Skulle dere likevel ha sterke motforestillinger mot dette, ber vi om at dere tar kontakt umiddelbart på prosjekttelefonen: 94 89 14 16.

På forhånd takk for hjelpen!

Med vennlig hilsen

Nanna Lien
Prosjektkoordinator HEIA – mat og aktivitet for god helse

Appendix 7

The information letter handed out to the general manager when visiting the food sales outlets.

UNIVERSITETET I OSLO
DET MEDISINSKE FAKULTET

Til den det måtte angå.

Institutt for medisinske basalfag
Avdeling for ernæringsvitenskap
Postboks 1046, Blindern
0316 Oslo

Besøksadresse
Domus Medica
Sognsvannsveien 9

Telefon: 22 85 13 78
Telefaks: 22 85 13 41
e-post: nanna.lien@medisin.uio.no

Nettadresse: www.nutrition.uio.no/

Gaustad 7, januar 2009

Til informasjon

"HEIA – mat og aktivitet for god helse" er et forskningsprosjekt ved Avdeling for ernæringsvitenskap, Universitetet i Oslo, som har som hovedmål å se på kosthold og fysisk aktivitet hos barn i barneskolealder. Kaja Kigen er masterstudent i ernæring og gjør sin masteroppgave på dette prosjektet. Masteroppgaven går ut på å utvikle og teste ut et observasjonsskjema for kartlegging av tilbud av mat og drikke hos ulike utsalgssteder rundt skolene som deltar i prosjektet. Observasjonene som gjøres nå vil følgelig bare brukes til å se om skjemaet er godt nok eller om det må jobbes mer med.

Dette innebærer i praksis at vi besøker din butikk/kiosk/spisested to ganger med ca. to ukers mellomrom for å observere tilstedeværelse av noen matvaregrupper, samt måle hyllemeter av noen matvarer. Den første gangen vil to observatører komme på litt forskjellig tidspunkt på samme dag. Den andre gangen vil det bare komme en observatør. Observatørene vil kunne legitimere at de kommer fra Universitetet i Oslo.

Besøket vi avlegger i deres butikk/kiosk/spisested vil ikke kreve noe av dere, og vi vil gjøre alt vi kan for å ikke forhindre vanlige kunder sine innkjøp. Vi kommer derfor på dagtid, for å forsøke å unngå de tidene på dagen det er mye mennesker i butikken.

Dersom dere har kommentarer eller spørsmål til undersøkelsen, må dere gjerne ta kontakt med oss på telefon: 94 89 14 16.

Med vennlig hilsen

Nanna Lien, forsker
Prosjektkoordinator HEIA

Kaja Kigen, mastergradsstudent

Appendix 8

Table showing the results from the literature review; articles found on direct observation of physical neighbourhood food environments.

Direct observation				
Sallis et al 1986	San Diego surveyed for heart – healthy foods and availability of specified foods and physical activity resources in urban neighbourhoods	Describe a method for assessing the availability of specified foods and physical activity resources in urban neighbourhoods	Pilot study in 24 neighbourhoods. Neighbourhood = 1 mile radius around selected public elementary schools, or neighbourhood boundaries as defined by residents near the schools. Food availability survey: stores categorized as supermarkets, neighbourhood grocery, convenience store or health food store. Survey form listed specific food items identified to be lower in fat or sodium than the traditional choice, in total 71 "heart – healthy" alternatives. Presence or absence of the items was recorded. Undergraduate student observers were trained. They were instructed to drive to the school and systematically survey the neighbourhood. They went to the stores in the neighbourhood, counting food items on the list. Half the neighbourhoods were surveyed twice by different observers. Reliability: 2 neighbourhoods were assessed by teams of two observers.	All neighbourhoods had access to more than one food store. Suggested changes in methodology: clear geographic boundaries should be defined. More training to the observers. Further development of checklists.
Bodor et al. 2007	Neighbourhood fruit and vegetable availability and consumption: the role of small food stores in an urban environment	Determining the potential relationship between food store access and in-store availability and consumption of fruits and vegetables (predictive model)	1) Food store access: food stores listed in Louisiana Office of Public Health's list of food retailers within the neighbourhood were included. Verified by driving around the neighbourhoods and visually locating the stores. Stores categorized into two groups. Stores and households geocoded and straight – line distances from household to store were calculated. 2) In – store availability: use of measuring tape to determine length of linear shelf space for fresh, canned and frozen vegetables. Counting the number of varieties available for each fruit and vegetable item. Neighbourhood availability: "cumulative accessibility potential" – GIS modelling concept measuring the magnitude of availability, accounting for the travel distance to each source. Neighbourhood availability variables created by summing all the shelf space. Focus on small stores within 100 metres.	Urban small food stores and their in – store availability of foods may play a role in affecting diet, especially vegetable intake. Greater local fruit and vegetable availability may be important especially for poor households. Future research: larger sample and wider area.

Glanz et al. 2007	Nutrition environment measures survey in stores (NEMS – S) – development and evaluation	Development and evaluation of measures of nutrition environments in retail food stores.	Four neighbourhoods (one neighbourhood defined as one census tract). Each neighbourhood had a minimum of 15 retail food outlets to ensure variability. Retail food outlets were identified, enumerated, classified and mapped using different data sources: county retail food license lists matched against addresses from land – use data from the Georgia Regional Transportation Authority, verified and supplemented using printed Yellow pages, online business directories and field work. Stores were classified to two main categories: grocery stores and convenience stores (including food marts within gas stations). Special stores, as bakeries, were excluded. Proposed measures were pretested in two neighbourhoods. Nutrition – related variables were selected based on the food products that contribute the most fat and calories to the diet. 10 indicator food categories: fruit, vegetables, milk, ground beef, hot dogs, frozen dinners, baked goods, beverages (soda, juice), whole grain bread and baked chips. The measures focused on availability of more healthful or recommended choices, quality and price. Training for raters: classroom and field work, 2 days in the two pretest neighbourhoods.	Inter – rater reliability was high, particularly for the display variables. Test – retest reliability results indicated stable health promotion and display measures over periods of 1 week to 2 months.
Cheadle et al. 1990	Evaluating community – based nutrition programs: assessing the reliability of a survey of grocery store product displays	Measure the reproducibility of a survey of grocery store product displays	Four general product areas: fresh produce, meat, milk, bread. Two types of information were recorded within each area: 1) Presence/absence of health – promotion items (health education activities, usually printed material, on or near the displays providing nutritional information or increased awareness of healthy food choices (not product packaging). Examples: shelf labelling, posters, recipes) 2) Physical dimensions of product displays: creating an index of the relative amount of space occupied healthy products (low – fat, high – fibre) in each product area, calculated as the proportion of shelf space devoted to such products relative to the overall size of the display of similar foods. The protocol took 30–45 minutes to complete. Sampling frame: full – service supermarkets listed in the yellow pages telephone directory. Inter – rater reliability: 37 stores. Test – retest: 61 stores in 5 communities. Test – retest and inter – rater reliability was evaluated.	

Author/Year	Title	Aim	Method	Findings/Conclusion
Horowitz et al. 2004	Barriers to buying healthy foods for people with diabetes: evidence of environmental disparities	Compare the availability and cost of diabetes – healthy foods in a minority neighbourhood with a white, affluent neighbourhood.	Food availability survey; foods recommended for people with diabetes. 2 neighbourhoods. Nutrition subcommittee of a diabetes coalition selected the following food items to be included: diet soda; 1% or fat free milk; high – fibre bread, low – carbohydrate bread or both; fresh fruits; fresh green vegetables or tomatoes. Field workers: document the presence of 1 or more of each of the target items, and the lowest price for each category, except prices for F&V. Used a database of stores inspected and licensed to sell food by the New York State Department of Agriculture and Markets to identify stores in both neighbourhoods. Field workers: 6 hours of training. In pairs, the fieldworkers visited the stores in the database. The field workers also verified the number of cash registers from the database. Desirable stores: at least 1 item from the five food/beverage groups. Other: undesirable.	A greater efforts needs to be made to make available stores that carry diabetes – healthy foods.
Kipke et al 2006	Food and park environments: neighbourhood – level risks for childhood obesity in east Los Angeles	Examine how environmental factors may be associated with increased risk of obesity	Databases used for finding all food outlets in the actual geographic area. Focus on the following food outlets: 1) fast food restaurants, 2) bakery, donut, cookie stores, 3) ice cream stores 4) convenience stores; 5) fish and meat stores, 6) grocery stores. Stores and schools were geocoded. Creating 300 and 500 m buffer around each school, and calculating the number of food outlets located within each school area buffer. Systematic observations in the grocery stores using field survey. Two members of the field research team walked through the store and recorded the availability and quality of fresh fruits and vegetables. Data were recorded and coded yielding a score regarding the availability and quality of fruits and vegetables. Also systematic observations in parks.	Children have easy access to fast food, and limited access to both healthy food options and parks. Thos was particularly true in areas around schools.

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Hosler et al. 2008	Assessing retail fruit and vegetable availability in urban and rural underserved communities	Investigate and compare retail F&V availability in urban and rural underserved communities in New York State.	Food store = retail store open at least 5 days a week having at least one of the following food items: milk, bread or fresh produce. Farmers markets were included regardless the number of days open during a week. 3 sources to obtain a list of food stores: 1) department of agriculture and markets' current inspected food store database, 2) department of agriculture and markets' online guide for farm – fresh products and farmers markets, 3) online yellow pages. Contacted all stores to verify whether they fit the food store definition or not and if they where located in the study area. 1 pages survey assessing more than 10 types of food and non – food items. Among other indicators, F&V presence and variety were assessed. A team of 2 or 3 trained surveyors conducted the in – store surveys. If fever than 10 types of F&V were sold, the surveyors wrote down each type, if more than 10 types, they noted large variety. Surveyors noted whether at least 1 dark green or orange – colored vegetable was present. Collected information about opening hours and number of cash registers used. To ensure inter – rater reliability, results of the assessment were recorded when all team members agreed.	The urban minority neighbourhood had the most barriers to fresh F&V in retail outlets, even when compared with the rural community
Franco et al. 2008	Neighbourhood characteristics and availability of healthy foods in Baltimore	Examine the association among the availability of healthy foods and racial and income neighbourhood composition.	Census tracts (administrative areas with a mean of 3500 residents of relatively homogenous socioeconomic characteristics) were used as proxies for neighbourhoods. Information on food stores in the actual study areas was obtained from InfoUSA. Food stores were categorized following the Standard Industrial Classification (SIC) codes. Improvements were made to the original list by 1) comparing the list to phone books 2) comparing the list to food license records and 3) having data collectors drive through the main thoroughfares of all the study neighbourhoods. The NEMS-S was used to measure food availability in each store. A healthy food availability score was calculated for each food store, following NEMS-S procedures. Some modifications were made to adapt it to local conditions.	Predominantly black and lower – income neighbourhoods have a lower availability of healthy foods than white and higher – income neighbourhoods due to the differential placement of types of stores as well as differential offerings of healthy foods within similar stores.

Study	Aim	Methods	Conclusions
Jetter et al. 2006	The availability and cost of healthier food alternatives	Investigate the cost and availability of a standard market basket of foods, and a healthier basket that included low – fat meat and dairy and whole grain products.	The market – basket study involved surveyors going into grocery stores in the areas of interest and collecting prices of a list of food items from each store. The average cost of the standard TFP market basket and the healthier market basket was calculated from these prices and compared. The food items in the survey were taken from the 2 – week grocery store shopping lists in the TFP. Healthier substitutes were identified for the healthier food basket. Surveyors recorded the lowest price per unit for each food item on the survey. In addition to price, data on fiber content, fat content, whether the food item was a store or name brand and package size were collected. Three surveys were conducted in each store over a 12 month period to account for seasonal variations in price.	The lack of availability in small grocery stores located in low – income neighbourhoods and the higher cost of the healthier market basket may be a deterrent to eating healthier among very low –income consumers.
Cohen et al. 2007	Reliability of a store observation tool in measuring availability of alcohol and selected food	Develop and test an observational tool to measure in – store availability and promotion of alcoholic beverages and selected food items having an impact on health.	The observation instrument was a four – page paper/pencil form adapted from the ImpacTeen assessment. Assessed inter – rater reliability on the following items: type of outlet, number of cash registers, placement, prices, length of shelf space, availability of selected fruit and vegetables. The observations were conducted by a two – person team. Each team followed a standard protocol and used the standard data collection instrument.	
Van der Horst 2008	The school food environment – associations with adolescent soft drink and snack consumption	School neighbourhood: Two observers audited each school. An audit instrument was developed to assess the availability of food in the schools. The instrument included observations of the different types of soft drinks/snacks that were available from vending machines and the canteen counter. Local neighbourhood: neighbourhood around schools were defined as a crow – fly buffer of 500 meters (stores that could be assessed within a lunch break of 30 minutes). Each school was geocoded. Records from a company providing information on stores in the Netherlands were used to identify stores. Five types of food outlets: 1) fast food outlets, 2) large supermarkets, 3) small food stores, 4) bakeries, 5) fruit/vegetable stores. The distance to the nearest food store was calculated using the street network.	

Appendix 9

The observational instrument developed.

Observasjonsskjema for å måle tilgjengelighet av mat i barneskolers nærmiljø

Observatørens navn: _____

Dato: _____._____._____ (dato dd – måned mm – år åå)

Tid ved start av observasjon: _____._____ (time tt – minutt mm)

Informasjon om utsalgsstedet for mat:

1. Navn: _____

2. Adresse: _____

3. Kjede (hvis aktuelt): _____

4. Type utsalgssted for mat:

   ☐ Kiosk   ☐ Bensinstasjon

   ☐ Restaurant/café   ☐ Matbutikk

   ☐ Spesialbutikk (som for eksempel bakeri eller utsalgssted for frukt og grønnsaker)

   ☐ Annen type utsalgssted: _____

   _____

   _____

5. Størrelse på utsalgsstedet:

   Antall kassaapparater: _____

6. Eventuelle kommentarer:

Sjekkliste for matvarer:

1. **Søte og salte kjeks:**
Som for eksempel: Ritz, Kaptein, Maryland Cookies, Bixit, First Price sjokolade/vanilje

Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

Antall hyllemeter med kjeks – mål og noter:

Plass til notater:

Totalt: _____ meter

2. **Sjokolade og søtsaker (ikke sukkerfri produkter)**
Som for eksempel smågodt i løsvekt, poser med sjokolade/vingummi, sjokoladebarer

Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

Antall hyllemeter med sjokolade og søtsaker – mål og noter:

Plass til notater:

Totalt: _____ meter

NB! Husk å måle alt – dette står ofte spredt rundt i butikken.

3. **Søte bakverk (ikke frosne produkter eller kaker):**
Som for eksempel boller, skolebrød, wienerbrød, donuts, berlinerboller, påsmurte lefser, kanelsnurrer, muffins i porsjonspakning

Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

Antall ulike typer av søte bakverk som er tilgjengelig (tell og noter antall):

_____

Fant du produkter i kategorien som ikke er nevnt ovenfor, vennligst noter hvilke:

4. **Usøtet bakverk (<u>ikke</u> frosne produkter eller brød):**
   Som for eksempel som rundstykker av ulike slag, baguetter, pizzaboller, ostebriks

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall typer av usøtet bakverk som er tilgjengelig: _____

   Antall typer <u>grovt</u> usøtet bakverk som er tilgjengelig: _____

5. **Frukt (frisk):**

   Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

   Antall ulike typer av frukt som er tilgjengelig: _____

   Ser fruktutvalget innbydende ut for deg (kryss av): ☐ Ja   ☐ Nei

6. **Grønnsaker (frisk):**
   <u>Ikke</u> poteter og krydderurter

   Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

   Antall ulike typer grønnsaker som er tilgjengelig: _____

   Er Knaskerøtter, Snacksgulrot eller liknende gulrotprodukt tilgjengelig (kryss av):
   ☐ Ja   ☐ Nei

   Er cherrytomater tilgjengelig (kryss av): ☐ Ja   ☐ Nei
   Er sukkererter tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Ser grønnsaksutvalget innbydende ut for deg (kryss av): ☐ Ja   ☐ Nei

7. **Salt snacks (<u>ikke</u> nøtter beregnet til for eksempel baking, som usaltede hasselnøtter, mandler, valnøtter)**
   Som for eksempel nøtter og potetchips

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall hyllemeter med salt snacks – mål og noter:

   Plass til notater:

   Totalt: _____ meter
   NB! Husk nøtteblandinger som for eksempel "Polly småsulten – nøtter og frukt"

8. **Brus <u>med</u> sukker**
   <u>Sukkerholdige</u> produkter <u>med kullsyre</u>

   Tilgjengelig (kryss av): ☐ Ja ☐ Nei

   Antall hyllemeter med brus med sukker – mål og noter. Velg målemetoden (e) nedenfor som passer, og summer til slutt:

   Hvis pall med kasser, tell kasser og mål kassene:

   Hvis ikke kasser, mål pallens lengde, bredde og høyde:

   Mål hyller (husk hyller i evt. kjøleskap):

   Totalt brus med sukker: _____ meter

9. **Brus <u>uten</u> sukker (<u>ikke</u> Farris eller Farris – liknende produkter):**
   Produkter <u>med kullsyre</u>

   Tilgjengelig (kryss av): ☐ Ja ☐ Nei

   Antall hyllemeter med brus uten sukker – mål og noter. Velg målemetoden (e) nedenfor som passer, og summer til slutt:

   Hvis pall med kasser, tell kasser og mål kassene:

   Hvis ikke kasser, mål pallens lengde, bredde og høyde:

   Mål hyller (husk hyller i evt. kjøleskap):

   Totalt brus uten sukker: _____ meter

10. Vann med og uten smak
Inkludert Farris og Farris – liknende produkter (Bris, Bonaqua, Taffelvann…)

Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

Antall hyllemeter med vann og Farris – liknende produkter – mål og noter. Velg målemetoden (e) nedenfor som passer, og summer til slutt:

Hvis pall med kasser, tell kasser og mål kassene:

Hvis ikke kasser, mål pallens lengde, bredde og høyde:

Mål hyller (husk hyller i evt. kjøleskap):

Totalt vann og Farris – liknende produkter: _____ meter

11. Juice og saft – liknende drikker i porsjonskartonger (½ liter eller mindre)
Som for eksempel juice, Kuli, Friskus, TINE 40/60, Mana

Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

Antall ulike typer av juice og saft – liknende drikker som er tilgjengelig: _____

NB! Husk at juice og saftliknende drikker kan stå plassert flere ulike steder.

Er varianter med mindre sukker tilgjengelig (som Lett iste): ☐ Ja   ☐ Nei

12. Smakssatt melk i porsjonskartonger (½ liter eller mindre):
Som for eksempel 24, milkshake, Litago jordbær/sjokolade, lett sjokolademelk, Q sjokolademelk
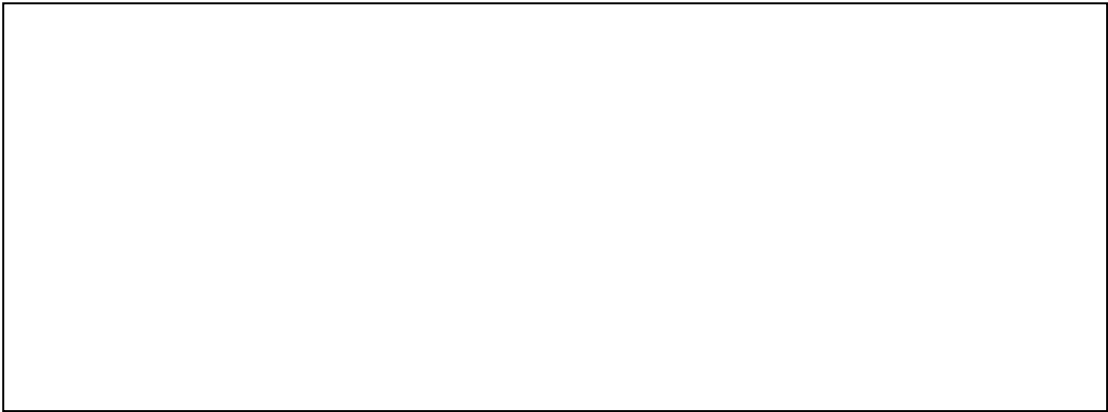
Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

Antall ulike typer av smakssatt melk som er tilgjengelig: _____

NB! Husk at smakssatt melk kan stå plassert flere ulike steder.

Er varianter med mindre sukker og/eller fett tilgjengelig (som 24, Q sjokolademelk 0 %, Litago lett sjokolademelk): ☐ Ja ☐ Nei
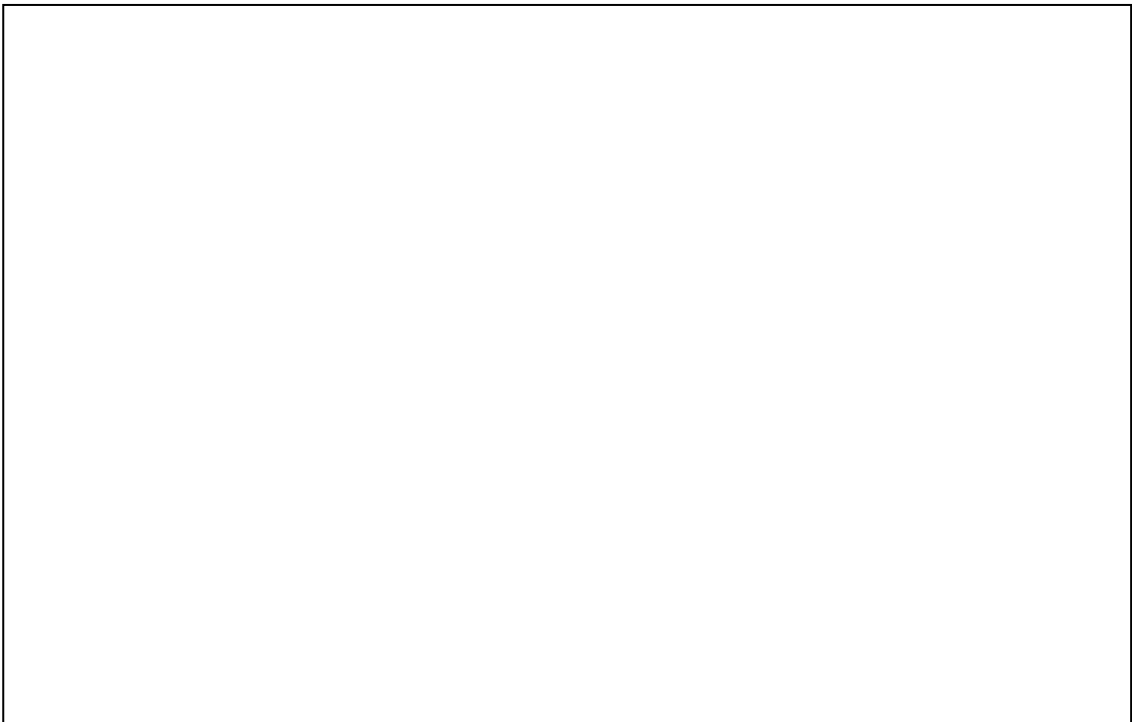
13. Skriv ned alt av matvarer som er tilgjengelig rundt en av kassene i butikken:

Tid når observasjonen er ferdig: _____._____ (time tt – minutt mm)

14. Eventuelle kommentarer:
Nevn evt. problemer som dukket opp under observasjonen eller andre kommentarer du måtte ha i forhold til utsalgsstedet du nå har observert eller selve observasjonsprosessen.

Appendix 10

Revised version of the observational instrument developed and the user's manual.

Observasjonsskjema for å måle tilgjengelighet av mat i barneskolers nærmiljø (revidert 10.02.2009)

Observatørens navn: _____

Dato: _____._____._____ (dato dd – måned mm – år åå)

Tid ved start av observasjon: _____._____ (time tt – minutt mm)

Informasjon om utsalgsstedet for mat:

1. Navn: _____

2. Kjede (hvis aktuelt): _____

3. Type utsalgssted for mat:

    ☐ Kiosk   ☐ Bensinstasjon

    ☐ Restaurant/café   ☐ Matbutikk

    ☐ Spesialbutikk (som for eksempel bakeri eller utsalgssted for frukt og grønnsaker)

    ☐ Annen type utsalgssted: _____

    _____

    _____

4. Størrelse på utsalgsstedet:

    Antall kassaapparater: _____

5. Eventuelle kommentarer:

Sjekkliste for matvarer:

1. **Søte og salte kjeks:**
   Som for eksempel: Ritz, Kaptein, Maryland Cookies, Bixit, First Price
   sjokolade/vanilje

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall hyllemeter med kjeks – mål og noter:

   Plass til notater:

   Totalt: _____ meter

2. **Sjokolade og søtsaker (ikke sukkerfri produkter)**
   Som for eksempel smågodt i løsvekt, poser med sjokolade/vingummi, sjokoladebarer

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall hyllemeter med sjokolade og søtsaker – mål og noter:

   Plass til notater:

   Totalt: _____ meter

   NB! Husk å måle alt – dette står ofte spredt rundt i butikken.

3. **Søte bakverk (ikke kaker eller frosne produkter):**
   Som for eksempel boller, skolebrød, wienerbrød, donuts, berlinerboller, påsmurte
   lefser i porsjonspakker og pakker med flere, kanelsnurrer, muffins i porsjonspakning,
   myke vafler i porsjonspakninger, croissanter

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall ulike typer av søte bakverk som er tilgjengelig (tell og noter antall):

   _____

   Fant du produkter i kategorien som ikke er nevnt ovenfor, vennligst noter hvilke:

4. **Usøtet bakverk (ikke frosne produkter eller brød):**
   Som for eksempel som rundstykker av ulike slag, baguetter, pizzaboller, ostebriks

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall typer av usøtet bakverk som er tilgjengelig: _____

   Antall typer grovt usøtet bakverk som er tilgjengelig: _____

5. **Frukt (frisk, ikke tørket eller hermetisk):**

   Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

   Antall ulike typer av frukt som er tilgjengelig: _____

   Ser fruktutvalget innbydende ut for deg (kryss av): ☐ Ja   ☐ Nei

6. **Grønnsaker (friske, ikke poteter og krydderurter):**

   Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

   Antall ulike typer grønnsaker som er tilgjengelig: _____

   Er Knaskerøtter, Snacksgulrot eller liknende gulrotprodukt tilgjengelig (kryss av):
   ☐ Ja   ☐ Nei

   Er cherrytomater tilgjengelig (kryss av): ☐ Ja   ☐ Nei
   Er sukkererter tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Ser grønnsaksutvalget innbydende ut for deg (kryss av): ☐ Ja   ☐ Nei

7. **Salt snacks (ikke nøtter beregnet til for eksempel baking, som usaltede hasselnøtter, mandler, valnøtter)**
   Som for eksempel nøtter og potetchips

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall hyllemeter med salt snacks – mål og noter:

   Plass til notater:

   Totalt: _____ meter

   NB! Husk nøtteblandinger som for eksempel "Polly småsulten – nøtter og frukt"

8. **Brus <u>med</u> sukker**
   <u>Sukkerholdige</u> produkter <u>med kullsyre</u>

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall hyllemeter med brus med sukker – mål og noter. Fyll inn antall pallebrett, kasser og hyllemeter.

   Antall **pallebrett** (ofte røde eller i papp):

   Antall **kasser** (oftest gule):

   Mål hyller (husk hyller i evt. kjøleskap):

   Totalt brus med sukker: _____ meter

9. **Brus <u>uten</u> sukker (<u>ikke</u> Farris eller Farris – liknende produkter):**
   Produkter <u>med kullsyre</u>

   Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

   Antall hyllemeter med brus uten sukker – mål og noter. Fyll inn antall pallebrett, kasser og hyllemeter.

   Antall **pallebrett** (ofte røde eller i papp):

   Antall **kasser** (oftest gule):

   Mål hyller (husk hyller i evt. kjøleskap):

   Totalt brus uten sukker: _____ meter

10. Vann med og uten smak
Inkludert **Farris og Farris – liknende produkter** (Bris, Bonaqua, Taffelvann…)

Tilgjengelig (kryss av): ☐ Ja   ☐ Nei

Antall hyllemeter med vann og Farris – liknende produkter – mål og noter. Fyll inn antall pallebrett, kasser og hyllemeter.

Antall **pallebrett** (ofte røde eller i papp):

Antall **kasser** (oftest gule):

Mål hyller (husk hyller i evt. kjøleskap):

Totalt vann og Farris – liknende produkter: _____ meter

11. Juice og saft – liknende drikker i porsjonskartonger (½ liter eller mindre)
Som for eksempel juice, Kuli, Friskus, TINE 40/60, Mana, iste (Lipton, Tine, Nestea), Mer, Fruktvann, Solrik, smoothie i ulike varianter

Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

Antall ulike typer av juice og saft – liknende drikker som er tilgjengelig: _____

NB! Husk at juice og saftliknende drikker kan stå plassert flere ulike steder.

Er lett iste tilgjengelig?   ☐ Ja   ☐ Nei

12. Smakssatt melk i porsjonskartonger (½ liter eller mindre):
Som for eksempel 24, milkshake, Litago jordbær/sjokolade, lett sjokolademelk, Q sjokolademelk, Coco (glassflaske)

Tilgjengelig: (kryss av): ☐ Ja   ☐ Nei

Antall ulike typer av smakssatt melk som er tilgjengelig: _____

NB! Husk at smakssatt melk kan stå plassert flere ulike steder.

Er varianter med mindre sukker og/eller fett tilgjengelig (som 24, Q sjokolademelk 0 %, Litago lett sjokolademelk):   ☐ Ja   ☐ Nei

13. Matvarer rundt kassene:

Finnes følgende matvarer rundt en eller flere av kassene?

☐ Sukkerfri tyggegummi   ☐ Sukkerfri pastiller

☐ Sjokolade   ☐ Andre søtsaker

☐ Grønnsaker   ☐ Frukt

☐ Nøtter (Trigger, Småsulten el.)   ☐ Vann/ Farris – liknende produkter

☐ Brus med sukker   ☐ Brus uten sukker

☐ Eventuelt andre matvare ved kassene, vennligst noter:

Tid når observasjonen er ferdig: _____._____ (time tt – minutt mm)

14. Eventuelle kommentarer:
Nevn evt. problemer som dukket opp under observasjonen eller andre kommentarer du måtte ha i forhold til utsalgsstedet du nå har observert eller selve observasjonsprosessen.

Veiledning for bruk av observasjonsskjema for å måle tilgjengelighet av mat i barneskolers nærmiljø

Dette dokumentet bør leses av de som skal bruke observasjonsskjemaet til kartlegging av mattilbud i butikker.

<u>Generelt:</u>

Du trenger ikke summere opp hyllemeter og antall under veis. Skriv det opp som et regnestykke med parenteser, gange – og plusstegn under "Plass til notater", så kan det regnes sammen når dataene legges inn i SPSS.

<u>Matvarene:</u>

Begynn observasjonsrunden ved butikkens inngang, og beveg deg gjennom butikken slik at du ender opp ved kassene. Dette er sannsynligvis den beste måten å gå gjennom butikken på, slik at du ikke overser noe.

1. **Søte og salte kjeks:**

   Mesteparten av kjeksen står som regel samlet, men vær obs på at det i tillegg ofte står kjeks på "sjokkselgere" andre steder i butikken

2. **Sjokolade og søtsaker:**

   Prøv å unngå å få med de sukkerfrie produktene. Sjokolade og søtsaker står som regel samlet, men det kan i tillegg stå på "sjokkselgere" andre steder i butikken.

   Dersom varene ligger i en kasse eller "sjokkselger" som er høyere enn den er bred, mål høyden i stedet for bredden.

   Tell ikke med kasser med godteri, for eksempel Smash!, som ikke er åpnet.

3. **Søte bakverk (IKKE frosne produkter eller kaker)**

   Det er produkter i PORSJONSSTØRRELSER vi er ute etter. Tell boller som selges enkeltvis, ulike boller som selges i poser (kanelsnurrer, sjokoladeboller, rosinboller…), donuts, muffins pakket en og en, wienerbrød, skoleboller, påsmurte lefser som selges enkeltvis og i pakker med flere.

   Hver av disse teller som en; en bolle teller som en, en muffins teller som en, en pose med sjokoladeboller telles som, en pose med rosinboller teller som en, en påsmurt lefse teller som en, en pakke med fem påsmurte lefser teller som en, og så videre.

   IKKE tell med produkter i frysedisken eller kaker. Heller ikke kringler/ julekake som ikke er i porsjonsstørrelser.

Belgiske vafler (myke vafler) i porsjonspakker telles med. Det samme gjør croissanter.

Alle disse produktene står som regel godt samlet ved der de ferske bakevarene er. Lefser, muffins, myke vafler og noen bolleposer (for eksempel kanelgrifler) kan imidlertid ofte stå for seg selv, ofte sammen med de ferdige kakene.

4. Usøtet bakverk (IKKE frosne produkter eller brød)

Det er produkter i PORSJONSSTØRRELSER vi er ute etter. Dette står som regel samlet.

IKKE tell med frosne produkter, og heller ikke brød.

Når du skal telle antall GROVE typer av usøtet bakverk som er tilgjengelig, må du telle de variantene som ved første øyekast ser grove ut. Ikke tenk på noen kriterier for at produkter skal kalles grove, men om de ser grove ut (selv om det er kjent at dette lurer oss – at produkter som ser grove ut, egentlig ikke er så grove).

5. Frukt (frisk):

IKKE tell med hermetisk eller tørket frukt.

Eksempel: epler. Dersom butikken har både gule, grønne og røde epler, tell epler som en. Eksempel: kiwi. Dersom kiwi selges både enkeltvis og i pakke med flere, teller dette allikevel som en. Flere ulike melontyper teller som en type frukt totalt. Og så videre.

Husk å telle med sitron og lime – disse ligger ofte blant grønnsakene. Avokado regnes som frukt.

6. Grønnsaker (frisk):

Ikke tell med poteter eller krydderurter.

Her gjelder det samme ved telling av frukt. Tell antall ulike typer som finnes. Ikke tell med dersom det finnes ulike varianter av en type grønnsak. Eksempler: dersom butikken har mange ulike typer løk (hvitløk, rødløk, gul løk, sjalottløk…), tell dette som en type grønnsak. Dersom butikken har avokado solgt i pakker, og som en og en, tell dette som en type grønnsak. Dersom butikken har flere ulike typer av paprika (gul, rød, grønn, smakspaprika), la dette telle som en grønnsak. Dersom butikken har mange ulike typer av salat (ruccola, isberg, ferdig kuttede og blandede salater…), la alt dette telle som en grønnsak totalt. Gulrot teller som en grønnsak, selv om det finnes mange ulike typer gulrøtter og pakninger, både snacksgulrøtter og vanlige gulrøtter. Og så videre.

7. **Salt snacks (<u>ikke</u> nøtter beregnet til baking, som usaltede hasselnøtter, mandler, valnøtter)**

Her er det først og fremst saltede nøtter og potetgull vi er ute etter. Dette står som regel samlet. I tillegg kan det stå nøtter og/eller potegull på "sjokkselgere" rundt i butikken. Ofte kan det også være pakker med nøtteblandinger beregnet som mellommåltid ved kassene, for eksempel Trigger eller Polly Småsulten. Noen butikker har også nøtter i løsvekt. Disse må telles med.

IKKE tell med nøtter som finne i bakeavdelingen, det er snacksnøtter vi er ute etter.

Tell ikke med kasser med potetchips eller nøtter som står fremme, men som ikke er åpnet.

8. **Brus <u>med</u> sukker**

Pallebrett og kasser har standardmål. Derfor kan du telle antall pallebrett og kasser med brus med sukker. Skriv svaret som <u>hele kasser eller pallebrett</u>, ikke som halve kasser eller pallebrett. Rund heller opp enn ned. Mål deretter hyllemeter i hylle i kjøleskap og ellers i butikken.

Husk at paller/ kasser med brus med sukker kan stå andre steder i butikken enn akkurat i drikkeavdelingen.

9. **Brus <u>uten</u> sukker**

Pallebrett og kasser har standardmål. Derfor kan du telle antall pallebrett og kasser med brus uten sukker. Skriv svaret som <u>hele kasser eller pallebrett</u>, ikke som halve kasser eller pallebrett. Rund heller opp enn ned. Mål deretter hyllemeter i hylle i kjøleskap og ellers i butikken.

Husk at paller/ kasser med brus uten sukker kan stå andre steder i butikken enn akkurat i drikkeavdelingen.

10. **Vann med og uten smak**

Her er farris – og farris – liknende produkter inkludert.

Pallebrett og kasser har standardmål. Derfor kan du telle antall pallebrett og kasser med vann med og uten smak og farris – liknende produkter. Skriv svaret som <u>hele kasser eller pallebrett</u>, ikke som halve kasser eller pallebrett. Rund heller opp enn ned. Mål deretter hyllemeter i hylle i kjøleskap og ellers i butikken.

Husk at paller/ kasser med vann med og uten smak og farris – liknende produkter kan stå andre steder i butikken enn akkurat i drikkeavdelingen.

11. Juice og saft – liknende drikker i porsjonskartonger (1/2 liter eller mindre)

Husk å få med ALT. Dette kan stå plassert flere steder i butikken. Mye står i kjøledisken sammen med juice og melkeprodukter, men det står også ofte "gjemt" i kjøleskap for brus, eller i egne kjøledisker for drikke.

Her teller alle juicer og juiceliknende drikker; juice, Kuli, Friskus, TINE 40/60, Mana, iste (Lipton, Tine, Nestea), Mer, Fruktvann, Solrik, smoothie i ulike varianter, og så videre.

Dersom flere produsenter har appelsinjuice, telles hver type som en. Dersom en produsent har appelsinjuice i flere størrelser (for eksempel Tines appelsinjuice; denne finnes i 0,3 og 0,5 liter), teller hver av størrelsene som en.

Vi teller kun porsjonskartonger, det vil si kartonger/ flasker på ½ liter eller mindre.

12. Smakssatt melk i porsjonskartonger (1/2 liter eller mindre)

Her teller 24, milkshake, Litago jordbær/sjokolade, lett sjokolademelk, Q sjokolademelk, Coco (glassflaske), og så videre.

Hver variant teller som en. Det vil si at for eksempel sjokolademelk fra ulike produsenter alle sammen teller som en hver.

Husk å få med alt! Mye står samlet sammen med meieriprodukter, men noe kan stå for seg selv i egne kjøledisker or drikke. Kan også noen ganger stå i brus – skap.

Vi teller kun porsjonskartonger, det vil si kartonger/ flasker på ½ liter eller mindre.

13. Matvarer rundt kassene:

Kryss av for de matvarene som befinner seg i umiddelbar nærhet til kassene, som man enkelt kan få tak i dersom man står i en (kort) kø.