UNIVERSITY OF AGDER

Correlates of regular soft drink consumption and its relation to weight status of children in eight European countries

The ENERGY-project

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This master's thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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Sammendrag

Formålet med masteroppgaven er å vurdere potensielle direkte sammenhenger mellom vurderte korrelater og vektstatus, vurdere forbruket av brus som mediator av disse relasjonene hos barn i Europa, og forskjeller i disse assosiasjonene mellom de Europeiske landene. I tillegg vurdere potensielle sosiodemografiske forskjeller og ulikheter mellom landene, korrelatene og i forholdet beskrevet ovenfor.

Data er hentet fra ENERGY prosjektet. Deskriptive analyser og "enveis" ANOVA ble brukt for å beregne proporsjoner klassifisert som normalvektig og overvektig, i henhold til kjønn, etnisitet, foreldres utdanning og land. Binær logistisk regresjon ble utført med vektstatus som avhengig variabel, og korrelatene for brusdrikking som prediktorer, justert for kjønn, sosio-økonomisk status og etnisitet, og utført separat for alle land, kjønn, sosio-økonomisk status og etnisitet.

Fire korrelater var signifikante; barnas holdning til brusdrikking, foreldre som rollemodeller, om barna liker brus eller ikke og tilgjengelighet hjemme. Barnets egen brusdrikking medierte ikke de fire observerte sammenhengene mellom korrelatene og vektstatus. Foreldrenes utdanningsnivå har betydning for om barnet tror brusdrikking påvirker vekten deres, og om barna liker brus. I en rekke land var foreldrenes normer- og tilgjengelighet hjemme signifikant. Sosio-demografiske forskjeller ble funnet i Hellas og Slovenia, der gutter hadde mindre sannsynlighet for å være overvektig justerte for sosio-økonomisk status og etnisitet.

Barnas holdning til brusdrikking, foreldre som forbilder, om barna liker brus eller ikke, og tilgjengelighet hjemme var signifikante korrelater relatert til barnets vektstatus. Disse relasjonen var ikke mediert av brusdrikking. I tillegg fant vi sosio-demografiske forskjeller og ulikheter mellom land, mellom de ulike korrelatene og i forholdet beskrevet over.

Nøkkelord: Korrelater, brusdrikking, barn, vektstatus

Abstract

The purpose of this master thesis is to assess the potential direct association between the assessed correlates and weight status, to assess the consumption of soft drinks as a mediator of these relationships, of children across Europe and differences between European countries. The second research question is to assess potential socio-demographic differences and inequalities between countries, in the determinants and the relationship described above.

Data from the ENERGY project was used. Descriptive analysis and one-way ANOVA were performed to calculate proportions classified as normal weight and overweigh, according to gender, ethnicity, parental education and country. Binary logistic regression analyses were performed with weight status as the dependent variable and correlates as predictors, adjusting for gender, socio-economic status (SES) and ethnicity, and performed separately for all countries, gender, SES and ethnicity.

Four correlates were significant; attitude, parent modeling, preference/liking and home availability. The child's own soft drink consumption did not mediate the four observed relationships between correlates and weight status. Parental educational level is associated with children's the correlate health beliefs and preference/liking. Between countries, correlates such as parental subjective norm and home availability were significant in several countries. Socio-demographic differences were found in Greece and Slovenia, with boys being less likely to be overweight than girls adjusted for SES and ethnicity.

Attitude, parent modeling, preference/liking and home availability were statistical significantly related to weight status, and these relationships were not mediated by soft drink consumption. We found socio-demographic differences and inequalities between countries, in the correlates, and the relationship described above.

Keywords: Correlates, children, soft drink, weight status

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1.0 The purpose of the study

The purpose of this master thesis is to assess the potential direct association between the assessed determinants and weight status, and to assess the consumption of soft drinks as a mediator of these relationships, of children across Europe and differences in these associations between European countries. The second research question is to assess potential socio-demographic differences and inequalities between countries, in the determinants and the relationship described above. Data from "EuropeaN Energy balance Research to prevent excessive weight Gain among Youth" (ENERGY)- cross sectional study was analyzed. This master thesis includes data from eight European countries.

2.0 Theory

2.1 Overweight and obesity

Overweight, obesity and their associated chronic diseases are significant global health issues (Kopelman, 2007). The prevalence of obesity has increased worldwide (Bastien, Poirier, Lemieux, & Després, 2014), and according to the World Health Organization (WHO), obesity is one of the greatest public health concern of the 21st century (World health organization, 2014). The rise in obesity varies by region, country and gender (Stevens et al., 2012), and obesity has been found to decrease health quality of life, increased risk for type 2 diabetes, elevated blood pressure and several types of cancer (Kopelman, 2007; B Swinburn et al., 2011). Overweight and obesity are actually the fifth leading risk for global deaths, and 65 % of the world`s population live in countries where overweight and obesity kills more people than underweight (World Health Organization, 2013). In 2008 an estimated 1.46 billion adults globally were overweight and 502 million adults were obese (B Swinburn et al., 2011). For instance, the global prevalence of obesity has nearly doubled between 1980 and 2008 (Bastien et al., 2014). Such growing numbers are a source of concern since the negative consequences of obesity start as early as in childhood (Bastien et al., 2014).

2.1.1 Overweight and obesity among children and adolescents

Childhood overweight and obesity has become a serious health problem in many countries worldwide and it is a huge public health challenge of the 21st century (Y. Wang & Lim, 2012).

There are numerous consequences of overweight and obesity among children and adolescents (Y. Wang & Lim, 2012; Waters et al., 2011), affecting both physical and psychological health (Oude Luttikhuis et al., 2009; Summerbell et al., 2005). Physical consequences include many risk factors associated with elevated blood pressure, high cholesterol, glucose intolerance, and even type II diabetes, previously known as an "old persons diabetes", are now more often seen in children, and also musculoskeletal problems (Kuzel & Larson, 2014; Oude Luttikhuis et al., 2009; Summerbell et al., 2005). Obese children actually show a 2- to 3- fold higher risk of developing high blood pressure compared to lean controls, and there is strong evidence supporting the fact that blood pressure tracks from childhood into adulthood (Schommer et al., 2014). In European population, about one third of overweight children and adolescents, suffer from hypertension (Neef et al., 2013). Furthermore, elevated body mass index (BMI) in children and adolescents correlates with the occurrence of sleep apnea (Neef et al., 2013), early maturity and some forms of asthma (Oude Luttikhuis et al., 2009).

Some of the psychosocial consequences that overweight and obese children might experience includes depression (Erermis et al., 2004; Neef et al., 2013; J. Wang & Lobstein, 2006), and low self-esteem, being bullied, and decreased school performances (Buttitta, Iliescu, Rousseau, & Guerrien, 2013). Obese children may be stereotyped as unhealthy, academically unsuccessful, unhygienic and lazy (Neef et al., 2013), and depressive episodes as well as body dissatisfaction caused by the social stigmatization is associated with obesity (Neef et al., 2013). In addition, psychosocially, obese children and adolescents suffer from a marked reduction in quality of life (QOL) (Neef et al., 2013). A recent review showed that among the 34 articles retained for the analysis, only three did not report lower QOL among obese children and adolescents. Clinical population appeared to be more affected than the general population. Several variables were associated with QOL such as self-esteem, image, bullying, screen time, parents educational level, and weight status (Griffiths, Parsons, & Hill, 2010).

Overweight children and adolescents have at least twice the risk of remaining so into adulthood than normal weight children, with the risk generally higher for adolescents and those who were obese during childhood (A. Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008). Approximately one half of overweight adolescents and over one-third of overweight children remain obese as adults (J. Wang & Lobstein, 2006). The obesity epidemic among children and adolescents also gives long-term effects on mortality and morbidity, e.g. coronary heart disease, diabetes, cancer (Maffeis & Tato, 2001), and needs therefore high priority in prevention (J. Wang & Lobstein, 2006). Once obesity is developed, it is difficult and costly to reverse and there are major challenges for people who have developed obesity (J. Wang & Lobstein, 2006).

It is important to mention that not all people living in developed countries with plenty of food become obese. And not all obese people will face the same health consequences (Seal, 2011). People have different genes and respond different to the same environment (Seal, 2011). In recent years, it has been reported that various genes may increase the risk of overweight and obesity in humans (Grønli, 2011). Mainly, it involves so-called "vulnerability genes" that make some people more susceptible than others. This doesn't explain the development of overweight and obesity alone, but helps in understanding the interaction with other genes and environmental factors (Grønli, 2011). Previous genetic studies conducted in families, adoptees and twins have clearly shown this genetic contribution to the obesity epidemic (Qi & Cho, 2008). The risk of obesity increase when an individual has relatives who are obese (Seal, 2011). A cohort study describing different patterns of overweight status between ages 5 and 14 years and examining the role of modifiable family and early life characteristics, concluded that parental overweight status is an important determinant of whether a child is overweight or not. (Mamun, Lawlor, O'Callaghan, Williams, & Najman, 2005).

As mention, environmental factors also play an important role in the development of overweight and obesity. "Obesogenic" environment refers to an environment that facilitates abnormal weight gain (Gauthier & Krajicek, 2013). Obesogenic environment is complex and multidimensional, involving e.g. attitudinal, behavioral, political, economic, social, individual and physical aspects (Gauthier & Krajicek, 2013). Relative to most adults, children are in a unique situation as they subject to circumstances, surroundings, and the environment placed upon them by the world, parents/caregivers, and themselves (Gauthier & Krajicek, 2013). How children respond and interact within an obesogenic environment can influence

their weight. For example, children with more self-control were less likely to become overweight than those with less control, when entering adolescence (Gauthier & Krajicek, 2013). Another study examined patterns among neighborhood food, physical activity, street/transportation, and socioeconomic characteristics and their associations with adolescent weight status (Wall et al., 2012). Regressions on separate neighborhood variables found that a low percentage of parks/recreation, and low perceived safety were associated with higher BMI z-score in boys and in girls. According to Golan (Golan, 2006) the home environment is another important setting relative to shape children`s eating and physical activity behaviors. Further, in the U.S, the most likely explanation for the high prevalence of obesity is an environment that produces constant pressure towards positive energy balance by promoting energy intake and discouraging physical activity (Hill & Melanson, 1999).

Within countries, socio-demographic gradients in childhood overweight have been observed. Overweight tends to be more prevalent among socio-economically disadvantaged children in developed countries, and children of higher socio-economic status in developed countries (Oude Luttikhuis et al., 2009). The complexity of overweight and obesity among children and adolescents makes the prevention and treatment especially challenging.

2.1.2 Prevalence of childhood overweight and obesity

The prevalence of overweight and obesity is increasing in child populations throughout the world (Lobstein, Baur, & Uauy, 2004; Miller et al., 2013; B Swinburn et al., 2011; Waters et al., 2011). Globally, in 2010, 43 million children (35 million in developing countries) were estimated to be overweight and obese; 92 million were at risk of overweight (de Onis, Blössner, & Borghi, 2010). The worldwide prevalence of childhood overweight and obesity increased from 4.2 % in 1990 to 6.7 % in 2010 (de Onis et al., 2010). This trend is expected to reach 9.1 %, or ≈ 60 million, in 2020 (de Onis et al., 2010).

In a study conducted in seven European countries, 25.8 % and 5.4 % of the boys, and 21.8 % and 4.1 % of the girls were overweight (including obesity) and obese, respectively (J. Brug et al., 2012). The highest prevalence of overweight children (including obesity) was observed in Greece, and the lowest in Belgium (girls) and Norway (boys) (J. Brug et al., 2012). 44.4 % and 11.2 % of the boys and 37.7 % and 9.7 % of the girls were overweight and obese in

Greece, respectively (J. Brug et al., 2012). All countries in this cross-sectional study had significant lower prevalence of overweight/obesity than Greece. In the whole sample, significantly higher prevalence of overweight and obesity was observed in boys than in girls (J. Brug et al., 2012).

In general, overweight prevalence among children and adolescents are higher in countries in the Mediterranean region and the UK, than countries in the middle, northern and eastern Europe (Cattaneo et al., 2010). For instance, the prevalence of overweight and obesity in Ireland (2003-2004) is 28.9 % for girls and 19.4 % for boys, in England (2009) 26.1 % for girls and 21.8 % for boys, and in Scotland 27.4 % for girls and 33.6 % for boys, respectively (World Obesity Federation, 2014). The prevalence of overweight (including obesity) among 12 year old Finnish school children has increased from 1977 to 2003 (Kautiainen, 2005). In 1977 8.2 % and 6.9 % of boys and girls, respectively, was overweight and obese. In 2003 the number were 21.5 % and 1.7 % respectively (Kautiainen, 2005). In Sweden, 15.6 % 7-9 year old children are overweight and 2.6 % obese (Moraeus et al., 2012). A review of the data on overweight among pre-school children in Albania, Bosnia and Herzegovina and Ukraine, show prevalence estimates of more than 25 % in all countries (Wijnhoven et al., 2013). In all studies, except the study on the Finnish school children, weight and height were measured.

2.1.3 Prevention of childhood overweight and obesity

Childhood obesity prevention involves keeping energy balance at a healthy weight while protecting the overall health, growth and development, and nutritional status for the child (Koplan, Liverman, & Kraak, 2005). The balance is between the energy that an individual eat as food and beverage, and the energy expended (Koplan et al., 2005).

Preventive programs need to target children at a very young age, before clustered obesogenic behaviors have been established in the child's habits (Gubbels, Assema, & Kremers, 2013). It is therefore important to focus on patterns when preventing childhood obesity, not just on single behaviors in childhood (Gubbels et al., 2013). The preventive strategies differ between an intervention meant to motivate behavioral changes (e.g. health promotion programs, social marketing, education) and policy interventions (laws and regulations) that reverse the environmental factors such as reducing the cost of healthy food and beverages and increasing

the cost of unhealthy foods (B Swinburn et al., 2011). Interventions that intend to reverse obesogenic factors will, in most cases, be policy led, but some interventions may also be food industry policies (B Swinburn et al., 2011). Policy-led interventions that affect the whole population have several strengths compared to health education and promoting programs. The reason why the policy-led intervention is preferred is because they tend to be sustainable, affect the whole population (including those who are tough to reach), be systematic and reverse some of the environmental factors related to child and adolescent overweight and obesity (B Swinburn et al., 2011). These policy-led interventions for preventing overweight can only be directed at the environment (making healthy choices easier) rather than the individual (forcing them to take healthy choices) (B Swinburn et al., 2011). Compared to other public health issues where we can directly require specific behaviors such as wearing a seat belt or not smoke in restaurants, we cannot tell people what to eat, or what not to eat, or to exercise or not. To eat unhealthy foods or to exercise or not are an individual choice, but rules and regulation can make the unhealthy choices more difficult.

It is important to understand the causes of childhood obesity, determine what to do about them, take proper action and call attention to what affects eating habits and physical activity levels (Koplan et al., 2005). It is also important to take into account that boys and girls show different behavioral patterns and therefore need different preventive approaches (Gubbels et al., 2013).

2.2 Energy balance related behaviors (EBRBs)

Energy balance-related behaviors (EBRBs) are the interaction of multiple behaviors that determine whether or not a positive energy balance occur and increase in body fatness and experienced (S. P. J. Kremers, De Bruijn, Schaalma, & Brug, 2004). In children and adolescents, some of the most important behaviors that can lead to overweight contain consumption of energy-dense foods, low levels of physical activity, high levels of television viewing and computer use (Gubbels et al., 2013), excess sedentary behavior (AS Singh et al., 2011) and passive transportation to school (Horst, Oenema, Looij-Jansen, & Brug, 2008). The total picture of these behaviors determine whether or not weight gain is experienced (De Craemer et al., 2012). It is important to address all behaviors when fighting the obesity epidemic. Focusing on one single energy balance-related behavior (EBRB), for instance

physical activity as a universal factor for obesity is not sufficient. For example, a child can meet the guidelines for physical activity, but he or she may still be sedentary for most of the time during the day (De Craemer et al., 2012). In addition, environmental factors, as well as personal choices in relation to lifestyle have been identified as important (Summerbell et al., 2005). A recent review showed strong evidence for an inverse association between total physical activity and overweight; moderate evidence for a positive association between sedentary behavior – mainly TV viewing – and overweight; but lacking evidence for an association between dietary behaviors and overweight was found (te Velde et al., 2012). The same review found a positive association for consumption of sugar-sweetened beverages with overweight in two studies (te Velde et al., 2012).

2.2.1 Correlates of EBRBs

Correlate means that there is a connection e.g. between behavior and weight status, but one cannot say anything about the cause. Important correlates of obesity related dietary behaviors among adolescents were assessed in the ENDORSE study (Horst et al., 2008). The most consistent associations were found between parental intake and children's fat, fruit/vegetable intake. Further, parent and sibling intake was associated with adolescents energy and fat intake, and parental education with adolescents fruit/vegetable intake (van der Horst et al., 2007). In addition, environmental factors, such as home, in school and neighborhood may be important correlates of EBRB (S. Kremers et al., 2006). Swimburn and colleagues (B. Swinburn, Egger, & Raza, 1999) tried to divide the environmental factors in types of four "obesogenic" factors that could influence overweight; physical (what is available), economic (what are the costs), political (what are the rules) and sociocultural (what is the social and cultural background). In addition, there are two other levels of influence; micro environmental factors (including schools, workplaces, homes and neighborhoods) and macro environmental factors (including health systems, governments and the food industry). All of these environmental factors interact with each other and may as well affect the demographic and personal factors of EBRB (B. Swinburn et al., 1999).

2.2.2 Soft drink consumption

The relationship between consumption of sugar-sweetened beverages (SSB) and body weight has generated considerable public and scientific interest. Within the past 2 decades, a number of studies in children have evaluated the association between SSB intake and obesity (TH, Overby Nc Fau - Klepp, Klepp Ki Fau - Bere, & E, 2012; Van Lippevelde et al., 2013). In general, an association has been found between SSB consumption and obesity (Garaulet et al., 2011; Hebden, Hector, Hardy, & King, 2013; Sesé et al., 2012).

A systematic review by Gibson (Sigrid, 2008) showed that approximately half of the cross-sectional and prospective studies in this review found a statistically significant association between SSB intake and BMI, weight, adiposity or weight gain in children. Of the three long-term interventions in the same review by Gibson, one study reported a decrease in obesity prevalence but no change in mean BMI, and two studies found a significant impact only among children already overweight at baseline. The relationship between consumption of sugar-sweetened drinks and childhood obesity was examined by Ludwig et al. in the early twenty century, and they found that for each additional serving of sugar-sweetened drink consumed, both body mass index (BMI) and frequency of obesity increased after adjustment for anthropometric, demographic, dietary, and lifestyle variables. The same study showed that baseline consumption of sugar-sweetened drinks was independently associated with change in BMI (Ludwig, Peterson, & Gortmaker, 2001).

Collison et al. did a study among Saudi school students, and found that SSB intake was correlated with a higher waist circumference and BMI among the boys (Collison et al., 2010). Another study showed that boys aged 6-11 years whose beverage pattern was characterized by a high intake of soft drinks had increased odds of overweight/obesity compared with a "moderate" beverage pattern (Duffey et al., 2012). Temporal patterns in SSB intake across recent decades have shown a close parallel between the obesity epidemic and rising levels of SSB consumption (Hu & Malik, 2010). Findings from epidemiological studies clearly indicate that regular consumption of SSBs can lead to weight gain (Hu & Malik, 2010). SSBs are the greatest contributor to added sugar intake among children in the U.S., and are thought to induce weight gain in part by incomplete compensation for liquid calories at subsequent meals (Hu & Malik, 2010).

Malik and colleagues have recently published a systematic review and meta-analysis on sugar-sweetened beverages and weigh gain in children and adults: they found that SSB consumption promotes weight gain in children, but the effect sizes were small (Malik, Pan, Willett, & Hu, 2013). In adults – The World Cancer Research Fund (Wiseman, 2008) found that there is probable causal relationship that SSB increase the risk of overweight and obesity in adults. So no convincing evidence of causal relationship in children has been established yet – and the effect of sugar sweetened beverages and obesity is still widely debated.

Johnson and colleagues assessed whether sugar-sweetened beverage (SSB) consumption increased fatness in British children (Johnson, Mander, Jones, Emmett, & Jebb, 2007). There was no evidence of an association between SSB consumption at 5 or 7 years of age and fatness at age 9 years, and the study showed a small positive correlation between low-energy drinks at age 5 and 7 years of age and fatness at age 9 years (Johnson et al., 2007).

2.2.3 Correlates of soft drink consumption

Correlates who are associated with sugar sweetened beverage consumption among children and adolescents include less participation in physical activity both in school and home, longer duration of screen time (watching television or playing video games) (Hebden et al., 2013), consumption by family and peers, availability in the home and at school (Grimm, Harnack, & Story, 2004; Hebden et al., 2013) and taste preference among adolescents (Grimm et al., 2004). Bere et al. (Bere, Glomnes, te Velde, & Klepp, 2008) found that references, accessibility, modeling and attitudes were strongly associated with soft drink consumption. In addition, gender, educational plans and dieting also were related to adolescent's soft drink consumption. Another study showed similar results (van der Horst et al., 2008).

Taste preference was one of the strongest predictors in one study (Grimm et al., 2004). 96 % of the respondents reported they liked or strongly liked the taste of soft drinks (Grimm et al., 2004). Those who reported that they "strongly like" the taste of soft drinks were 4.5 times more likely to drink this beverage five or more times per week compared to those who responded they "like", "dislike" or "strongly dislike" the taste of soft drinks (Grimm et al., 2004).

Home environment variables such as parental modeling, home availability and accessibility, parental rules, and the availability of soft drinks at home to take to school are associated with soft drink consumption (Tak et al., 2011). In particular, parents are ultimately responsible for their children's food and beverage choices because especially young children have little control over these consumptions (Lopez et al., 2012). In other words, parental soft drink intake and availability in the home are very important correlates for the children and adolescents soft drink intake (Grimm et al., 2004). One study found that those whose parents regularly drank soft drinks were almost three times more likely to drink this beverages five or more times per week compared to those whose parents did not regularly consume soft drinks (Grimm et al., 2004). Parental rules are associated with soft drink consumption and this indicates that parental rules are of direct importance for adolescents behavior (Tak et al., 2011). This may be because adolescents have less room to make their own decisions regarding soft drink consumption when their parents have such strict rules.

Presence of soft drink vending machines in schools is also associated with soft drink consumption (French, Story, & Fulkerson, 2002). A study from 336 secondary schools in the U.S. found that 98 % of the schools had soft drink vending machines available to students (French et al., 2002). Further, pupils in schools with longer distance to a shop selling soft drinks and schools with rules concerning soft drinks and candy tend to have lower odds for drinking soft drinks at school (Bere et al., 2008).

3.0 Methods

3.1 The cross sectional study within the ENERGY-project

The ENERGY-project included a cross-sectional, school-based survey of anthropometrics and energy balance related behaviors (EBRBs) (Johannes Brug et al., 2010). This cross-sectional study was carried out in seven European countries in 2010, between March and June. The seven European countries are Belgium, Greece, Hungary, the Netherlands, Norway, Slovenia and Spain. Switzerland joined the survey in May 2010 as the eighth country, and distributed the last questionnaire in December same year (van Stralen et al., 2011). The cross-sectional survey included anthropometric measurements, child and parent questionnaires to measure EBRBs and potential individual and environmental correlates of

these behaviors. A detailed description of the design and methodology have been published by Van Straalen et al. (van Stralen et al., 2011)

3.2 Sample and procedure

Each country participating in this cross-sectional study was represented by a local partner institute. Each partner had the responsibility to collect the data in that given country. A standardized protocol was used to make sure that the procedure for sampling, data collection and data handling was the same in all eight countries (van Stralen et al., 2011).

The cross-sectional study was carried out among 10-12 year old children. A minimum sample of 1000 school children per country as well as one parent (main caregiver) for each child was aimed in the study. The number of participants was selected after looking at previous cross-European studies on the same topic. In addition, this minimum was required to enable analyses of the associations between correlates and specific EBRBs, and to compare between countries as well as within-countries (van Stralen et al., 2011).

For each country, the aim was to include minimum 20 schools and 2 classes per school, resulting in approximately 50 children per school. Based on previous experiences, it was necessary to oversample in order to recruit at least 1000. It was calculated a non-response rate of 10%, resulting in 1100 school children in every country. The sample size was also calculated to detect differences in overweight prevalence between countries (van Stralen et al., 2011).

A national sample frame was used in Greece, Hungary, the Netherlands and Slovenia, while schools from specific regions were sampled in Spain, Belgium, Norway and Switzerland (van Stralen et al., 2011). Because of the differences in population within the different regions in each country the sampling of schools was random and multi-staged, involving 7 steps (van Stralen et al., 2011). A school recruitment letter was sent to the headmaster of each school participating in the study, followed by a personal telephone call. All parents (main caregiver) received a letter explaining the study purpose and were asked for written consent for their child´s participation due to school agreement. This was necessary in countries where active informed consent was required; Belgium, Hungary, Norway, Spain, Greece, Slovenia and

Switzerland (van Stralen et al., 2011). A total of 199 schools participated, with 7915 children (response rate 60%) and 6512 parents (response rate 55%) completing the questionnaires (van Stralen et al., 2011).

3.3 Data collection and data handling

During one school hour the children completed the child questionnaire. A researcher was present to ensure that everything went well according to the procedures, and to answer any question the children might have. This section did not take place on Mondays in order to avoid that weekend days were reported in answering the 24-hour recall question in the questionnaire. At the same time anthropometric measurements were conducted. The student also received a parent questionnaire in a closed envelope to take home for completion by one of their parents. Completed parent questionnaires were brought back to school in a closed envelope by the student and were collected by the teacher (van Stralen et al., 2011).
The questionnaire form from all countries, both child and parent, were shipped to the coordinating center in the Netherlands. Further, the data were scanned and the data were transferred into SPSS files. All data sent to the coordinating center were merged and checked by a data manager to quality check the data (van Stralen et al., 2011).

3.4 Personal variables

Gender and ethnicity were assessed in the child questionnaire by self-report. Gender; "Are you a girl or a boy?" with the response options "girl" and "boy" and ethnicity; "Which language do you most often speak at home?" with the response options: "native language", "three country specific language options", "others". The ethnicity variable was dichotomized into: "native" vs. "non-native". Parent's education level was assessed in the parent questionnaire. Parents (and/or other caregiver) were asked to report their own level of education. Both scores were combined, and dichotomized into low (both parent/caregiver with fewer than 14 years of education) vs. high (at least one parent/caregiver with 14 years or more of education). In this international dataset this approximately distinguishes families with at least one caregiver who has completed medium or high vocational, college or university training from other families (van Stralen et al., 2011).

3.5 Soft drink consumption and determinants

Prevalence of soft drink consumption was assessed by the following question "How many times a week do you usually drink fizzy drinks and fruit squash?" with the response options: "never", "less than once a week", "once a week", "2-4 days a week", "5-6 days a week", "every day, once a day" and "every day, more than once a day". This variable was dichotomized into once a week or less vs. more than once a week.

All correlates for soft drink consumption was dichotomized and linked to different constructs such as personal correlates, family environment or school environment (van Stralen et al., 2011). Research question "I think drinking fizzy drinks and fruit squash is" had response option: "very good", "good", "neither good nor bad", "bad", and "very bad". This variable was dichotomized into children who think drinking soft drinks is good vs. children who think drinking soft drinks is bad and linked to attitude.

"If I drink fizzy drinks or fruit squash my parents/care givers think it is" had response options: "very good", "good",…,"very bad" and was dichotomized into parents who think it is good vs. parents who think it is bad and linked to parental subjective norm. "If I drink fizzy drinks or fruit squash, most of my friends think this is" had the same response option as the question above and was dichotomized into "friends who think it is good" and "friends who think it is bad" and this correlate was linked to peer subjective norm.

To determine the children´s thoughts about health, question as "I think drinking fizzy drinks and fruit squash will make me fat" were asked. The response alternative was "I fully agree", "I agree a bit", "neither agree nor disagree", "I disagree a bit" and "I fully disagree". This question was dichotomized into I disagree that soft drinks will make me fat vs. I agree that soft drinks will make me fat and linked to health beliefs. Question as "I like the taste of fizzy drinks or fruit squash" with the response option "I fully agree", "I agree a bit", …, "I fully disagree" was dichotomized into children who like the taste vs. children who don't like the taste and linked to preference/liking.
"How often does your parents/caregivers drink fizzy drinks or fruit squash?", "how often do most of your friends drink fizzy drinks or fruit squash?", "If I ask my parents/caregivers for a fizzy drink or fruit squash, I get one", "I am allowed to take fizzy drinks or fruit squash whenever I want" and "Are there usually fizzy drinks or fruit squash at your home?" had

response option: “”always”, “often”, “sometimes”, “not often” and “never”. The first of these questions was dichotomized into parents who drink soft drinks often vs. parents who do not drink soft drinks often and linked to parent modeling. The second was dichotomized into friends who drink soft drinks often vs. friends who do not drink soft drinks often and linked to peer modeling. The third question was dichotomized into children who often get one vs. children who never get one and was called parental practices 2. The fourth question was dichotomized into I´m always allowed to take soft drinks vs. I´m not allowed to take soft drinks whenever I want and was called parental practices 1. The last question was dichotomized into there are always soft drinks at our home vs. there are not often soft drinks at our home and linked to home availability.

3.6 Weight status

Trained research assistants measured weight and body height. The child was measured in light clothing without shoes. Weight was measured with a calibrated electronic scale SECA 861 (accuracy of 0.1 kg). Body height was measured with a Seca Leicester Portable stadiometer (accuracy of 0.1 cm). Two readings of each measurement were obtained A third measurement was obtained if the two readings differed more than 1%. All three measurements were recorded and the outlier was excluded during the data cleaning process and the mean of the two remaining recordings was calculated (van Stralen et al., 2011).

The International Obesity Task Force criteria was used as the definition of weight status (normal weight, overweight, obesity) for each child based on the calculated BMI for each child (Cole, Bellizzi, Flegal, & Dietz, 2000).

3.7 Statistical Methods of the present study

All data were analyzed using SPSS version 19 (SPSS Inc. Chicago, IL). Descriptive analysis and one-way ANOVA tests were performed to calculate proportions classified as normal weight and overweigh, according to gender, ethnicity, parental education and country. The eleven correlates of regular soft drink consumption that were chosen in this study were calculated according to weight status, gender, ethnicity, parental education and country (table 1).

Binary logistic regression analyses were then performed with weight status as the dependent variable (table 2). Model 1 included gender, ethnicity and SES. Model 2 included correlates of regular soft drink consumption chosen in this study and model 1. The third model was included in order to assess the consumption of soft drinks as a mediator of the potential relationships between the correlates and weight status; if a significant relationship became less significant it was taken as an indicator for soft drink consumption being a mediator (MacKinnon, Fairchild, & Fritz, 2007).

4.0 Results

The study sample included 7915 children; mean age 11,5 years, 52 % girls, 91 % native ethnicity and 47 % had parents with high education. Further 77 % and 23 % were categorized as normal weight and overweigh (including obese), respectively (table 1).

The main findings in this study were related to research question one. In the relationship between being overweight and the correlates for regular soft drink consumption, four correlates were statistical significant; attitude, parenting modelling, preference/liking and home availability. Meaning that children who think they will get fat drinking soft drinks are more likely to be overweight; children who have parents who drink soft drinks not often are less likely to be overweight; children who don't like the taste of soft drinks are more likely to be overweight and children who have low availability of soft drinks at home are more likely to be overweight. In the fully adjusted model, these correlates were all of similar magnitude and still significant; i.e. indicating that child's own soft drink consumption did not mediate the four observed relationships between correlates and weight status described above.

The first part of second research question was to assess potential socio-demographic differences and inequalities between countries and in the determinants. Girls and boys had quite similar results for all correlates for regular soft drink consumption. However, home availability was statistical significant (OR=1.48, 95% CI 1.18 - 1.86) in boys, but not in girls. For both high SES and low SES health beliefs and preference liking was statistical significant. In addition, when we adjusted for the child's own soft drink consumption it was statistical significant for children with low educated parents. For native children

preference/liking and parent modelling was statistical significant with OR on 1.35 (95% CI 1.15-1.6) and 0.73 (95% CI 0.63 – 0.85), respectively. Health belief was the only determinant who were statistical significant for non—native children, adjusted for gender, SES and the correlates of regular soft drink consumption.

Between countries there are some differences. In Belgium peer modelling (4 %), preference/liking (12 %), parental practices 2 (14 %) and home availability (11 %) had quite low scores compared to the average. In the Netherlands only 0.8 % of the children reported drinking soft drinks less than once a week. Further, preference/liking is quite low between Dutch children (7 %) compared to Greek (46 %) and Slovenian (40 %) children. 5 % of the Dutch children reported home availability as an important correlate compared to 43 % in Greece and 44 % in Slovenia. Greek children reported health belief (70 %), attitude (91 %), peer modelling (17 %) and preference/liking (46 %). Hungarian children reported 47 %, 21 %, and 25 % on attitude, peer subjective norm and parent modelling, respectively.

Among Norwegian children both parental subjective norm (97 %) and peer subjective norm (86 %) were important correlates for soft drink consumption. In addition, 62 % of the Norwegian children reported that parental practices 1 are of importance. Swiss children reported parent modelling with 58 %. They also reported peer subjective with 66 %. Spanish children have quite same results as the total of the sample, except peer modelling with 17 % of the Spanish children reporting that they have friend who drink soft drinks not often.

The second part of research question 2 was to assess potential socio-demographic differences in the relationship described above (table 3, table 4, table 5,…, table 16). Between countries there were some socio-demographic differences. In Greece and Slovenia, boys were less likely to be overweight than girls when you adjust for SES and ethnicity. In addition in Slovenia, children with high-educated parents were less likely to be overweight than children with low educated parents, adjusted for gender and ethnicity. No other countries had significant results adjusting for gender or SES or ethnicity.

In all countries, except Norway, health belief was statistical significant. In Slovenia, The Netherlands, Greece and Switzerland health belief was the only significant result with OR= 0.58 (95% CI 0.42 – 0.82), 0.37 (95% CI 0.21 – 0.65), 0.41 (95 % CI 0.29 – 0.58) and 0.3 (95% CI 0.14 – 0.67), adjusted for gender, SES, ethnicity and the correlates for regular soft

drink consumption. In both Norway and Spain peer subjective norm was statistical significant. Analyses stratified by gender showed that SES was significant for boys and girls, adjusting for ethnicity (OR= 0.74 (95 % CI 0.62 – 0.9), OR= 0.65 (95 % CI 0.54 – 0.79), respectively). Between low SES and high SES there were quite different results. For low SES health belief (OR=0.42, 95 % CI 0.34 – 0.52), parental practices 2 (OR= 0.76, 95% CI 0.58 – 0.99) and home availability (OR=1.56, 95 % CI 1.2 – 2.02) was significant, and for high SES health belief (OR=0.5, 95 % CI 0.4 – 0.6), parent modelling (OR=0.7, 95 % 0.58 – 0.85) and taste preference/liking (OR= 1.36, 95 % CI 1.11 – 1.66), both adjusted for gender, ethnicity and the correlates for soft drink consumption. Only health belief (OR=0.23, 95 % CI 0.13 – 0.42) was significant for non-native children adjusted for gender, SES and correlates for soft drinks.

5.0 Discussion

5.1 Discussion of the results

The aim of the study was to examine the association between correlates of regular soft drink consumption and its relation to weight status in children in eight European countries.

In our study parental subjective norm is quite high in all eight countries, except the Netherlands where 61 % of the children have parents who think it is bad their child is drinking soft drinks. In all other countries over 80 % of the parents think it is bad drinking soft drinks. Further, 62 % of Norwegian, 60 % of Spanish and 53 % of Greek children are not allowed to take soft drinks whenever they want. High parental allowance and parental concerning about soft drinks have been previously studied. Vereecken et al. (C. A. Vereecken, Keukelier, & Maes, 2004) found that allowing children to consume soft drinks whenever they like resulted in a higher soft drink intake. Moreover, several studies (De Bruijn, Kremers, De Vries, Van Mechelen, & Brug, 2007; Haerens et al., 2008) indicated that food rules concerning unhealthy foods could discourage soft drink intake. Nevertheless, to much harshness may have adverse effects resulting in less healthy food choices (Fisher & Birch, 1999).

Furthermore, home availability is quite high in The Netherlands (5 %), Belgium (11 %) and Hungary (22 %), meaning that 5 % of Dutch children reported that there are never/not often

soft drinks at their home. In addition, Spain and Switzerland reported 33 %, and this indicates that availability of soft drinks is quite high in most of the countries investigated. Research show that the availability of soft drinks in household in European countries is steadily and significantly increasing (Naska, Bountziouka, & Trichopoulou, 2010). Households in Wes and North Europe reported higher daily availability of soft drinks compared to other regions in Europe. The same study showed that lower socio-economic status was associated with more frequent and higher availability of soft drinks in the household (Naska et al., 2010). On the other hand, parental practices 1 indicate that a great amount of children are not allowed to take soft drinks whenever they want at home. In other words, even if the availability at home is large, the parental policy seems to be quite high in a lot of homes investigated in this study.

Further, in Greece 50 % of the parents/caregivers are drinking soft drinks not often, which indicates that the other half of the parents are consuming soft drinks relatively often. The numbers are quite high in Switzerland (58 %) and Slovenia (54 %) as well. Research have shown that parental soft drink intake in these tree countries was positively associated with children's intake in Greece and Switzerland (both $p<0.05$), but not in Slovenia (Van Lippevelde et al., 2013). Peer subjective norm and peer modelling were also investigated as potential correlates of regular soft drink consumption. In all countries, except Hungary and the Netherlands over 50 % of the children reported that they had friend who think it is bad drinking soft drinks. But in addition, the consumption of soft drinks among the friends is quite high in all eight countries.

Some research show that peer group snack and soft drink consumption were associated with individual intake (Wouters, Larsen, Kremers, Dagnelie, & Geenen, 2010), another showed that respondents have a significantly greater probability of eating healthily if a nominated peer also does so (Barclay, Edling, & Rydgren, 2013). Peer environment (and also family environment) are the primary social context that play a role in young peoples norms regarding weight and weight-related behaviours (Salvy, de la Haye, Bowker, & Hermans, 2012). There is growing evidence that children and adolescents are influenced by what their peers eat (Salvy et al., 2012). Both studies are on peer influence and eating behaviours, and not on soft drink consumption directly. But it is reasonably to believe that this also can be linked to soft drink consumption. Further interventions could be on developing better self-efficacy programs that enable children to better manage peer interaction with food and especially soft drink consumption, and make their own decisions about food and drink intake.

Between countries there were some socio-demographic differences. In Greece and Slovenia, boys are less likely to be overweight than girls when you adjust for SES and ethnicity. This is in line with the total result with boys being less likely to be overweight than girls in the total sample of all children in the eight European countries in this study. In addition in Slovenia, children with parents with high education were less likely to be overweight than children with parents with low education, adjusted for gender and ethnicity. Research in line with these results are minor, but there is some research that shows that parental socioeconomic status (SES) is a significant predictor for children's and adolescents dietary habits including soft drink consumption. With children from lower SES consuming more soft drinks than their counterparts from high SES (C. Vereecken, Legiest, De Bourdeaudhuij, & Maes, 2009). In addition, children from low SES are more likely to be overweight (De Coen et al., 2012).

Due to low participation, some results aren't analysed for the Netherlands. These results are marked n.a. in the table for the Netherlands (table 10). This is also quite clear in the descriptive table (table 1).

5.2 Methodological discussion

5.2.1 Design of the study

The Energy project is a school based cross-sectional study carried out in eight European countries (Johannes Brug et al., 2010). Cross-sectional studies are conducted at one time point or over a short period, and this type of study is carried out to estimate the prevalence of the outcome of interest for a given population, especially in terms of public health planning (Levin, 2006). A cross-sectional study design is used when the purpose of the study is descriptive (often in form of a survey), or when the purpose of the study is to find the prevalence of the outcome of interest (Levin, 2006). The fact that cross-sectional studies are carried out at one time point is one limitation of this design. This gives no indication of the sequence of events – that means we cannot say if the exposure occurred before, after or during the outbreak of the disease (Levin, 2006).

There is a lot of information that can be collected about potential risk factors in a cross-sectional study (Levin, 2006). In a longitudinal study there is often problems with loss to

follow-up studies, and one strategy to overcome this is to minimize the amount of information collected (Levin, 2006). This is on the other hand not a problem in a cross-sectional study design. Other advantages of cross-sectional studies are the fact that they are inexpensive, are very useful for public health planning and understanding of disease etiologic (Levin, 2006). On the other side it is difficult to draw a conclusion about the cause, you only get a glimpse of how the situation is (Levin, 2006). The situation may provide differing results if another timeframe had been chosen. (Levin, 2006). The ENERGY-project explored correlates of EBRB, but not predictors or true determinants. Furthermore, school based surveys need to be done in one school hour; the number of question that can be included in the questionnaire is therefore restrictive (Johannes Brug et al., 2010; van Stralen et al., 2011).

5.2.2 The quality of the child questionnaire

The ENERGY child questionnaire was developed in order to assess EBRBs of the child. Consistency of questionnaires was ensured by translating the original questionnaire (developed in English) into each relevant language and then back-translating into English. Only parts of the child questionnaire will be used in the present study (van Stralen et al., 2011). A test-retest reliability and construct validity study was performed of the child questionnaire using the Intra- Class Correlation (ICC) coefficient and percentage agreement (AS Singh et al., 2011). The test-retest reliability study compared to scores by the same pupil performed one week apart, and the construct validity compared the questionnaire responses and a face-to face interview with the same pupil (AS Singh et al., 2011). The test-retest reliability was good to excellent in 115 (76.6 %) items and moderate in 34 (22.7 %) items for the total sample across all countries. 11 response items did not show acceptable variability. The test-retest reliability was similar across all countries (AS Singh et al., 2011). For the construct validity study a cognitive interview was conducted among approximately three children of each participating class about the same subjects as the questionnaire with a research assistant present. Construct validity appeared to be good to excellent for 70 out of 150 items (46.7 %), moderate of 39 items (26 %) and poor construct validity in 41 items (27.3%) (AS Singh et al., 2011). The construct validity was comparable across all countries, except for Greece and the Netherlands. These findings show that the ENERGY-child questionnaire has good test-retest reliability and moderate to good construct validity for the large majority of items (AS Singh et al., 2011).

5.2.3 Selection and response rate

In this study there was a wide range in response rate at the school level. Between 15 (Slovenia) and 37 (Greece) schools participated in each country (J. Brug et al., 2012). Differences in response rate at schools and also on student level may reduce the external validity of the findings (J. Brug et al., 2012).

Response rate at the child level in this study were in general high (>80 %), except for Hungary, Norway and Spain were lower response rate were obtained (J. Brug et al., 2012). The lower response rate in these countries is probably because parents did not provide active parental informed consent (J. Brug et al., 2012). This may have resulted in participation of children from parents who are more interested in issues regarding obesity prevention, and thus to biased results. Parental data in the Netherlands might be biased to higher levels of education, which may have resulted in lower overall levels of overweight and obesity for this country (J. Brug et al., 2012).

5.2.4 Anthropometrics

Measurements were conducted according to standardized protocols (J. Brug et al., 2012). Measured height and weight is preferred rather than self-reported height and weight. Several studies have examined the validity of self-reported height and weight among adolescents and have found that adolescents' self-reported weight tends to be lower than measured weight (Himes & Story, 1992; Strauss, 1999). For height, however, results vary between that adolescents tend to overestimate their height (Giacchi, Mattei, & Rossi, 1998) or underestimate their height . One other study found either systematic bias (Himes & Story, 1992). On the other hand, self-reports will remain an important health surveillance tool but should not be relied on detect weight problems (Elgar, Roberts, Tudor-Smith, & Moore, 2005).

5.3 Ethical discussion

Ethical considerations on research that involve children are much more complex than deliberations about adult involvement in research (Kelly & Mackay-Lyons, 2010). When researching on children it is important to emphasize that children need protection before, during and after the research process. It is important to take into account the child´s age and individual situation in relation to the method and content of the research (NESH, 2006). Children are a vulnerable group and do not have the competence to give consent for participation in a study. Therefore, consent of the parent or other caregivers must be obtained. If the child is developed and relatively mature and understands the information provided, in relation to the study (12 years old), the researcher should obtain written consent from the child in respect for children's right to a self-determining life (Polit & Beck, 2010). Respect for human dignity involves the participant´s rights to self-determination, which means participants have the freedom to control their own activities, including their voluntary participation in the study (Polit & Beck, 2010).

Another important ethical dilemma the researchers need to consider is the balance between harm and benefit in terms of research involving children (Polit & Beck, 2010). The participants should not be exposed to unnecessary risks of harm or discomfort, and that their participation in research must be essential to achieving scientifically and socially important aims that could not be realized otherwise (Polit & Beck, 2010). Ethical research must use all strategies to prevent this. In addition, the participants needs to be assured that their participation in the given study, or the information they had to give to the researchers, will not be used against them (Polit & Beck, 2010).

The ENERGY-project followed the Helsinki Declaration and the conventions of the Council of Europe on human rights and biomedicine. All participating countries got ethical clearance from the relevant ethical committees and ministries in their respective countries (van Stralen et al., 2011). The specifics regarding where the countries got its ethical approvals is mention elsewhere (van Stralen et al., 2011).

6.0 Strengths and limitations of the study

The ENERGY-project brings together a multidisciplinary team of experts on epidemiology, human nutrition, and physical activity, public health, psychology and health economics (Johannes Brug et al., 2010). This multidisciplinary is strength of the ENERGY-project.

The cross-European design of the study allows unique comparisons in EBRB and their correlates between countries and regions. Not many studies have done so in an international setting (Johannes Brug et al., 2010). Further, ENERGY use different methods to carefully analyze which EBRB that are the most relevant; which behavioral correlates is supported by evidence; and the fact that ENERGY has objectively measured weight, height and waist circumferences of the participating children is another strength of the study.

The ENERGY cross-sectional study also has several potential weaknesses. Many of the measurements in the study are self-reported by the children and their parents. Such self-reports may be liable to social desirability and recall bias (Johannes Brug et al., 2010). Nevertheless, the ENERGY-project with its cross-European approach is a unique endeavor to study EBRB, their potential determinants, and to develop and test an obesity prevention intervention scheme focusing on personal, family environmental and school environmental factors in different European countries.

References

Barclay, K. J., Edling, C., & Rydgren, J. (2013). Peer clustering of exercise and eating behaviours among young adults in Sweden: a cross-sectional study of egocentric network data. [Article]. *BMC Public Health, 13*(1), 1-13.

Bastien, M., Poirier, P., Lemieux, I., & Després, J.-P. (2014). Overview of Epidemiology and Contribution of Obesity to Cardiovascular Disease. *Progress in Cardiovascular Diseases, 56*(4), 369-381.

Bere, E., Glomnes, E. S., te Velde, S. J., & Klepp, K. I. (2008). Determinants of adolescents' soft drink consumption. *Public Health Nutr, 11*(1), 49-56.

Brug, J., te Velde, S., Chinapaw, M., Bere, E., de Bourdeaudhuij, I., Moore, H., . . . Singh, A. (2010). Evidence-based development of school-based and family-involved prevention of overweight across Europe: The ENERGY-project's design and conceptual framework. *BMC Public Health, 10*(1), 276.

Brug, J., van Stralen, M. M., Te Velde, S. J., Chinapaw, M. J., De Bourdeaudhuij, I., Lien, N., . . . Manios, Y. (2012). Differences in weight status and energy-balance related behaviors among schoolchildren across Europe: the ENERGY-project. *PLoS One, 7*(4), e34742.

Buttitta, M., Iliescu, C., Rousseau, A., & Guerrien, A. (2013). Quality of life in overweight and obese children and adolescents: a literature review. *Quality of Life Research*, 1-23.

Cattaneo, A., Monasta, L., Stamatakis, E., Lioret, S., Castetbon, K., Frenken, F., . . . Brug, J. (2010). Overweight and obesity in infants and pre-school children in the European Union: a review of existing data. *Obesity Reviews, 11*(5), 389-398.

Cole, T. J., Bellizzi, M. C., Flegal, K. M., & Dietz, W. H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ, 320*(7244), 1240.

Collison, K. S., Zaidi, M. Z., Subhani, S. N., Al-Rubeaan, K., Shoukri, M., & Al-Mohanna, F. A. (2010). Sugar-sweetened carbonated beverage consumption correlates with BMI, waist circumference, and poor dietary choices in school children. [Article]. *BMC Public Health, 10*, 234-246.

De Bruijn, G. J., Kremers, S. P. J., De Vries, H., Van Mechelen, W., & Brug, J. (2007). Associations of social-environmental and individual-level factors with adolescent soft drink consumption: Results from the SMILE study. *Health Education Research, 22*(2), 227-237.

De Coen, V., Vansteelandt, S., Maes, L., Huybrechts, I., De Bourdeaudhuij, I., & Vereecken, C. (2012). Parental socioeconomic status and soft drink consumption of the child. The mediating proportion of parenting practices. *Appetite, 59*(1), 76-80.

De Craemer, M., De Decker, E., De Bourdeaudhuij, I., Vereecken, C., Deforche, B., Manios, Y., & Cardon, G. (2012). Correlates of energy balance-related behaviours in preschool children: a systematic review. [Article]. *Obesity Reviews, 13*, 13-28.

de Onis, M., Blössner, M., & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children. *The American Journal of Clinical Nutrition, 92*(5), 1257-1264.

Duffey, K. J., Huybrechts, I., Mouratidou, T., Libuda, L., Kersting, M., De Vriendt, T., . . . Popkin, B. M. (2012). Beverage consumption among European adolescents in the HELENA study. *Eur J Clin Nutr, 66*(2), 244-252.

Elgar, F. J., Roberts, C., Tudor-Smith, C., & Moore, L. (2005). Validity of self-reported height and weight and predictors of bias in adolescents. *Journal of Adolescent Health, 37*(5), 371-375.
Erermis, S., Cetin, N., Tamar, M., Bukusoglu, N., Akdeniz, F., & Goksen, D. (2004). Is obesity a risk factor for psychopathology among adolescents? *Pediatrics International, 46*(3), 296-301.
Fisher, J. O., & Birch, L. L. (1999). Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *American Journal of Clinical Nutrition, 69*(6), 1264-1272.
French, S. A., Story, M., & Fulkerson, J. A. (2002). School Food Policies and Practices: A State-Wide Survey of Secondary School Principals. *Journal of the American Dietetic Association, 102*(12), 1785-1789.
Garaulet, M., Ortega, F. B., Ruiz, J. R., Rey-Lopez, J. P., Beghin, L., Manios, Y., . . . Moreno, L. A. (2011). Short sleep duration is associated with increased obesity markers in European adolescents: effect of physical activity and dietary habits. The HELENA study. *Int J Obes, 35*(10), 1308-1317.
Gauthier, K. I., & Krajicek, M. J. (2013). Obesogenic environment: A concept analysis and pediatric perspective. *Journal for Specialists in Pediatric Nursing, 18*(3), 202-210.
Giacchi, M., Mattei, R., & Rossi, S. (1998). Correction of the self-reported BMI in a teenage population. *International Journal of Obesity, 22*(7), 673-677.
Golan, M. (2006). Parents as agents of change in childhood obesity - from research to practice. *International Journal of Pediatric Obesity, 1*(2), 66-76.
Griffiths, L. J., Parsons, T. J., & Hill, A. J. (2010). Self-esteem and quality of life in obese children and adolescents: A systematic review. *International Journal of Pediatric Obesity, 5*(4), 282-304.
Grimm, G. C., Harnack, L., & Story, M. (2004). Factors associated with soft drink consumption in school-aged children. *Journal of the American Dietetic Association, 104*(8), 1244-1249.
Grønli, K. S. (2011). Aktivt liv svekker genetisk fedmerisiko Retrieved 04.11.2011, 2011, from http://www.forskning.no/artikler/2011/november/303558
Gubbels, J., Assema, P., & Kremers, S. J. (2013). Physical Activity, Sedentary Behavior, and Dietary Patterns among Children. *Current Nutrition Reports, 2*(2), 105-112.
Haerens, L., Craeynest, M., Deforche, B., Maes, L., Cardon, G., & De Bourdeaudhuij, I. (2008). The contribution of psychosocial and home environmental factors in explaining eating behaviours in adolescents. *European Journal of Clinical Nutrition, 62*(1), 51-59.
Hebden, L., Hector, D., Hardy, L. L., & King, L. (2013). A fizzy environment: Availability and consumption of sugar-sweetened beverages among school students. *Preventive Medicine, 56*(6), 416-418.
Hill, J. O., & Melanson, E. L. (1999). Overview of the determinants of overweight and obesity: current evidence and research issues. *Med Sci Sports Exerc, 31*(11 Suppl), S515-521.
Himes, J. H., & Story, M. (1992). Validity of self-reported weight and stature of American Indian Youth. *Journal of Adolescent Health, 13*(2), 118-120.
Horst, K., Oenema, A., Looij-Jansen, P., & Brug, J. (2008). The ENDORSE study: research into environmental determinants of obesity related behaviors in Rotterdam schoolchildren. *BMC Public Health, 8*, 142.
Hu, F. B., & Malik, V. S. (2010). Sugar-sweetened beverages and risk of obesity and type 2 diabetes: Epidemiologic evidence. *Physiology & Behavior, 100*(1), 47-54.

Johnson, L., Mander, A. P., Jones, L. R., Emmett, P. M., & Jebb, S. A. (2007). Is sugar-sweetened beverage consumption associated with increased fatness in children? *Nutrition, 23*(7–8), 557-563.
Kautiainen, S. (2005). Trends in adolescent overweight and obesity in the Nordic countries. [Article]. *Scandinavian Journal of Nutrition, 49*(1), 4-14.
Kelly, B., & Mackay-Lyons, M. J. (2010). Ethics of involving children in health-related research: applying a decision-making framework to a clinical trial. *Physiother Can, 62*(4), 338-346.
Kopelman, P. (2007). Health risks associated with overweight and obesity. *Obesity Reviews, 8*, 13-17.
Koplan, J. P., Liverman, C. T., & Kraak, V. I. (2005). Preventing childhood obesity: health in the balance: executive summary. *J Am Diet Assoc, 105*(1), 131-138.
Kremers, S., De Bruijn, G., Visscher, T., Van Mechelen, W., De Vries, N., & Brug, J. (2006). Environmental influences on energy balance-related behaviors: A dual-process view. *Behav Nutr Phys Act*, 3 - 9.
Kremers, S. P. J., De Bruijn, G.-J., Schaalma, H., & Brug, J. (2004). Clustering of energy balance-related behaviours and their intrapersonal determinants. *Psychology & Health, 19*(5), 595-606.
Kuzel, R., & Larson, J. (2014). Treating childhood obesity. *Minn Med, 97*(1), 48-50.
Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evid-based Dent, 7*(1), 24-25.
Lobstein, T., Baur, L., & Uauy, R. (2004). Obesity in children and young people: a crisis in public health. *Obesity Reviews, 5*, 4-85.
Lopez, N. V., Ayala, G. X., Corder, K., Eisenberg, C. M., Zive, M. M., Wood, C., & Elder, J. P. (2012). Parent Support and Parent-Mediated Behaviors Are Associated with Children's Sugary Beverage Consumption. *Journal of the Academy of Nutrition and Dietetics, 112*(4), 541-547.
Ludwig, D. S., Peterson, K. E., & Gortmaker, S. L. (2001). Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *The Lancet, 357*(9255), 505-508.
MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation Analysis. *Annual Review of Psychology, 58*(1), 593-614.
Maffeis, C., & Tato, L. (2001). Long-term effects of childhood obesity on morbidity and mortality. *Horm Res, 55 Suppl 1*, 42-45.
Malik, V. S., Pan, A., Willett, W. C., & Hu, F. B. (2013). Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *The American Journal of Clinical Nutrition, 98*(4), 1084-1102.
Mamun, A. A., Lawlor, D. A., O'Callaghan, M. J., Williams, G. M., & Najman, J. M. (2005). Family and early life factors associated with changes in overweight status between ages 5 and 14 years: findings from the Mater University Study of Pregnancy and its outcomes. *Int J Obes Relat Metab Disord, 29*(5), 475-482.
Miller, P. E., McKinnon, R. A., Krebs-Smith, S. M., Subar, A. F., Chriqui, J., Kahle, L., & Reedy, J. (2013). Sugar-Sweetened Beverage Consumption in the U.S.: Novel Assessment Methodology. *American journal of preventive medicine, 45*(4), 416-421.
Moraeus, L., Lissner, L., Yngve, A., Poortvliet, E., Al-Ansari, U., & Sjöberg, A. (2012). Multi-level influences on childhood obesity in Sweden: societal factors, parental determinants and child's lifestyle. *International Journal of Obesity, 36*(7), 969-976.

Naska, A., Bountziouka, V., & Trichopoulou, A. (2010). Soft drinks: time trends and correlates in twenty-four European countries. A cross-national study using the DAFNE (Data Food Networking) databank. *Public Health Nutr, 13*(9), 1346-1355.
Neef, M., Weise, S., Adler, M., Sergeyev, E., Dittrich, K., Körner, A., & Kiess, W. (2013). Health impact in children and adolescents. *Best Practice & Research Clinical Endocrinology & Metabolism, 27*(2), 229-238.
NESH. (2006). Foskingsetiske retningslinjer for samfunnsvitenskap, humaniora, juss og teologi. http://www.etikkom.no.
Oude Luttikhuis, H., Baur, L., Jansen, H., Shrewsbury, V. A., O'Malley, C., Stolk, R. P., & Summerbell, C. D. (2009). Interventions for treating obesity in children. [Meta-Analysis Review]. *Cochrane Database Syst Rev*(1).
Polit, D., & Beck, C. T. (2010). *Essentials of nursing Nursing Research - Appraising Evidence for Nursing Practice*. Philsdelphia: Wolter Kluwer Health: Lippincott Williams & Wilkins.
Qi, L., & Cho, Y. A. (2008). Gene-environment interaction and obesity. *Nutrition Reviews, 66*(12), 684-694.
Salvy, S.-J., de la Haye, K., Bowker, J. C., & Hermans, R. C. J. (2012). Influence of peers and friends on children's and adolescents' eating and activity behaviors. [Article]. *Physiology & Behavior, 106*(3), 369-378.
Schommer, V. A., Barbiero, S. M., Cesa, C. C., Oliveira, R., Silva, A. D., & Pellanda, L. C. (2014). [Excess Weight, Anthropometric Variables and Blood Pressure in Schoolchildren aged 10 to 18 years.]. *Arq Bras Cardiol, 0*.
Seal, N. (2011). Introduction to Genetics and Childhood Obesity: Relevance to Nursing Practice. *Biological Research For Nursing, 13*(1), 61-69.
Sesé, M. A., Jiménez-Pavón, D., Gilbert, C. C., González-Gross, M., Gottrand, F., de Henauw, S., . . . Moreno, L. A. (2012). Eating behaviour, insulin resistance and cluster of metabolic risk factors in European adolescents. The HELENA Study. *Appetite, 59*(1), 140-147.
Sigrid, G. (2008). Sugar-sweetened soft drinks and obesity: a systematic review of the evidence from observational studies and interventions. [Article]. *Nutrition Research Reviews, 21*(2), 134-147.
Singh, A., Mulder, C., Twisk, J. W. R., Van Mechelen, W., & Chinapaw, M. J. M. (2008). Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obesity Reviews, 9*(5), 474-488.
Singh, A., Vik, F., Chinapaw, M., Uijtdewilligen, L., Verloigne, M., Fernandez-Alvira, J., . . . Brug, J. (2011). Test-retest reliability and construct validity of the ENERGY-child questionnaire on energy balance-related behaviours and their potential determinants: the ENERGY-project. *Int J Behav Nutr Phys Act, 8*, 136.
Stevens, G. A., Singh, G. M., Lu, Y., Danaei, G., Lin, J. K., Finucane, M. M., . . . Ezzati, M. (2012). National, regional, and global trends in adult overweight and obesity prevalences. *Population Health Metrics, 10*(1), 22-37.
Strauss, R. S. (1999). Comparison of measured and self-reported weight and height in a cross-sectional sample of young adolescents. *International Journal of Obesity & Related Metabolic Disorders, 23*(8), 904.
Summerbell, C. D., Waters, E., Edmunds, L. D., Kelly, S., Brown, T., & Campbell, K. J. (2005). Interventions for preventing obesity in children. *Cochrane Database Syst Rev*(3).

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Prev Med, 29*(6 Pt 1), 563-570.
Swinburn, B., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: shaped by global drivers and local environments. *The Lancet, 378*(9793), 804-814.
Tak, N. I., Te Velde, S. J., Oenema, A., Van der Horst, K., Timperio, A., Crawford, D., & Brug, J. (2011). The association between home environmental variables and soft drink consumption among adolescents. Exploration of mediation by individual cognitions and habit strength. *Appetite, 56*(2), 503-510.
te Velde, S. J., van Nassau, F., Uijtdewilligen, L., van Stralen, M. M., Cardon, G., De Craemer, M., . . . ToyBox-study, g. (2012). Energy balance-related behaviours associated with overweight and obesity in preschool children: a systematic review of prospective studies. *Obesity Reviews, 13*, 56-74.
Stea, T.H., Overby, N.C., Klepp, K.I., Bere, E., (2012). Changes in beverage consumption in Norwegian children from 2001 to 2008. *Public Health Nutr, 15*(3), 379-385.
van der Horst, K., Oenema, A., Ferreira, I., Wendel-Vos, W., Giskes, K., van Lenthe, F., & Brug, J. (2007). A systematic review of environmental correlates of obesity-related dietary behaviors in youth. *Health Education Research, 22*(2), 203-226.
van der Horst, K., Timperio, A., Crawford, D., Roberts, R., Brug, J., & Oenema, A. (2008). The School Food Environment: Associations with Adolescent Soft Drink and Snack Consumption. *American journal of preventive medicine, 35*(3), 217-223.
Van Lippevelde, W., te Velde, S. J., Verloigne, M., De Bourdeaudhuij, I., Manios, Y., Bere, E., . . . Maes, L. (2013). Associations between home- and family-related factors and fruit juice and soft drink intake among 10- to 12-year old children. The ENERGY project. *Appetite, 61*, 59-65.
van Stralen, M., te Velde, S., Singh, A., De Bourdeaudhuij, I., Martens, M., van der Sluis, M., . . . Brug, J. (2011). EuropeaN Energy balance Research to prevent excessive weight Gain among Youth (ENERGY) project: Design and methodology of the ENERGY cross-sectional survey. *BMC Public Health, 11*(1), 65.
Vereecken, C., Legiest, E., De Bourdeaudhuij, I., & Maes, L. (2009). Associations Between General Parenting Styles and Specific Food-Related Parenting Practices and Children's Food Consumption. *American Journal of Health Promotion, 23*(4), 233-240.
Vereecken, C. A., Keukelier, E., & Maes, L. (2004). Influence of mother's educational level on food parenting practices and food habits of young children. *Appetite, 43*(1), 93-103.
Wall, M. M., Larson, N. I., Forsyth, A., Van Riper, D. C., Graham, D. J., Story, M. T., & Neumark-Sztainer, D. (2012). Patterns of Obesogenic Neighborhood Features and Adolescent Weight: A Comparison of Statistical Approaches. *American journal of preventive medicine, 42*(5), e65-e75.
Wang, J., & Lobstein, T. (2006). Worldwide trends in childhood overweight and obesity. *Int J Pediatr Obes, 1*, 11 - 25.
Wang, Y., & Lim, H. (2012). The global childhood obesity epidemic and the association between socio-economic status and childhood obesity. *International Review of Psychiatry, 24*(3), 176-188.
Waters, E., de Silva-Sanigorski, A., Hall, B. J., Brown, T., Campbell, K. J., Gao, Y., . . . Summerbell, C. D. (2011). Interventions for preventing obesity in children. [Meta-Analysis Review]. *Cochrane Database Syst Rev*(12).

Wijnhoven, T. M. A., van Raaij, J. M. A., Spinelli, A., Rito, A. I., Hovengen, R., Kunesova, M., . . . Breda, J. (2013). WHO European Childhood Obesity Surveillance Initiative 2008: weight, height and body mass index in 6–9-year-old children. *Pediatric Obesity, 8*(2), 79-97.

Wiseman, M. (2008). The second World Cancer Research Fund/American Institute for Cancer Research expert report. Food, nutrition, physical activity, and the prevention of cancer: a global perspective. *Proc Nutr Soc, 67*(3), 253-256.

World Health Organization. (2013). Obesity and overweight, from http://www.who.int/mediacentre/factsheets/fs311/en/

World health organization. (2014). Childhood overweight and obesity, from http://www.who.int/dietphysicalactivity/childhood/en/index.html

World Obesity Federation. (2014). World map of obesity from http://www.worldobesity.org/aboutobesity/resources/world-map-obesity/?map=children

Wouters, E. J., Larsen, J. K., Kremers, S. P., Dagnelie, P. C., & Geenen, R. (2010). Peer influence on snacking behavior in adolescence. *Appetite, 55*(1).

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Correlates of regular soft drink consumptions and its relation to weight status of children in eight European countries; the ENERGY (EuropeaN Energy balance Research to prevent excessive weight Gain among Youth) cross-sectional study

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Abstract

Background: Current data on correlates of regular soft drink consumption and its relation to weight status among European children is necessary as part of preventive strategies against overweight and obesity among children and adolescents.

Methods: A school-based cross-sectional study of 7915 children in eight European countries. Data on frequency and correlates of regular soft drink consumption were collected. Binary logistic regression analyses were performed with weight status as the dependent variable and correlates as predictors, adjusting for gender, socio-economic status (SES) and ethnicity. Soft drink consumption was then assessed as a potential mediator of the relationship between the correlates and weight status. Binary logistic regression was also performed separately for all countries, and separately for gender, SES and ethnicity.

Results: In the relationship between being overweight and the following correlates were significant; the odds ratio for attitude was 0.47 (95 % CI 0.41-0.54); parent modeling was 0.74 (95 % CI 0.64 – 0.85); preference/liking was 1.35 (95 % CI 1.16 – 1.58) and OR for home availability was 1.34 (95 % CI 1.14 – 1.57). Meaning that children who think they will get fat drinking soft drinks are more likely to be overweight; children who have parents who drink soft drinks not often are less likely to be overweight; children who don't like the taste of soft drinks are more likely to be overweight and children who have low availability of soft drinks at home are more likely to be overweight.
In the fully adjusted model, these OR were all of similar magnitude and still significant; i.e. indicating that child's own soft drink consumption did not mediate the four observed relationships between correlates and weight status described above.

Conclusion: Attitude, parent modeling, preference/liking and home availability were statistical significantly related to weight status among children, and these relationships were not mediated by soft drink consumption.

Keywords: Correlates, Soft drinks, Children, Weight Status

Background

The prevalence of overweight and obesity among children and adolescents has risen throughout Europe and has become a major public health challenge of the 21st century [1]. Even though there are large differences between countries and regions, the prevalence of overweight children is estimated to be approximately 20 % in Europe [2, 3]. In a recent study, 25.8 % and 5.4 % of European boys and 21.8 % and 4.1 % of European girls were categorized as overweight and obese, respectively [4].

Obesity in children develops from a complex interaction between genetics and behavior, mainly related to dietary habits, physical activity and sedentary behavior [5]. Numerous behavioral risk factors has been suggested to promote or protect excess weight gain in children, e.g. diets with high energy density, high consumption of sugar-sweetened beverages (SSB), eating patterns, low levels of physical activity and high levels of sedentary behavior [5]. A contributory factor to the rising prevalence [6-8] of overweight and obesity among children and adolescents thus seem to be the consumption of sugar-sweetened beverages [9-11]. Several studies have found an association between soft drink consumption and obesity, both cross-sectional [12-14] and longitudinal [15]. Malik and colleagues have recently published a systematic review and meta-analysis on SSB and weight gain in children and adults: they found evidence that SSB consumption promotes weight gain in children, but the effect sizes were small [12]. A systematic review by Gibson [16] showed that approximately half of the cross-sectional and prospective studies in this review found a statistically significant association between sugar-sweetened drink consumption and body mass index (BMI), weight, adiposity or weight gain in at least one subgroup. Of the three long-term interventions to reduce consumption of SSB in the same review by Gibson [16], one reported a decrease in obesity prevalence but no change in mean BMI, and two found a significant impact only among children already overweight at baseline. Furthermore, Harnack et al. found that total energy intake among children and adolescents was positively associated with consumption of non-diet soft drinks [17].

Most of the studies on soft drink consumption and overweight among children and adolescents are cross-sectional studies, which means we can not say if the exposure occurred before, after or during the development of obesity [18].

There can be various reasons why children and adolescents consume soft drinks. Gender, educational plans, dieting, accessibility, modeling, attitudes and preferences all seem to be strong correlates of especially adolescents´ soft drink consumption [19]. In addition: taste preferences, soft drink consumption habits of parents and friends, availability at home and in school and television viewing have been described to be associated with soft drink consumption [20]. This study also reported that soft drink consumption in general was higher among boys compared to girls, and intake increased with age [20]. Another study investigated the associations of family-related factors with children´s fruit/juice and soft drink consumption, and found three family-related factors (parental modeling, availability at home and drinking together) who were positively associated with soft drink intake [21]. Additionally, two family related correlates (allowing and parental self-efficacy) were solely associated with soft drink intake of European children [21]. It also appears that both environmental factors as well as personal factors are important correlates of soft drink consumption [22]. As seen from the cross-sectional studies mention above, the relationship between soft drink consumption and a higher weight status are relatively small. Therefore, it is of interest to observe if the correlates might be directly related to overweight or not. Several studies have investigated the correlates of soft drink consumption among children and adolescents [19, 23, 24], e.g. gender, dieting, modeling home availability and socio-economic status. But to our knowledge there are none studies investigating the relationship between the correlates of regular soft drink consumption and weight status among children and adolescents in Europe.

The aims of this study are (1) to assess the potential direct association between the assessed correlates of soft drink consumption and weight status, and consumption of soft drinks as a mediator of these relationships, of children across Europe and differences in these associations between

European countries, and (2) to assess potential socio-demographic differences and inequalities between countries in the correlates and relationships described above in children across Europe.

Methods

The ENERGY-project includes a cross-sectional, school-based survey of anthropometrics and energy balance related behaviors (EBRBs) across eight European countries [25]. The aim of the survey was to provide up to date information on the prevalence of overweight and obesity, and to provide information on the most important EBRBs and their social, cognitive and school environmental correlates [26]. The conceptual design and framework of the project [25] as well as a description of the cross-sectional survey [27] have been published elsewhere.

The present study was conducted according to the guidelines in the Declaration of Helsinki and all procedures involving human subjects were approved by the relevant ethical committees and ministries in each country participating in the study [27]. In Belgium, the Medical Ethics Committee of the University Hospital Ghent; in Greece, the Bioethics Committee of Harokopio University; in Hungary, the Scientific and Ethics Committee of the Health Sciences Council; in the Netherlands; the Medical Ethics Committee of the VU University Medical Center; in Norway, the National Committee for Research Ethics in Norway; in Slovenia, the National Medical Ethics Committee of the Republic of Slovenia; in Spain, the Clinical Research Ethics Committee of the Government of Aragón; and in Switzerland, the Ethical Committee Basel, the Ethical Committee St. Gallen, the Ethical Committee Aargau and the Ethical Committee Bern [27].

Data from “EuropeaN Energy balance Research to prevent excessive weight Gain among Youth” (ENERGY)- study were assessed in this study, and includes data from eight European countries [25].

Sample and procedure

Seven countries were included in the school-based survey (Belgium, Greece, Hungary, the Netherlands, Norway, Slovenia and Spain), conducted between March and July 2010. In May 2010 Switzerland started its survey and distributed the last questionnaires in December. A national sample frame was used in Greece, Hungary, the Netherlands and Slovenia, while schools from specific regions were sampled in Spain, Belgium, Norway and Switzerland. Students in their final years of primary education (aged 10 to 12 years), and one of their parents participated in the study. The sample size was calculated to detect differences in overweight prevalence between countries. Based on previous cross-European studies, a minimum sample of 1000 schoolchildren per country, and one parent (the main caretaker) for each student, were aimed for.

A school recruitment letter was sent to the headmaster of each sampled school, followed by a personal telephone call. Following the schools agreement, parents received a letter explaining the study purpose and were asked for written consent for their child´s participation in countries where active informed consent was required (Belgium, Hungary, Norway, Spain, Greece, Slovenia and Switzerland) or were provided with a form to declare that their child was not to be included in the study in The Netherlands where ethical approval required passive informed consent. The students participating in the study completed the child questionnaire during one school hour in the presence of a trained researcher. The student also received a parent questionnaire in a closed envelope to take home for completion by one of their parents. Completed parent questionnaires were brought back to school in a closed envelope by the student and were collected by the teacher. A total of 199 schools participated, with 7915 children (response rate 60%) and 6512 parents (response rate 55%) completing the questionnaires.

Measures

All measures were obtained using standardized protocols across the countries [27]. Consistency of questionnaires was further ensured by translating the original questionnaire (developed in English)

147 into each relevant language and then back-translating into English. Only parts of the child
148 questionnaire will be used in the present study, further details about other measures and training of
149 research staff are published elsewhere [27].
150

151 **Weight status**

152 Trained researchers measured weight and body height. The child was measured in light clothing
153 without shoes. Weight was measured with a calibrated electronic scale SECA 861 (accuracy of 0.1 kg).
154 Body height was measured with a Seca Leicester Portable stadiometer (accuracy of 0.1 cm). Two
155 readings of each measurement were obtained A third measurement was obtained if the two readings
156 differed more than 1%. All three measurements were then recorded and the outlier was excluded
157 during the data cleaning process and the mean of the two remaining recordings was calculated.
158 The International Obesity Task Force criteria was used as the definition of weight status (normal
159 weight, overweight, obesity) for each child based on the calculated BMI for each child [28].
160

161 **Personal variables**

162 In the child questionnaire gender; “Are you a girl or a boy?” with the response options “girl” and
163 “boy” and ethnicity; “Which language do you most often speak at home?” with the response options:
164 “native language”, “three country specific language options”, “others”, were self-reported. The
165 ethnicity variable was dichotomized into: “native” and “non-native”. Parent’s education level was
166 assessed in the parent questionnaire. Parents (and/or other caregiver) were asked to report their
167 own level of education. Both scores were combined, and dichotomized into low (both
168 parent/caregiver with fewer than 14 years of education) and high (at least one parent/caregiver with
169 14 years or more of education). In this international dataset this approximately distinguishes families
170 with at least one caregiver who has completed medium or high vocational, college or university
171 training from other families.
172

Soft drink consumption and correlates of soft drink consumption

Dietary behaviors were assessed in the child questionnaire. Prevalence of soft drink consumption was assessed by the following question: 'How many times a week do you usually drink fizzy drinks and fruit squash?' with the response options: 'never', 'less than once a week', 'once a week', '2-4 days a week', '5-6 days a week', 'every day, once a day' and 'every day, more than once a day'. This variable was dichotomized into once a week or less vs. more than once a week.

All the correlates for soft drink consumption were dichotomized and linked to different constructs such as personal correlates, family environment or school environment [27]. These constructs will be used further in the article.

Research question 'I think drinking fizzy drinks and fruit squash is' had response option: 'very good', 'good', 'neither good nor bad', 'bad', and 'very bad'. This variable was dichotomized into children who think drinking soft drinks is good vs. children who think drinking soft drinks is bad, and linked to 'attitude'.

'If I drink fizzy drinks or fruit squash my parents/care givers think it is' had response options: 'very good', 'good',… ,'very bad' and was dichotomized into parents who think it is good vs. parents who think it is bad and linked to 'parental subjective norm'. 'If I drink fizzy drinks or fruit squash, most of my friends think this is' had the same response option as the question above and was dichotomized into 'friends who think it is good' and 'friends who think it is bad', and linked to 'peer modeling'.

To determine the children´s thoughts about health, question as 'I think drinking fizzy drinks and fruit squash will make me fat' were asked. The response alternative was 'I fully agree', 'I agree a bit', 'neither agree nor disagree', 'I disagree a bit' and 'I fully disagree'. This question was dichotomized into I disagree that soft drinks will make me fat vs. I agree that soft drinks will make me fat. This determinant was linked to 'health beliefs'. Question as 'I like the taste of fizzy drinks or fruit squash'

with the response option 'I fully agree', 'I agree a bit', …, 'I fully disagree' was dichotomized into children who like the taste vs. children who don't like the taste, and linked to 'preferences/liking'.

'How often does your parents/caregivers drink fizzy drinks or fruit squash?', 'how often do most of your friends drink fizzy drinks or fruit squash?', 'If I ask my parents/caregivers for a fizzy drink or fruit squash, I get one', 'I am allowed to take fizzy drinks or fruit squash whenever I want' and 'Are there usually fizzy drinks or fruit squash at your home?' had response option: 'always', 'often', 'sometimes', 'not often' and 'never'. The first of these questions was dichotomized into parents who drink soft drinks often vs. parents who do not drink soft drinks often, and linked to 'parent modeling'. The second was dichotomized into friends who drink soft drinks often vs. friends who do not drink soft drinks often, and linked to 'peer modeling'. The third question was dichotomized into children who often get one vs. children who never get one. This determinant item was called 'parental practices 2'. The fourth question was dichotomized into I´m always allowed to take soft drinks vs. I´m not allowed to take soft drinks whenever I want and was called 'parental practices 1'. The last question was dichotomized into there are always soft drinks at our home vs. there are not often soft drinks at our home and linked to 'home availability'.

Statistical Methods

All data were analyzed using SPSS version 19 (SPSS Inc. Chicago, IL). Descriptive analysis (frequencies) and one-way ANOVA tests were performed to calculate proportions classified as normal weight and overweigh (including obese), according to gender, ethnicity, parental education and country [29]. The eleven correlates of regular soft drink consumption that were chosen in this study were calculated according to weight status, gender, ethnicity, parental education and country (table 1).

To assess research question 1, binary logistic regression analyses were performed with weight status as the dependent variable (table 2); model 1 included gender, ethnicity and socio-economic status (SES), model 2 included correlates of regular soft drink consumption chosen in this study and model

1, and model 3 included times per week consuming soft drinks and model 2. The third model was included in order to assess the consumption of soft drinks as a mediator of the potential relationships between the correlates and weight status; if a significant relationship became less significant it was taken as an indicator for soft drink consumption being a mediator [30]. Gender, ethnicity, SES and the correlates of regular soft drink consumption were included in the models in order to adjust for these potential confounders. To assess research question 2, binary logistic regression analyses were performed separately for all countries (stratified by country) and separate for gender, SES and ethnicity (stratified by gender, SES, ethnicity).

Results

The study sample included 7915 children; mean age 11,5 years, 52 % girls, 91 % native ethnicity and 47 % had parents with high education. Further 77 % and 23 % were categorized as normal weight and overweigh (including obese), respectively (table 1).

Children with highly educated parents reported a lower consumption of soft drinks per week than children with low educated parents (p= ≤0.001). Further, both attitude (p= ≤0.001) and parental practices 1 (p= ≤0.001) are statistical significant between high education vs. low education. Among children with native ethnicity 28 % reported drinking soft drinks less than once a week, 22 % non-native children also reported drinking soft drinks less than once a week (p= ≤0.001). Native children reported 44 % for correlate parental practice 1, and non-native children reported 31 % (p= ≤0.001). Regarding parental practices 1, gender (girls vs. boys), ethnicity (native vs. non-native) and SES (high education vs. low education) was statistical significant (p= ≤0.001).

Between countries, there were large differences among the different correlates. In The Netherlands, only 0.8 % of the children reported drinking soft drinks less than once a week, compared to 39 % in Greece and 40 % in Slovenia. Peer subjective norm varied between 21 % in Hungary to 86 % in

Norway. Further, parental practices 2 differed between 9 % in The Netherlands compared to 42 % in Spain. There were also large country differences in home availability, with Greek children reporting 43 % and Slovenian children reporting 44 % compared to 5 % in Dutch children (table 1).

In the relationship between potential correlates and being overweight the following correlates were significant (model 2, table 2); the odds ratio for attitude was 0.47 (95% CI 0.41-0.54); parenting modeling was 0.74 (95% CI 0.64-0.85); preference/liking was 1.35 (95% CI 1.16-1.58) and the OR for home availability was 1.34 (95% CI 1.14-1.57). In the fully adjusted model (model 3, table 2), these OR were all of similar magnitude and still significant was 0.47 (95% CI 0.41-0.54), 0.74 (95% CI 0.64-0.85), 1.35 (95% CI 1.16-1.58) and 1.36 (95% CI 1.13-1.58) for the correlates attitude, parent modeling, and preference/liking and home availability respectively.

The second part of research question 2 was to assess the potential socio-demographic differences and inequalities in the relationship described above. The analyses to answer this part of the second research question is conducted, but there were few differences between the countries, gender, SES groups and ethnicity groups regarding the relationships between the correlates and weight status

Discussion

When examining the relationship mention above we found that children who think they will get fat drinking soft drinks are more likely to be overweight than children who don't think they will get fat. Children who have parents who drink soft drinks not often are less likely to be overweight than children with parents who don't drink soft drinks often. Further, children who don't like the taste of soft drinks are more likely to be overweight than children who like the taste of soft drinks, and children who have low availability of soft drinks at home are more likely to be overweight than those who have high availability at home.

Parents clearly appear as important role models in children and adolescents soft drink consumption and previous studies have found that parental soft drink intake have shown to be related to children`s soft drink intake [20, 21, 31]. Youth whose parents regularly drank soft drinks have been reported to be 2.88 times more likely to consume soft drinks five or more times per week compared with those whose parents did not regularly drink soft drinks [20]. Moreover, this study (20) says nothing about the child's weight status according to parental soft drink intake, but it might be that children of parents who consume a large amount of soft drinks are more likely to be overweight than those whose parents don't drink soft drinks regularly.

Several studies have examined the relationship between the availability of soft drinks at home and soft drink consumption and these studies show that availability at home are associated with soft drink intake [20, 32, 33]. In one study, students aged 9-16 years were almost five times as likely to be high consumers if soft drinks were usually available in their homes [9], and another study found a moderate positive association between home food availability and girls' soft drink consumption [34]. Another study found that high food availability in the home environment was associated with lower child weight, but only in food-insecure families [35]. Although these findings only investigated the home availability and food and soft drink intake, with the possible assumption that children who have high availability at home are more likely to be overweight, these findings are somewhat opposite from what we found in our study with children who have low availability of soft drinks at home were more likely to be overweight than children with high availability at home. An explanation might be that children consume soft drinks at schools or at friends when the availability is low at home, because low availability of soft drinks at home is not synonymous with low soft drink intake in general among children. But low availability of soft drinks at home may cause higher consumption of e.g. fruit juice, and several studies [36, 37] have shown a positive association between fruit juice intake and overweight.

In addition, cross-sectional evidence has revealed that the extent to which parents, particularly mothers, practice healthy eating behaviors and make healthy foods available correlates positively with children's level of consumption [35]. However, if a parent or caregiver is making certain foods available in the home, it is likely because that parent or caregiver is also eating those foods, so it is not easy to separate parent modeling and home availability due to that these two correlates naturally co-occur [35].

In this study, we observe that children with low availability of soft drinks at home – and have parents who drink soft drinks regularly – are more overweight. This is somewhat contradictory, but interesting. An explanation to this may be that children experience low availability at home because their parents drink what is available, and perhaps this leads to children consuming soft drinks elsewhere. Since both parental soft drink intake and availability at home seems to play a role for children and adolescents soft drink intake, future intervention studies could target the home and parents when preventing overweight and obesity among children and adolescents.

In our study we also found a statistical significant association between preference/liking and weight status with children who don't like the taste of soft drinks being more likely to be overweight than children who like the taste. Studies on this relationship are limited, but few studies have examined the relationship between taste preference and food intake [38, 39]. Because children eat what they like and leave the rest, food preference are especially important correlates of food intake in young children. The choice children make are important in considering the overall nutritional quality of their diets [38], and it is reasonable to believe that taste preference may have an impact on children soft drink intake as well. Our findings on the other hand are quite opposite than what other studies have shown. There can be varied reasons why, and a longitudinal study on children's taste preferences found that the strongest predictor of the number of foods that a child liked at age 8 was the number of foods liked at age 4 [40]. This reinforces that taste preferences begin early in life, and may explain why some children don't like the taste of soft drinks, simply because they didn't like it

334 when they were infants. Another explanation may be that because children don't like soft drinks they
335 replace this with other beverages, such as fruit juices. Several studies show that fruit-juice may be
336 associated with overweight [36, 41]. But to determine if taste associate with weight status of
337 children (one way or another) further and more recent research is needed in this field.
338
339 Children who think they will get fat drinking soft drinks are more likely to be overweight than
340 children who don't think they will get fat. Why children think this behavior is making him or her fat
341 may be a combination of many factors. Some of these factors may be that children have high
342 consumers at home or in close family, or maybe these children think that soft drink consumption
343 causes weight gain. The evidence is small, and the factors that contribute to what children think
344 about causes of weight gain are multifactorial. There are some existing data though on beliefs of the
345 cause and effect of weight status among children [42]. Lower self-esteem was found in the children
346 who believed that they are responsible for their own overweight, and other evidence gathered in the
347 same study support the view that the overweight child is more vulnerable to low self-esteem [42].
348
349 There are gender differences in soft drink consumption with boys consuming more soft drinks per
350 week than girls. This gender differences is consistent with findings from other studies investigating
351 beverage consumption in European [10, 43] and US children [44]. Several studies [24, 45] also show
352 that parents' SES has an impact on the child´s consumption of sugar-sweetened beverages, with high
353 SES children consuming less soft drink than low SES children. The present study showed similar
354 results with children with high-educated parents consuming less soft drink per week than children
355 with low- educated parents.
356
357 This study found that non-native children consumed more soft drinks per week than native children.
358 The results are in line with earlier studies in different countries in Europe indicating that differences
359 according to ethnicity or immigrant status occur in weight status and dietary habits [46-48].
360 Moreover, higher consumption of soft drinks may be caused by other factors as well, and not only

361 their ethnicity because ethnic minorities in Europe are often less well off in many other aspects in life
362 than native people – on average they are often lower educated, lower income levels and more likely
363 to live in poor neighborhoods [49].
364
365 In the fully adjusted model (model 3), we found that the child's own soft drink consumption did not
366 mediate the four observed relationships between correlates and weight status described above. That
367 means that parent's consumption are not related to child weight status because children drink more
368 soft drinks. An explanation for this might be that health behavior often is associated with each other,
369 e.g. that overall low intake of fruits and vegetables and excessive soft drink consumption and high-
370 fat-containing snacks are associated [50]. Another explanation can be that this is difficult to measure
371 and these measurements are often self-reported by children/parents, and we cannot verify if the
372 information given by the children and their parents are correct or not. Furthermore, overweight
373 children and their families may have changed their behavior because they are overweight.
374
375 **Strengths and limitations of the study**
376
377 There were some limitations in this study. First, because the present study was a cross-sectional
378 study, it was not possible to make statements about causality when significant associations were
379 found. Second, there were some differences in response rates at student (e.g. the Netherlands) level
380 between countries; this could have reduced the generalizability of the findings. In addition, response
381 rates at the student level were lower in Hungary, Norway and Spain compared to the other
382 countries. This was mostly because parents did not provide active parental informed consent. This
383 may result in participation of children from parents who are more interested in issues regarding
384 obesity prevention, and thus to biased results. Further, dietary behaviors were based on self-report,
385 and this may be a weakness of the study because you cannot verify that the information the
386 informant gives is correct. Nevertheless, the measures showed good test-retest reliability and
387 construct validity [51].

However, there were some important strengths of the present study; the study's multidisciplinary and the large multi-national sample allowing unique comparisons across eight European countries, the range of countries involved, and the range of potential correlates of soft drinks covered. Furthermore, the fact that the children`s weight and height have been measured objectively strengthen this study further.

Conclusion

In this study we found four correlates of regular soft drink consumption; attitude, parental modeling, preference/liking and home availability that was related to weight status among children in eight European countries. We also found that the child's own soft drink consumption was not mediating the four observed relationship between correlates and weight status.

Furthermore, there were several statistical significant potential socio-demographic differences and inequalities between countries and in the determinants. There were few differences between countries, sexes, SES groups and ethnicity groups regarding the relationship between the determinants and weight status.

Abbreviations

SES: Socio-economic status

SSB: sugar-sweetened beverages

BMI: body mass index

EBRB: energy balance related behaviors

Author`s contributions:

K.M. analyzed the data and drafted the manuscript. The process forward is to send the manuscript to others in the ENERGY-project for imput and comments before it is submitted to the International journal of behavioral nutrition and physical activity (IJBNPA).

Competing interests

The author declares that she has no competing interests.

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References

1. Wang Y and Lim H: **The global childhood obesity epidemic and the association between socio-economic status and childhood obesity**. *International Review of Psychiatry* 2012, **24**(3): p. 176-188.
2. Jackson-Leach R and Lobstein T: **Estimated burden of paediatric obesity and co-morbidities in Europe. Part 1. The increase in the prevalence of child obesity in Europe is itself increasing**. *International journal of pediatric Obesity* 2006, p. 26-32.
3. Lobstein T and Jackson-Leach R: **Estimated burden of paediatric obesity and co-morbidities in Europe. Part 2. Numbers of children with indicators of obesity-related disease**. *International journal of pediatric Obesity* 2006, p. 33-41.
4. Brug J, van Stralen MM, Te Velde SJ, Chinapaw MJ, De Bourdeauij I, Lien N, Bere E, Maskini V, Singh AS, Maes L: **Differences in weight status and energy-balance related behaviors among schoolchildren across Europe: the ENERGY-project**. PLoS One, 2012, **7**(4): p. e34742.
5. Rennie K, Johnson L, Jebb S: **Behavioural determinants of obesity**. *Best Pract Res Clin Endocrinol Metab* 2005, **19**: p. 343 - 358.
6. Waters E, de Silva-Sanigorski A, Hall BJ, Brown T, Campbell KJ, Gao Y, Armstrong R, Prosser L, Summerbell CD: **Interventions for preventing obesity in children**. *Cochrane Database Syst Rev* 2011, (12): p. CD001871.
7. Swinburn BA, Sacks G, Hall KD, McPherson K, Finegood DT, Moodie ML, Gortmaker SL: **The global obesity pandemic: shaped by global drivers and local environments**. *The Lancet* 2011, **378**(9793): p. 804-814.
8. Lobstein T, Baur L, Uauy R: **Obesity in children and young people: a crisis in public health**. *Obesity Reviews* 2004, **5**: p. 4-85.
9. Hebden L,Hector D, Hardy LL, King L: **A fizzy environment: Availability and consumption of sugar-sweetened beverages among school students**. *Preventive Medicine* 2013, **56**(6): p. 416-418.
10. Duffey KJ, Huybrechts I, Mouratidou T, Libuda L, Kersting M, De Vriendt T, Gottrand F, Widhalm K, Dallongeville J, Hallstrom L, Gonzalez-Gross M, De Henauw S, Moreno LA, Popkin BM: ***Beverage consumption among European adolescents in the HELENA study***. *Eur J Clin Nutr* 2012, **66**(2): p. 244-252.
11. James J, Thomas P, Cavan D, Kerr D: **Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial**. *BMJ* 2004, **328**(7450): p. 1237.
12. Malik VS, Pan A, Willett WC, Hu FB: ***Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis***. *The American Journal of Clinical Nutrition* 2013, **98**(4): p. 1084-1102.
13. Collison KS, Zadi MZ, Subhani SN, Al-Rubeaan K, Shoukri M, Al-Mohanna FA: **Sugar-sweetened carbonated beverage consumption correlates with BMI, waist circumference, and poor dietary choices in school children**. *BMC Public Health* 2010, **10**: p. 234-246.
14. Basu S, McKee M, Galea G, Stuckler D: **Relationship of soft drink consumption to global overweight, obesity, and diabetes: a cross-national analysis of 75 countries.** *Am J Public Health* 2013, **103**(11): p. 2071-7.
15. Zheng M, Rangan A, Olsen NJ, Bo-Andersen L, Wedderkopp N, Kristensen P, Grontred A, Ried-Larsen M, Lempert SM, Allman-Farinelli M, Heitmann BL:

Sugar-sweetened beverages consumption in relation to changes in body fatness over 6 and 12 years among 9-year-old children: the European Youth Heart Study. *Eur J Clin Nutr* 2014, **68**(1): p. 77-83.
16. Sigrid, G: **Sugar-sweetened soft drinks and obesity: a systematic review of the evidence from observational studies and interventions**. *Nutrition Research Reviews* 2008, **21**(2): p. 134-147.
17. Harnack L, Stang J, Story M: **Soft Drink Consumption Among US Children and Adolescents: Nutritional Consequences.** *Journal of the American Dietetic Association* 1999, **99**(4): p. 436-441.
18. Levin KA: **Study design III: Cross-sectional studies.** *Evid-based Dent* 2006, **7**(1): p. 24-25.
19. Bere E, Glomnes ES, te Velde SJ, Klepp KI: **Determinants of adolescents' soft drink consumption.** *Public Health Nutr* 2008, **11**(1): p. 49-56.
20. Grimm GC, Harnack L, Story M: **Factors associated with soft drink consumption in school-aged children**. *Journal of the American Dietetic Association* 2004, **104**(8): p. 1244-1249.
21. Van Lippevelde W, te Velde SJ, Verloigne M, De Bourdeaudhuij I, Manios Y, Bere E, Jan N, Fernandez-Alvira JM, Chinapaw MJ, Bringolf-Isler B, Kovacs E, Brug J, Maes L: **Associations between home- and family-related factors and fruit juice and soft drink intake among 10- to 12-year old children. The ENERGY project**. *Appetite* 2013, **61**: p. 59-65.
22. Story M, Neumark-Sztainer D, French S: **Individual and Environmental Influences on Adolescent Eating Behaviors.** *Journal of the American Dietetic Association* 2002, **102**(3, Supplement): p. S40-S51.
23. Must A and Strauss RS: **Risks and consequences of childhood and adolescent obesity**. *International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity* 1999, **23 Suppl 2**: p. S2-11.
24. Pabayo R, Spence JC, Cutumisu N, Casey L, Storey K: **Sociodemographic, behavioural and environmental correlates of sweetened beverage consumption among pre-school children**. *Public Health Nutrition* 2012, **15**(08): p. 1338-1346.
25. Brug J, te Velde S, Chinapaw M, Bere E, de Bourdeaudhuij I, Moore H, Maes L, Jensen J, Manios Y, Lien N, Klepp K, Lobstein T, Martens M, Salmon J, Singh A: **Evidence-based development of school-based and family-involved prevention of overweight across Europe: The ENERGY-project's design and conceptual framework.** *BMC Public Health* 2010, **10**(1): p. 276.
26. Fernández-Alvira JM, te Velde SJ, de Bourdeaudhuij I, Bere E, Manios Y, Kovacs E, Jan N, Brug J, Moreno LA: **Parental education associations with children's body composition: mediation effects of energy balance-related behaviors within the ENERGY-project.** *International Journal of Behavioral Nutrition & Physical Activity* 2013, **10**(1): p. 80-88.
27. van Stralen M, te Velde S, Singh A, De Bourdeaudhuij I, Martens M, van der Sluis M, Manios Y, Grammatikaki E, Chinapaw M, Maes L, Bere E, Jensen J, Moreno L, Jan N, Molnar D, Moore H, Brug J: **EuropeaN Energy balance Research to prevent excessive weight Gain among Youth (ENERGY) project: Design and methodology of the ENERGY cross-sectional survey.** *BMC Public Health* 2011, **11**(1): p. 65.
28. Cole TJ, Bellizzi MC, Flegal KM, Dietz WH: **Establishing a standard definition for child overweight and obesity worldwide: international survey.** *BMJ* 2000, **320**(7244): p. 1240.

29. Hellevik O: **Linear versus logistic regression when the dependent variable is a dichotomy**. *Quality & Quantity* 2009, **43**(1): p. 59-74.
30. MacKinnon DP, Fairchild AJ, Fritz MS: **Mediation Analysis**. *Annual Review of Psychology* 2007, **58**(1): p. 593-614.
31. Totland TH, Lien N, Bergh IH, Bjelland M, Gebremariam MK, Klepp KI, Andersen LF: **The relationship between parental education and adolescents' soft drink intake from the age of 11-13 years, and possible mediating effects of availability and accessibility**. *Br J Nutr* 2013, **110**(5): p. 926-33.
32. Verloigne M, van Lippevelde W, Maes L, Brug J, de Bourdeaudhuij I: **Family- and school-based correlates of energy balance-related behaviours in 10–12-year-old children: a systematic review within the ENERGY (EuropeaN Energy balance Research to prevent excessive weight Gain among Youth) project.** *Public Health Nutrition* 2012, **15**(08): p. 1380-1395.
33. Bjelland M, Lien N, Grydeland M, Bergh IH, Anderssen SA, Klepp KI, Andersen LF: **Intakes and perceived home availability of sugar-sweetened beverages, fruit and vegetables as reported by mothers, fathers and adolescents in the HEIA (HEalth In Adolescents) study.** *Public Health Nutrition* 2011, **14**(12): p. 2156-2165.
34. Bauer KW, Neumark-Sztainer D, Fulkerson JA, Hannan PJ, Story M: **Familial correlates of adolescent girls' physical activity, television use, dietary intake, weight, and body composition**. *Int J Behav Nutr Phys Act* 2011, **8**: p. 25.
35. Ventura A and Birch L: **Does parenting affect children's eating and weight status?** *In J Behav Nutr Phys Act* 2008, **5**: p. 15.
36. Dennison BA Rockwell HL, Baker SL: **Excess Fruit Juice Consumption by Preschool-aged Children Is Associated With Short Stature and Obesity**. *Pediatrics* 1997, **99**(1): p. 15-22.
37. Faith MS, Dennison BA, Edmunds LS, Stratton HH: **Fruit Juice Intake Predicts Increased Adiposity Gain in Children From Low-Income Families: Weight Status-by-Environment Interaction**. *Pediatrics* 2006, **118**(5): p. 2066-2075.
38. Birch LL and Fisher JO: **Development of Eating Behaviors Among Children and Adolescents**. *Pediatrics* 1998, **101**(Supplement 2): p. 539-549.
39. Birch LL: **Psychological Influences on the Childhood Diet**. *The Journal of Nutrition* 1998, **128**(2): p. 407S-410S.
40. Skinner JD, Carruth BR, Bounds W, Ziegler PJ: **Children's food preferences: A longitudinal analysis.** *Journal of the American Dietetic Association* 2002, **102**(11): p. 1638-1647.
41. Wojcicki JM and Heyman MB: **Reducing Childhood Obesity by Eliminating 100% Fruit Juice.** *American Journal of Public Health* 2012, **102**(9): p. 1630-1633.
42. Pierce JW and Wardle J: **Cause and Effect Beliefs and Self-esteem of Overweight Children**. *Journal of Child Psychology and Psychiatry* 1997, **38**(6): p. 645-650.
43. Coppinger T, Jeanes YM, Mitchell M, Reeves S: **Beverage consumption and BMI of British schoolchildren aged 9–13 years.** *Public Health Nutrition* 2013, **16**(7): p. 1244-1249.
44. Miller PE, McKinnon RA, Krebs-Smith SM, Subar AF, Chriqui J, Kahle L, Reedy J: **Sugar-Sweetened Beverage Consumption in the U.S.: Novel Assessment Methodology**. *American journal of preventive medicine*, 2013, **45**(4): p. 416-421.
45. Han E and Powell LM: **Consumption Patterns of Sugar-Sweetened Beverages in the United States.** *Journal of the Academy of Nutrition & Dietetics* 2013, **113**(1): p. 43-53.

46. Brug J, van Stralen MM, te Velde SJ, Chinapaw MJ, de Bourdeaudhuij I, Lien N, Bere E, Maskini V, Singh AS, Maes L, Moreno L, Jan N, Kovacs E, Lobstein T, Manios Y: **Differences in weight status and energy-balance related behaviours according to ethnic background among adolescents in seven countries in Europe: the ENERGY-project.** *Pediatr Obes* 2012, **7**(5): p. 399 - 411.
47. Nicolaou M, Doak CM, van Dam RM, Brug J, Stronsk K, Seidell JC: **Cultural and social influences on food consumption in dutch residents of Turkish and moroccan origin: a qualitative study**. *J Nutr Educ Behav* 2009, **41**(4): p. 232-41.
48. Kleiser C, Mensink GB, Neuhauser H, Schenk L, Kurth BM: **Food intake of young people with a migration background living in Germany**. *Public Health Nutr* 2010, **13**(3): p. 324-30.
49. Caperchione CM, Kolt GS Mummery WK: **Physical activity in culturally and linguistically diverse migrant groups to Western society: a review of barriers, enablers and experiences**. *Sports Med* 2009, **39**(3): p. 167-77.
50. Jiménez-Cruz A, Bacardí-Gascón M, Jones EG: **Consumption of Fruits, Vegetables, Soft Drinks, and High-Fat-Containing Snacks Among Mexican Children on the Mexico-U.S. Border**. *Archives of Medical Research* 2002, **33**(1): p. 74-80.
51. Singh AS, Vik FN, Chinapaw MJ, Uijtdewilligen L, Verloigne M, Fernandez-Alvira JM, Stomfai S, Manios Y, Martens M, Brug J: **Test-retest reliability and construct validity of the ENERGY-child questionnaire on energy balance-related behaviours and their potential determinants: the ENERGY-project**. *Int J Behav Nutr Phys Act* 2011, **8**: p. 136.

Table 1. Descriptive analysis of the proportion classified as normal weight and overweight (included obese), as well as the correlates of regular soft drink consumption related to weight status, gender, parental education level, ethnicity and country.

Total	**N**	**Normal weight**	**Overweight**	**Soft drink consumption - less than once a week**	**Attitude**	**Health beliefs**	**Parental subjective norm**	**Peer subjective norm**
		%	**%**	**%**	**%**	**%**	**%**	**%**
	7915	**77**	**23**	**27**	**77**	**53**	**85**	**54**
Normal weight	5953			27	77	49	86	54
Overweight	1773			30	80	70	88	57
p-value				0,15	0,008	≤0,001	0,23	0,73
Girls	4111	79	21	32	82	58	88	58
Boys	3792	75	25	23	73	50	85	51
p-value		≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001
Low education	2020	73	27	26	73	55	88	55
High education	3719	80	20	32	82	54	89	57
p-value		≤0,001	≤0,001	≤0,001	≤0,001	0,414	0,094	0,156
Non-native	617	74	26	22	73	54	85,7	52
Native	7175	77	23	28	78	54	87	55
p-value		0,12	0,116	≤0,001	0,006	0,805	0,534	0,172
Belgium	1008	85	15	19	76	57	82	49
Greece	1100	59	41	39	91	70	91	71
Hungary	1022	75	25	21	47	49	81	21
The Netherlands	959	84	16	0,8	79	46	61	39
Norway	1006	86	14	25	90	55	97	86
Slovenia	1187	73	27	40	69	53,5	87	50
Spain	1025	75	25	36	86	49	91	51
Switzerland	608	86	14	26	74	38	94	66
p-value		≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001

)4

Peer subjective norm	Parent modelling	Peer modelling	Preference/ liking	Parental practices (4)	Parental practices (1)	Home availability
%	%	%	%	%	%	%
54	**43**	**10**	**24**	**27**	**42**	**27**
54	44	10	22	27	42	26
57	43	11	32	30	47	33
0,73	0,316	0,199	≤0,001	0,006	≤0,001	≤0,001
58	45	12	29	29	45	30
51	42	8	19	26	40	24
≤0,001	0,005	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001
55	42	11	29	28	39	27
57	47	10	25	31	50	30
0,156	≤0,001	0,878	0,004	0,056	≤0,001	0,017
52	43	9	25	26	31	25
55	44	10	24	27	44	27
0,172	0,776	0,407	0,495	0,408	≤0,001	0,166
49	37	4	12	14	34	11
71	50	17	46	37	53	43
21	25	4	18	15	30	22
39	31	3	7	9	23	5
86	39,5	8	9	33	62	19
50	54	14	40	33	38	44
51	52	17	26	42	60	33
66	58	9	27,5	33	30	33
≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001

Table 2. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in a sample of 7915 European children.

Total (N=7915)	Model 1	Model 2	Model 3
Gender	0.75 (0.66 - 0.85)	0.66 (0.58 - 0.75)	0.66 (0.58 - 0.75)
Ethnicity	0.97 (0.75 - 1.25)	0.96 (0.74-1.25)	0.96 (0.74 - 1.25)
SES	0.7 (0.6 - 0.79)	0.69 (0.6-0.79)	0.69 (0.6 -79)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.05(0.88-1.26)	1.05 (0.88-1.26)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.47 (0.41-0.54)	0.47 (0.41-0.54)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.93 (0.73-1.17)	0.93 (0.74-1.17)
Friends who think it is bad to drink soft drinks (B7)		1.06 (0.92-1.23)	1.06 (0.92-1.23
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.74 (0.64 - 0.85)	0.74 (0.64-0.86)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.97 (0.78 - 1.2)	0.98 (0.78-1.2)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.35 (1.16 - 1.58)	1.35 (1.16-1.6)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. (B13)		0.98 (0.83-1.16)	0.98 (0.83-1-16)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.1 (0.96 -1.3)	1.1 (0.96-1.3)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.34 (1.14-.1.57)	1.36 (1.13-1.58)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.01(0.86-1.19)

Appendix I

Total	N	Normal weight	Overweight	Soft drink consumption - less than once a week	Attitude	Health beliefs	Parental subjective norm	Peer subjective norm
		%	%	%	%	%	%	%
	7915	**77**	**23**	**27**	**77**	**53**	**85**	**54**
Normal weight	5953			27	77	49	86	54
Overweight	1773			30	80	70	88	57
p-value				0,15	0,008	≤0,001	0,23	0,73
Girls	4111	79	21	32	82	58	88	58
Boys	3792	75	25	23	73	50	85	51
p-value		≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001
Low education	2020	73	27	26	73	55	88	55
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p-value		≤0,001	≤0,001	≤0,001	≤0,001	0,414	0,094	0,156
Non-native	617	74	26	22	73	54	85,7	52
Native	7175	77	23	28	78	54	87	55
p-value		0,12	0,116	≤0,001	0,006	0,805	0,534	0,172
Belgium	1008	85	15	19	76	57	82	49
Greece	1100	59	41	39	91	70	91	71
Hungary	1022	75	25	21	47	49	81	21
The Netherlands	959	84	16	0,8	79	46	61	39
Norway	1006	86	14	25	90	55	97	86
Slovenia	1187	73	27	40	69	53,5	87	50
Spain	1025	75	25	36	86	49	91	51
Switzerland	608	86	14	26	74	38	94	66
p-value		≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001

Parent modelling	Peer modelling	Preference/ liking	Parental practices (4)	Parental practices (1)	Home availability
%	%	%	%	%	%
43	**10**	**24**	**27**	**42**	**27**
44	10	22	27	42	26
43	11	32	30	47	33
0,316	0,199	≤0,001	0,006	≤0,001	≤0,001
45	12	29	29	45	30
42	8	19	26	40	24
0,005	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001
42	11	29	28	39	27
47	10	25	31	50	30
≤0,001	0,878	0,004	0,056	≤0,001	0,017
43	9	25	26	31	25
44	10	24	27	44	27
0,776	0,407	0,495	0,408	≤0,001	0,166
37	4	12	14	34	11
50	17	46	37	53	43
25	4	18	15	30	22
31	3	7	9	23	5
39,5	8	9	33	62	19
54	14	40	33	38	44
52	17	26	42	60	33
58	9	27,5	33	30	33
≤0,001	≤0,001	≤0,001	≤0,001	≤0,001	≤0,001

Appendix II

Table 2. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in a sample of 7915 European children.

Total (N=7915)	Model 1	Model 2	Model 3
Gender	0.75 (0.66 - 0.85)	0.66 (0.58 - 0.75)	0.66 (0.58 - 0.75)
Ethnicity	0.97 (0.75 - 1.25)	0.96 (0.74-1.25)	0.96 (0.74 - 1.25)
SES	0.7 (0.6 - 0.79)	0.69 (0.6-0.79)	0.69 (0.6 -79)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.05(0.88-1.26)	1.05 (0.88-1.26)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.47 (0.41-0.54)	0.47 (0.41-0.54)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.93 (0.73-1.17)	0.93 (0.74-1.17)
Friends who think it is bad to drink soft drinks (B7)		1.06 (0.92-1.23)	1.06 (0.92-1.23
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.74 (0.64 - 0.85)	0.74 (0.64-0.86)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.97 (0.78 - 1.2)	0.98 (0.78-1.2)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.35 (1.16 - 1.58)	1.35 (1.16-1.6)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. (B13)		0.98 (0.83-1.16)	0.98 (0.83-1-16)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.1 (0.96 -1.3)	1.1 (0.96-1.3)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.34 (1.14-.1.57)	1.36 (1.13-1.58)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.01(0.86-1.19)

Model 1: gender, ethnicity and SES

Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption

Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix III

Table 3. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Belgium

	Model 1	Model 2	Model 3
Gender	0.72 (0.46 - 1.13)	0.63 (0.39 - 1.01)	0.63 (0.4 - 1.01)
Ethnicity	0.78 (0.33 - 1.84)	0.88 (0.37 - 2.13)	0.88 (0.36 - 2.13)
SES	0.78 (0.44 - 1.38)	0.82 (0.45 - 1.47)	0.81 (0.45 - 1.47)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.2 (0.63 - 2.27)	1.3 (0.66 - 2.39)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.34 (0.2 - 0.57)	0.33 (0.2 - 0.57)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		1.16 (0.55 - 2.45)	1.17 (0.55 - 2.5)
Friends who think it is bad to drink soft drinks (B7)		1.44 (0.88 - 2.36)	1.43 (0.87 - 2.35)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.58 (0.34 - 0.98)	0.6 (0.34 - 0.98)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.4 (0.09 - 1.76)	0.4 (0.09 - 1.74)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.31 (0.69 - 2.49)	1.26 (0.63 - 2.53)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		1.17 (0.57 - 2.39)	1.15 (0.55 - 2.37)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		0.88 (0.51 - 1.54)	0.88 (0.5 - 1.54)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.02 (0.45 - 2.3)	0.99 (0.43 - 2.29)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.06 (0.57 - 2.15)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix IV

Table 4. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Greece

	Model 1	Model 2	Model 3
Gender	0.69 (0.52 - 0.91)	0.66 (0.49 - 0.88)	0.66 (0.5 - 0.88)
Ethnicity	1.44 (0.85 - 2.44)	1.27 (0.74 - 2.2)	1.27 (0.74 - 2.2)
SES	1.01 (0.77 - 1.34)	0.99 (0.74 - 1.32)	0.99 (0.74 - 1.32)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.54 (0.82 - 2.91)	1.54 (0.82 - 2.91)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.41 (0.29 - 0.58)	0.41 (0.29 - 0.58)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.82 (0.46 - 1.46)	0.82 (0.46 - 1.46)
Friends who think it is bad to drink soft drinks (B7)		0.88 (0.63 - 1.24)	0.88 (0.63 - 1.24)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		1.03 (0.77 - 1.39)	1.03 (0.76 - 1.39)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		1.04 (0.72 - 1.52)	1.04 (0.72 - 1.52)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		0.91 (0.67 - 1.23)	0.91 (0.67 - 1.23)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		1.06 (0.77 - 1.47)	1.07 (0.77 - 1.48)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.08 (0.78 - 1.49)	1.08 (0.78 - 1.49)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		0.96 (0.7 - 1.33)	0.96 (1.34)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			0.99 (0.72 - 1.36)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix V

Table 5. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Hungary

	Model 1	Model 2	Model 3
Gender	0.77 (0.55 - 1.08)	0.68 (0.47 - 0.96)	0.67 (0.47 - 0.96)
Ethnicity	0.56 (0.2 - 1.16)	0.66 (0.23 - 1.9)	0.64 (0.22- 1.86)
SES	0.86 (0.62 - 1.21)	0.85 (0.6 - 1.21)	0.85 (0.6 - 1.2)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.08 (0.73 - 1.6)	1.07 (0.72 - 1.59)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		1.95 (1.35 - 2.8)	0.52 (0.36 - 0.74)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.7 (0.44 - 1.12)	0.69 (0.43 - 1.11)
Friends who think it is bad to drink soft drinks (B7)		1.12 (0.73 - 1.72)	1.14 (0.74 - 1.74)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		1.1 (0.7 - 1.72)	1.08 (0.7 - 1.7)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.98 (0.4 - 2.39)	0.99 (0.4 - 2.4)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.17 (0.73 - 1.9)	1.15 (0.71 - 1.86)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.54 (0.31 - 0.96)	0.53 (0.3 - 0.94)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.55 (1.04 - 2.32)	1.54 (1.03 - 2.3)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		0.99 (0.61 - 1.62)	0.94 (0.57 - 1.55)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.3 (0.83 - 1.99)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix VI

Table 6. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Norway

	Model 1	Model 2	Model 3
Gender	0.83 (0.54 - 1.28)	0.79 (0.51 - 1.24)	0.8 (0.51 - 1.24)
Ethnicity	0.6 (0.22 - 1.65)	0.62 (0.22 - 1.76)	0.62 (0.22 - 1.76)
SES	0.96 (0.58 - 1.57)	0.98 (0.59 - 1.63)	0.98 (0.59 - 1.62)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.67 (0.6 - 4.67)	1.67 (0.6 - 4.7)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.65 (0.41 - 1.03)	0.65 (0.41 - 1.03)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		1.91 (0.22 - 16.52)	1.91 (0.22 - 16.7)
Friends who think it is bad to drink soft drinks (B7)		0.52 (0.29 - 0.96)	0.52 (0.29 - 0.96)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.91 (0.57 - 1.46)	0.91 (0.58 - 1.46)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.7 (0.26 -1.88)	0.7 (0.26 - 1.87)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.2 (0.58 - 2.51)	1.2 (0.56 - 2.5)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		1.28 (0.76 - 2.15)	1.27 (0.76 - 2.15)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		0.86 (0.51 - 1.44)	0.86 (0.51 - 1.44)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.29 (0.72 - 2.3)	1.28 (0.71 - 2.3)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.04 (0.61 - 1.78)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix VII

Table 7. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Slovenia

	Model 1	Model 2	Model 3
Gender	0.64 (0.46 - 0.87)	0.57 (0.41 - 0.8)	0.58 (0.42 - 0.81)
Ethnicity	1.19 (0.66 - 2.17)	1.13 (0.61 - 2.08)	1.15 (0.62 - 2.16)
SES	0.46 (0.33 - 0.63)	0.43 (0.31 - 0.6)	0.43 (0.3 - 0.6)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.39 (0.91 - 2.12)	1.42 (0.92 - 0.82)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.58 (0.42 - 0.82)	0.59 (0.42 - 0.82)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		1.02 (0.57 - 1.82)	1.004 (0.56 - 1.8)
Friends who think it is bad to drink soft drinks (B7)		1.12 (0.79 - 1.58)	1.1 (0.78 - 1.55)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.71 (0.5 - 1.01)	0.73 (0.51 - 1.04)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.63 (0.38 - 1.06)	0.64 (0.38 - 1.07)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		0.97 (0.67 - 1.41)	0.99 (0.68 - 1.44)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.77 (0.51 - 1.16)	0.79 (0.52 - 1.19)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.3 (0.87 - 1.94)	1.3 (0.88 - 1.97)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.35 (0.92 - 1.99)	1.38 (0.94 - 2.04)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			0.85 (0.6 - 1.23)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix VIII

Table 8. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Spain

	Model 1	Model 2	Model 3
Gender	0.79 (0.57 - 1.08)	0.72 (0.52 - 1.004)	0.73 (0.52 - 1.02)
Ethnicity	1.001 (0.36 - 2.78)	0.97 (0.34 - 2.77)	0.98 (0.34 - 2.8)
SES	0.87 (0.59 - 1.3)	0.82 (0.54 - 1.22)	0.82 (0.55 - 1.24)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		0.94 (0.54 - 1.64)	0.95 (0.54 - 1.67)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.57 (0.4 - 0.79)	0.57 (0.4 - 0.79)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.76 (0.4 - 1.45)	0.76 (0.4 - 1.45)
Friends who think it is bad to drink soft drinks (B7)		1.73 (1.22 - 2.45)	1.72 (1.22 - 2.44)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.49 (0.35 - 0.7)	0.5 (0.35 - 0.7)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.79 (0.5 - 1.26)	0.79 (0.5 - 1.27)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.07 (0.72 - 1.58)	1.1 (0.73 - 1.65)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.06 (0.72 - 1.56)	1.07 (0.73 - 1.57)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.27 (0.86 - 1.89)	1.27 (0.86 - 1.52)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.005 (0.68 - 1.49)	1.02 (0.68 - 1.52)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			0.91 (0.6 - 1.36)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix IX

Table 9. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in Switzerland

	Model 1	Model 2	Model 3
Gender	0.66 (0.39 - 1.1)	0.55 (0.31 - 0.96)	0.55 (0.32 - 0.97)
Ethnicity	0.5 (0.29 - 0.88)	0.54 (0.3 - 0.97)	0.55 (0.3 - 0.99)
SES	0.6 (0.34 - 1.04)	0.57 (0.3 - 1.05)	0.57 (0.31 - 1.04)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.14 (0.57 - 2.31)	1.17 (0.58 - 2.4)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.37 (0.21 - 0.65)	0.36 (0.2 - 0.63)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		1.5 (0.18 - 12.6)	1.43 (1.17 - 12.1)
Friends who think it is bad to drink soft drinks (B7)		0.85 (0.46 - 1.57)	0.88 (0.47 - 1.62)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.72 (0.4 - 3.5)	0.78 (0.43 - 1.43)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		1.29 (0.48 - 3.5)	1.3 (0.48 - 3.5)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.65 (0.93 - 2.9)	1.66 (0.93 - 2.9)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.98 (0.54 - 1.79)	1.02 (0.56 - 1.86)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.21 (0.65 - 2.26)	1.24 (0.66 - 2.33)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.68 (0.9 - 3.13)	1.8 (0.96 - 3.42)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			0.63 (0.32 - 1.26)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix X

Table 10. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children in The Netherlands

	Model 1	Model 2	Model 3
Gender	0.59 (0.27 - 1.18)	0.48 (0.21 - 1.09)	0.47 (0.2 - 1.07)
Ethnicity	0.54 (0.11 - 2.73)	0.41 (0.06 - 2.7)	0.38 (0.06 -2.55)
SES	0.74 (0.33 - 1.67)	0.88 (0.36 - 2.16)	0.92 (0.37 - 2.28)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		0.41 (0.17 - 1.02)	0.42 (1.17 - 1.04)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.3 (0.14 - 0.67)	0.3 (0.14 - 0.68)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		1.32 (0.51 - 3.41)	1.35 (0.52 - 3.5)
Friends who think it is bad to drink soft drinks (B7)		1.71 (0.72 - 4.08)	1.69 (0.71 - 4.02)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.81 (0.34 - 1.9)	0.83 (0.39 - 1.96)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		n.a.	n.a.
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.55 (0.37 - 6.48)	1.74 (0.39 - 7.83)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.86 (0.15 - 5.02)	0.86 (1.15 - 5.01)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		0.76 (0.31 - 1.87)	0.79 (0.32 - 1.96)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		n.a.	n.a.
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			0.67 (0.12 - 3.7)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix XI

Table 11. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in boys in Europe

	Model 1	Model 2	Model 3
Gender			
Ethnicity	1.15 (0.79 - 1.68)	1.16 (0.79- 1.7)	1.16 (0.79 - 1.7)
SES	0.74 (0.62 - 0.9)	0.72 (0.6 - 0.87)	0.72 (0.6 - 0.88)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.09 (0.86-1.4)	1.11 (0.87 - 1.4)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.52 (0.43 - 0.63)	0.52 (0.43 - 0.62)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.93 (0.68 - 1.28)	0.93 (0.68 - 1.28)
Friends who think it is bad to drink soft drinks (B7)		1.1 (0.9 - 1.34)	1.09 (0.9 - 1.33)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.8 (0.66 - 0.98)	0.81 (0.66 - 0.99)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		1.09 (0.79 - 1.51)	1.1 (0.8 - 1.52)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.28 (1.02 - 1.6)	1.3 (1.03 - 1.6)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.94 (0.74 - 1.19)	0.95 (0.75 - 1.21)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.11 (0.9 - 1.37)	1.11 (0.9 - 1.38)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.48 (1.18 - 1.86)	1.52 (1.2 - 1.91)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			0.86 (0.7 - 1.1)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix XII

Table 12. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in girls in Europe

	Model 1	Model 2	Model 3
Gender			
Ethnicity	0.84 (0.6 - 1.18)	0.83 (0.59 - 1.18)	0.82 (0.58 - 1.17)
SES	0.65 (0.54 - 0.79)	0.66 (0.54 - 0.8)	0.65 (0.54 - 0.79)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.01 (0.76 - 1.33)	1.001 (0.76 - 1.32)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.42 (0.34 - 0.51)	0.42 (0.4 - 0.51)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.9 (0.67 - 1.3)	0.93 (0.66 - 1.3)
Friends who think it is bad to drink soft drinks (B7)		1.03 (0.84 - 1.27)	1.03 (0.84 - 1.27)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.68 (0.55 - 0.83)	0.66 (0.54 - 0.82)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.88 (0.66 - 1.19)	0.87 (0.65 - 1.17)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.43 (1.16 - 1.76)	1.4 (1.13 - 1.7)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		1.02 (0.81 - 1.3)	1 (0.8 - 1.26)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.14 (0.92 - 1.4)	1.13 (0.9 - 1.41)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.23 (0.99 - 1.55)	1.2 (0.95 - 1.5)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.16 (0.94 - 1.45)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix XIII

Table 13. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children with low educated parents

	Model 1	Model 2	Model 3
Gender	0.82 (0.67 - 1.003)	0.71 (0.57 - 0.87)	0.7 (0.57 - 0.87))
Ethnicity	1.09 (0.79 - 1.5)	1.05 (0.76 - 1.47)	1.05 (0.76 - 1.47)
SES			
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.23 (0.94 - 1.63)	1.23 (0.93 - 1.6)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.42 (0.34 - 0.52)	0.42 (0.34 - 0.52)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.9 (0.63 - 1.3)	0.9 (0.63 - 1.29)
Friends who think it is bad to drink soft drinks (B7)		0.97 (0.77 - 1.22)	0.97 (0.77 - 1.22)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.8 (0.64 - 1.01)	0.8 (0.6 - 1.005)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.84 (0.59 - 1.19)	0.83 (0.58 - 1.2)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.35 (1.06 - 1.7)	1.34 (1.05 - 1.71)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.76 (0.58 - 0.99)	0.76 (0.58 - 0.99)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.17 (0.92 - 1.5)	1.17 (0.92 - 1.5)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.56 (1.2 - 2.02)	1.55 (1.19 - 2.01)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.04 (0.8 - 1.34)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix XIV

Table 14. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in children with high educated parents

	Model 1	Model 2	Model 3
Gender	0.7 (0.6 - 0.83)	0.63 (0.54 - 0.75)	0.64 (0.54 - 0.75)
Ethnicity	0.79 (0.52 - 1.2)	0.8 (0.52 - 1.2)	0.79 (0.52 - 1.2)
SES			
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		0.93 (0.73 - 1.19)	0.93 (0.73 - 1.19)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.5 (0.4 - 0.6)	0.5 (0.4 - 0.6)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.93 (0.73 - 1.19)	0.94 (0.7 - 1.27)
Friends who think it is bad to drink soft drinks (B7)		0.94 (0.69 - 1.34)	1.11 (0.93 - 1.34)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.7 (0.58 - 0.85)	0.7 (0.58 - 0.84)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		1.05 (0.8 - 1.38)	1.05 (0.8 - 1.38)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.36 (1.11 - 1.66)	1.35 (1.11 - 1.66)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		1.15 (0.94 - 1.42)	1.15 (0.93 - 1.42)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.08 (0.9 - 1.31)	1.08 (0.89 - 1.31)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.22 (0.99 - 1.49)	1.21 (0.98 - 1.5)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.02 (0.84 - 1.25)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

Appendix XV

Table 15. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status in native children

	Model 1	Model 2	Model 3
Gender	0.73 (0.64 - 0.83)	0.65 (0.57 - 0.74)	0.65 (0.56 - 0.74)
Ethnicity			
SES	0.68 (0.6 - 0.78)	0.68 (0.59 - 0.78)	0.68 (0.59 - 0.78)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.01 (0.84 - 1.22)	1.01 (0.84 - 1.22)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.49 (0.42 - 0.56)	0.49 (0.42 - 0.56)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.96 (0.75 - 1.2)	0.96 (0.75 - 1.2)
Friends who think it is bad to drink soft drinks (B7)		1.06 (0.9 - 1.23)	1.06 (0.9 - 1.23)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.73 (0.63 - 0.85)	0.73 (0.63 - 0.85)
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.99 (0.8 - 1.24)	0.99 (0.8 - 1.24)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.35 (1.15 - 1.6)	1.34 (1.14 - 1.58)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		1.004 (0.85 - 1.19)	1.002 (0.85 - 1.19)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.22 (0.96 - 1.31)	1.12 (0.96 - 1.31)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.32 (1.12 - 1.56)	1.32 (1.11 - 1.56)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.01 (0.86 - 1.19)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

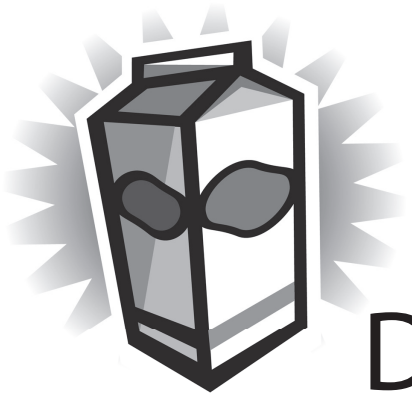
Appendix XVI

Table 16. Odds ratio (95 % confidence intervals) for correlates of regular soft drink consumption related to weight status among non-native children

	Model 1	Model 2	Model 3
Gender	1.04 (0.64 - 1.7)	0.84 (0.5 - 1.43)	0.85 (0.45 - 1.39)
Ethnicity			
SES	0.93 (0.56 - 1.54)	0.8 (0.46 - 1.39)	0.8 (0.45 -1.39)
Children who think drinking soft drinks is bad VS. Children who think drinking soft drinks is good (B4)		1.73 (0.83 - 3.6)	1.72 (0.83 - 3.6)
Children who think soft drinks will make them fat VS. Children who dont think soft drinks will make them fat (B5)		0.23 (0.13 - 0.42)	0.23 (0.13 - 0.42)
Parents/caregivers who think it is bad their child is drinking soft drinks VS. Parents who think it is good their children is drinking soft drinks (B6)		0.66 (0.26 - 1.64)	0.66 (0.26 - 1.66)
Friends who think it is bad to drink soft drinks (B7)		1.07 (0.61 - 1.87)	1.06 (0.6 - 1.85)
Parents/caregivers who are drinking soft drinks not often VS. Parents/caregivers who are drinking soft drinks often(B8)		0.77 (0.44 - 1.35)	0.75 (0.42 - 1.33
Friends who drink soft drinks not often VS. Friend who drink soft drinks often (B9)		0.58 (0.2 - 1.66)	0.58 (0.2 - 1.63)
Children who dont like the taste of soft drinks VS children who dont like the taste of soft drinks (B10)		1.57 (0.9 - 2.75)	1.55 (0.87 - 2.7)
If i ask for a soft drink from my parents/caregivers I never/not often get one VS. If I ask for a soft drink from my parents/caregivers I always/often get one (B13)		0.75 (0.4 - 1.44)	0.75 (0.39 - 1.43)
I am not allowed to take soft drinks whenever i want VS. Children who are allowed to take soft drinks whenever they want (B14)		1.19 (0.66 - 2.2)	1.18 (0.64 - 2.2)
There are never/not often soft drinks at our home VS. There are often soft drinks at our home(B17)		1.54 (0.83 - 2.86)	1.52 (0.82- 2.83)
Children who are drinking soft drinks less than once a week VS. Children who are drinking soft drinks more than once a week (B1)			1.14 (0.6 - 2.17)

Model 1: gender, ethnicity and SES
Model 2: gender, ethnicity, SES and correlates for regular soft drink consumption
Model 3: gender, ethnicity, SES, correlates for regular soft drink consumption and times a week consuming soft drinks

University



DIETARY AND PHYSICAL ACTIVITY HABITS OF CHILDREN

» **Child** questionnaire

Land Code:	School number:	Class number:	Code number:
☐	☐☐☐	☐☐	☐☐

Dear child,

We are researchers that investigate dietary and physical activity patterns of 8000 children from different countries across Europe. We want to learn about what the differences are between children in Belgium, Greece, Hungary, the Netherlands, Norway, Slovenia, Spain, and Switzerland. Therefore we need your help! We would like to ask you to answer this questionnaire. It will take approximately 1 school lesson.
No one – except for the researchers - will get to know about your answers. So you don't have to worry that your teacher, parents or class mates will see what you answered.
There are no 'right' or 'wrong' answers. Just fill in what applies to you or your situation!
We very much hope that you are willing to fill in the questionnaire. Your participation in the study is voluntary. So if you don't want to fill in the questionnaire you can tell us.

Thank you in advance for your help!

Name of the main researcher, university

How to complete the questionnaire?

- Complete the questionnaire using a blue or black pen.
- Place a clear **X** in the answer box.
- Most of the questions can be answered by placing a clear **X** in the answer box. Mark only one box per question. If multiple answers can be given, this will be indicated next to the question. In some questions we ask you to write your own answer.

EXAMPLES:

How often do you eat bread?

- ☐ Always
- ☒ Often
- ☐ Sometimes
- ☐ Not often
- ☐ Never

Please indicate which is your favourite soft drink.

Cola

If you answer something incorrectly, leave the incorrect **X** and make the correct box completely black
For example:

How often do you eat bread?

- ☐ Always
- ☒ Often
- ■ Sometimes (this means that you are eating **sometimes** bread)
- ☐ Not Often
- ☐ Never

A1. In what year were you born? (Please fill in one digit per box)

☐☐☐☐

A2. In what month is your birthday?

- ❑ January
- ❑ February
- ❑ March
- ❑ April
- ❑ May
- ❑ June
- ❑ July
- ❑ August
- ❑ September
- ❑ October
- ❑ November
- ❑ December

A3. Are you a girl or a boy?

- ❑ Girl
- ❑ Boy

A4. What is today's date?

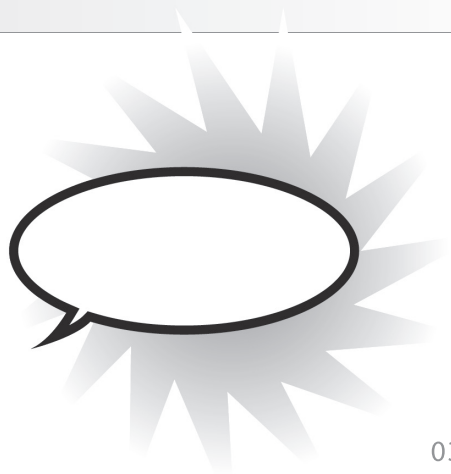
☐☐ Day ☐☐ Month ☐☐☐☐ Year

A5. Which language do you most often speak at home?

- ❑ English
- ❑ Panjabi
- ❑ Urdu
- ❑ Bengali
- ❑ Other

A6. Which adults do you live with? (You can mark more than one box)

- ❑ Both my mother and my father all the time
- ❑ Only with my mother
- ❑ Only with my father
- ❑ With my mother and her new partner
- ❑ With my father and his new partner
- ❑ With my grandparents
- ❑ Other adults



A7. Do you live with any brothers and/or sisters? (You can mark more than one box)

- ❑ Yes, one or more older brother(s)
- ❑ Yes, one or more younger brother(s)
- ❑ Yes, one or more older sister(s)
- ❑ Yes, one or more younger sister(s)
- ❑ No, I do not live in the same house as my brother(s) or sister(s)
- ❑ I don't have any brother(s) or sister(s)

The following questions are about your dietary habits. First we will ask what you **usually** drink or eat. Think about the **last few weeks.** If you don't know or remember exactly what you ate or drank give your best guess. **Please do not leave any question unanswered!** Place a clear **X** in the answer box.

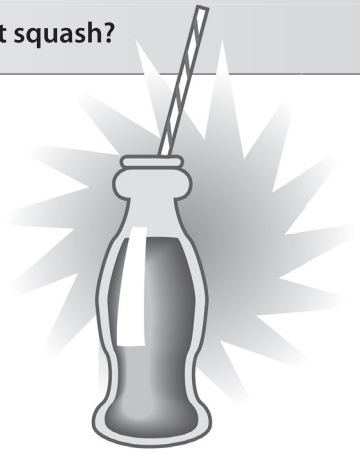
QUESTIONS ABOUT SOFT DRINKS

When we say soft drinks, we mean fizzy drinks and fruit squash but **NOT** diet drinks and fruit juice.

EXAMPLES for soft drinks:

Fizzy drinks:	Cola, 7-up, Pepsi, Fanta, Sprite, Orangina etc.
Fruit squash/cordials:	Ice Tea, Limonade etc.
Sport and energy drinks:	Lucozade, Relentless and Tiger etc.

B1. How many times a week do you usually drink fizzy drinks and fruit squash?



- ❑ Never
- ❑ Less than once a week
- ❑ Once a week
- ❑ 2-4 days a week
- ❑ 5-6 days a week
- ❑ Every day, once a day
- ❑ Every day, more than once a day

B2. On a day that you drink fizzy drinks and fruit squash, how many glasses, cans or bottles do you drink on such a day? Please fill in the number of glasses/ small bottles (250 ml), cans (330 ml) and bottles (500 ml) you usually drink. (Please mark one box for column a., one box for column b., and one box for column c.)

a. Glasses or small bottles (250 ml)

- ❑ None
- ❑ 1 glass/small bottle
- ❑ 2 glasses/small bottles
- ❑ 3 glasses/small bottles
- ❑ 4 glasses/small bottles
- ❑ 5 or more glasses/small bottles

b. Cans (330 ml)

- ❑ None
- ❑ 1 can
- ❑ 2 cans
- ❑ 3 cans
- ❑ 4 cans
- ❑ 5 or more cans

c. Bottles (500 ml)

- ❑ None
- ❑ 1 bottle
- ❑ 2 bottles
- ❑ 3 bottles
- ❑ 4 bottles
- ❑ 5 or more bottles

B3. How many fizzy drinks or fruit squash did you drink <u>yesterday?</u>
Please fill in the number of glasses/ small bottles (250 ml), cans (330 ml) and bottles (500 ml) you drank yesterday. (Please mark one box for column a., one box for column b., and one box for column c.)

a. Glasses or small bottles (250 ml)

- ❑ None
- ❑ 1 glass/small bottle
- ❑ 2 glasses/small bottles
- ❑ 3 glasses/small bottles
- ❑ 4 glasses/small bottles
- ❑ 5 or more glasses/small bottles

b. Cans (330 ml)

- ❑ None
- ❑ 1 can
- ❑ 2 cans
- ❑ 3 cans
- ❑ 4 cans
- ❑ 5 or more cans

c. Bottles (500 ml)

- ❑ None
- ❑ 1 bottle
- ❑ 2 bottles
- ❑ 3 bottles
- ❑ 4 bottles
- ❑ 5 or more bottles

B4. I think that drinking fizzy drinks or fruit squash is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

B5. I think drinking fizzy drinks or fruit squash will make me fat.

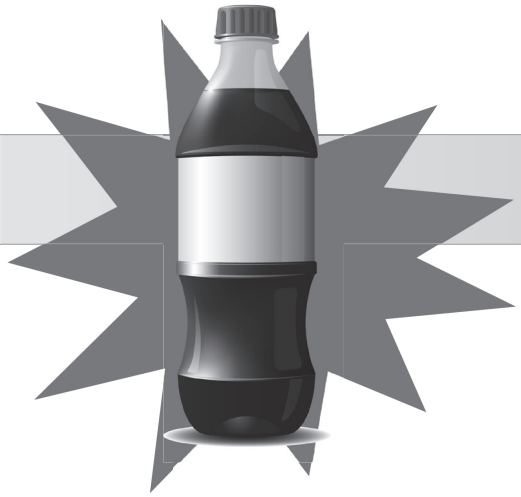
- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

B6. If I drink fizzy drinks or fruit squash, my parents/care givers think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

B7. If I drink fizzy drinks or fruit squash, most of my friends think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad



B8. How often does your parents/care givers drink fizzy drinks or fruit squash?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B9. How often do most of your friends drink fizzy drinks or fruit squash?

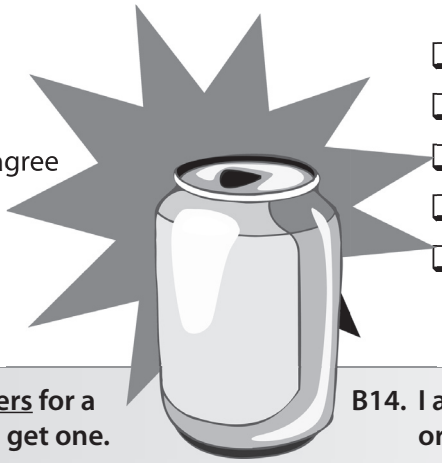
- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B10. I like the taste of fizzy drinks or fruit squash.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

B11. Drinking fizzy drinks or fruit squash is something that I do without even really thinking about.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree



B12. I find drinking no fizzy drinks or fruit squash.....

- ❑ Very easy
- ❑ Easy
- ❑ Neither easy nor difficult
- ❑ Difficult
- ❑ Very difficult

B13. If I ask my <u>parents/care givers</u> for a fizzy drink or fruit squash, I get one.

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B14. I am allowed to take fizzy drinks or fruit squash whenever I want.

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B15. Do your <u>parents/care givers</u> have rules about how many fizzy drinks or fruit squash you are allowed to drink?

- ❑ Yes
- ❑ No

B16. If you ask your <u>parents/care givers</u> to buy a certain brand of fizzy drinks or fruit squash, will she do it?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B17. Are there usually fizzy drinks or fruit squash at your home?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B18. In which situations do you usually drink fizzy drinks or fruit squash? (You can mark more than one box)

- ❑ During the weekend
- ❑ Breakfast
- ❑ Lunch
- ❑ Dinner
- ❑ At school
- ❑ While watching television
- ❑ As a thirst quencher between meals
- ❑ During/after sports
- ❑ When I am with friends
- ❑ At birthdays/parties
- ❑ I never drink fizzy drinks or fruit squash

B19. How often do you spend your own money on fizzy drinks or fruit squash?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

B20. If the price of fizzy drinks and fruit squash were doubled, I would buy less fizzy drinks or fruit squash from my own money.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree
- ❑ I never buy fizzy drinks or fruit squash from my own money

QUESTIONS ABOUT FRUIT JUICES

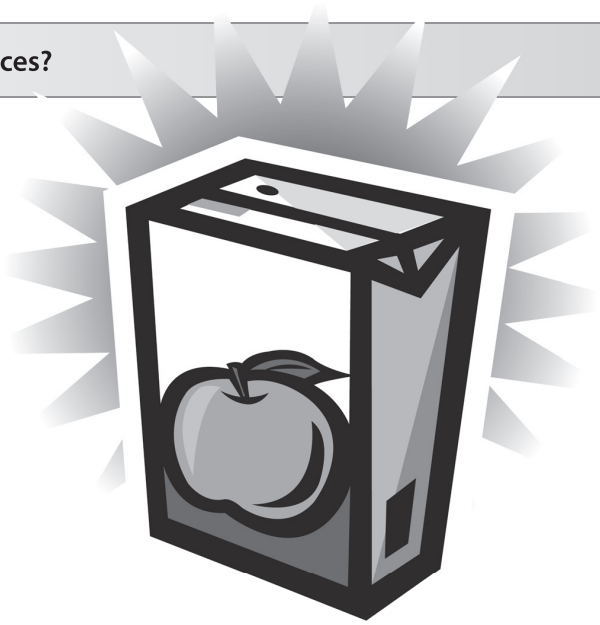
When we say fruit juices, we mean the packed fruit juices and the freshly blended fruit juice at home (100% fruit juice).

EXAMPLES for fruit juices:

Apletiser, Tropicana, Simply Orange, Innocent Smoothies, Sunny Delight

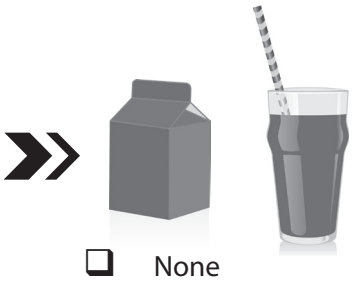
C1. How many times a week do you <u>usually</u> drink fruit juices?

- ❑ Never
- ❑ Less than once a week
- ❑ Once a week
- ❑ 2-4 days a week
- ❑ 5-6 days a week
- ❑ Every day, once a day
- ❑ Every day, more than once a day



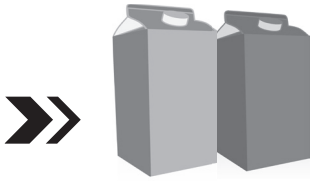
C2. On a day that you drink fruit juices, how many glasses or cartons do you drink on such a day?
Please fill in the number of glasses/ small bottles (250 ml) and regular cartons (330 ml) you usually drink.
(Please mark one box for column a. and one box for column b.)

a. Glasses or small cartons (250 ml)



- ❑ None
- ❑ 1 glass/carton
- ❑ 2 glasses/cartons
- ❑ 3 glasses/cartons
- ❑ 4 glasses/cartons
- ❑ 5 or more glasses/cartons

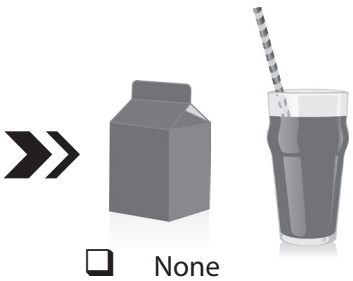
b. Regular cartons (330 ml)



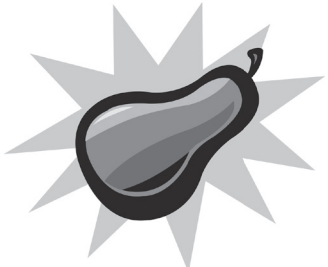
- ❑ None
- ❑ 1 carton
- ❑ 2 cartons
- ❑ 3 cartons
- ❑ 4 cartons
- ❑ 5 or more cartons

C3. How many fruit juices did you drink <u>yesterday</u>?
Please fill in the number of glasses/ small bottles (250 ml) and regular cartons (330 ml) you drank **<u>yesterday?</u>**
(Please mark one box for column a. and one box for column b.)

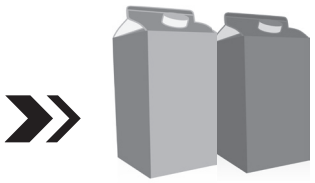
a. Glasses or small cartons (250 ml)



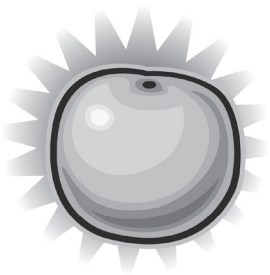
- ❑ None
- ❑ 1 glass/carton
- ❑ 2 glasses/cartons
- ❑ 3 glasses/cartons
- ❑ 4 glasses/cartons
- ❑ 5 or more glasses/cartons



b. Regular cartons (330 ml)



- ❑ None
- ❑ 1 carton
- ❑ 2 cartons
- ❑ 3 cartons
- ❑ 4 cartons
- ❑ 5 or more cartons



C4. I think that drinking fruit juices is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

C5. I think it is recommended for children my age.....

- ❑ Not to drink fruit juices at all
- ❑ To drink fruit juices as much as you like
- ❑ To drink not more than one glass a day
- ❑ I don‘t know what is recommended

C6. I think drinking fruit juices will make me fat.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

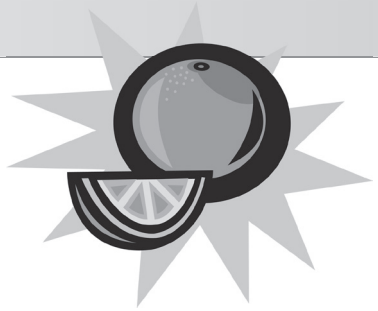
C7. I am allowed to take fruit juices whenever I want.

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

C8. Do your <u>parents/care givers</u> have rules about how many fruit juices you are allowed to drink?

- ❑ Yes
- ❑ No

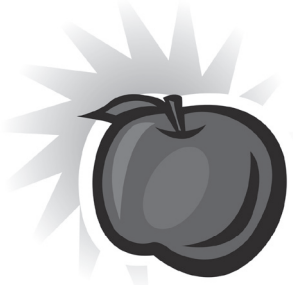
C9. Are there usually fruit juices in your home?



- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

C10. In which situations are you most likely to drink fruit juices? (You can mark more than one box)

- ❑ During the weekend
- ❑ Breakfast
- ❑ Lunch
- ❑ Dinner
- ❑ At school
- ❑ While watching television
- ❑ As a thirst quencher between meals
- ❑ During/after sports
- ❑ When I am with friends
- ❑ At birthdays/parties
- ❑ I never drink fruit juices



QUESTIONS ABOUT BREAKFAST

When we say breakfast we mean the first things you usually eat and drink within 2 hours after getting up in the morning. This can be at home, on the way to school or just before entering school. During weekends breakfast is anything you drink and/or eat before 11 a.m.

D1. From Monday to Friday during school weeks, on how many days do you usually eat breakfast?

- ❑ I never eat breakfast on school days
- ❑ 1 day
- ❑ 2 days
- ❑ 3 days
- ❑ 4 days
- ❑ 5 days

D2. On how many days in the weekenddays (Saturday and Sunday) do you usually eat breakfast?

- ❑ I never eat breakfast on weekenddays
- ❑ I usually eat breakfast on 1 weekendday (Saturday OR Sunday)
- ❑ I usually eat breakfast on both weekenddays (Saturday AND Sunday)

D3. What do you usually have for breakfast on school days?

- ❑ Just a drink (milk, fruit juice, tea, hot chocolate etc.)
- ❑ Just food (cereal, bread, sandwich, cheese, sausages, pizza, pie, eggs etc.)
- ❑ Drink with cold food (cereal, bread, sandwich, cheese etc.)
- ❑ Drink with hot food (sausages, pizza, pie, eggs etc.)
- ❑ Other

D4. What is the reason that you usually skip breakfast?

- ❑ I never skip breakfast
- ❑ I do not have enough time
- ❑ I do not like the breakfast products at home
- ❑ I have never thought about it
- ❑ I am not hungry in the morning
- ❑ I just cannot eat early in the morning

D5. Did you eat breakfast yesterday?

- ❑ Yes
- ❑ No

D6. Did you eat lunch yesterday?

- ❑ Yes
- ❑ No

D7. Did you eat dinner yesterday?

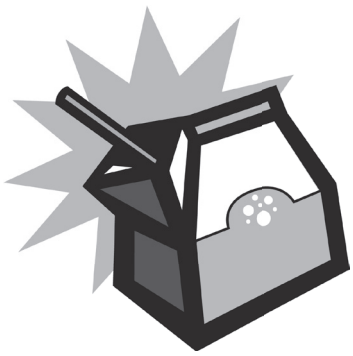
- ❑ Yes
- ❑ No

D8. Did you eat anything between meals yesterday?

- ❑ Yes
- ❑ No

D9. I think that eating breakfast is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad



D10. I think it is recommended for children of my age to.....

- ❑ Skip breakfast
- ❑ Eat breakfast if you feel like it
- ❑ Eat breakfast on schooldays
- ❑ Eat breakfast every day
- ❑ I don't know what is recommended

D11. I think NOT eating breakfast will make me fat.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

D12. I think eating breakfast will make me fat.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

D13. If I eat breakfast, my parents/care givers think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

D14. If I eat breakfast, most of my friends think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

D15. How often do your parents/care givers eat breakfast?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

D16. How often do most of your friends eat breakfast?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

D17. I like eating breakfast.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

D18. Eating breakfast is something that I do without even really thinking about.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

D19. I find eating breakfast every day

- ❑ Very easy
- ❑ Easy
- ❑ Neither easy nor difficult
- ❑ Difficult
- ❑ Very difficult

D20. My parents/care givers encourage me to have breakfast.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

D21. Do your parents/care givers have rules about whether you should eat breakfast?

- ❑ Yes
- ❑ No

D22. If you ask your parents/care givers to buy a certain brand of food or drink for breakfast, will they do it?

- ❑ Yes, always
- ❑ Yes, mostly
- ❑ Sometimes
- ❑ Not often
- ❑ Never

D23. Are there usually breakfast products (milk, cereals, bread etc) at your home?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

D24. How often do you eat breakfast with your parents/care givers?

- ❑ Never
- ❑ Less than once a week
- ❑ Once a week
- ❑ 2-4 days a week
- ❑ 5-6 days a week
- ❑ Every day

D25. In which situations do you usually eat your breakfast?
(You can mark more than one box)

- ❑ At a set table at home
- ❑ In bed
- ❑ While watching television
- ❑ On my way to school
- ❑ At school before the class starts
- ❑ I never eat breakfast

QUESTIONS ABOUT PHYSICAL ACTIVITY

The next few questions are about how you normally get to school.

E1. How many days do you usually bike to school?

- ❑ I never bike to school
- ❑ 1 day per week
- ❑ 2 days per week
- ❑ 3 days per week
- ❑ 4 days per week
- ❑ 5 days per week

E2. IF YOU BIKE to school, how long does it take you to bike to school?

- ❑ I never bike to school
- ❑ 1 to 5 minutes
- ❑ 6 to 10 minutes
- ❑ 11 to 15 minutes
- ❑ More than 15 minutes

E3. How many days a week do you usually walk to school?

- ❑ I never walk to school
- ❑ 1 day per week
- ❑ 2 days per week
- ❑ 3 days per week
- ❑ 4 days per week
- ❑ 5 days per week

E4. IF YOU WALK to school, how long does it take you to walk to school?

- ❑ I never walk to school
- ❑ 1 to 5 minutes
- ❑ 6 to 10 minutes
- ❑ 11 to 15 minutes
- ❑ More than 15 minutes

E5. How many days do you usually travel by car to school?

- ❑ I never travel to school by car
- ❑ 1 day per week
- ❑ 2 days per week
- ❑ 3 days per week
- ❑ 4 days per week
- ❑ 5 days per week

E6. How many days do you usually travel by public transport (bus, schoolbus, tram, metro) to school?

- ❑ I never travel to school by public transport
- ❑ 1 day per week
- ❑ 2 days per week
- ❑ 3 days per week
- ❑ 4 days per week
- ❑ 5 days per week

E7. How did you go to school today?
(If you went by both, public transport and bike e.g. biking from home to the subway and then to school by subway you can mark more than one box)

- ❑ By bike
- ❑ By foot
- ❑ By car
- ❑ By public transport

» **The next question is about what you normally do during breaks at school hours**

E8. What do you usually do during breaks at school?

- ❑ I usually spend the time sitting (e.g. reading, talking, hanging out with friends)
- ❑ I usually spend time walking and moving around
- ❑ I usually spend the time doing sports or similar activities

» The next few questions are about sports activities

When we say sports activities we mean all sports activities that take place at a sports club and/or the supervision of a trainer/instructor/coach. Such activities are: football, tennis, rugby, gymnastics, basketball, volleyball, track & field etc. Taking part in sports activities makes you feel tired and out of breath.

E9. My FAVORITE sport is (Please fill in the box)

☐ I do not participate in any sports activities ➜ **Continue with question E14.**

E10. In a TOTAL WEEK how many hours do you do this sport?
(Please include training and competition hours)

- ☐ 30 minutes/week
- ☐ 1,0 hour/week
- ☐ 1,5 hours /week
- ☐ 2,0 hours /week
- ☐ 2,5 hours /week
- ☐ 3,0 hours/week
- ☐ 3,5 hours/week
- ☐ 4,0 hours/week
- ☐ 4,5 hours/week
- ☐ 5,0 hours a week or more

E11. My SECOND FAVORITE sport is (Please fill in the box)

☐ I do not have a second sport ➜ **Continue with question E13.**

E12. In a TOTAL WEEK how many hours do you do this sport?
(Please include training and competition hours)

- ❑ 30 minutes/week
- ❑ 1,0 hour/week
- ❑ 1,5 hours /week
- ❑ 2,0 hours /week
- ❑ 2,5 hours /week
- ❑ 3,0 hours/week
- ❑ 3,5 hours/week
- ❑ 4,0 hours/week
- ❑ 4,5 hours/week
- ❑ 5,0 hours a week or more

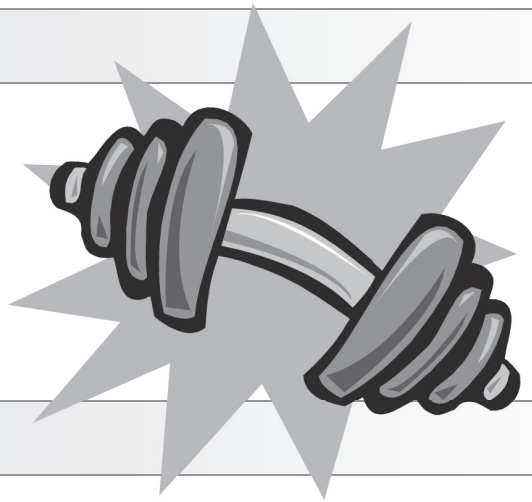
E13. How many hours of sports did you do <u>yesterday?</u>

- ❑ I did not do any sports
- ❑ 30 minutes
- ❑ 1,0 hour
- ❑ 1,5 hours
- ❑ 2 ,0 hours
- ❑ 2,5 hours
- ❑ 3,0 hours
- ❑ 3,5 hours
- ❑ 4,0 hours
- ❑ 4,5 hours
- ❑ 5,0 hours or more

» **Now we will ask you some questions about what you think about physical activity/sports.**

Remember, when we say physical activity/sports we mean doing sports, active play, biking, walking, skating and other sport activities!

E14. I think that physical activity/sports is.....



- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

E15. I think it is recommended for children of my age.....

- ❑ To be active once a week
- ❑ To be active some days a week
- ❑ To be active every day for 30 minutes
- ❑ To be active every day for 1 hour
- ❑ To be active every day for 2 hours
- ❑ To be active every day for 3 to 4 hours
- ❑ I don‘t know what is recommended

E16. I think NOT doing physical activity/sports will make me fat.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

E17. If I do physical activity/sports, my parents/care givers think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

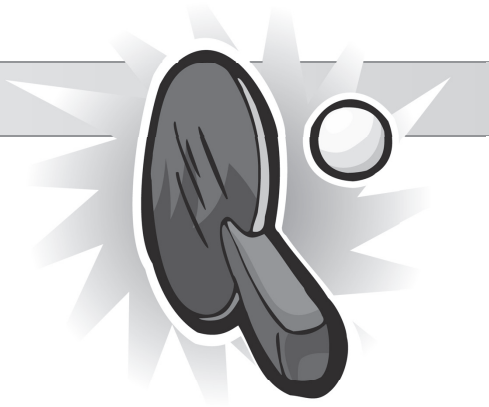
E18. If I do physical activity/sports, most of my friends think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

E19. How often do your parents/care givers do physical activity/sports?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

E20. How often do most of your friends do physical activity/sports?



- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

E21. I like doing physical activity/sports.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

E22. Physical activity/sports is something that I do without even really thinking about.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

E23. I find doing physical activity/sports for 1 hour every day.....

- ❑ Very easy
- ❑ Easy
- ❑ Neither easy nor difficult
- ❑ Difficult
- ❑ Very difficult

E24. My <u>parents/care givers</u> encourage me to be physically active/do sports.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

E25. My <u>parents/care givers</u> help me if I need something for my sports.
(shoes, money, equipment, transport and such)

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

E26. Do your <u>parents/care givers</u> have rules about whether you should be physically active/do sports?

- ❑ Yes
- ❑ No

E27. Do your <u>parents/care givers</u> allow you to take part in physical activity/do sports?

- ❑ Yes
- ❑ No

E28. If you indicate that you like a certain physical activity/sports will your <u>parents/care givers</u> allow you to do it?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

E29. Do you have the following things at home that you can use for physical activities/sports?
(You can mark more than one box)

- ❑ Bike
- ❑ Tennis and or badminton racket
- ❑ Ball (basketball, volleyball, football etc.)
- ❑ Sporting shoes
- ❑ Skipping rope
- ❑ Skates
- ❑ Skis
- ❑ Skate board

E30. How often do you take part in physical activity/ do sports with your parents/care givers?

- ❑ Never
- ❑ Less than once a week
- ❑ Once a week
- ❑ 2-4 days a week
- ❑ 5-6 days a week
- ❑ Every day

QUESTIONS ABOUT TV VIEWING

When we say watching television we also mean watching DVDs, videos, and watchting films at the computer

F1. About how many hours a day do you usually watch television in your free time?
(Please mark one box for weekdays and one box for weekenddays)

Weekdays (average of all weekdays)

- ❑ None at all
- ❑ 30 minutes/day
- ❑ 1,0 hour/day
- ❑ 1,5 hours/day
- ❑ 2,0 hours/day
- ❑ 2,5 hours/day
- ❑ 3,0 hours/day
- ❑ 3,5 hours/day
- ❑ 4,0 or more hours/day

Weekenddays (average of all weekenddays)

- ❑ None at all
- ❑ 30 minutes/day
- ❑ 1,0 hour/day
- ❑ 1,5 hours/day
- ❑ 2,0 hours/day
- ❑ 2,5 hours/day
- ❑ 3,0 hours/day
- ❑ 3,5 hours/day
- ❑ 4,0 or more hours/day

When we say playing games on a computer we also mean games console (Playstation, Xbox, GameCube). When we say leisure activities we also mean chatting online, internet, emailing, etc

F2. About how many hours a day do you usually play games on a computer, or use your computer for leisure activities in your free time?
(Please mark one box for weekdays and one box for weekenddays)

Weekdays (average of all weekdays)

- ❑ None at all
- ❑ 30 minutes/day
- ❑ 1,0 hour/day
- ❑ 1,5 hours/day
- ❑ 2,0 hours/day
- ❑ 2,5 hours/day
- ❑ 3,0 hours/day
- ❑ 3,5 hours/day
- ❑ 4,0 or more hours/day

Weekenddays (average of all weekenddays)

- ❑ None at all
- ❑ 30 minutes/day
- ❑ 1,0 hour/day
- ❑ 1,5 hours/day
- ❑ 2,0 hours/day
- ❑ 2,5 hours/day
- ❑ 3,0 hours/day
- ❑ 3,5 hours/day
- ❑ 4,0 or more hours/day

F3. About how many hours did you watch television yesterday?

- ❑ None at all
- ❑ 30 minutes
- ❑ 1,0 hour
- ❑ 1,5 hours
- ❑ 2,0 hours
- ❑ 2,5 hours
- ❑ 3,0 hours
- ❑ 3,5 hours
- ❑ 4,0 or more hours

F4. About how many hours did you play games on a computer, games console or use your computer for leisure activities yesterday?

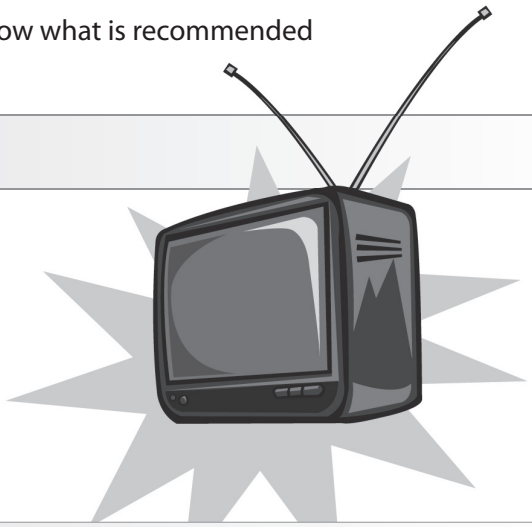
- ❑ None at all
- ❑ 30 minutes
- ❑ 1,0 hour
- ❑ 1,5 hours
- ❑ 2,0 hours
- ❑ 2,5 hours
- ❑ 3,0 hours
- ❑ 3,5 hours
- ❑ 4,0 or more hours

F5. I think watching television is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

F6. I think it is recommended for children of my age.....

- ❑ Not to watch television at all
- ❑ To watch television not more than a few times per week
- ❑ To watch television for less than 1 hour per day
- ❑ To watch television for less than 2 hours per day
- ❑ To watch television for more than 2 hours per day
- ❑ To watch television as often as you like
- ❑ I don't know what is recommended



F7. I think watching too much television can help making me fat.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

F8. If I watch television, my <u>parents/care givers</u> think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

F9. If I watch television, most of my <u>friends</u> think this is.....

- ❑ Very good
- ❑ Good
- ❑ Neither good nor bad
- ❑ Bad
- ❑ Very bad

F10. How often do your parents/care givers watch television?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

F11. How often do most of your friends watch television?

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

F12. I like watching television.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

F13. Watching television is something that I do without even really thinking about.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

F14. I find NOT watching television

- ❑ Very easy
- ❑ Easy
- ❑ Neither easy nor difficult
- ❑ Difficult
- ❑ Very difficult

F15. My parents/care givers allow me to watch television whenever I want.

- ❑ I fully agree
- ❑ I agree a bit
- ❑ Neither agree nor disagree
- ❑ I disagree a bit
- ❑ I fully disagree

F16. If I ask my parents/care givers to watch television, I can do so.

- ❑ Always
- ❑ Often
- ❑ Sometimes
- ❑ Not often
- ❑ Never

F17. Do your parents/care givers have rules about how many hours per day you are allowed to watch television?

- ❑ Yes
- ❑ No

F18. Do you have a television in your own bedroom?

- ❑ Yes
- ❑ No

F19. How often do you watch television with your parents/care givers?

- ❑ Never
- ❑ Less than once a week
- ❑ Once a week
- ❑ 2-4 days a week
- ❑ 5-6 days a week
- ❑ Every day, once a day
- ❑ Every day, more than once a day

F20. How often do you watch television during meals? (Please mark once in every row)

	Always	Often	Sometimes	Not often	Never
Breakfast	❑	❑	❑	❑	❑
Lunch	❑	❑	❑	❑	❑
Dinner	❑	❑	❑	❑	❑

GENERAL QUESTIONS ABOUT YOURSELF

G1. Do you think you are too thin or too fat?

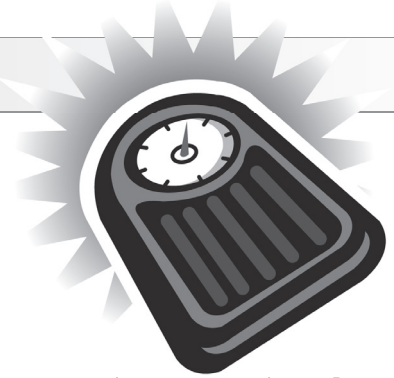
- ❑ I am much too thin
- ❑ I am a bit too thin
- ❑ I am not too thin nor too fat
- ❑ I am a bit too fat
- ❑ I am much too fat

G2. How often have you tried to get slimmer/thinner during the last year?

- ❑ None
- ❑ 1-4 times
- ❑ 5-10 times
- ❑ More than 10 times
- ❑ I try to slim all the time

G3. Do you try to get slimmer or thinner right now?

- ❑ Yes
- ❑ No



Thank you for completing this questionnaire!