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Overweight, physical activity and sedentary behavior in preschoolers: A comparison between Belgium and Bulgaria

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Foreword

First, I would like to say that this thesis was more to me than just writing a paper. It gave me the opportunity to spend a semester abroad in Bulgaria, a country I'd never been to before. It was a wonderful opportunity and it allowed me to create a broader vision on many things such as differences between cultures, historical insights, etc… I was also able to meet a lot of interesting people of whom some I might call friends, even though they are now more than a 1000 km away from me. It was an amazing experience I would redo immediately.

Furthermore, I would also like to thank some people who helped me with creating this thesis. First of all, I would like to thank professor Cardon for her feedback and advice. I would also like to thank Ellen De Decker for all the support and feedback she gave me and especially for all the time she took to read my thesis and giving me advice. She was always first to give me advice and assisted me whenever I had doubts about certain matters. My special thanks goes certainly also out to professor doctor Iotova and all her assistants in Bulgaria. She helped me to find my way in Bulgaria and was always there for me whenever I had a question or when I did not understand something, since I barely spoke the language. She also took the time to assist me with some parts of my thesis, for which I am very thankful. Finally, I would also like to thank my friends and my girlfriend Jolien for being supportive whenever I needed it, for taking a break with me whenever I got fed up with the writing and for all the extra advice they gave me.

Abstract

Aim of the study: This study aimed to determine the prevalence of overweight and obesity, physical activity and sedentary behavior of preschool children in Belgium and Bulgaria and to investigate potential differences between both countries in boys and girls. Since little is known about the health status of preschoolers in Eastern Europe, comparing the situation in Bulgaria with the situation in a more developed, Western Europe country, Belgium is of interest.

Method: In Belgium, 1008 preschoolers (50,50% boys) took part in the study, while in Bulgaria, 552 preschoolers (47,83%) were involved. Anthropometric measurements were performed to determine the prevalence of overweight and obesity in both countries. Physical activity was measured by using step counts. Accelerometers were used in Belgium while pedometers were used in Bulgaria. They wore them for 4 consecutive days, namely 2 weekdays and 2 weekend days. Parental questionnaires were used to investigate the sedentary behavior levels of the preschoolers.

Results: The prevalence of overweight and obesity was not significantly different between Bulgaria and Belgium. Results showed that 1 out of 10 preschoolers was overweight and around 3% was obese. The physical activity levels of the preschoolers in Belgium were significantly higher on weekdays and in total but lower on weekend days ($p<0,001$) compared to Bulgaria. Boys tended to be more physically active than girls. It was also observed that, in Belgium, preschoolers were much less active on weekend days compared to weekdays ($p<0,001$). Regarding sedentary behavior, the results for screen time indicated that many preschoolers in both countries exceed the norm (i.e. <120 minutes screen time/day) but that significantly ($p<0,001$) more children exceeded this norm in Bulgaria (56%) compared to Belgium (32,1%).

Conclusion: Although the results were more worrying for Bulgaria (suggesting the situation in Eastern Europe tends to be worse), the need for interventions is high in both countries. The prevalence of overweight and obesity is still alarmingly high and less than half of the preschoolers reaches the lowest norms of recommendations regarding physical activity and sedentary behavior. Results also showed that the girls were more vulnerable to a shortage of physical activity and excessive sedentary behavior and that weekend days were problematic for both genders in Belgium. Therefore, interventions should give special attention towards physical activity and sedentary behavior on weekend days and for girls.

1 Study of the literature

1.1 Introduction

The prevalence of overweight and obesity is increasing worldwide. Many studies in different countries found that increasing numbers of adults, and even young children at preschool age (2-6 years old), are overweight and obese (Kolarzyk et al., 2012). Many factors are found to be associated with overweight such as the socio-economic status (SES) of the child and family, prevalence of overweight and obesity in the family, environmental factors, etc … It is also assumed that, next to a lack of physical activity, improper dietary intake leads to obesity. Previous research has already provided evidence or suggestive evidence that overweight and obesity at childhood are related to breakfast and soft drink consumption and physical activity. Above that, investigators also found that a lack of physical activity, combined with excessive sedentary behavior, is determinative for overweight and obesity as a child (Kolarzyk et al., 2012).. These behaviors are the so called "energy balance related behaviors" or "EBRB's" (see 1.3) and they all play an important role in determining whether a child is overweight or not. (Verloigne et al. 2012). This study of the literature will try to provide more information on the overweight and obesity problem in preschool children and its link with energy balance related behaviors.

1.2 Overweight and obesity in preschool children

1.2.1 Definition

It is important to understand what exactly is meant with the terms "overweight" and "obesity". Many studies use these terms in different ways and use different criteria for determining whether a person is overweight or obese. Up to date, two different standards are used, namely the World Health Organization (WHO) standards and the International Obesity Task Force (IOTF) standards. The WHO-standards state that a child is considered overweight when his/her BMI (BMI= mass (kg)/length²(m)) and/or weight is above the 85th percentile. A child is considered obese when his/her BMI and/or weight is above the 95th percentile. Secondly, the IOTF uses a definition which is also based on the BMI but specified for age and gender. They define a child as overweight when his/her BMI is above the percentile corresponding to 25 kg/m² (overweight) and 30 kg/m^2 (obese). This means that, at the age of 5, a child can be considered overweight (which can be compared to an adult with a BMI of 25 kg/m² or higher) when the BMI is 17,42 kg/m² or higher for boys, and 17,15 kg/m² or higher for girls. The child is

considered obese (which can be compared to an adult with a BMI of 30 kg/m² or higher) when the BMI is above 19,30 kg/m² (for boys) and above 19,17 kg/m² (for girls) (Cole et al. 2000).

1.2.2 Prevalence of overweight and obesity in preschool children

As already mentioned, overweight and obesity are increasing worldwide. It has been recognized as one of the biggest health problems and is also considered as one of the greatest challenges public health services are faced with to "cure". According to data of the WHO, 1 billion people were overweight in 2005 and more than 300 million were obese. The increase of obesity is occurring in every age group, sex, race and smoking status (Global health risks, 2009).

De Onis et al. (2010), indicated the worldwide prevalence of overweight and obesity in preschool children by using 450 cross-sectional surveys of 144 different countries. They found that since 1990, the prevalence of overweight and obesity in preschool children has increased dramatically. In 2010, it was estimated that, based on the WHO-standards, approximately 43 million preschool children were overweight and/or obese of which 35 million live in developing countries. This increasing trend will persist and in 2020 approximately 60 million preschool children will be estimated to be overweight and/or obese.

Van Stralen et al. (2012) conducted secondary data analyses of data from 4-7 year old children in 6 different European countries, (Belgium, Bulgaria, Germany, Greece, Poland and Spain) to indicate the prevalence of overweight and obesity in preschool children across Europe. The data-sets were from studies which were already conducted earlier (varying from 1998 until 2011) and were results of observational studies, as well as from interventions. The data sets from the European countries provided information about overweight- and obesity-indices, EBRB and relevant socio-demographic information such as age, gender, socio-economic status (SES) and parental BMI, for risk group identification. The results of Van Stralen et al. (table 1) show that overweight and obesity tends to be a bigger problem in girls than in boys. The results also show that the prevalence of overweight and obesity is slightly higher when the WHO-criteria are used. In the present study, a comparison between Bulgarian and Belgian data will be made. Therefore it is important to provide detailed information about what is already known about the prevalence of overweight and obesity in preschoolers in these two countries. The prevalence of overweight in boys in Belgium was approximately 10%, while in Bulgaria 15% of the boys were overweight. For girls, the prevalence of overweight was found to be 13% in Belgium and approximately 25% in Bulgaria. And finally,

for the prevalence of obesity, 0,6% Belgian boys were found to be obese while 5,8% Bulgarian boys were found to be obese. For girls, they found that 1% of the girls in Belgium were obese and 6,7% in Bulgaria. When these overweight- and obesity-rates are transferred to non-gender-specific rates, results indicate that in Bulgaria 20% of all preschool children are overweight of which 6,25% are obese. For Belgium, 11,5% of the preschool children are overweight of which 0,8% are obese.

Table 1: Prevalence of overweight and obesity in six European countries (Van Stralen et al., 2012)

Country	Belgium		Bulgaria		Germany		Greece		Poland		Spain	
N	1434		726		2956		708		375		273	
IOTF-criteria												
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Overweight (%)	9,4	13	15,2	24,5	11,2	13,4	24,2	30,0	18,6	16,8	26,8	38,2
Obese (%)	0,6	1	5,8	6,7	1,2	2,4	10,1	12,0	5,5	3,2	9,9	11,5
WHO-criteria												
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Overweight (%)	9,8	10,9	19,3	21,8	9,7	7,6	14,4	16,1	15,0	14,2	29,6	29,8
Obese (%)	2,0	1,2	7,7	7,3	1,9	1,7	5,1	3,3	11,8	4,5	13,4	10,7

Using the WHO-criteria the results were slightly different. With these criteria in Belgium 9,8% and in Bulgaria 19,3% of the boys were found to be overweight. For the girls the numbers were 10,9% in Belgium and 21,8% in Bulgaria. According to the WHO-standards 2% of the boys in Belgium were obese and in Bulgaria 7,7% of boys. For girls, the prevalence of obesity was 1,2% in Belgium and 7,3% in Bulgaria.

Apart from the study of Van Stralen et al., another study of Massa (2002), was conducted in Flanders (the Dutch-speaking part of Belgium) and investigated approximately 9000 Flemish children to determine the prevalence of overweight and obesity. This prevalence was then compared with the prevalence of overweight and obesity in 1980. They used the 85^{th} and 95^{th} percentiles as cutpoints for overweight and obesity. Massa found that, 14,8% of the 3-4 year old Flemish boys was overweight of which 6,7% were obese. For the 3-4 year old girls in that

study, the prevalence of overweight was the same but 6,5% of the girls in this study were obese. Results also showed that the prevalence of overweight and obesity increased with age. The prevalence of overweight in Flemish boys of 5-6 years old was 19,8% and 8,7% were obese. For girls, the prevalence of overweight was already 23% and the prevalence of obesity was 11,2%.

1.2.3 Determinants of obesity

Overweight and obesity have a lot of determinants which contribute to be/become overweight and/or obese. The next section will indicate the most important determinants of overweight and obesity in preschool children.

1.2.3.1 Personal determinants

1.2.3.1.1 Gender

A study of Jouret et al. (2007) conducted among 1780 French preschoolers found that girls had a bigger chance to become obese than boys. This result was confirmed by the study of Wake et al. (2007), who conducted a study among 4983 Australian preschoolers. They found an association of a higher BMI category with female preschoolers.

Another study of Kuepper-Nybelen et al. (2005) conducted among 1979 German preschoolers found no difference between boys and girls for the prevalence of overweight and obesity in preschoolers.

Although not all studies found corresponding results, some studies tend to state that girls are more often overweight and/or obese than boys and that they have a higher risk to become overweight and/or obese than boys.

1.2.3.1.2 Nationality

Kuepper-Nybelen et al. (2005) also found that children's nationality plays an important role in the prevalence of overweight and obesity. They investigated the differences in prevalence of overweight and obesity between preschoolers in Germany with the German nationality and preschoolers in Germany with another (or double) nationality. They found that the prevalence of overweight and obesity was significantly higher in the preschoolers with another nationality compared to the preschoolers with only the German nationality. They concluded that the higher prevalence of overweight and obesity in children with another or double nationality was explained by ethnic differences (Kuepper-Nybelen et al., 2005).

1.2.3.1.3 Socioeconomic status (SES)

In general, it is assumed that the prevalence of overweight and obesity is higher in preschoolers with a low SES. Wake et al. (2007) conducted a study among 4983 Australian preschoolers and found that children with a lower SES tended to be in higher BMI categories compared to children with a high SES.

It must be noticed that the relationship between SES and the prevalence of overweight and obesity is quite complex. Wang (2001) found in a study of children, aged 6-18, that in developed countries the prevalence of overweight and obesity tended to be higher among children with a high SES and lower among children with a low SES. On the other hand, they found a reversed association in less developed countries (such as China). In these countries, Wang found that the prevalence of overweight and obesity was higher among children with a higher SES compared to children with a lower SES. However, a study of Van Rossem et al. (2010), conducted among 2954 Dutch preschoolers, found that the inverse association between childhood overweight and socioeconomic status only appears after the age of 3 years. Before this age, the relationship between SES and overweight/obesity may be positive.

1.2.3.2 Environmental determinants

Some social trends contribute to the increase of obesity and promote the energy intake and decrease the energy consumption behaviors. This is the so called "obesic environment", such as non-stop multiple TV channels, bad infrastructure for walkers and cyclists, larger portions of food, more fast-food restaurants, etc. (Manger et al., 2012). Some determinants of obesity will be listed in the next section to create a brighter view on this so called "obesic" environment.

1.2.3.2.1 Diet and food culture

In most cases, obesity is caused by an excessive energy consumption (dietary intake) relative to energy expenditure. The change in food culture contributes to the excessive food intake. Fast-food restaurants are often open 24/7, the food is cheaper and easy accessible. Also the size of the portions in general has increased significantly and prepackaged food is highly marketed in adults as well as in children. It can be concluded that these changes in food culture contribute to the obesity problem by selling more, cheaper, easily accessible but unhealthy food (Melanson et al., 1999; Rolls, 2003; Aronne et al., 2009). But it must be noticed that these changes in food culture are not solely contributing to the prevalence of overweight and obesity, the etiology is more complex than only blaming "excessive food

intake". It includes genetic, environmental, psychological, social, economic and even political factors which influence the obesity problem (Swinburn et al., 2009).

1.2.3.2.2 Social networks

Social networks, such as peers and family, also play an important role in increasing the risk for obesity. The home environment plays a very important role since the parental views on diet, PA, etc… influence the child's behavior. A study of Spurrier et al. (2008) found that parental decisions regarding the preschool children's diet was associated with the intake of fats and adiposity. Another study conducted by Christakis and Fowler showed that there is an increased risk of 40% to become obese when one of the siblings of a child turned obese (Christakis and Fowler, 2007).

1.2.3.2.3 Policy

Swinburn et al. (2009) found that the policy of governments can also play a role in obesity problem, especially in the availability and costs of food products. For example, it has been suggested that certain policies of the US government in the '70s contributed to an abundance of food and therefore to an increase of the food intake of the population. The main and most important reasons for the increase of obesity is the change in dietary behavior and the decrease of physical activity, which will be discussed later in this thesis.

1.2.4 Interventions to prevent overweight and obesity

Overweight and obesity are risk factors for different health problems such as cardiovascular diseases, diabetes mellitus 2, respiratory diseases, … There is also an increased risk for getting different types of cancer in overweight or obese people (Ma et al, 2010). These health problems are a financial burden for the health care system of the governments of different countries and therefore they are trying to decrease the prevalence of overweight and obesity by making children and parents aware of the risks, motivating them to become more physically active, change their dietary habits, etc.. A few interventions to prevent overweight and obesity target preschool and elementary school children. One of the reasons that(preventive) interventions target these age groups is because children are still "modifiable" at this age: they easily pick up a behavior, manners, etc and these behaviors also tend to track into adolescence/adulthood (Hinkley et al, 2011). Another reason for early preventive interventions is that the earlier the interventions start, health problems have less opportunity to develop. For example, the "VITAL"-program of Manger et al. (2012) was executed amongst 5-6 year old US children. VITAL stands for "Values Initiative Teaching About Lifestyle". This program tried to make children aware of the use of healthy food and physical

activity by letting the teachers give classes about it. The children learned about proper nutrition, received pedometers to encourage physical activity and received a total of 8 lessons of 30 minutes about the advantages of physical activity, the benefits of healthy nutrition, etc. Positive results were found at the end of the intervention: 37% of the children who started in the group "obese" moved to another group ("overweight" or "healthy weight") by the end of the study. Although the results suggest positive intervention results, it must be considered that the VITAL-program was a pilot study. The program also should be tested in other elementary schools too to determine its actual effectiveness. (Manger et al. 2012) Another study of Dennison et al. (2004), investigated if an intervention that aimed to reduce sedentary behavior and screen time had an effect on the prevalence of overweight and obesity in preschool children. They observed that there was a decrease in weight status for the children of the intervention group while there was an increase for the children in the control group, no significant differences were found between the two groups. They also found an increase in television viewing in the control group while there was a decrease in the intervention group. A study of Olsen et al. (2012), provided a description of a study that aimed to prevent overweight and obesity at the age of 2-6 years old of children who had high predisposition for overweight. The children were selected based on their high weight at birth, high maternal weight or a low SES. The intervention tried to change as many determinants as possible and ran over about one and a half year in total. The investigators aimed to obtain a full perspective of the EBRB of the participants and tried to use this to prevent overweight and obesity. Results of this study are not been published yet.

Based on the studies mentioned above, it can be concluded that implementing (preventive) interventions for overweight and obesity might have positive effects on preventing or reducing the prevalence of overweight and obesity in preschool children, especially on short term. However, more research is needed to determine long term effect of these interventions on the prevalence of overweight and obesity.

1.3 Energy balance related behaviors

Energy balance related behaviors (EBRB) are the different behaviors that contribute to energy consumption and/or energy intake and are also referred to as "diet- and activity-related behaviors". These behaviors are related to the BMI-status because of their link with energy consumption (such as sports, physical activity,…) and energy intake (intake of food, drinks,…). The study of Gubbels et al. (2012), conducted amongst 2074 Dutch preschoolers, suggested that these behaviors are often clustered. The "sedentary snacking pattern" and the

all-round-healthy"-pattern are two examples of behavior clustering. The sedentary snacking pattern combines sedentary behavior (such as television viewing) with the intake of snacks. In the all-round healthy pattern high levels of physical activity, combined with low levels of (screen-based) sedentary behavior, cluster with healthy food intake. All these individual behaviors play a role in the BMI-status of a person and an even more determining role when these behaviors cluster with each other.

1.4 Physical Activity

1.4.1 Definition

Physical activity (PA) is the behavior that results in an increased heart rate, muscle activity and energy consumption. There are different levels and different kinds of PA. The level of PA depends on the consumption of energy. Whereas PA of a light intensity goes along with a low energy consumption, moderate to vigorous physical activity (MVPA) goes with a high energy consumption. PA does not only include sports, it also includes active transport, walking,… (Beunen, 2001).

1.4.2 Recommendations for physical activity in young children

Different institutions already formulated recommendations for PA for all ages including preschoolers. A Canadian study (Tremblay et al., 2012) investigated and updated the Canadian Physical Activity guidelines for young children from 0-4 years old. Toddlers (aged 1-2 years) and preschoolers (aged 3-4 years) should accumulate at least 180 minutes of PA at any intensity spread throughout the day including a variety of activities in a different environment and activities that develop movement skills. Furthermore, a progression towards at least 60 minutes of energetic play is suggested by 5 years of age.

These Canadian guidelines are relevant for every child within the target population (i.e. 0-4 years old) regardless of race, SES,… Once these guidelines are followed they can improve motor skills, body composition, health, etc… The more daily play is conducted, the more improvement is made, which means the more physically active the child is and the more the risk of becoming overweight/obese reduces. The second institution that formulated recommendations for preschool children (3-5 years old) is the US National Association for Sport and Education (NASPE). These guidelines are older and more vague about how much time must be spent physically active. The NASPE guidelines state that children who already/still go to school should have more than one hour structured PA and more than one hour unstructured PA a day. Structured PA includes physical activities which are organized

such as physical education lessons, activities in sport clubs, etc. Unstructured physical activity includes the activities that are not organized such as active transport, playing in the backyard, etc. (Beets et al., 2011) Additional to the Canadian recommendations and the recommendations of the US NASPE, the Australian government developed different recommendations for PA for preschool children. The Australian recommendations state that all children, aged 5-12 years old, should be involved in at least 60 minutes of moderate to vigorous intensity activities per day and should not use electronic media for entertainment purposes for more than 2 hours per day (Commonwealth Department of Health and Ageing, 2004).

Finally, also the Flemish government recently formulated recommendations regarding the PA levels of preschoolers. According to the ministry of health, preschool children (aged 3-6 years) should be involved in at least 3 hours of PA regardless the intensity of it (light, moderate or vigorous) (Flemish government, department of health, via www.eetexpert.be). Next to the total amount of PA, recommendations for the total number of steps preschoolers should take per day are formulated. The study of Adams et al, 2013, investigated the possibilities of transforming data received with accelerometers/pedometers into minutes/day. They concluded that 11500 steps/day match about at least 60 minutes of MVPA. Adams et al. also mentioned that when 8500 steps/day were taken, there was a chance of approximately 94% for the boys and 91% for the girls that they reached the norm of 60 or more minutes MPVA/day. Furthermore, Tudor-Locke et al. (2011) found that children (6-11 years) should take at least 13500 steps/day to meet the recommendations of 60 minutes or more MVPA per day. They concluded that it is difficult to find one standard amount of steps/day to meet the recommendations for PA since many studies tend to have different findings.

1.4.3 Prevalence of physical activity in preschoolers

A study of Cardon et al. (2008), conducted among 76 4-5 year old Flemish children showed that on weekdays only 7% reached the norm of one hour MVPA per day, on weekend days this number was slightly higher (8%). Although the boys tended to have more minutes of moderate PA, no significant differences were found between the genders.

The study of Hinkley et al., (2012), investigated how much of their total awake time on weekly basis preschool children spend on physical activity. They found that boys spent significantly more time in physical activity compared to girls. Boys spent 17,0% of their time being physically active while girls spent only 15,3% of their time in an active way. Boys and

girls spent more time being physically active on weekend days compared to on week days (boys: 18,2% vs. 16,7%; girls: 15,8% vs. 15,1%). Hinkley et al also found that on an average day 5,1% of all children who participated in the study reached the Australian recommendations of more than 3 hours PA per day. When the guidelines of the US NASPE were used, 56% of all children reached the guidelines of more than 2 hours PA per day. A study of Cardon and De Bourdeaudhuij (2007), conducted amongst 76 Belgian preschoolers, found that boys took an average of 10121 steps/ day while the girls took 9867 steps/day however this difference was not found to be significant. The total average, regardless the gender of the children, was 9980 steps/day The results also showed that only 8% of the children reached the norm (of Tudor-locke et al., 2011) of more than 13500 steps/day.

Finally, a study of Gidlow et al. (2008) which was conducted amongst 503 English children, of which 53 were preschoolers, found that the in-school activity levels of preschoolers were lower compared to the out-school physical activity levels however this difference was small and not significant. The same result was found for week- and weekend days: preschoolers tended to be more physically active on weekend days but this difference was again rather small and not significant.

1.4.4 Benefits of physical activity in preschool children

It is important to include PA in preventive interventions against obesity and overweight because it is one of the most important preventers of obesity and overweight (Janssen and Leblanc, 2010). Furthermore, it is also known that physical activity has many physical and mental health benefits for children. A review of Janssen and Leblanc, conducted in 2010, found strong suggestive evidence that PA has positive effects on adiposity in obese and overweight children (5-17 years old), muscoskeletal health, fitness and several components of cardiovascular health (Janssen and Leblanc, 2010). There is effective evidence of PA for the following health benefits: adiposity levels with children (aged 5-17 years old) with normal body weight, blood pressure in normotensive youth, plasma lipid and lipoprotein levels and on non-traditional cardiovascular risk factors (inflammatory markers, endothelial function, and heart rate variability). As mentioned above, PA also has (potential) benefits for mental health such as: a better self-concept, less anxiety, positive effects against depression, etc. The review confirmed that PA has indeed a positive influence on the health of children. The dose-response relation even suggests in some cases that the more PA the greater the health benefit. (Janssen and Leblanc, 2010). It has also suggested that PA helps in the motor,

musculoskeletal, social and psychological development of preschool children (Van Cauwenberghe et al., 2012).

1.4.5 Determinants of physical activity in preschool children

PA can be considered as a behavior which has many determinants who contribute to this behavior. Because preschool children are a unique age group, it is logical that they also have some specific determinants. The following determinants are those who are shown by most studies to play an important role in preschooler's PA levels.

1.4.5.1 Demographic and biological variables

An important determinant of PA, is the gender of the child. Studies have shown that, at the age of 5, boys tend to be more physically active than girls. A study of Finn et al. (2002), assessed the PA levels of 214 children for 2 continuous days and found that boys spent more time being physically active compared to girls. They also had a higher number of activity counts compared to girls. In the review by Hinkley et al. (2008), it was concluded that in 80% of the investigated studies a gender difference was found, whereas boys tended to be more physically active compared to girls. Important to mention is that some studies found no significant difference for PA levels of preschool children for gender. For example, the study of Cardon and De Bourdeaudhuij (2008), measured the PA levels of 89 preschool children with an accelerometer and found that girls had even more counts per minute than boys. Girls had a mean of 709 counts per minute while boys only had a mean of 694 counts per minute. No significant difference between boys and girls was found for total PA time in the latter study. In the study of Hannon and Brown (2008), a significant relation was found between age and PA. They concluded that 3-year-olds showed a significantly greater proportion of time in light activities than 4- and 5-year-olds. This study also revealed that the younger ones had more moderate activity than the older ones but the older children spent more time in vigorous activity compared to the younger. According to the study of Pate (2006), 4- and 5-year old children were less involved in activities of light intensity compared to the younger group of 3-years old. Although different studies indicated that age had an influence on PA levels, the review of Hinkley et al. (2008), found no significant relation between age and PA in 2-5 year old children. It can be concluded that further investigation is needed. Next to gender and age, no significant relationship between the SES and the PA level of the child was found in the review of Hinkley et al. This review of Hinkley et al. also investigated if the BMI of the child played an influencing role on the PA level of the child. They found that there was no

significant difference in PA levels between children with a low and high BMI and concluded that the BMI has no influence on the physical activity level of the preschool child.

Finally, the study of Finn et al., (2002), investigated the relationship between the PA levels of the child and the maternal BMI. The results showed no significant relationship. Only the BMI of the father had an influence on the physical activity behavior of the child. When the father had a higher BMI, the child spent significantly less time in physical activity. Overweight children (i.e. children with a higher BMI) had a lower average of total physical activity time and moderate to vigorous physical activity time compared to the normal weight children.

1.4.5.1.1 Behavioral variables

Out of the review of Hinkley et al. (2008) only 7 studies investigated the relationship between PA and behavioral attributes. Half of them found a negative effect of sedentary behavior and TV-viewing on PA, the other half was inconclusive, meaning more research on these variables is needed as well.

1.4.5.1.2 Social and cultural variables

The study of Bürgi et al. (2010), investigated the impact of distinct socio-cultural determinants such as parental characteristics. The investigators assessed differences in PA in preschool children according to different socio-cultural determinants and the regional environment. Significant differences for two parental characteristics to influence PA were found: migrant status and workload of the mother. For the workload of the mothers, it was concluded that children of mothers with no professional activity or a part-time job were more physically active and watched less TV than mothers with a full time job. Therefore, it could be concluded that not only the social environment, but also the regional environment plays an important role in determining PA of young children.

1.4.5.1.3 Physical environmental variables

Different studies indicated that an active-lifestyle promoting environment helps to increase PA amongst people who live in that environment. Therefore, the school environment can play an important role in stimulating the children to be physically active by providing a challenging and stimulating environment. A study of Cardon et al. (2008) found that the PA levels of children increased when there were less children per m^2. Investigators also found that the presence of a hard surface increased the PA levels of the boys. The study of Hannon and Brown (2008), conducted in a single preschool, showed that when portable play equipment, (e.g. hoops, hurdles, balls) was provided, children tended to be more

active during their breaks and time on the playground. However, another study by Cardon et al. (2009), that focused on an active playground of the preschools, showed no significant increase in PA time during recess for preschool children when PA triggers, such as toys, were provided. It was concluded that the provision of an active environment is not enough for preschoolers to decrease the sedentary behavior time and increase the PA time during recess. Cardon et al. (2009) suggested that there was a need for more active play of high intensity as well as inclusion of more activating supervision and more time allocation to structured physical activity.

It can be concluded that different determinants of PA play an important role and these determinants interact with each other. Therefore, knowledge of all the different determinants is a must to understand the health problem and to develop and provide a proper intervention program.

1.5 Sedentary Behavior

1.5.1 Definition

Sedentary behavior includes all behaviors where the human body only performs a minimum of movement. Many behaviors can be classified as sedentary behavior like sitting, lying, reading a book, watching TV, etc. (Pate et al., 2011). The term sedentary behavior can also be determined as a function of energy expenditure. From this point of view, sedentary behavior is considered as the behavior with a small increase of intensity, just above the metabolic rate but still under the expenditure of behavior which is considered as light-intensive PA behavior (e.g. walking). In metabolic equivalents (MET's), this means that sedentary behavior is the behavior with an energy expenditure lower than 1-1,5 MET (Pate et al, 2011, Hinkley et al 2010). While high levels of physical activity are predictors for a healthy lifestyle and tend to prevent obesity, high levels of sedentary behavior increase the risk for obesity. It is also shown that high levels of sedentary behavior in childhood are associated with adverse metabolic profiles and poor fitness level in later life (Pate et al, 2011). Sedentary behavior and physical activity can co-exist and it is still possible for preschoolers, who meet the physical activity guidelines, to spend a large portion of their time in sedentary behavior. Both of the behaviors should therefore be considered as independent constructs (Pate et al., 2011).

1.5.2 Recommendations for sedentary behavior in preschool children

In several countries, recommendations are made to limit daily screen time to 1-2 hours a day for preschool children. An early recommendation was made by the American Association for Pediatrics (AAP) stating that children from 2 years or older shouldn't watch TV for more than 2 hours daily. But it is questioned if these recommendations are accurate enough because of the lack of inclusion of other screen-based sedentary behavior (Hinkley et al., 2012). Therefore, the Australian Government's Department of Health and Ageing made new guidelines in October 2009 proposing that preschool children (3-5 years old) shouldn't engage in more than 1 hour of screen-based sedentary behavior per day. This recommendation includes all forms of screen-based activity such as TV, internet use, gaming,… (Commonwealth Department of Health and Ageing, 2004). Finally, the Flemish ministry of health formulated in their recommendations that preschool children should not be watching TV or play on the computer for more than 2 consecutive hours (www.eetexpert.be).

Although screen time is part of the problem of sedentary behavior in children, children also engage in many other daily sedentary activities next to screen time. They go to school where they spend most of their time sitting in the classroom, they look into books at home, play with their toys, color in their color book, etc… (Gebremariam et al, 2012). When planning an intervention it is important that all these separate sedentary activities are taken into account to ensure that the general sedentary behavior time decreases.

1.5.3 Prevalence of sedentary behavior in preschool children

An Australian study with a sample of 1004 3-5 year-olds from Melbourne found that the children had approximately 112,5 minutes of screen-based entertainment per day. Twenty-two percent of the children met the Australian recommendations, 58,9% met the recommendations of the AAP and almost one third of the children met both the Australian and the AAP recommendations (Hinkley et al, 2012). Although different recommendations are already formulated, the results out of the study of Hinkley et al. showed that only a minority of the children reached the strictest recommendations and half of the children did not even reach the lowest recommendations (i.e. no more than 2 hours of watching TV per day) for sedentary behavior/screen time. Another study of Stolley et al. (2003), conducted amongst 1424 US preschool children of minority groups (blacks and Hispanics), found that the mean time they spent watching TV was 2,95 hours. This is significantly above the norm of <120 minutes per day.

It can be concluded that interventions to decrease sedentary behavior and clear recommendations, which are applicable for the majority of the population, are needed.

1.5.4 Risks of excessive sedentary behavior

While PA comes with a lot of health benefits, sedentary behavior brings along many health risks and this both physically and mentally. In preschool children, sedentary behavior is associated with adiposity (and a higher risk for becoming overweight and/or obese), a negative effect on the bone mineral density,… More specifically, watching violence on TV has been associated with higher aggressive and antisocial behavior and this effect was even the highest in the youngest children (up to 5 years old) (Hinkley et al., 2010).

1.5.5 Determinants of sedentary behavior in preschool children

As preschool children spend a lot of their time being sedentary, it is important to know and to understand the different determinants and factors that influence these behaviors. Therefore Hinkley et al. (2010), included in their review all the important factors of sedentary behavior in preschool children. The investigators found that the following factors play a determining role in preschoolers' sedentary behavior:

1.5.5.1.1 Demographic and biological variables

The child's sex was the demographic and biological factor which was investigated the most. Preschoolers' sex had an indeterminate association with sedentary behavior and even no association of sex was found with television viewing. Furthermore, also indeterminate associations were found for child's age, child's BMI, parental education and race with sedentary behavior (Hinkley et al., 2010).

1.5.5.1.2 Behavioral attributes and skills variables

A total of 14 behavioral attributes were investigated and no association between outdoor playtime and the amount of time the child spent by watching TV in preschoolers was found (Hinkley et al. 2010).

1.5.5.1.3 Social and cultural variables

Out of the 12 investigated studies, 8 studies stated that there were associations between 12 characteristics of the social environment and sedentary behaviors among young children. Although none of the correlates studied have been investigated thoroughly enough to provide vast conclusions, it was found that TV-time rules has an inverse association on some of the sedentary behaviors (mainly on those concerning the total screen time such as TV-viewing and computer use) (Hinkley et al., 2010).

1.5.5.1.4 Physical environmental variables

The studies focused mainly on the environment of the home of the children and the daycare centre/preschool of the children. Half of the correlates investigated (11 out of 22) were found to be relevant for the preschool/daycare centre of the children. Some of the correlates which were found to have a positive association with sedentary behaviors were correlates such as constant television, television in the bedroom, region of residence,… But in general the variables identified in the physical environment were not associated with young children's sedentary behavior (Hinkley et al.,2010).

It can be concluded that the factors which determine the sedentary behavior of preschool children are multi-dimensional and very complex. Although a lot of potential correlates were found, evidence only existed for two variables: sex and outdoor playtime. Further evidence and investigations are needed to fully understand which variables play an important role in the sedentary behavior of preschool children but this will be difficult because of the dearth in literature on the correlates of sedentary behaviors in preschool children (Hinkley et al, 2010).

One of the kinds of sedentary behavior which contributes a lot to the total sedentary behavior time is screen time, which will be discussed below (Pate et al, 2011).

1.5.6 Screen time

With the rise of new technology in this century, a specific kind of sedentary behavior has developed rapidly: screen time. People have more and more opportunities to spend time sitting in front of any kind of screen. They can take these devices everywhere they go which makes it easy to spend sitting time anywhere. Also the big "assortment" of screens contributes to an accumulation of screen time. For example, one person can spend an hour using the computer, watch TV for one hour and play games on a tablet for one hour. Because all these screens are used for different purposes, sedentary behavior accumulates easily without the person noticing it. A study, conducted in Belgium, found that the average total screen time for children of 4 to 7 years old was approximately 74 minutes on weekdays and 140 minutes on weekend days (Cardon and De Bourdeaudhuij, 2008).

The study of Van Stralen et al., which was already mentioned in 1.2.2, also looked for causes of overweight and obesity. Van Stralen et al. found a significant correlation in Belgium between the total screen time and overweight of preschool children ($p<0,001$), concluding that the screen time can be associated with overweight and obesity (Van Stralen et al., 2012).

1.6 Measuring PA and sedentary behavior in preschool children

Different methods are used to measure PA and sedentary behavior in preschool children. Most methods that are used to asses PA can also be used to assess sedentary behavior in preschool children and vice versa but the chosen outcome is different. To measure and determine total physical activity time, a wide spectrum of different methods is available. The most appropriate methods to measure PA in children is the accelerometer, the pedometer and direct observation. Because preschoolers have short intermittent bursts of activity and because of their cognitive-ability and recall limitations, measuring preschoolers' PA is difficult (Bailey et al., 1995).

1.6.1.1 The accelerometer

An accelerometer is a device that measures the accelerations made during the activities he/she performs while wearing the device. It can be used to measure both PA and sedentary behavior. There are three types of accelerometers: uniaxial, biaxial and triaxial accelerometers, meaning that activity can be assessed by accelerometry following one (uni), two (bi) or three (tri) directions. Theoretically, the bi- and triaxial accelerometer should give the best result but in practice, this is not always feasible especially not with the tri-axial accelerometer because of the difficult processing (Kelly, 2004). The accelerometer can be worn on different places on the body but preferably on the hip or around the lower back. Because the device is located closer to the body center of gravity, results will be more reliable (Nilsson et al., 2002).

A study of Pate et al. (2006), investigated the validity and reliability of accelerometers to assess PA. They let 30 preschool children perform PA tasks while wearing an accelerometer and while measuring the expired respiratory gases and oxygen consumption by using Cosmed portable metabolic system device. Based on their results the researchers were able to conclude that the accelerometer was indeed a valid, reliable instrument. A good, positive correlation was found between the accelerometer and the measured VO_2 (r=0.82). Another study of Reilly et al (2003), conducted among 52 3-4 year olds, showed that the accelerometer (ActiGraph 7164) is a reliable and valid instrument to measure sedentary behavior in preschool children. Reilly et al. found that a cutpoint of <1100 counts per minute was valid to assess sedentary behavior in preschool children. It was also found that about 80% of the non-active minutes were counted correctly, making it a good method to measure sedentary behavior in preschool children. Before an accelerometer can be used, the measuring interval (epoch) has to be defined. Studies suggested that intervals of one minute are ideal to

measure PA but recently more studies found that it would be better to take sampling intervals of only 15 seconds. This would be considered better and more accurate, in particular with preschool children who have an instable pattern of PA which means that their pattern of PA is highly intermittent (Pate, 2006).

One of the advantages of an accelerometer is the fact that it has a step count function which gives valid information about the number of steps taken by the subject. This step count function is found to be reliable and valid for measuring the number of steps taken per day in children (Rosenkranz et al., 2011). Another advantage is that the device is very small so the person who wears it will barely notice it and PA is not restricted in any way. Accelerometers also give information about the different intensities of the PA (light, moderate and vigorous physical activity) which is useful to find differences in the daily time of total PA. But it also has some disadvantages: it is very expensive and requires technical expertise and additional soft- and hardware to analyze the data. It can also not be worn during water activities as most of them are not waterproof. Furthermore it does underestimate non-weight-carrying activities such as cycling. The fact that it does not measure all activities (e.g. cycling) is a serious disadvantage because when this is not taken into account it can give a serious distorted image of one's physical activity. (Pate et al., 2006, Cardon 2007).

1.6.1.2 Activpal

The Activpal is considered as a very reliable and valid to measure PA and sedentary behavior in preschool children since it can not only measure activity but also postures of the body which makes it more suitable of giving detailed information about the PA and/or sedentary behavior of preschool children (Davies et al., 2012).

1.6.1.3 The pedometer

The pedometer is a small, inexpensive and simple device that can also be used to measure PA. It measures the steps taken by the subject who carries the device and is mostly worn around the waist. The measurements are based on the vertical accelerations of the hip during the walking movement. It is a popular alternative for measuring PA in children because it is less expensive compared to the accelerometer and does not need additional soft- and hardware to work with it. Therefore, the pedometer is more users friendly compared to the accelerometer and people see it as a less complex way to get results regarding the PA levels of children (Pitta, 2006). Although the pedometers have been shown to be reliable and valid, it is known that the pedometer tends to underestimate the number of steps made during slow walking. Therefore, it is possible that (small) children who walk at slow speeds would have an

underestimated total counts of steps. Furthermore, it is also possible that not only steps are measured but other "vertical movements" too such as getting up from a chair. This can give a distorted image of the total PA. Another disadvantage of the pedometer is the fact that there are only limited data available. Pedometers are not able to give any information about the intensity of the PA, the nature of the activities, etc… (Cardon 2007). Finally, a pedometer does not got a universal standard for the vertical acceleration threshold registering of a step. This makes it difficult to compare different outcomes of pedometers to each other because every manufacturer of pedometers uses another standard. Therefore it is also difficult to use the pedometer to make physical activity recommendations (Scruggs et al, 2013).

1.6.1.4 Self-report

Self-report is the method where the subject himself keeps track of his behavioral patterns. It has been proven to be a reliable and valid method among adults but the younger the children, the lower the reliability of the data. In general, it is assumed that children younger than 10 years old are incapable of self-reporting their behavior (Loprinzi et al., 2011).

1.6.1.5 Proxy-report

When self-report is not possible, proxy-report is a good alternative. Proxy-report uses people close by the subject to report their PA and sedentary behavior. For example parents can report PA and sedentary behavior patterns of young children, who are incapable of self-reporting their behavior. It has been proven to provide accurate estimates of the PA and sedentary behavior of young children though a risk of bias still remains (Loprinzi et al., 2011).

1.6.1.6 Direct observation

A third option to assess physical activity in preschoolers is direct observation. This means that the investigators videotape and/or observe children while they are involved in physical activities or sport and quantify the behaviors after observation. This is a method which is used quite often with children because of the difficulty to apply other techniques within this population. A search through the literature revealed that there are six instruments which have already been used to asses physical activity in preschool children by direct observation. These are: the CARS, the OSRAC-P, the SCAN-CAT, the BEACHES, the CPAF and the FATS (Oliver et al., 2007). These direct observation systems can also provide a lot of information about sedentary behavior such as the total time spent with sedentary behavior, type of activities, environmental and social context, location and prompts (such as en- or discouraging PA and sedentary behavior) (Pate et al., 2010). The most used instrument as a criterion measure for the validation of accelerometer and pedometer data with preschoolers is

the OSRAC-P. The OSRAC-P, a modified version of the CARS was developed with preschool children and had the purpose to allow investigators to obtain more details about the context of the PA which means more information about things such as intensity, nature of the activity,… A disadvantage of direct observation is that this method is very time consuming and therefore it is not usable in large scale studies or with large populations. Furthermore, this method is also not suitable for measuring PA on a daily basis (Pitta et al., 2006). Finally, the direct observation method is a subjective method and provides data that are not reliable because it relies on the observer's interpretation of the data. This interpretation can differ between different observers (Pitta et al., 2006).

1.7 Health and life circumstances in Eastern Europe and Bulgaria

1.7.1 The East-West Health Gap

Up to date, not much information is available about the prevalence of overweight and obesity, PA and sedentary behavior in Eastern Europe countries. Not many studies exist regarding these topics and especially not among preschoolers. Since a lot of these countries are still developing, the need for information about the health status in these countries grows. In Western Europe, the use of interventions to prevent and decrease the prevalence of overweight/obesity and sedentary behavior and to increase PA, is well recognized. In Eastern-Europe, this is not the case and this tends to be a problem. Nedo and Paulik talk about the "East-West Health Gap" to mark this problem. They state that many the inequalities that can be detected between Eastern and Western Europe are caused by the additive effect of socio-economic factors and health damaging behaviors (such as smoking). They consider this gap as one of the biggest challenges today and in the nearby future (Nedo and Paulik, 2012). According to Zatonski, the situation in Eastern Europe was not so bad. In the mid 60's, life expectancy and health was more or less equal to the ones in Western Europe. But from the seventies, health circumstances decreased in the East until the biggest East-West health gap proportions right before the fall of communism. In the 90's a lot of the Eastern-Europe countries started to recover of the fall of communism. This brought along an increase in life and health circumstances but this increase is rather slowly and not present in every country. Free market economy, dietary changes and access to new and different kind of foods are named as possible factors explaining this increase. Zatonski concludes that the improvement of healthy behaviors in Central and Eastern Europe is only just beginning and there is still a long way to go before the gap is closed (Zatonski, 2007)

1.7.2 Prevalence of overweight and obesity in Eastern Europe

As already mentioned, there is little known about the prevalence of overweight and obesity in Eastern Europe and especially not in preschoolers. The study of Van stralen et al. (2012) (see 1.2.2), provides data about the prevalence of overweight and obesity in preschool children. But these data are secondary and some are from studies which were conducted a long time ago (range: 1998-2011). A study of Nedo and Paulik, conducted among 852 Romanian and 1099 Hungarian men and women (mean age: 48 years) found that the prevalence of obesity was rather high in both countries. In Hungary, the prevalence of obesity was 22%. In Romania, the prevalence of obesity was 16,5% (Nedo and Paulik, 2012). However, this was a study which was not conducted among preschoolers, it does create a good image of the enormous problem the countries face concerning overweight and obesity and healthy lifestyle in general.

1.7.3 Health and life circumstances in Bulgaria

Since Bulgaria joined the European Union in 2006, it was expected that the economy would grow and wealth would improve. But since health circumstances were poor in Bulgaria (it has one of the lowest life expectancies of Europe), it faces a lot of challenges. First, there is the fact that a lot of people in Bulgaria live in rural areas where basic services such as electricity and piped water are limited. Next to this, a large proportion of the population lives below poverty level or is vulnerable to becoming so. This has again an impact on the health circumstances such as access to healthy food. Finally, part of the Bulgarian population is Roma, who have been excluded from mainstream society for centuries. This resulted in poor access to health services and low socio-economic status. All these factors are extra challenges considering health improvement next to improving the general health (McKee et al., 2007).

As there is so little known about the health circumstances in Bulgaria (and Eastern Europe), and because of the fact that Bulgaria takes part in the ToyBox-project (see 2.1), and will therefore provide data, this thesis will try to create a clear view on the situation regarding preschool children. The data of the ToyBox-project will be used to make a comparison between both countries. By monitoring the prevalence of overweight and obesity, PA and sedentary behavior, a good image can be created of the physical health situation among preschoolers. By comparing this to Belgian results and the Belgian situation to the Bulgarian results and Bulgarian situation, the problem of the East-West Health gap can be studied.

1.8 Research questions

A comparison between Belgian and Bulgarian preschooler data will be made for several reasons. First, the two countries are located in a total different part of Europe, where not many studies regarding overweight and obesity (and PA and sedentary behavior) in preschool children are available. Second, Bulgaria and Belgium take both part in the ToyBox-project (see 2.1) and provide data regarding overweight and obesity, PA and sedentary behavior in preschoolers. This makes it more practical to compare information out of these two countries. Finally, Bulgaria has been chosen because it is a county in Eastern Europe that could be seen as a reference for other Eastern Europe countries. Based on the results, the East West Health Gap can be investigated and it will become clear if it is still present and in what size.

With the continuing rise of overweight and obesity, it is important to create a clear view on the prevalence of overweight and obesity in different countries and its underlying EBRB's. The data of a large European project (the ToyBox-project, see 2.1) will be used in this study to calculate the prevalence of overweight and obesity in preschool children. Next to calculating the prevalence of overweight and obesity in the latter countries, the prevalence rates of overweight and obesity of Belgium and Bulgaria will also be compared. Because not many recent studies are available investigating this problem, this study will try to determine the prevalence of overweight and obesity in Bulgaria and Flanders (the Northern part of Belgium). Comparing Belgium, a well developed country in the West of Europe, to Bulgaria, a country that is still developing in the East of Europe, will be very interesting. For instance, if differences are showed, it can be questioned if these are explained by cultural differences, geographic differences, the influence of the East-West health gap,… Based on the results found in the literature, which stated that the prevalence of overweight and obesity was higher in Bulgaria than in Belgium, we still expect that the prevalence of overweight and obese preschoolers in Bulgaria will be higher compared to Belgium. A second reason why we expect them to be higher in Bulgaria is the fact that we expect the East-West Health Gap to be still present. Furthermore, we will also investigate if there is a difference in prevalence of overweight between boys and girls in the two countries. For both countries, we expect that girls will have a higher BMI compared to boys since this was found in the majority of the studies in the literature.

Next to the prevalence of overweight and obesity, this study will also investigate the PA levels of the preschool children in Bulgaria and Flanders by making use of step count data. PA levels will be calculated for weekdays and for weekend days. Finally, the number of steps

taken by preschool children in Bulgaria and Flanders will be compared to see in which country the preschool children have the most step counts and are consequently more physically active. Because Bulgaria is a still developing country in the East of Europe, we expect that preschoolers in Belgium will have a higher number of steps for weekdays and weekend days compared to Bulgarian preschoolers. Differences between genders within the countries will also be investigated and for both countries, it is expected that boys are more PA than girls. The number of preschool children who reach the norm for PA in steps will also be calculated and a comparison between both countries will be made.

Finally, sedentary behavior will also be investigated in the last research question in this study. The total hours spent TV viewing, using the computer, total screen time and quiet play will be investigated for both countries, with a distinction made for weekdays and weekend days and for boys and girls. Finally, these total hours spent in these sedentary activities will be compared for the children in Bulgaria and Belgium and differences between genders will be investigated. The number of children who stay within the norm of 120 minutes of screen time per day will be calculated and compared between both countries.

2 Methods

To indicate the prevalence of overweight and obesity and the activity levels of Bulgarian and Belgian preschool children, data of the ToyBox-study (see 2.1) were used. The data that are used in this study are the data collected during the pretest measurements of the ToyBox-project in Belgium and Bulgaria between March and June 2012.

2.1 The ToyBox-project

The ToyBox-project is an EU-funded study that will develop and test an innovative and evidence-based obesity prevention program for children aged 4-6 years. Four to six year old preschoolers were targeted because early childhood is an important period for addressing obesity prevention, since behaviors, psychological traits and physiological processes are mostly formed at this age. Behaviors and ideas adopted at that age are more likely to persist into the adulthood and therefore increase the chance of a healthy adulthood. The main goal of the Toy-Box project is to promote an active and healthy lifestyle in order to prevent obesity. The development of the Toy-Box project is based on different steps. Above that, the Toy-Box-project will also try to identify all determinants and behaviors which contribute and relate to overweight and obesity at preschool-age. Furthermore, the intervention will also try to evaluate the models and strategies which have the greatest impact on behavioral change in this age group. The project also aims to develop an intervention at preschool-age which aims to decrease the prevalence of overweight and obesity. Thereby, this intervention will try not only to involve the children but also the families of the children and will be adjustable to all children of the participating countries. The intervention will be implemented in the 6 participating European countries (Belgium, Bulgaria, Poland, Spain, Greece and Germany) and its process, impact and outcomes will be evaluated as well as its cost-effectiveness. Finally, the results will be published in order to make recommendations for the European public health policy (www.toybox-study.eu).

2.2 Population

The population of this study are Flemish and Bulgarian preschool children between 3 and 5 years old. The sampling method was prescribed in a protocol and was identical in Belgium and Bulgaria. For Belgium, a list was first made which included every municipality in Eastern- and Western-Flanders. Based on the education level of the residents, these municipalities were divided in three SES-levels (conform stratified sampling). Out of these three SES-levels, 5 municipalities were chosen ad random and every preschool in this municipality was listed (conform cluster sampling). Finally, the smallest preschools were

removed from the list and all schools were contacted by phone and were invited to participate in the study. After each school was contacted and showed interest in the project, an appointment was made with the head of the school to further explain the study. During this appointment some extra information about the project was provided and the goals of the ToyBox-project were clarified. The same sampling method was used in Bulgaria but adapted to the Bulgarian municipalities. As seen in table 2, a total of 97 preschools were contacted in Belgium and 30 agreed to take part in the study (response rate: 30,92%). In Bulgaria 48 preschools were contacted and 37 agreed for participation (response rate: 77,08%). A total of 2919 children were contacted in Belgium and 1869 agreed to take part in the study (response rate: 64%,03%). In Bulgaria 2035 preschoolers were contacted and 1331 agreed (response rate: 65,41%).

Table 2: Number of preschools and preschool participating in the Toybox-study						
Country	Belgium			Bulgaria		
	Contacted	Agreed	Response Rate	Contacted	Agreed	Response Rate
Preschools	97	30	30,92%	48	37	77,08%
Preschool children	2919	1869	64,03%	2035	1331	65,41%

2.2.1 Characteristics of the population

The mean age of the children in Bulgaria was 4,69 year (SD±0,29). In Belgium, the preschoolers' mean age was 4,41 year (SD±0,67) (table 3).

Table 3: Mean age of the Belgian and Bulgarian children participating in this study				
Country	Belgium		Bulgaria	
	Mean	**SD**	**Mean**	**SD**
Age (in years)	4,41	0,67	4,69	0,29

From the total of 552 Bulgarian preschool children, 264 were boys (47,83%) and 280 were girls. In Belgium, there were 509 boys (50,50%) and 455 girls of a total of 1008 preschoolers (table 4).

Table 4: Gender of the preschoolers in Belgium and Bulgaria				
Country	Belgium		Bulgaria	
	#	%	#	%
Boys	509	50,50	264	47,83
Girls	455	45,14	280	50,72
Missing values	44	4,37	8	1,45
Total	1008	100	552	100

2.3 Procedure

Once preschools agreed to participate in the project, parents of preschoolers in the participating prechools received an information letter including a detailed description of the ToyBox-project. Parents were invited to participate (attachment 1) and to let their child wear an accelerometer or pedometer for five consecutive days. Accelerometers were used in Belgium and pedometers in Bulgaria. The reason that accelerometers were used in Belgium is because these devices were available in great numbers. In Bulgaria pedometers were used because accelerometers were not available. To ensure that the same procedure was used in both countries, the accelerometers were programmed to measure steps. Next to the PA levels, anthropometric measurements were performed in both countries. In Belgium, anthropometric measurements were performed on Tuesday (table 5) in the period between March and June of 2012. These measurements included height, weight and abdominal circumference. Preschoolers who had parental permission received an accelerometer after the measurements. When the preschoolers received their accelerometer, they also got a letter with a registration form for their parents which they had to fill in. The registration form (attachment 2) was handed out to the parents to indicate the moments, duration and reason for not wearing the accelerometer or pedometer. The parents had to write down the time the preschoolers was fitted with the accelerometer/pedometer in the morning and the time the device was removed in the evening before sleeping. Also, when preschoolers performed water based activities (e.g., swimming, taking a bath, etc.), the device had to be removed and parents wrote time the duration of removing the accelerometer/pedometer.

Table 5: Week schedule accelerometers/pedometers

	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday
Belgium	Handing out accelero-meters (data not included)	Preschooler wears the accelerometer (data not included)	Measurement day 1	Measurement day 2	Measurement day 3	Measurement day 4	Collect devices
Bulgaria		Handing out pedometers (data not included)	Measurement day 1	Measurement day 2	Measurement day 3	Measurement day 4	Collect devices

Because preschoolers may react on wearing the accelerometer or pedometer (i.e. increase their PA levels), the first day and the second day (Tuesday and Wednesday) in Belgium, and

the first day in Bulgaria (Wednesday), were excluded from the data. Preschoolers wore the device from Thursday until Sunday, with two weekdays and two weekend days that included in the data. The device was retrieved by the investigators on Monday. The data that were used in Bulgaria, also included two weekdays (Thursday and Friday) and two weekend days (Saturday and Sunday).

Next to the anthropometric measurements and the PA levels, parents of preschoolers in Belgium and Bulgaria also received a questionnaire with questions about different behaviors of their child regarding PA (attachment 4), sedentary behavior, nutrition, etc. The questionnaire aimed to collect information about the daily habits of the children but also about the daily habits of the parents. In general the questionnaire aimed to receive a full perspective on the daily, social life of the child and the parents. All preschoolers who were measured, received a questionnaire to take home to the parents. Preschoolers who had permission to wear an accelerometer received a questionnaire and also a food frequency questionnaire, and a registration form.

2.4 Measuring instruments

2.4.1 Anthropometric measurements

During the measurements, both height and weight of each child was determined. Children were measured with only their underwear, socks and one layer of light clothing. Each child was measured two times for weight and height and from these measurements the mean was taken. For measuring the children's weight, the investigators used a normal, standard balance. The scales, that were used, were of the type SECA 861 (figure 1) and SECA 813 (figure 2) and are considered to be reliable and accurate to 0,01kg. The device that was used to measure the height of the children was a SECA 225 (figure 3) of a SECA 214 (figure 4). These are accurate on the 0,01 cm level. It is known as the best measuring device to determine the height of a child because, when used properly, the possibility to make a measuring error is really low (www.Indianpediatrics.net).

Figure 1: SECA 861

Figure 2: SECA 813

Figure 3: SECA 225

Figure 4: SECA 214

2.4.2 Physical activity and sedentary behavior

2.4.2.1 Accelerometer

As mentioned above, the accelerometer was used in Belgium to measure the preschoolers' steps during five consecutive days. The accelerometer is considered to be an accurate measuring instrument for free-living PA assessment among preschoolers (Bornstein, 2011). The accelerometer does not only provide information about the intensity and type of the physical activity, also steps across different days can be measured (Tudor-locke et al. 2011). In Belgium, three different types of accelerometers were used: the GT1M (figure 5), the GT3X (figure 6) and the GT3X+ (figure 7). Before the accelerometer could be fitted on the

preschoolers, they were programmed using the Actilife 6 software. The start date and end date was programmed. When the accelerometer was handed to the children, the device had a sticker on it with items such as flowers, animals, butterflies, etc… The stickers were used to make the accelerometer attractive to the preschoolers and it was used in order to make sure that the accelerometer was fitted correctly (i.e., correct side up). It was clipped around the trousers like a belt so that it would not move out of place during any sudden movements. The accelerometer was worn at the right side of the body, above the knee. The parents received a short manual (attachment 3) so they knew how to fit on the accelerometer on the children.

Figure 5: GT1M accelerometer

Figure 6: GT3X accelerometer

Figure 7: GT3X+ accelerometer

2.4.2.2 Pedometer

The pedometer is another device that can be used to assess the amount of physical activity. The model used in Bulgaria was the OMRON model (figure 8). It was used in Bulgaria to count the steps preschoolers took on a daily basis. They are valid instruments and accurate instruments which correlate strongly with behavioral observation and accelerometer data (Scruggs et al, 2013). While the accelerometer measures all the accelerations of the body center of mass and the steps, the pedometer only measures the number of steps taken by the subject who wears it.

Figure 8: The OMRON model Hj-720IT-E2 Walking Style Pro pedometer

2.4.2.3 Questionnaires to assess preschoolers' sedentary behavior

Parents were invited to complete a questionnaire (attachment 4) which aimed to investigate different behaviors of both the caretakers and the child. It aimed to learn more about the daily habits including preschoolers' sedentary behavior. The questions that were included in this study are a small sample of the total questionnaire of the ToyBox-study. These questions are:

- "How many hours does your child watch TV on weekdays per day?"
- "How many hours does your child watch TV on weekends per day?"
- "How many hours does your child uses the computer on weekdays per day?"
- "How many hours does your child uses the computer on weekends per day?"
- "How many hours is your child involved in quiet play on weekdays per day?"
- "How many hours is your child involved in quiet play on weekends per day?"

The parents could choose for each question between a number of answers. Each number corresponded with an amount of time going from 1 ("never") to 9 ("more than 8 hours a day") and with an extra answer possibility for when the parents didn't really know the answer: 10

("I don't know"). Since the parents fill in the questionnaire, the method used is proxy-report. Lozinski et al (2011) proved that this is a good method to give accurate estimates of sedentary behavior in young children. A study of Rey-Lopez et al. (2012) found a good reliability between the results of a questionnaire regarding sedentary behavior and objectively measured sedentary behavior.

2.5 Statistical Analysis

The data included in this study are based on the data from the questionnaires in Belgium and Bulgaria. After the results of both countries were received, a statistical analysis was conducted to determine whether there were significant differences between the results of both countries.

For the anthropometric measurements, means were calculated based on gender and an independent sample t-test was used to compare the means of both countries for height and weight. The BMI was calculated using the formula of BMI (weight(kg)/length(m)^2) and the measured height and weight of the children and the BMI was compared between the countries. Prevalence rates for overweight and obesity were calculated by using the IOTF-criteria, specific for age and gender and these prevalence percentages were compared using chi^2-tests.

The total steps were used to measure the PA level of the child in both Belgium and Bulgaria. The total mean steps taken by the preschool children was calculated by calculating the average of both weekdays and multiplying this with five. This value was summed up with the average of both weekdays (which was multiplied with two) and then divided by seven. The means for weekdays, weekend days and in total of both countries were compared by using an independent sample t-test and significance was considered when $p<0.005$. Differences regarding gender and type of day within the countries were investigated by using a univariate ANOVA. Based on the outcome, the means were compared to see if there were any significant differences. After this, the means of both countries were compared to the norm of PA in steps ($\geq$ 13500 steps/day) to determine how many preschoolers reached the norm of PA regarding the steps/day. The percentages of each country were compared to each other by using Chi^2. Significance was considered when $p<0,05$

The same method was used to investigate preschoolers' sedentary behavior. First the answers of the questionnaire were recoded into quantitative answers so they could be compared in the analyses. The total means for the use of TV, computer and time spent with quiet play were

compared based on the ANOVA outcome. Differences between the countries and weekdays and weekends were investigated. After this, the means of both countries were compared to the norm of sedentary behavior regarding screen time (i.e. less than 120 minutes/day) to determine how many preschoolers reached the norm of sedentary behavior regarding screen time. The percentages of both countries were compared to each other by using Chi^2. Total screen time was calculated by accumulating the mean time the preschool children spent watching the TV and using the computer. Significance was considered when $p<0,05$.

3 Results

3.1 Anthropometric results

A significant difference was found between the mean age of the children. In Belgium, the mean age was 4,41 years old, while it was 4,96 years in Bulgaria. In Belgium, 52,8% of the children were boys while in Bulgaria this was 48,5%. The mean weight of the children in Bulgaria was 19,47 kg (SD±2,86), the mean height of the children was 110,26 cm (SD±4,69). In Belgium, the mean weight of the children was 17,62 kg (SD±2,58) and the mean height was 105,03 cm (SD±5,91). Significant differences between countries were found for both weight and height but not for the BMI of the children. The difference between the percentage of boys within both samples in Belgium and Bulgaria was also not significant (chi^2=2,540), meaning both groups were almost identical and therefore comparable (table 6).

Table 6: Anthropometric results of the preschool children in Belgium and Bulgaria

Country		**Belgium**			**Bulgaria**		Significance	
	N	Mean	SD	N	Mean	SD	t	p
Age (years)	925	4,41	0,67	425	4,96	0,29	-21,050	**<0,001**
Percentage boys	964	52,8%		544	48,5%			0,111
Weight (kg)	1008	17,62	2,58	552	19,47	2,86	-12,640	**<0,001**
Height (cm)	1007	105,03	5,91	552	110,26	4,69	-19,181	**<0,001**
BMI	1007	15,92	1,36	522	15,95	1,55	-0,388	0,698

3.2 Prevalence of overweight and obesity

The prevalence of overweight and obesity was calculated for each age category and sorted out by gender and country. Each table in this section represents the prevalence of overweight and obesity per gender and country.

In general, the prevalence of overweight and obesity was higher in Bulgaria than in Belgium but the differences between the countries were not significant (boys: chi^2=3,463; p=0,177; girls: chi^2=1,732; p=0,421 and total: chi^2=3,992; p=0,136) (table 7).

Out of a total of 481 Belgian boys, 46 preschoolers were found to be overweight and 8 were obese. This means that 9,56% of the boys in this study were overweight and 1,66% were obese. Out of 427 Belgian girls, 58 preschoolers were overweight and 13 were obese. This means that 13,58% of the girls were overweight and 3,04% were obese.

Table 7: Prevalence of overweight and obesity								
Country		**Belgium**				**Bulgaria**		
		Total	Boys	Girls		Total	Boys	Girls
Total	N	908	481	427		427	209	218
Overweight	N	104	46	58		61	23	38
	%	11,45%	9,56%	13,58%		14,29%	11%	17,43%
Obesity	N	21	8	13		15	8	7
	%	2,31%	1,66%	3,04%		3,51%	3,83%	3,21%

In Bulgaria, the prevalence of overweight and obesity was only slightly higher. For the Bulgarian boys it was found that out of a total of 209 boys, 23 were overweight and 8 were obese. This means that 11% of the Bulgarian boys were overweight and 3,83% were obese. For the Bulgarian girls, it was found that, out of a total sample of 218 girls, 38 were found to be overweight of which 7 were obese, so 17,43% of the girls who participated in this study were overweight and 3,21% were obese (table 7).

3.3 Physical activity

Table 8 represents the number of steps taken by the preschoolers (note: N stands for the number of preschoolers). As can be seen, significant differences were found between the countries for every variable (gender and type of day).

In general, Belgian preschoolers took significantly more steps than Bulgarian preschoolers ($t=4,002$; $p<0,001$). A significant difference was found between the Belgian and Bulgarian boys on both weekdays and weekend days. On weekdays, the Belgian preschool boys took significantly more steps than the Bulgarian preschool boys but on weekend days the Bulgarian preschoolers took significantly more steps than the Belgian preschoolers (weekdays: $t=10,380$ and $p<0,001$; weekend days: $t=-2,272$ and $p<0,05$). Significant differences were also found between girls of both countries. The Belgian girls took significantly more steps on weekdays than the Bulgarian preschool girls ($t=7,880$ and $p<0,001$) but on weekend days the Bulgarian girls took significantly more steps ($t=-5,601$ and $p<0,001$).

Table 8: PA in steps/day for both countries									
Country		**Belgium**			**Bulgaria**			Significance	
		N	Mean	SD	N	Mean	SD	t	p
Boys	Week	502	10873	2881	252	8437	3789	8,980	**<0,001**
	Weekend	490	7907	3781	246	8647	4181	-2,338	**<0,050**
	Total*	488	10054	2551	235	8610	3096	6,204	**<0,001**
Girls	Week	454	9588	2557	268	7985	3524	6,502	**<0,001**
	Weekend	440	7080	3524	263	8628	4009	-5,178	**<0,001**
	Total*	440	8915	2277	252	8235	3090	3,054	**<0,010**
Total	Week	998	10192	2877	527	8179	3653	10,979	**<0,001**
	Weekend	970	7404	3720	514	8620	4077	-5,632	**<0,001**
	Total*	968	9438	2547	491	8397	3092	6,431	**<0,001**

3.3.1 Type of day within the country

In Belgium, preschoolers took significantly more steps on weekdays (10192 steps/day) than on weekend days (7404 steps/day) ($F=463,882$; $p<0,001$) A significant difference was found for the steps taken by the Belgian male preschoolers between weekdays and weekend days ($F=2,913$; $p<0,05$). The Belgian preschool boys took significantly more steps on weekdays (10873 steps/day) compared to weekend days (7907 steps/day). For the Belgian girls, a significant difference was also found between steps taken on weekdays and weekend days ($F=2,913$; $p<0,005$), showing again a lower number of steps on weekend days (7080 steps/days compared to 9588 steps/day on weekdays). No significant difference was found for the Bulgarian preschoolers between weekdays (8179 steps/day) and weekend days (8620 steps/day) however their number of steps was for both genders higher on weekend days ($F=2,620$; $p=0,106$). For the Bulgarian boys, no significant difference was found between weekdays and weekend days ($F=1,176$; $p=0,278$). The means for weekdays and weekend days didn't differ too much from each other (Mean weekdays: 8437 steps; mean weekend days: 8647 steps). When the results of the girls were compared separately, a significant difference was found for the Bulgarian girls between weekdays and weekend days ($F=10,806$ $t=-2,021$; $p<0,050$), showing that the girls took more steps on weekend days (8628 steps/day) compared to weekdays (7985 steps/day).

3.3.2 Gender differences within the countries

Total steps were calculated for both genders and compared to see if boys were more PA than girls. For Belgium it was found that boys took significantly ($F=68,714$; $p<0,001$) more steps than girls and this on both weekdays and weekend days. In Bulgaria, no significant difference was found between boys and girls on weekdays nor on weekend days ($F=1,421$; $p=0,233$).

3.3.3 Results compared to the norm

Table 9 shows the results of both countries compared to the norm for PA of preschool children in steps/day. When the results of both countries are compared to the norm of 11500 steps of Adams et al., and the norm of 13500 steps of Tudor-Locke et al. (2011), it can be seen that both norms are not reached on any day. When the results are compared to the norm of Adams et al. (which is 8500 steps/day), this norm is already reached on some days. Significant differences were found on week ($t=18,573$ and $p<0,001$)) and weekend days ($t=-9,171$ and $p<0,001$) for the Belgian preschoolers and in the total PA over the whole week ($t=11,453$ and $p<0,001$). For the Bulgarian preschoolers, a significant difference was found between the norm and their results on weekdays ($t=-2,020$ and $p<0,01$) but not for weekend days ($t=0,669$ and $p=0,504$) and for the total PA ($t=-0,738$ and $p=0,461$). It can be seen that both results for weekend days and total PA are close to the norm of 8500 steps/day. On weekend days, the Bulgarian preschoolers stay slightly above the norm, while in total they are a little beneath the norm. The Belgian preschoolers reached the norm of 8500 steps/day on weekdays and in total during the whole week (regardless of the type of day). They did not reach the norm on weekend days. The Bulgarian preschoolers never reached the norm of 8500 steps/day but no significant difference was found between the norm and the steps taken on weekend days.

When the genders are compared, a significant difference is found for the Belgian boys on weekdays, weekend days and for total PA. On weekdays and over the whole week, they score significantly above the norm of 8500 steps/day (weekdays: $t=18,451$ and $p<0,001$; total week: $t=13,451$ and $p<0,001$) but that they score below the norm on weekend days ($t=-3,474$ and $p<0,005$).

For the Bulgarian boys, no significant differences were found between their results and the norm. On weekdays they score below the norm with 8437 steps ($t=-0,261$ and $p=0,795$) while on weekend days and for the total week they score more than the norm of 8500 steps/day (weekend: $t=0,551$ and $p=0,582$; total: $t=0,545$ and $p=0,586$).

For the Belgian girls, significant differences were found with the norm on weekdays, weekend days and for total PA. They score, like the Belgian boys, significantly above the norm on weekdays (t=9,062 and p<0,001) and for total PA (t=3,824 and p<0,001) but below the norm on weekend days(t=-8,451 and p<0,001). The Bulgarian girls had a significant difference between the norm and PA on weekend days (t=-2,392 and p<0,050) but no significant differences were found between their results and the norm on weekend days (t= 0,517 and p=0,504) and for the total week (t=-1,364 and p=0,461)

Table 9: PA compared to the norm (8500 steps/day) for both countries

Country		**Belgium**				**Bulgaria**			
		N	Mean	SD	p	N	Mean	SD	p
Boys	Week	502	10873	2881	**<0,001**	252	8437	3789	0,795
	Weekend	490	7907	3781	**<0,005**	246	8647	4181	0,582
	Total	488	10054	2551	**<0,001**	235	8610	3096	0,586
Girls	Week	454	9588	2557	**<0,001**	268	7985	3524	**<0,050**
	Weekend	440	7080	3524	**<0,001**	263	8628	4009	0,606
	Total	440	8915	2277	**<0,001**	252	8235	3090	0,174
Total	Week	998	10192	2877	**<0,001**	527	8179	3653	**<0,050**
	Weekend	970	7404	3720	**<0,001**	514	8620	4077	0,504
	Total	968	9438	2547	**<0,001**	491	8397	3092	0,461

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Table 10 shows the percentages of the children who reach the lowest norm of 8500 steps/day and the highest norm of 13500 steps/day. The differences between the percentages of both countries were found to be significant on every type of day and in total on the p<0,05 and p<0,001 level. It can be observed that, in Belgium, on weekdays the lowest norm is reached by the majority of the children but that weekend days tend to be a problem: only 42,9% of the boys, 36,1% of the girls and 38,7% of all the Belgian preschoolers reach the lowest norm of 8500 steps/day on weekend days. The highest norm, of 13500 steps, is not reached by many Belgian preschoolers. As expected from the results of table 8, the percentage of Belgian children who reach the norm is higher on weekdays and for total PA but not for weekend days. In Bulgaria, fewer preschoolers reach the norms of 8500 steps/day and 13500 steps/day. On weekdays, weekend days and in total, less than half of the children reach the lowest norm of 8500 steps/day. Again, the norm of 13500 steps/day is reached by only very few children.

Table 10: % of preschool children who reach the norm of 85000 steps and 13500 steps in both countries									
Country		**Belgium**			**Bulgaria**				
		N	% >8500	% >13500	N	% >8500	% > 13500	Chi²	p
Boys	Week	502	83,5%	15,9%	252	48,8%	8,3%	238,805	**<0,001**
	Weekend	490	42,9%	7,1%	246	50,8%	10,6%	9,190	**<0,05**
	Total	488	85,8%	7,4%	235	48,9%	6,8%	147,022	**<0,001**
Girls	Week	454	70,4%	4,4%	268	39,9%	7,5%	65,542	**<0,001**
	Weekend	440	36,1%	1,8%	263	49,8%	11,8%	54,243	**<0,001**
	Total	440	60,2%	2%	252	45,6%	6,0%	17,661	**<0,001**
Total	Week	998	76,3%	10,3%	527	43,8%	7,8%	223,331	**<0,001**
	Weekend	970	38,7%	4,6%	514	49,6%	11,1%	49,905	**<0,001**
	Total	968	67,7%	4,9%	491	46,8%	6,1%	60,872	**<0,001**

3.4 Sedentary Behavior

3.4.1 Screen time

Table 11 shows the screen time of the preschoolers for both countries. A significant difference was found between the total screen time for Belgian and Bulgarian preschool children. For the Belgian preschool children the total screen time was 110,62 minutes per day (SD±65,33), for the Bulgarian children the total screen time was 155,81 minutes per day (SD±82,55). Significant differences were found between boys of both countries for both weekdays and weekend days: the Bulgarian preschool boys spent significantly more time in front of a screen than the Belgian preschool boys. The same significant differences were found for the girls: the Bulgarian girls spent significantly more time in front of a screen than the Belgian girls and this on both weekdays ($t=-7,278$; $p<0,001$) and weekend days ($t=-5,907$; $p<0,001$) as well as in total screen time ($t=-7,524$; $p<0,001$).

Table 11: Screen time in minutes/day									
Country		**Belgium**			**Bulgaria**				
		N	Mean	SD	N	Mean	SD	t	p
Boys	Week	491	94,34	66,32	250	141,24	84,33	-7,669	**<0,001**
	Weekend	487	161,17	94,98	251	212,03	121,46	-5,785	**<0,001**
	Total*	477	112,60	68,10	248	160,09	86,47	-7,522	**<0,001**
Girls	Week	436	91,79	60,32	271	131,73	76,82	-7,278	**<0,001**
	Weekend	430	154,49	89,00	268	201,60	110,07	-5,907	**<0,001**
	Total*	421	108,36	62,42	266	151,13	78,31	-7,524	**<0,001**
Total	Week	938	93,01	63,34	523	136,46	80,55	-10,639	**<0,001**
	Weekend	929	158,45	92,34	521	207,47	116,31	-8,269	**<0,001**
	Total*	909	110,62	65,33	516	155,81	82,52	-10,684	**<0,001**

3.4.1.1 Type of day within the countries

A significant difference was found between the screen time on weekdays and the screen time on weekend days for both countries. The Belgian preschoolers spent significant more time behind a screen on weekend days compared to weekdays (F=307,686; p<0,001) and this for both boys and girls. For the Bulgarian preschoolers, significant differences were also found between week and weekend days: Bulgarian preschoolers (both boys and girls) had higher amounts of screen time on weekend days compared to weekdays (F=129,344; p<0,001)

3.4.1.2 Gender differences within the countries

No gender differences were found for the Belgian preschoolers, both genders tended to be involved in approximately the same amount of screen time (F=1,563; p=0,211). For the Bulgarian preschoolers, same results were found with no significant differences between boys and girls for the screen time (F=2,597; p=0,107).

3.4.1.3 Results compared to the norm

Table 12 and 13 compare the results to the norm of the Flemish government (not more than 120 minutes of screen time daily). For the Bulgarian children, no specific recommendations or norms regarding screen time could be located in the literature so the lowest norm of international recommendations was taken as reference (which was also not more than two hours daily).When the screen time on week days, weekend days and the total screen time of both countries are compared with the norm, which is for both countries less than two hours

screen time per day, significant differences were found for between the countries for both gender and type of day. The Belgian preschool children stayed underneath the norm of 120 minutes screen time/day and this on weekdays and in total for both genders. The Bulgarian preschoolers had significant differences with the norm for all means and were all above the norm. This shows that the Bulgarian preschool children exceed the recommendations regarding screen time since their means are all significantly above the norm (table 12).

Table 13 shows the number of preschoolers of both countries who reached the norm of no more than 120 minutes screen time per day. It shows, like table 12, that in Bulgaria, meeting the recommendations tends to be more problematic compared to Belgium. The percentage of preschoolers who exceed the norm of 120 minutes screen time per day is for every gender and type of day significantly higher in Bulgaria compared to Belgium.

Table 12: Screen time compared to the norm (120 minutes/day)

Country		**Belgium**				**Bulgaria**			
		N	Mean	SD	p	N	Mean	SD	p
Boys	Week	491	94,34	66,32	**<0,001**	250	141,24	84,33	**<0,001**
	Weekend	487	161,17	94,98	**<0,001**	251	212,03	121,46	**<0,001**
	Total	477	112,60	68,10	**<0,050**	248	160,09	86,47	**<0,001**
Girls	Week	436	91,79	60,32	**<0,001**	271	131,73	76,82	**<0,050**
	Weekend	430	154,49	89,00	**<0,001**	268	201,60	110,07	**<0,001**
	Total	421	108,36	62,42	**<0,001**	266	151,13	78,31	**<0,001**
Total	Week	938	93,01	63,34	**<0,001**	523	136,46	80,55	**<0,001**
	Weekend	929	158,45	92,34	**<0,001**	521	207,47	116,31	**<0,001**
	Total	909	110,62	65,33	**<0,001**	516	155,81	82,52	**<0,001**

Table 13: % of preschool children who do not exceed the norm of 120 minutes of screen time daily							
Country		**Belgium**		**Bulgaria**			
		N	% <120 min	N	% <120 min	Chi²	p
Boys	Week	491	82,9%	250	59,2%	49,458	**<0,001**
	Weekend	487	49,1%	251	34,3%	14,747	**<0,001**
	Total	477	66,5%	248	42,7%	37,758	**<0,001**
Girls	Week	436	85,3%	271	62,4%	49,034	**<0,001**
	Weekend	430	54,9%	268	37,3%	20,416	**<0,001**
	Total	421	70,1%	266	45,5%	41,239	**<0,001**
Total	Week	938	84,1%	523	60,8%	99,395	**<0,001**
	Weekend	929	51,7%	521	35,7%	34,271	**<0,001**
	Total	909	67,9%	516	44%	77,791	**<0,001**

3.4.2 Use of Computer

Table 14 shows the use of computer of the preschoolers for both countries. Significant differences for all variables were found for the use of computer between Belgium and Bulgaria. The Bulgarian boys, girls and in general all Bulgarian preschoolers used the computer significantly more than the Belgian preschoolers and this on both weekdays as on weekend days. The Bulgarian children spent on weekdays on average 34,75 minutes per day (SD±45,65) behind their computer screen while the Belgian children spent only 13,17 minutes per day (SD±27,21) using the computer (t=-9,938; p<0,001). On weekend days, the time spent using the computer was even higher for Bulgarian preschoolers. Bulgarian children spent 50,59 minutes per day (SD±64,57) with the computer while the Belgian children only spent 26,18 minutes per day (SD±38,64) with using the computer (t=-7,937; p<0,001). Belgian boys spent significantly less time with the computer than the Bulgarian boys and this on both weekdays (t=-7,502; p<0,001) and weekend days (t=-6,518; p<0,001), as well for the total computer time (t=-7,597; p<0,001). For girls, the same significant differences were found: The Belgian girls spent significantly less time using the computer compared to the Bulgarian girls and this for all days (weekdays: t=-6,605; p<0,001; weekend days: t=-4,732; p<0,001 total: t=-6,449; p<0,001).

3.4.2.1 Type of day

A significant difference was found between the time the preschoolers spent with using the computer on weekdays and on weekend days. In both Belgium (F=69,104; p<0,001) and

Bulgaria (F=21,459; p<0,001), the computer was significantly more used on weekend days compared to weekdays (table 14).

3.4.2.2 Gender differences within the countries

Significant differences were found between the genders for the use of computer. The boys of both countries used the computer significantly more than the girls. The Belgian boys used the computer significantly more than the girls (F=6,205; p<0,050). In Bulgaria, the difference between boys and girls was even bigger (F=16,822; p<0,001) with the boys using the computer significantly more.

Table 14: Use of PC in minutes/day for both countries

Country		**Belgium**			**Bulgaria**			Significance	
		N	Mean	SD	N	Mean	SD	t	p
Boys	Week	495	14,48	29,44	256	40,55	51,39	-7,502	**<0,001**
	Weekend	496	28,57	40,10	255	58,82	68,33	-6,518	**<0,001**
	Total*	488	18,17	30,17	255	45,21	52,49	-7,597	**<0,001**
Girls	Week	439	11,82	24,70	272	29,12	38,56	-6,605	**<0,001**
	Weekend	439	23,51	36,84	272	42,35	58,94	-4,732	**<0,001**
	Total*	432	14,87	25,28	271	32,99	41,69	-6,449	**<0,001**
Total	Week	945	13,17	27,21	530	34,75	45,65	-9,938	**<0,001**
	Weekend	947	26,18	38,64	529	50,59	64,57	-7,937	**<0,001**
	Total*	931	16,59	27,92	528	39,06	47,79	-9,891	**<0,001**

3.4.3 Use of TV

In table 15, the preschoolers' TV viewing time of both countries is represented. The Bulgarian children watched significantly more TV compared to the Belgian preschoolers and this on both weekdays (t=-7,693; p<0,001), weekend days (t=-5,662; p<0,001) and in total during the whole week (t==7,687; p<0,001). The Bulgarian boys watched significantly more TV than the Belgian boys and again for all variables: weekdays (t=-5,309; p<0,001), weekend days (t=-3,679; p<0,001) and in total during the whole week (t=-5,337; p<0,001). For the girls, the same results were found between both countries. The Bulgarian girls watched significantly more TV and this on weekdays (t=-5,507; p<0,001), weekend days (t=-4,262; p<0,001) and in total (t=-5,457; p<0,001).

3.4.3.1 Type of day

Significant differences were found for the use of TV between weekdays and weekend days. In both countries, the preschoolers watched significantly more TV on weekend days compared to weekdays (Belgium: F=299,375; p<0,001 and Bulgaria: F=151,654; p<0,001).

3.4.3.2 Gender differences within the countries

No significant differences in TV viewing time were found between the boys and girls of both countries. Boys watched approximately the same amount of TV than the girls in Belgium (F=0,000; p=0,987). In Bulgaria, there was also no significant difference in TV viewing time between boys and girls (F=0,389; p=0,533).

Table 15: Use of TV in minutes/day for both countries

Country		**Belgium**			**Bulgaria**			Significance	
		N	Mean	SD	N	Mean	SD	t	p
Boys	Week	502	80,08	50,95	253	101,38	54,17	-5,309	**<0,001**
	Weekend	491	132,16	76,41	255	155,41	84,60	-3,679	**<0,001**
	Total*	488	94,13	52,82	255	116,51	56,43	-5,337	**<0001**
Girls	Week	445	80,36	49,83	272	103,01	58,91	-5,507	**<0,001**
	Weekend	439	131,98	77,07	269	159,37	86,42	-4,262	**<0,001**
	Total*	437	94,77	53,78	267	118,33	58,40	-5,457	**<0,001**
Total	Week	959	80,30	50,51	527	102,30	56,53	-7,693	**<0,001**
	Weekend	942	132,49	76,78	526	157,98	85,84	-5,662	**<0,001**
	Total*	937	94,63	53,33	521	117,66	57,40	-7,687	**<0,001**

3.4.4 Time spent with quiet play

Table 16 represents the amount of time the children spent with quiet play. It was found that the time spent with quiet play on weekdays did not differ between both countries (t=1,247; p=0,213). Belgian preschoolers spent significantly more time with quiet play on weekend days (t=12,715; ^<0,001) and for the total time of quiet play during the whole week (t=5,878; p<0,001).

The boys of both countries spent approximately the same time with quiet play since no significant difference was found between the boys of both countries on weekdays (t=1,492; p=0,136). However, on weekend days (t=9,501; p<0,001) and in total(t=4,588; p<0,001), the Belgian boys spent significantly more time with quiet play compared to the Bulgarian boys.

For the girls, the same results were found. The Belgian girls spent significantly more time with quiet play, compared to the Bulgarian girls, on weekend days (t=8,821; p<0,001) and in total (t=3,753; p<0,001) but no significant difference was found for the time spent with quiet play on weekdays (t=0,138; p<0,890).

3.4.4.1 Type of day

The Belgian preschoolers spent significantly more time with quiet play on weekend days compared to weekdays (F=593,972; p<0,001), but the increase in time on weekend days was significantly higher in the girls (F=3,959; p<0,050), meaning Belgian girls spent significantly more time with quiet play on weekend days compared to Belgian boys. In Bulgaria, the children spent also significantly more time with quiet play on weekend days (F=52,472; p<0,001) but the increase in time was more or less the same for both genders (F=1,049; p=0,306).

3.4.4.2 Gender differences within the county

Significant differences between the genders were found for both countries. In Belgium, the girls were significantly more involved in quiet play than the boys and especially on weekend days (F=6,745; p<0,010). In Bulgaria, the girls were also significantly more involved in quiet play compared to the boys and this again, especially on weekend days (F=8,520; p<0,050).

Table 16: Quiet play in minutes/day for both countries

Country		**Belgium**			**Bulgaria**			Significance	
		N	Mean	SD	N	Mean	SD	t	p
Boys	Week	494	92,37	58,80	247	85,42	61,64	1,492	0,136
	Weekend	498	175,42	101,87	253	113,48	74,04	9,501	**<0,001**
	Total*	487	115,54	62,50	245	93,42	59,61	4,588	**<0,001**
Girls	Week	445	94,62	53,43	257	93,97	64,23	0,138	0,890
	Weekend	436	192,44	94,42	261	131,26	84,96	8,821	**<0,001**
	Total*	433	122,77	57,54	252	104,97	63,68	3,753	**<0,001**
Total	Week	951	93,96	57,08	506	89,90	62,96	1,247	0,213
	Weekend	944	183,59	99,02	515	122,74	80,28	12,715	**<0,001**
	Total*	930	119,39	60,98	498	99,38	61,90	5,878	**<0,001**

4 Discussion

The purpose of this study was to compare the prevalence rate of overweight and obesity and the PA and sedentary behavior levels of preschoolers in Belgium, a Western European country, and Bulgaria, an Eastern European country.

The results showed that the prevalence of both overweight and obesity is slightly higher within the Bulgarian preschooler population compared to the Belgian one but that this difference was not significant. In Belgium, the total prevalence (non-gender specific) of overweight was 11% and the prevalence of obesity was 2%. In Bulgaria, the prevalence of overweight was 14% and the prevalence of obesity was 3%.

The results of this study showed that the prevalence of overweight and obesity was similar in Bulgaria compared to Belgium and that the prevalence of overweight and obesity was higher in girls compare to boys and this in both countries. The small difference between Belgium and Bulgaria could be explained as an indirect consequence of the still present East-West health gap. It is possible that the health services in Bulgaria are less developed with as consequence that (preventive) interventions regarding overweight and obesity are less implemented but since this difference is not significant, it is more likely that the East-West health gap does not have a major influence on the prevalence of overweight and obesity. In fact, it is more worrying that in Belgium, a country where the risks of overweight and obesity are well known and interventions are often implemented, the situation is only slightly better compared to Bulgaria.

The fact that the prevalence of overweight and obesity is higher in girls compared to boys, is in accordance to the results Jouret et al. (2007) and who found that girls have higher risks to become overweight and/or obese and with the results found by Wake et al. (2007) that stated that female preschoolers are found to be associated with higher BMI categories compared to boys.

When the results of this study are compared to the results of the study of Massa (2002), which was conducted amongst Flemish preschoolers, it can be seen that Massa found higher prevalences of overweight and obesity and this for both boys and girls. The prevalence of overweight in Belgian preschool boys was approximately 8% higher in the study of Massa (17% compared to 10% in this study) and the obesity rate was as well approximately 6% higher (8% compared to 2% in this study). For the girls, the prevalence rates of overweight and obesity were also higher (19% compared to 14% in this study) while for obesity this was

already around 12% higher (15% compared to 3% in this study). A possible explanation for the different finding can be found in the cut points that were used to define overweight and obesity in both studies. Massa used the WHO cut points, are lower compared to the ones used in this study.

When the results of this study are compared with the study of Van Stralen et al. (2012), it can be noticed that the results of both studies tend to match. Van Stralen et al. found that the overweight rate for the Belgian boys was approximately 10% and for the Bulgarian boys it was approximately 15% . Compared to the results of the Belgian boys in this study, the prevalence of overweight is similar. But the prevalence of overweight of the Bulgarian preschool boys in this study is lower than the prevalence of Van Stralen et al. found (15% compared to 11% in this study). When the prevalence of overweight in Belgian and Bulgarian girls in this study is compared to the results Van Stralen found, corresponding results on the prevalence of overweight of the Belgian girls (13% in the study of Van stralen compared to 14% in this study) were found but a great difference is found for the prevalence of overweight of the Bulgarian girls (25% in the study of Van Stralen compared to 17% in this study). Regarding the prevalence of obesity, Van Stralen et al. found that that 1% of the Belgian boys was obese, which is almost a similar value to the 2% found in this study. Van Stralen also found that the prevalence of obesity amongst Bulgarian boys was 6%. This is also a more similar value compared to the prevalence found for obesity amongst Bulgarian boys in this study (4%). Van Stralen et al. found in their study that 1% of the Belgian preschool girls was obese and 7% of the Bulgarian preschool girls was obese. When these results are compared to the results of this study, it can be seen that the result for the Belgian preschool girls is higher in this study (1% compared to 3% in this study) but that the result for the Bulgarian preschool girls higher is in the study of Van Stralen et al. (7% compared to 3% in this study). Although it must be noticed that the results for the prevalence of obesity within girls of both studies are more or less similar.

Compared to the results of Massa and Van Stralen et al., results of this study indicate more recent numbers of prevalence of overweight and obesity in preschoolers. The prevalence of overweight and obesity in Belgian preschool children tends to stay stable, but still quite high. In Bulgaria, similar prevalence rates are found, only slightly higher. This can indicate that the East-West Health gap is still present, although in a minor way. Therefore, further investigation is needed to determine in what way the situation in Bulgaria is influenced by the East-West health gap and how this can be decreased. Although small differences in the

prevalence overweight and obesity were found in both countries, the number of preschoolers being overweight and obese is high and suggests that there is a need for (preventive) interventions focusing on overweight and obesity at preschool age as well in Belgium as in Bulgaria.. In both countries interventions should give extra attention for girls, since the problem tends to be bigger in girls compared to boys.

Next to the prevalence of overweight and obesity in both Belgium and Bulgaria, also PA levels were investigated in this study. In general, results indicated that Belgium preschool children took more steps per day than the Bulgarian preschool children and this on weekdays and in total. On average, the Belgian preschoolers took about 10192 steps on weekdays compared to the Bulgarian preschoolers who only took 8179 steps on weekdays. In total, the Belgian preschool children had a mean of 9438 steps per day, which was significantly more than the 8397 steps/day of the Bulgarian preschool children. On weekend days, the Bulgarian children took more steps than the Belgian children (8620 steps/day compared to 7404 steps/day). The results also showed that the Belgian children took significantly less steps on weekend days compared to weekdays. Corresponding results about Belgian preschoolers' average steps/day were found in the study of Cardon and De Bourdeaudhuij (2007). In the study by Cardon and De Bourdeaudhuij, Belgian preschoolers took 9980 steps/day which is similar to total value for the Belgian preschoolers in this study. Results in the study of Gidlow et al. (2008) indicated that the PA levels in-school were lower than the PA-levels out-school and that preschoolers tended to be more physically active on weekend days compared to weekdays but that this difference was not significant. This corresponds with the results of the Bulgarian children since they take more steps on weekdays (=school days) compared to weekend days (=non-school days). But the results of Gidlow et al. contrast with the results of the Belgian preschoolers, since they take significantly fewer steps on weekend days compared to weekdays. It is striking that the PA levels of the Belgian preschool children in this study is lower on days when they do not attend school (weekend days). Results of this study suggest that Belgian preschoolers are less active during weekend days and that an increase of PA out of school should be targeted in interventions. A possible explanation for the difference between the results of this study and the study of Gidlow et al., could be that the study of Gidlow et al. was conducted almost 5 years ago. In these 5 years, technology has developed a lot and many electronic devices started to focus on a younger public, such as preschoolers. The fact that this technology, for example tablets, is more easily accessible now and that there is a wide range of choice for games and applications which are developed especially for

preschoolers, can explain why preschool children tend to be less active on out-of-schooldays and weekend days since this may be a trigger to spend playtime in more sedentary ways.. The difference between Belgian and Bulgarian preschoolers for the weekend days could also be a consequence of some differences in infrastructure and climate. For instance, Bulgarian preschoolers tended to have much more open space available in cities and in rural areas. This can be a stimulant for more active play, and thus explains the slight rise in PA of the Bulgarian preschoolers on weekend days. Another possible explanation for the fact that the Bulgarian preschoolers' PA tended to increase on weekend days while the Belgian preschoolers' PA decreased, could be the weather. In Belgium, the weather in spring (the period wherein the data were collected) is more likely to be unsure, while in Bulgaria spring goes along with high temperatures and few days with rain. This can be a trigger for children in Belgium to stay inside, while in Bulgaria it can be a trigger to go play outdoors and therefore increase their PA levels.

When a comparison between boys and girls was made, it could be observed that the boys took more steps than the girls and this as well in Belgium as in Bulgaria. The average of the steps during the entire registration period (10054 steps/day), taken by the Belgian boys was almost similar to the 10121 steps/day Cardon and De Bourdeaudhuij (2007) found in their study. The average of the girls in this study was a little below the 9867 steps/day found by Cardon and De Bourdeaudhuij. Corresponding results were found in the study of Finn (2002), Cardon and De Bourdeaudhuij (2007) and the review of Hinkley (2008), with boys being more physically active than girls however the gender difference in the study of Cardon and De Bourdeaudhuij was not found to be significant. In Belgium, the boys took on weekdays averagely 1200 steps more than the girls. On weekend days this difference was smaller: the boys took only approximately 900 steps more than the girls. In Bulgaria the boys took on weekdays around 500 steps more compared to the Bulgarian preschool girls. On weekend days, the difference between boys and girls was again smaller: the Bulgarian boys only took about 20 steps more than the girls. It is remarkable that the difference in PA between boys and girls decreases on weekend days while on weekdays, when they attend preschool, it can be expected that the children receive the same amount of PA in school since this is mainly structured PA. This difference could be explained by the fact that boys are more active during the recess periods where the preschoolers are free to play in the way they want. It is possible that boys prefer to spend these recess periods in a more active way by, for example, playing football. On weekend days, such recess periods are unavailable which could explain the catch-up

movement in PA levels of the girls on weekend days. However, further investigation is needed to determine the reasons of this catch-up movement of the preschool girls. When the differences for gender between regarding the type of day within both countries, are compared, it can be seen that the boys (of both countries) spent significantly more steps than girls on weekdays and weekend days. All these results confirm the results of Hinkley and Finn which stated that there are indeed gender differences for PA and that the boys tend to spend more time being physically active than the girls. On the other hand, a contrast can be found between the results of this study and the results of the study of Cardon and De Bourdeaudhuij (2008), which found also no significant difference for the total PA time between preschool boys and girls (although the boys were slightly more active).

When the results of this study are compared to the norm of 11500 steps/day of Adams et al. (2013), or the norm of 13500 steps/day of Tudor-Locke (2011), it can be seen that the means of both countries, for both genders, is below both norms. When we take the norm of 8500 steps/day of Adams et al. it can be seen that in Belgium, the norm is reached by both boys and girls on weekdays and over the whole week but not on weekend days.
In general, the Bulgarian preschoolers score around the norm for PA on weekend days and in total but significantly below the norm on weekdays. No significant differences were found between the means of the Bulgarian boys and the norm on weekdays, weekend days and in total. This means that they tend to score more or less like the norm. On weekdays, they score a little below the norm, while on weekend days and in total, they score a little above the norm. The Bulgarian girls score, like the boys, around the norm on weekend days and in total but significantly below the norm on weekdays. Although the Belgian preschoolers did not reach the norm of 13500 steps of Tudor Locke, the mean steps taken over the whole week (9438 steps/day) is only slightly beneath the mean Cardon and De Bourdeadhuij (2007) found (9980 steps/day). This shows that a lack of PA in Belgian preschoolers is still a problem.

When the percentages of preschoolers who reach the norm for PA are compared, it can be observed that, in Belgium, the percentage of preschoolers who reach the norm drastically drops on weekend days and this for both genders. It is remarkably that, on weekdays, a large majority of the preschoolers (around 75%) reaches the norm of 8500 steps, compared to a strong minority on weekend days (around 40%). The difference between the norm of 8500 and 13500 steps/day is even more remarkable. Compared to the 75% of the Belgian preschoolers, who reach the norm of 8500 steps on weekdays, only 10% reach the norm of 13500 steps. And on weekend days only 5% of the preschoolers reach the 13500 steps/day

compared to the 40% who reach the norm of 8500 steps/day. This shows again that the PA levels drop drastically on weekend days. When these percentages are compared to the results Cardon et al. (2008) found in their study, it can be seen that these results are more or less similar. Cardon et al. found that 7% of the Flemish preschoolers reached the norm of 1 hour MVPA/per day (which can be considered as at least 13500 steps/day). Considering the norm of 13500 steps/day, it can be viewed that in this study, 3% more preschoolers reach the norm on weekdays. Remarkably, in the study of Cardon et al., the percentage of preschoolers who reached the norm slightly increased on weekend days (i.e. 1%), the percentage of Flemish preschoolers who reaches the norm, decreases with 5%. The same pattern is observed within the Bulgarian preschoolers, but the problem is even bigger: only around 40% of the Bulgarian preschoolers reach the norm of 8500 steps/day on weekdays. Compared to the norm of 13500 steps, only 8% reach the norm. This is in accordance to the results of Cardon and De Bourdeaudhuij (2007) where the results also showed that only 8% of the preschoolers reached this norm. As could be expected from the literature, the percentage of girls reaching the norms is lower than the percentage of boys and this for both countries. This is also confirming the results of Cardon and De Bourdeaudhuij (2007).

One of the possible explanations of the difference in PA is the fact that in Belgium, which is a more developed country, preschoolers who attend preschool receive (mandatory) PE classes at least once a week. This can explain why the number of steps is higher in Belgium in the week compared to the weekend. On the other hand, a lot of free playing space is available in Bulgaria which gives the children a lot of opportunities to play outdoors and to be PA, for which the possibility is again higher on weekend days. This could explain the Bulgarian preschoolers' small rise in steps on weekend days. Another possible explanation for the fact that the number of steps taken per day is higher in Belgium than in Bulgaria, is the fact that the East-West health gap is still not entirely eliminated. Therefore, it is possible that the number of interventions to promote PA is lower in Bulgaria and that the health services are not yet at maximum level.

In general, it can be concluded that interventions are needed to increase PA levels of the preschoolers in both Belgium and Bulgaria, since only few preschoolers reach the norm of 13500 steps. These interventions should focus on both genders and weekdays and weekend days although extra attention should be given towards girls in both countries and PA levels of both genders on weekend days in Belgium since the problem seems to be bigger in girls and on weekend days in Belgium. On the other hand, in Bulgaria, the focus should be on a general

increase of PA and especially on weekdays, since the results showed that weekdays tended to be more problematic than weekend days. This is in contrast to Belgium, where the focus should be more on the home environment since the PA levels of the Belgian preschoolers drastically dropped on weekend days.

Finally, also sedentary behavior was in investigated in Belgium and Bulgaria and the results indicated that the Bulgarian preschool children spent a significantly higher amount of time in screen time viewing activities compared to the Belgian preschoolers. The screen time of Bulgarian preschool children was on both weekdays and weekend days almost 40 minutes higher than the Belgian preschoolers' screen time. However, since the use of tablets is not taken into account in the questionnaire, it is possible that the total screen time is underestimated since tablets have many applications for preschoolers and since this is becoming more and more popular. This could affect the total screen time of both countries and especially in Belgium, since the use of tablets for preschoolers is widely spread. On the other hand, it is possible that the parents saw tablets as "use of computer", this makes it possible that tablet use is included under "use of computer". Further investigation is needed to determine the role of tablets in sedentary behavior of preschoolers and to determine how much time is spent with it.

The difference in total screen time can be explained by a few factors. First, the screen time on both weekdays and weekend days is significantly higher in Bulgarian preschoolers than in Belgian preschoolers (and this for both boys and girls), which results of course in a higher total screen time. Next to this, the higher amount of total screen time for the Bulgarian preschoolers is also explained by the fact that the Bulgarian preschoolers watched significantly more TV and used the computer significantly more than the Belgian preschoolers. Especially the excessive use of TV explains the high amount of screen time of the Bulgarian preschoolers. With the amount of TV alone, many Bulgarian children reach, or already are, above the norm of 2 hours screen time per day. The accumulation of the excessive TV use, combined with the use of computer (which was again significantly higher for the Bulgarian preschoolers) results again in a higher total screen time. The fact that the Bulgarian preschoolers are generally more involved in screen time-related activities could also be explained by the fact that the disadvantages of screen time-related activities are not well known in Bulgaria. This can be a consequence of the fact that (preventive) interventions regarding this topic are not implemented as much as in Belgium.

The amount of screen time was in both countries significantly higher on weekend days than on weekdays. In both countries and for both genders, the difference in screen time between weekdays and weekend days was more than one hour. It can be concluded that the differences between weekdays and weekend days are more or less similar in both countries but the amount of screen time was still much higher in Bulgaria. The results found in this study for screen time of the Belgium preschool children are higher compared to the results of the study of Cardon and De Bourdeaudhuij (2008). Cardon and De Bourdeaudhuij found that the average screen time, of Belgian children aged 4-7 years old, was approximately 74 minutes on weekdays and 140 minutes on weekend days. In this study the total screen time of the Belgian preschoolers was approximately 90 minutes per day on weekdays and 160 minutes per day on weekend days. A possible explanation for this difference could be the fact that this study had a different age range (2,5-6 year olds), giving other and unique results but it can be noticed that this still remains a big difference with the results Cardon and De Bourdeaudhuij found. When the results of the screen time and TV viewing are compared to the results of Stolley et al. (2003), it can be seen that the amount of TV watched by the US preschoolers of the study of Stolley et al., is even above the amount watched by the Bulgarian children. This could be explained that, like minority groups, Bulgarian preschool children are less taught/warned about the risks of excessive screen time/TV viewing compared to the Belgian children. The results indicate that the amount of screen time is too high on weekend days in both countries. The excessive use of TV seems to be a big part of the problem of the total screen time. Therefore, interventions towards the use of TV could be useful for both genders in both countries and should aim especially towards weekend days since the problem is bigger on weekend days.

No significant differences were found between the genders of both countries for the total screen time. In both countries, the boys tended to have a higher total screen time compared to the girls, but this difference was small and therefore not significant in both countries. It could also be observed that in both countries the boys used the computer more and watched more TV than the girls. In general, these results are similar to the findings of Hinkley et al., which stated that there were no gender differences for sedentary behavior nor TV use.

When the results are compared to the recommendations, made by different institutions, for total screen time it can be seen that many preschoolers do not reach even the lowest of recommendations. In Belgium the recommendations state that preschoolers should not have more than two hours of screen time daily. When these recommendations are compared to the

results of this study, it can be seen that, on average, the Belgian preschoolers reach the norm only on weekdays and are only a little above the norm for the total screen time (over the whole week) with 5 minutes. On weekend days, they exceed this norm of 120 minutes with 38 minutes. When we look at the number of Belgian preschoolers who reach the norm, it can be seen that on weekdays 84% of all the preschoolers reach the norm of less than 120 minutes of screen time. On weekend days, only 52% reaches the norm. This shows clearly that mainly the weekend days are problematic for the rise of sedentary behavior caused by excessive screen time. However, on weekdays, 16% of the preschoolers fail to reach the norm. This is still a high percentage of preschoolers who have an excessive amount of screen time, meaning the need for (preventive) interventions is still high in Belgium. In Bulgaria, the preschoolers exceed the norm of 120 minutes/per day on both weekdays and weekend days and for the total screen time. On weekdays their screen time is 16 minutes above the norm, but on weekdays the mean screen time is 87 minutes above the norm. This means that the Bulgarian preschool children have almost 3,5 hours of screen time per day on weekends. This shows that the weekend days are in Bulgaria even more problematic than in Belgium. When the number of Bulgarian preschoolers who reach the norm is investigated, it can be seen that on weekdays only 61% of all Bulgarian preschoolers stay within the norm of 120 minutes. On weekend days this number is even lower: only 36% of all the preschoolers stay within the norm of 120 minutes. These results show that the need for interventions regarding screen time is even higher in Bulgaria. Therefore, the implementation of the ToyBox-project would be expected to be effective to decrease screen time, since this aims not only at behaviors in-school but also behaviors out-school such as decreasing the TV-viewing time

Results showed that Belgian preschoolers spent more time in quiet play than Bulgarian preschoolers. This is remarkable because until now, Bulgarian preschoolers had always a higher amount of time spent with screen time (and thus sedentary behavior). Next to this, the results also show that the amount of time spent on quiet play was higher on weekend days than on weekdays. This shows again that the problem of a too sedentary lifestyle is bigger on weekend days compared to weekdays. Another remarkable result was the fact that, unlike with screen time, the girls tended to be more involved in quiet play than the boys, especially in Bulgaria, where this difference between the genders was found to be significant. The logical explanation for this difference is the fact that boys are more likely to be involved in more active forms of play such as building camps, … Girls, on the other hand, tend to be more involved in more passive forms of play such as coloring, playing with dolls, etc. This

should again be taken into account when interventions are developed. Interventions regarding quiet play of preschoolers should mainly aim towards a decrease in quiet play on weekend days and should spend special attention towards girls since they are more likely to participate in excessive quiet play.

Although this study found some significant differences between the countries, it had also some limitations. A first limitation is the age difference between the preschoolers of both countries. The Bulgarian preschoolers were significantly older (approximately 6 months) compared to the Belgian preschoolers. This does not play an important role regarding the prevalence of overweight and obesity, but it could provide bias for PA and sedentary behavior since older children tend to play in a more active way. Another limitation is the fact that, as mentioned before, the use of tablets was not included in the questionnaires regarding sedentary behavior. A third limitation is that only two countries (one Eastern Europe and one Western Europe country) are compared, which makes it difficult to make conclusions about the whole East West Health gap since this is about the situation in whole Eastern and Western Europe. Furthermore, by using pedometers and accelerometers with step count function, it is not possible to obtain information about the intensity of the activities of the preschoolers. Finally, it would be interesting to use longitudinal data (instead of cross-sectional data which were used in this study) to look at the evolution of the prevalence of overweight and obesity. It can be concluded that further investigation is needed to obtain more specific information about the further evolution of overweight and obesity, the intensities of PA of preschoolers and the situation regarding the East West Health gap in other European countries.

5 Conclusion

Overweight and obesity in preschoolers is still an actual problem in Belgium and Bulgaria but the situation in Bulgaria is not as bad as expected. The prevalence of overweight and obesity is still high (and even higher within girls than within boys) and the fact that, in both Belgium and Bulgaria, one out of ten preschool children is overweight is very alarming. This problem asks for (preventive) interventions to decrease the prevalence rates and to assure that the risk for becoming overweight/obese at a later age decreases.

It can also be concluded that there is a need to increase the PA levels of the preschool children in Belgium and Bulgaria. Especially in Bulgaria, the majority of the preschoolers does not reach even the lowest norm of 8500 steps/day. In Belgium, special attention should go to promoting PA on weekend days, while the focus in Bulgaria should be on an increase on PA during the whole week. Interventions should of course try to aim for both genders to increase their PA levels but should give special attention towards the girls because they, as proven in other studies as well, score lower for PA levels than the boys. The PA recommendations are not reached and that the situation tends to be worse in Bulgaria. This can be an indication of the fact that the East-West health gap is still present.
Further investigation is needed to examine the difference between PA levels on weekdays and weekend days because the results of various studies tend to differ and to examine the influence of the East-West Health gap.

Finally, the results regarding screen time showed that screen time in preschoolers is a major problem in Bulgaria and Belgium. This asks for interventions that aim at reducing the total screen time of the preschoolers with special attention towards weekend days and for boys, since boys tend to be more involved with screen time than girls and because the screen time was above the norm and much higher on weekend days compared to weekdays. It was also shown that screen time is a bigger problem in Bulgaria than in Belgium, suggesting the need for interventions is higher in Bulgaria. Next to screen time, recommendations should also be made concerning quiet play to decrease the total sedentary behavior time.

In general, it could be seen that the prevalence of overweight and obesity, PA and sedentary behavior levels were bigger problems in Bulgaria compared to Belgium. This shows that the East-West health gap is still present in some way and is still a problem that Bulgaria faces when it wants to improve the public health.

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www.indianpediatrics.net

www.Health.gov.au

www.Toybox-study.eu

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Attachments

Attachment 1: Information letter for the parents (English+Dutch)

Logo of your Institute

INFORMATION FORM

Dear parent/ caregiver,

The kindergarten of your child has accepted to participate in the ToyBox project, a programme which is supported by the European Commission and will be carried out from April 2012 to June 2013 in 6 European countries: Belgium, Bulgaria, Germany, Greece, Poland, and Spain. About 5000 children aged 4-6, their parents and their teachers will participate in this project.

Background information and aims of the ToyBox project

Dietary and physical activity habits are considered as key factors to achieve children's optimum growth, whereas they may also exert a significant positive or negative impact on health status throughout the lifespan. Preschool age consists a critical life period during which dietary and physical activity habits are being formed, while the kindergarten offers the opportunity to promote such health behaviours in children.

The aim of the ToyBox project is to promote healthy snacking, drinking and physical activity behaviours in European preschool children. The programme will be implemented at the kindergarten by the teachers. The kindergartens that will accept to participate in the programme will be part of either this year (2012-2013) or the following one (2013-2014).

Measurements and timeline

In order to evaluate the outcome of the ToyBox programme, the children who will participate in the programme and their parents will be asked to undergo the following procedures during April-June 2012 and May-June 2013:

- Parents will be asked to complete a questionnaire regarding the snacking, drinking and physical activity behaviours of the family and some information on the medical history of the child.
- Children will be asked to wear a pedometer for 6 days (i.e. a small device to be attached on children's pants/belts, to assess and provide objective measures of your child's physical activity levels).

- Children's height, weight and waist circumference will be measured.
- Children will be asked to perform some physical activity mini-tests. Specifically, we will ask your child to balance across a bench and to jump sideways back and forth for a few seconds to assess its coordination. Moreover, to also assess your child's flexibility and strength, he/she will be asked to bend over while standing and to jump across twice.

All measurements on children will be performed by professional staff and during the school hours. You may complete the questionnaire at home.

Finally, parents will be asked to report to teachers and/or researchers potential events, related to the child's health or medical history, that might occur during the year of the programme.

Confidentiality

This project has been approved by the [Local Ministry/ies, University Ethical Committee, other Body]. All information that will be collected will be kept strictly confidential and will be used only for scientific purposes. Only the members of the research group will have access to the data. You and your child will be given a random number for identification purposes and will use this number throughout the entire programme. Individual responses will be kept separately from any identifying information and yours or your child's identity will be kept confidential in any description or publication of the results.

Voluntary

Hoping that you appreciate the importance of such initiatives for the health and quality of life of our children, we look forward to your positive response. We would like to clarify that the participation of your child and yourself is voluntary. You are free to withdraw from the study at any given time, without giving any reason. Choosing not to participate or withdrawing from this study will not have any consequences for you or your child.

Contact details

For any further information you may require, please contact at working days:

Name: _____

Telephone: _____

E-mail: _____

Website: http://www.toybox-study.eu/

Logo of your Institute

CERTIFICATE OF CONSENT

I have read the information form and the information supplied is clear to me. If I do have more questions, I know whom to call. I agree with my child's participation in the project described in the information form and I am willing to participate in the ToyBox project as well.

I have been informed that my child's and my participation in this study are voluntary. I am free to withdraw and / or my child from the study any time and without giving any reason.

Name and surname of the child (in BLOCK letters)

Name and surname of parent/ caregiver (in BLOCK letters)

Name and location of preschool (in BLOCK letters)

Date: … /… / 20…

Telephone number during working hours:

Telephone number evening:

Signature parent/ caregiver

Name & signature of researcher

Prof. Ilse De Bourdeaudhuij

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Beste ouder,

De kleuterschool van uw kind neemt deel aan het “ToyBox“ project, een programma dat op een leuke manier gezonde tussendoortjes, het drinken van water, meer bewegen en minder zitten promoot bij kleuters in 6 Europese landen: België, Bulgarije, Duitsland, Griekenland, Polen en Spanje. Ongeveer 6000 kleuters tussen 4 en 6 jaar oud zullen deelnemen aan dit project. Het project zal volgend schooljaar (2012-2013) of een jaar later (2013-2014) uitgevoerd worden door de kleuterleerkrachten in de kleuterschool van uw kind.

Om het effect van het ToyBox project na te gaan, vinden er in de kleuterklas van uw kind twee meetmomenten plaats (op [**datum**] en tussen april en juni 2013). Tijdens beide meetmomenten wordt de lengte, het gewicht en de buikomtrek van alle kleuters uit de klas van uw kind gemeten. Daarnaast dragen de kleuters gedurende vijf opeenvolgende dagen een klein bewegingsmetertje dat met een riempje ter hoogte van de heup gedragen wordt. Het toestelletje heeft de grootte van een luciferdoosje, meet enkel versnellingen en is volledig onschadelijk voor de gezondheid. Tenslotte wordt aan de ouders gevraagd om een vragenlijst rond voeding en beweging in het gezin in te vullen. Hoe meer ouders deze vragenlijst invullen, hoe beter voor de resultaten van dit project.

Graag willen wij u uitnodigen om ook uw kind gedurende vijf dagen een bewegingsmetertje te laten dragen. Hoe meer kleuters er in de klas een bewegingsmetertje dragen, hoe leuker dit is voor de ganse klas!

Indien u akkoord gaat dat uw kind een bewegingsmetertje draagt, gelieve dit aan te duiden op het toestemmingsformulier en dit formulier terug mee te geven naar school **vóór [datum]**. Na afloop van het project kunnen wij van ieder kind dat een bewegingsmetertje gedragen heeft, een overzicht geven van hoe actief hij/zij was tijdens de meetmomenten. Indien u niet akkoord gaat dat uw kind tijdens de meetmomenten gemeten en gewogen wordt, gelieve dit dan aan te geven op het toestemmingsformulier onder “opmerkingen”.

Dit onderzoek is goedgekeurd door het Ethisch Comité van het Universitair ziekenhuis te Gent en alle verzamelde informatie zal enkel door de onderzoekers gebruikt worden. Uw deelname is volledig vrijwillig en u kan op ieder moment uit de studie stappen. Indien uw kind op de startdag van het meetmoment weigerachtig staat tegenover de bewegingsmeter zullen wij uw kind uiteraard niet forceren om het metertje toch te dragen.

Voor meer informatie kan u contact op te nemen met Marieke De Craemer of Ellen De Decker op bovenstaande gegevens.

Wij danken u alvast voor uw tijd om deze informatie te lezen en hopen dat uw kleuter zal deelnemen.

Vriendelijke groeten,

Prof. dr. Ilse De Bourdeaudhuij

Prof. dr. Greet Cardon

Drs. Marieke De Craemer

Drs. Ellen De Decker

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TOESTEMMINGSFORMULIER

(Terug meegeven naar school vóór [datum] aub!)

Ik heb de informatie van het ToyBox project doorgenomen en heb hierbij geen verdere vragen.

Ik ben ervan op de hoogte dat de deelname van mezelf en van mijn kind volledig vrijwillig is en dat ik op elk moment uit de studie kan stappen, zonder hierbij een reden op te geven.

☐ **Ik geef hierbij toestemming om mijn kind gedurende vijf dagen een bewegingsmetertje te laten dragen**.

Eventuele opmerkingen:

……

Naam en achternaam van de OUDER (in DRUKLETTERS aub)

Naam en achternaam van de KLEUTER (in DRUKLETTERS aub)

Woonplaats: **Datum: … /… / 20…**

School kind: **Klas:**

Vestiging:

Handtekening ouder

Attachment 2: Registration form pedometers (+accelerometers with step count function)

6.3 Parental activity diary for pedometers

Country code |__|	School number |__|__|	Class number |__|__|	Code number |__|__|__|

Date returned:.....

Number of total hours attending preschool:.....

Please note down every morning and every evening the time you attached and removed the pedometer. Please also write down when your child was not wearing the pedometer and the reason for not wearing the device (e.g. swimming, sleeping).

Date	Time when you attached the pedometer in the morning	Time when you removed the pedometer in bed at night	Time NOT worn	Activities/reasons for not wearing the pedometer
e.g. Day 1: (Wednesday) 21/04/2011	07:00	20:00	14:00 – 15:00	e.g., 30 min sleeping 15 min swimming, 15 min bathing/showering
DAY 1 (Wednesday)				
DAY 2 (Thursday)				
DAY 3 (Friday)				
DAY 4 (Saturday)				
DAY 5 (Sunday)				
DAY 6 (Monday)				

Attachment 3: Manual pedometers (+ accelerometers with step count function)

6.4 Letter of instructions for parents (pedometer)

- ✓ The pedometers is a regular step counter measuring your children's daily steps
- ✓ Please do not swing, drop or step the pedometer, and do not wash it or touch it with wet hands.
- ✓ The pedometer should be fastened to the waistband of your child´s pants or skirt. It should be worn on the RIGHT hip, in line to the midpoint of the left knee.

1. Clip the Holder with the Main unit to the band or belt of the skirt, shorts or trousers.

2. Clip the Strap to the shorts or trousers.

- ✓ The pedometer will be used for 6 consecutive days of measurements.
- ✓ Leave children wear the instrument for as long as possible during all waking hours, removing them only for water-based activities and sleeping.
- ✓ We provide you a diary; it should be completed by the parents regarding time periods, occasions and reason that the pedometer was removed (e.g. for swimming).
- ✓ The teacher of your child is already informed of the procedure and proper instrument use.
- ✓ IMPORTANT: The pedometer is expensive, please take good care of it and return it to the researchers on the date instructed.

Thank you for your co-operation!

Attachment 4: Core questionnaire (dutch)

Vragenlijst voor de ouders

Landcode	Kleuterschoolcode	Klasnummer	Codenummer
|__|	|__|__|	|__|__|	|__|__|__|

De datum van vandaag

|__|__| |__|__| |__|__|__|__|
Dag **Maand** **Jaar**

Beste ouders/verzorgers,
Samen met uw kind neemt u deel aan een grote Europese studie die voedings- en bewegingsgewoonten onderzoekt van ongeveer 5000 kinderen uit België, Bulgarije, Duitsland, Griekenland, Polen en Spanje. We hopen dat u bereid bent om deze vragenlijst in te vullen. Uw deelname is vrijwillig. Alle antwoorden worden strikt vertrouwelijk verwerkt in overeenkomst met onze regelgeving omtrent het verwerken van onze gegevens. Deze informatie wordt enkel gebruikt voor onderzoeksdoeleinden. Enkel de onderzoekers hebben toegang tot uw gegevens.
U hoeft uw naam niet te vermelden op deze vragenlijst. Wanneer u deze vragenlijst hebt ingevuld, gelieve deze dan in de envelop te steken die uw kind meegekregen heeft naar huis. Deze envelop kan u dan terug meegeven met uw kind of afgeven aan de leerkracht op school. Indien u verder nog vragen heeft, kunt u Marieke De Craemer of Ellen De Decker bereiken op het nummer 09/264.86.83 of u kunt ook de ToyBox-website bezoeken: http://www.toybox-study.eu/
Hoogachtend,
Prof. Dr. Ilse De Bourdeaudhuij

Hoe vult u de vragenlijst in

- In deel **B, C, D EN E** stellen we eerst vragen met betrekking tot U en daarna met betrekking tot UW KIND. Wanneer u  ziet, wil dit zeggen dat deze vragen over U gaan en wanneer u  ziet, wil dit zeggen dat de vragen over UW KIND gaan.

- Gelieve de vragenlijst in te vullen met **een zwarte of blauwe balpen**.
- Plaats een duidelijke **X** in het vakje met het juiste antwoord. De meeste vragen kunnen beantwoord worden met een duidelijke **X** in het juiste vakje. Duid enkel één vakje aan per vraag, tenzij meerdere antwoorden aangeduid mogen worden. Dit zal duidelijk aangegeven worden bij de vraag.
- Bij sommige vragen, vragen we u om uw eigen antwoord neer te schrijven.

VOORBEELD:

Hoe ver is de afstand tussen de kleuterschool van uw kind en uw huis?
❑ Minder dan 500 meter
❑$_2$ Vanaf 500 meter tot <1 kilometer
x$_3$ Vanaf 1 kilometer tot <2 kilometer
❑$_4$ Vanaf 2 kilometer tot <3 kilometer
❑$_5$ Vanaf 3 kilometer tot <4 kilometer
❑$_6$ 4 kilometer of meer

Hoeveel tijd per week besteed uw kind aan sporten in een sportclub?

|_**0**_|_**2**_| uur |_**3**_|_**5**_| minuten

Indien u uw antwoord wil veranderen, laat de '**X**' staan bij het foute antwoord en maak het vakje met het juiste antwoord volledig zwart:

Hoe ver is de afstand tussen de kleuterschool van uw kind en uw huis?
❑$_1$ Minder dan 500 meter
❑$_2$ Vanaf 500 meter tot <1 kilometer
x$_3$ Vanaf 1 kilometer tot <2 kilometer
■$_4$ Vanaf 2 kilometer tot <3 kilometer
❑$_5$ Vanaf 3 kilometer tot <4 kilometer

A. Socio-demografische vragen

De volgende vragen zijn bedoeld voor de persoon die deze vragenlijst invult. Ideaal gezien is dit de persoon die altijd voor het kind zorgt. Gelieve deze vragen in te vullen en aan te duiden wat van toepassing is in uw situatie. Het is belangrijk om te weten dat er geen goede of slechte antwoorden zijn.

A1. Deze vragenlijst werd ingevuld door…

- ❑1 De moeder
- ❑2 De stiefmoeder
- ❑3 De vader
- ❑4 De stiefvader
- ❑5 Ander (Gelieve in te vullen door wie .....)

A2. Is uw kind in België geboren?

❑1 Ja ❑2 Nee, hij/zij is geboren in: .....

A3. Is de biologische moeder van uw kind geboren in België?

❑1 Ja ❑2 Nee, ze is geboren in: .....❑3 Ik weet het niet

A4. Is de biologische vader van uw kind geboren in België?

❑1 Ja ❑2 Nee, hij is geboren in: .....❑3 Ik weet het niet

A5. In welke ta(a)l(en) spreekt u meestal/vooral thuis met uw kind?

- ❑1 Nederlands
- ❑2 Indien een andere taal, gelieve te verduidelijken: .....

A6. Met welke volwassenen leeft uw kind samen? (U kan meer dan één antwoord aanduiden)

- ❑1 Met zowel zijn/haar moeder als vader
- ❑2 Enkel met zijn/haar moeder
- ❑3 Enkel met zijn/haar vader
- ❑4 Met zijn/haar moeder en haar nieuwe partner
- ❑5 Met zijn/haar vader en zijn nieuwe partner
- ❑6 Met zijn/haar grootouders
- ❑7 Andere volwassenen (gelieve te verduidelijken)……

Hoeveel personen leven momenteel in het huishouden waar uw kind normaal verblijft?

A7. Aantal mensen ouder dan 18 jaar: |__| perso(o)n(en).

A8. Aantal mensen jonger dan 18 jaar: |__| perso(o)n(en).

Hoeveel jaar schoolopleiding hebben u en uw partner voltooid? Gelieve één antwoord aan te duiden voor uzelf en één antwoord voor uw partner. (Reken de jaren in de kleuterschool niet mee en begin vanaf de leeftijd van 6 jaar)

	A9. Ik	**A10. Partner**	**A11. Ik heb geen partner**
Minder dan 7 jaar	❑1	❑1	❑1
7-12 jaar	❑2	❑2	
13-14 jaar	❑3	❑3	
15-16 jaar	❑4	❑4	
Meer dan 16 jaar	❑5	❑5	

Wat is gedurende de laatste 6 maanden uw hoofdberoep en dat van uw partner?

	A12. Ik	**A13. Partner**	**A14. Ik heb geen partner**
Voltijds huisvrouw/huisman	❑1	❑1	❑1
Voltijds werken	❑2	❑2	
Deeltijds werken	❑3	❑3	
Werkloos	❑4	❑4	
Voltijds studeren	❑5	❑5	
Ziek/invalide	❑6	❑6	
Iets anders	❑7	❑7	

A15. Wat is het geslacht van uw kind?

❑1 Jongen ❑2 Meisje

A16. Op welke dag/maand/jaar is uw kind geboren?

|___|___| Dag |___|___| Maand |___|___|___|___| Jaar

A17. Hoeveel dagen per week gaat uw kind normaal gezien naar de naschoolse opvang?

|___| Dagen

A18. Hoeveel uren per dag gaat uw kind normaal gezien naar de naschoolse opvang?

|___|___| Uren

A19. Wat denkt u van het gewicht van uw kind?

❑1 Het gewicht van mijn kind is zeer laag
❑2 Het gewicht van mijn kind is laag
❑3 Het gewicht van mijn kind is niet te laag/niet te hoog
❑4 Het gewicht van mijn kind is hoog
❑5 Het gewicht van mijn kind is zeer hoog

Hoeveel uren slaapt uw kind gemiddeld per nacht? (Gelieve een antwoord aan te duiden voor de weekdagen en een antwoord voor de weekenddagen)

A20. Weekdagen **(gemiddelde per nacht)**	**A21.** Weekenddagen **(gemiddelde per nacht)**
❑$_1$ Minder dan 6 uur	❑$_1$ Minder dan 6 uur
❑$_2$ 6-7 uur	❑$_2$ 6-7 uur
❑$_3$ 8-9 uur	❑$_3$ 8-9 uur
❑$_4$ 10-11 uur	❑$_4$ 10-11 uur
❑$_5$ 12-13 uur	❑$_5$ 12-13 uur
❑$_6$ 14 uur	❑$_6$ 14 uur
❑$_7$ Meer dan 14 uur	❑$_7$ Meer dan 14 uur
❑$_8$ Ik weet het niet	❑$_8$ Ik weet het niet

Denk na over het aantal keer en de duur van de dutjes die uw kind meestal neemt; gelieve de <u>TOTALE TIJD VAN ALLE DUTJES SAMEN PER DAG</u> aan te duiden. (Gelieve een antwoord aan te duiden voor de weekdagen en een antwoord voor de weekenddagen)

A22. Weekdagen **(gemiddelde per weekdag)**	**A23.** Weekenddagen **(gemiddelde per weekenddag)**
❑$_1$ Mijn kind neemt geen dutjes op weekdagen	❑$_1$ Mijn kind neemt geen dutjes op weekenddagen
❑$_2$ Minder dan 1 uur	❑$_2$ Minder dan 1 uur
❑$_3$ 1-2 uur	❑$_3$ 1-2 uur
❑$_4$ 3-4 uur	❑$_4$ 3-4 uur
❑$_5$ 5-6 uur	❑$_5$ 5-6 uur
❑$_6$ 7-8 uur	❑$_6$ 7-8 uur
❑$_7$ 9 uur of meer	❑$_7$ 9 uur of meer
❑$_8$ Ik weet het niet	❑$_8$ Ik weet het niet

Welk gezinslid is meestal verantwoordelijk voor…?

	Ik	Partner	Grootouders	Anderen
A24. Uw kind klaar-maken voor school	❑$_1$	❑$_2$	❑$_3$	❑$_4$
A25. Uw kind afzetten aan de kleuterschool	❑$_1$	❑$_2$	❑$_3$	❑$_4$
A26. Uw kind oppikken aan de kleuterschool	❑$_1$	❑$_2$	❑$_3$	❑$_4$
A27. Koken voor uw kind	❑$_1$	❑$_2$	❑$_3$	❑$_4$
A28. Toezicht houden bij maaltijden	❑$_1$	❑$_2$	❑$_3$	❑$_4$
A29. Toezicht houden bij buitenactiviteiten	❑$_1$	❑$_2$	❑$_3$	❑$_4$

Wat is de leeftijd, de lengte en het gewicht van de ouders/verzorgers waar het kind mee samenleeft?

		Ik	Partner
A30.	Leeftijd	|___|___| jaar	|___|___| jaar
A31.	Lengte	|__|__|__|(cm)	|__|__|__|(cm)
A32.	Gewicht	|__|__|__|.|__|(kg)	|__|__|__|.|__|(kg)

B. Drinkgedrag

Het volgende deel in de vragenlijst wil het drinkgedrag van u en uw kind meten. Gelieve alle vragen te beantwoorden. Het is belangrijk om te weten dat er geen goede of slechte antwoorden zijn. Gelieve in te vullen wat van toepassing is op uw situatie.

Als we spreken van:
- Water: bedoelen we kraantjeswater, mineraalwater, natuurlijk bruisend water of plat water
- Frisdranken: bedoelen we alle gesuikerde of gezoete dranken, met koolzuurgas of niet, gewoon of light. Bv. Cola en Cola light/zero, Ice Tea, Sprite, Pepsi, Fanta, Orangina, enzovoort.
- Voorverpakte sapjes: bedoelen we alle producten gebaseerd op fruitsap, inclusief: 100% vers fruitsap in een fles of brik, 30% fruitsap met toegevoegde suikers (nectar), sportdranken, smoothies, sappen in blik, bv. Tropicana, Minute Maid.

➢ VRAGEN OVER U

Hoe vaak drinkt U normaal de volgende dranken?

Drank	Portiegrootte	Nooit	1 keer of minder per week	2-4 keer per week	5-6 keer per week	1-2 keer per dag	3-4 keer per dag	5 keer of meer per dag
B1. Water (kraantjes-water, plat of bruisend water)	1 kop = 250 ml 1 klein plastic flesje = 500ml 1 glas water = 250 ml	❑1	❑2	❑3	❑4	❑5	❑6	❑7
B2. Fruitsap, zelf geperst of net geperst	1 glas fruitsap = 250ml	❑1	❑2	❑3	❑4	❑5	❑6	❑7
B3. Fruitsap, voorverpakt/ in een fles (100%, nectar enz.)	1 klein plastic flesje = 500ml	❑1	❑2	❑3	❑4	❑5	❑6	❑7
B4. Light frisdranken *(Cola light, Sprite light...)*	1 kop = 250 ml 1 blik = 330ml 1 klein plastic flesje = 500ml 1 glas limonade = 250 ml	❑1	❑2	❑3	❑4	❑5	❑6	❑7

B5. Gesuikerde dranken *(Frisdranken zoals Cola, Ice Tea, Fanta...)*	1 kop = 250 ml 1 blik = 330ml 1 klein plastic flesje = 500ml 1 glas limonade = 250 ml	❑$_1$	❑$_2$	❑$_3$	❑$_4$	❑$_5$	❑$_6$	❑$_7$

➢ VRAGEN OVER UW KIND

Gelieve de volgende uitspraken te lezen en het antwoord aan te duiden dat het meest van toepassing is op uw situatie:

	Helemaal niet akkoord	Niet akkoord	Neutraal	Akkoord	Helemaal akkoord
B6. Mijn kind heeft de toestemming om frisdranken of voorverpakte sappen te drinken als hij/zij er om vraagt	❑1	❑2	❑3	❑4	❑5
B7. Ik zorg er voor dat water altijd beschikbaar is voor mijn kind	❑1	❑2	❑3	❑4	❑5
B8. Het is slecht voor mijn kind om elke dag frisdranken te drinken	❑1	❑2	❑3	❑4	❑5
B9. Het is slecht voor mijn kind om elke dag voorverpakte sappen te drinken	❑1	❑2	❑3	❑4	❑5
B10. Ik moedig mijn kind aan om water te drinken	❑1	❑2	❑3	❑4	❑5
B11. Als ik zelf frisdranken of voorverpakte sappen zou willen drinken, zou ik mezelf tegenhouden om dit te doen door de aanwezigheid van mijn kind	❑1	❑2	❑3	❑4	❑5
B12. Ik ben tevreden over de hoeveelheid water die mijn kind drinkt	❑1	❑2	❑3	❑4	❑5
B13. Mijn kind verkiest om frisdranken of voorverpakte sappen te drinken in plaats van water	❑1	❑2	❑3	❑4	❑5
B14. Tijdens de maaltijd is water altijd beschikbaar op tafel	❑1	❑2	❑3	❑4	❑5
B15. Ik vind het moeilijk om mijn kind water te geven wanneer hij/zij eigenlijk frisdranken of voorverpakte sappen wil drinken	❑1	❑2	❑3	❑4	❑5
B16. Mijn kind vindt het niet leuk om water te drinken	❑1	❑2	❑3	❑4	❑5
B17. Frisdranken of voorverpakte sappen zijn altijd beschikbaar voor mijn kind	❑1	❑2	❑3	❑4	❑5

B18. De hoeveelheid water die mijn kind drinkt, ligt binnen de aanbevolen hoeveelheid	❑1	❑2	❑3	❑4	❑5
B19. Mijn kind kan zoveel frisdranken en voorverpakte sappen drinken als hij/zij wil	❑1	❑2	❑3	❑4	❑5
B20. Ik geef mijn kind frisdranken of voorverpakte sappen om hem/haar te belonen of te troosten	❑1	❑2	❑3	❑4	❑5
B21. Tijdens maaltijden zijn frisdranken of voorverpakte sappen altijd beschikbaar	❑1	❑2	❑3	❑4	❑5
B22. Mijn kind drinkt enkel frisdranken of voorverpakte sappen bij speciale gelegenheden, bv. verjaardagen	❑1	❑2	❑3	❑4	❑5

B23. Hoe vaak denkt u dat uw kind frisdranken en voorverpakte sappen zou mogen drinken?

❑1 Nooit
❑2 Bij speciale gelegenheden, bv. verjaardagen
❑3 1 glas of minder per week
❑4 2-4 glazen per week
❑5 5-6 glazen per week
❑6 1-2 glazen per dag
❑7 3-4 glazen per dag
❑8 5 of meer glazen per dag
❑9 Ik weet het niet

B24. Hoeveel glazen water denkt u dat uw kind dagelijks zou mogen drinken?

❑1 Geen of zelden
❑2 1 glas per dag
❑3 2 glazen per dag
❑4 3 glazen per dag
❑5 4 glazen per dag
❑6 5 glazen per dag
❑7 6 glazen per dag
❑8 7 glazen per dag
❑9 8 of meer glazen per dag
❑10 Ik weet het niet

C. Tussendoortjes

Het volgende deel van de vragenlijst peilt naar de consumptie van tussendoortjes bij u en bij uw kind. Gelieve alle vragen te beantwoorden. Het is belangrijk om te weten dat er geen goede of foute antwoorden zijn.

Als we spreken over TUSSENDOORTJES, bedoelen we alle voedingsmiddelen die als tussendoortje tussen hoofdmaaltijden gegeten worden, bv. tussen het ontbijt en het middagmaal (tussendoortje in de voormiddag), tussen middagmaal en avondmaal (tussendoortje in de namiddag) en voordat men naar bed gaat (avondtussendoortje).
Voorbeelden van tussendoortjes zijn:
- een stuk fruit of groente, koekje, yoghurt (gewoon of met fruit), graanreep, brood, een zakje chips, een reep chocolade, enzovoort.

➢ VRAGEN OVER U

Hoe vaak <u>eet U</u> op weekdagen een tussendoortje tussen de hoofdmaaltijden?

Op weekdagen	Nooit op weekdagen	1 dag in de week	2 dagen in de week	3 dagen in de week	4 dagen in de week	5 dagen in de week
C1. Ontbijt	❑1	❑2	❑3	❑4	❑5	❑6
C2. Voormiddag (tussen ontbijt en middagmaal)	❑1	❑2	❑3	❑4	❑5	❑6
C3. Namiddag (tussen middagmaal en avondmaal)	❑1	❑2	❑3	❑4	❑5	❑6
C4. ‘s Avonds (na het avondmaal)	❑1	❑2	❑3	❑4	❑5	❑6

Hoe vaak <u>eet U</u> tijdens het weekend een tussendoortje tussen de hoofdmaaltijden?

Tijdens het weekend	Nooit in het weekend	1 dag in het weekend	2 dagen in het weekend
C5. Ontbijt	❑1	❑2	❑3
C6. Voormiddag (tussen ontbijt en middagmaal	❑1	❑2	❑3
C7. Namiddag (tussen middagmaal en avondmaal)	❑1	❑2	❑3
C8. ‘s Avonds (na het avondmaal)	❑1	❑2	❑3

Hoe vaak eet u de volgende voedingsmiddelen als tussendoortje (tussen de hoofdmaaltijden)?

	Nooit	1 keer of minder per week	2-4 keer per week	5-6 keer per week	1-2 keer per dag	3-4 keer per dag	5 keer of meer per dag
C9. Nootjes/pinda's	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C10. Cake	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C11. Volkorenbrood	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C12. Koekjes	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C13. Chips en andere gelijkaardige zoute tussendoortjes	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C14. Broodstengels	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C15. Chocolade	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C16. Snoep	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C17. Kaas	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C18. Quiche	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C19. Yoghurt/verse kaas	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C20. Pizza	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C21. Vers fruit	❑1	❑2	❑3	❑4	❑5	❑6	❑7
C22. Groenten	❑1	❑2	❑3	❑4	❑5	❑6	❑7

➢ VRAGEN OVER UW KIND

Gelieve de volgende uitspraken te lezen en het antwoord aan te duiden dat het meest van toepassing is op uw situatie met betrekking tot tussendoortjes in de voormiddag, in de namiddag en 's avonds.

	Helemaal niet akkoord	Niet akkoord	Neutraal	Akkoord	Helemaal akkoord
C23. Mijn kind eet graag fruit of groenten als tussendoortje	❑1	❑2	❑3	❑4	❑5
C24. Mijn kind eet graag melkproducten als tussendoortje	❑1	❑2	❑3	❑4	❑5

C25. Mijn kind eet graag graanproducten/brood als tussen- doortje	❑1	❑2	❑3	❑4	❑5
C26. Ik geef mijn kind vaak fruit of groenten als tussendoortje	❑1	❑2	❑3	❑4	❑5
C27. Ik geef mijn kind vaak melkproducten als tussendoortje	❑1	❑2	❑3	❑4	❑5
C28. Ik geef mijn kind vaak graanproducten/brood als tussen- doortje	❑1	❑2	❑3	❑4	❑5
C29. Ik stel groenten en fruit regelmatig ter beschikking van mijn kind	❑1	❑2	❑3	❑4	❑5
C30. Ik stel melkproducten regelmatig ter beschikking van mijn kind	❑1	❑2	❑3	❑4	❑5
C31. Ik stel graanproducten/brood regelmatig ter beschikking van mijn kind	❑1	❑2	❑3	❑4	❑5
C32. Mijn kind kiest zoete en zoute tussendoortjes wanneer fruit en groenten beschikbaar zijn	❑1	❑2	❑3	❑4	❑5
C33. Mijn kind kiest zoete en zoute tussendoortjes wanneer andere kinderen fruit of groenten eten	❑1	❑2	❑3	❑4	❑5
C34. Ik denk dat zoete en zoute tussendoortjes niet ongezond zijn voor mijn kind	❑1	❑2	❑3	❑4	❑5
C35. Ik stel zoete en zoute tussendoortjes regelmatig ter beschikking van mijn kind	❑1	❑2	❑3	❑4	❑5
C36. Mijn kind mag geen tussendoortje eten voor TV	❑1	❑2	❑3	❑4	❑5
C37. Mijn kind mag fruit en groenten eten als tussendoortje, zonder dit aan mij te vragen	❑1	❑2	❑3	❑4	❑5
C38. Mijn kind mag melkproducten of graan-producten/brood eten als tussendoortje, zonder dat aan mij te vragen	❑1	❑2	❑3	❑4	❑5
C39. Mijn kind mag enkel	❑1	❑2	❑3	❑4	❑5

zoete of zoute tussendoortjes eten bij special gelegenheden, bv. verjaar- dagen					
C40. Ik geef mijn kind zoete of zoute tussendoortjes om hem/haar te belonen of te troosten	❑1	❑2	❑3	❑4	❑5
C41. Als ik mijn kind verbied om zoete of zoute tussendoortjes te eten, vind ik het moeilijk om mij aan de regels te houden als hij/zij begint te zeuren	❑1	❑2	❑3	❑4	❑5
C42. Ik vind het moeilijk om zelf geen zoete of zoute tussendoortjes te eten door de aanwezigheid van mijn kind	❑1	❑2	❑3	❑4	❑5
C43. Ik ben tevreden met het tussendoortjesgedrag van mijn kind	❑1	❑2	❑3	❑4	❑5

Als we zeggen:
Fruit of groenten: bedoelen we stukken fruit of groenten (sappen zijn niet inbegrepen)
- Brood of granen: bedoelen we elke soort brood of granen of graanproducten
- Melkproducten: bedoelen we elke soort melk (gewoon of met een smaakje), yoghurt (gewoon of met een smaakje) of kaas
- Zoete of zoute tussendoortjes: bedoelen we elke soort chocolade, koekjes, snoep, chips, croissants, pizza of ijsjes, enzovoort

Wat zijn volgens u aanvaardbare hoeveelheden van de volgende voedingsmiddelen die een kind van 4 tot 6 jaar mag eten?

	Nooit	**Bij speciale gelegen-heden, bv. verjaar-dagen**	**1 keer of minder per week**	**2-4 keer per week**	**5-6 keer per week**	**1-2 keer per dag**	**3-4 keer per dag**	**5 keer of meer per dag**
C44. Snoep/chocolade	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C45. Koekjes	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C46. Chips en gelijkaardige zoute tussendoortjes	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C47. Fruit en groenten	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8

C48. Pizza, quiche	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C49. Melk (normaal)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C50. Yoghurt (normaal)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C51. Melk (gearomatiseerd)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C52. Yoghurt (gearomatiseerd)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8
C53. Kaas	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8

D. BEWEGING

Het volgende deel van de vragenlijst peilt naar de beweging bij u en bij uw kind. Gelieve alle vragen te beantwoorden. Het is belangrijk om te weten dat er geen goede of foute antwoorden zijn. Gelieve in te vullen wat van toepassing is op uw situatie.

Als we in de volgende vragen spreken over FYSIEKE ACTIVITEIT, bedoelen we:

Activiteiten die je uitvoert, inclusief het uitvoeren van een sport of trainen

➢ VRAGEN OVER U

Denk na over de tijd die U spendeerde aan wandelen gedurende de laatste 7 dagen. Dit houdt het wandelen naar het werk en naar huis in, het wandelen om u van de ene plaats naar de andere te verplaatsen en ieder ander soort wandelen dat u enkel doet voor recreatie, sport, training of vrije tijd.

D1. Gedurende de **laatste 7 dagen**, op hoeveel dagen heeft u gedurende minstens 10 minuten aan één stuk **gewandeld**?

Ja❑1 |___| dagen per week

Niet gewandeld ❑2 ➔➔ **ga verder**

D2. Hoeveel tijd spendeerde u meestal aan wandelen op die dagen?

|___|___| uur per dag

en

|___|___| minuten per dag

Denk na over alle matige activiteiten die U uitvoerde gedurende de laatste 7 dagen. Matige activiteiten zijn activiteiten die een matige fysieke activiteit vergen en die u wat zwaarder doen ademen dan normaal. Denk alleen aan deze activiteiten die je gedurende minstens 10 minuten aan één stuk deed.

D3. Gedurende de **laatste 7 dagen**, op hoeveel dagen heeft u matige fysieke activiteiten uitgevoerd, zoals lichte lasten dragen, rustig fietsen of dubbeltennis spelen?

Ja ❑$_1$ |___| dagen per week

Geen matige fysieke activiteit ❑$_2$ **➔➔ ga verder met vraag D5**

D4. Hoeveel tijd spendeerde u gemiddeld aan matige fysieke activiteit op die dagen?

|___|___| uur per dag

en

|___|___| minuten per dag

Denk aan alle zware activiteiten die U uitvoerde tijdens de laatste 7 dagen. Zware fysieke activiteit verwijst naar activiteiten die zware fysieke arbeid vergen en die U veel zwaarder doen ademen dan normaal. Denk alleen aan de activiteiten die u minstens gedurende 10 minuten aan één stuk uitvoerde.

D5. Gedurende de **laatste 7 dagen**, op hoeveel dagen voerde u zware fysieke activiteit uit, zoals zware lasten heffen, graven, aerobics of snel fietsen?

Ja❑$_1$ |___| dagen per week

Geen zware fysieke activiteit ❑$_2$ **➔➔ ga verder met vraag D7**

D6. Hoeveel tijd spendeerde u gemiddeld aan zware fysieke activiteit op die dagen?

|___|___| uur per dag

en

|___|___| minuten per dag

Denk aan de tijd die U spendeerde aan zitten op weekdagen, gedurende de laatste 7 dagen. Hou ook rekening met de tijd op uw werk, thuis, leertijd en tijdens de vrije tijd. Dit kan bijvoorbeeld aan een bureau zitten zijn, vrienden bezoeken, lezen of zittend/liggend naar TV kijken.

D7. Gedurende de laatste 7 dagen, hoeveel tijd zat u neer op een **weekdag**?

|___|___| uur en |___|___| minuten per dag

Als we in de volgende vragen spreken van **FYSIEKE ACTIVITEIT, inclusief het uitvoeren van een sport of trainen**, bedoelen we:

Activiteiten die UW KIND voor of na school uitvoert en die hem/haar zwaarder doen ademen of doen zweten.

Voorbeelden van fysieke activiteiten zijn: wandelen, fietsen, op de speelplaats spelen,

groepssporten zoals voetbal en georganiseerde sporten zoals zwemlessen of danslessen.

➢ VRAGEN OVER UW KIND

D8. Is uw kind lid van een sportclub?

❑$_1$ Ja
❑$_2$ Nee ➔➔➔ **Gelieve verder te gaan met vraag D11**

D9. Hoeveel tijd spendeert uw kind per week aan het uitoefenen van een sport in een sportclub?

|___|___| uur |___|___| minuten

D10. Welke soort sport beoefent uw kind in een sportclub?
Gelieve de antwoorden aan te duiden die van toepassing zijn.

❑$_1$ Kleuterturnen
❑$_2$ Zwemmen
❑$_3$ Voetbal
❑$_4$ Dans
❑$_5$ Andere, gelieve te verduidelijken:
……

D11. Hoe gaat uw kind naar school en terug en hoe lang doet uw kind er over?

	D12. Naar school	**D12a. Tijd (minuten)**	**D13. Naar huis**	**D13a. Tijd (minuten)**
Wandelen	❑$_1$		❑$_1$	
Fietsen (zelf)	❑$_2$		❑$_2$	
Samen met de ouder op de fiets	❑$_3$		❑$_3$	
Met de bus of ander openbaar vervoer	❑$_4$		❑$_4$	
Met de auto/bromfiets	❑$_5$		❑$_5$	
Andere, gelieve te verduidelijken: …….	❑$_6$		❑$_6$	

Denk na over waar uw kind zijn/haar tijd GISTEREN spendeerde.
Opgelet: Als gisteren een zaterdag of zondag was, dan verwijst deze vraag naar de *laatste* WEEKDAG (vrijdag)

D14. Hoe was het weer GISTEREN? (gelieve *één* antwoord aan te duiden)

❑$_1$ Goed om buiten te spelen
❑$_2$ Te nat om buiten te spelen
❑$_3$ Te warm of te vochtig om buiten te spelen
❑$_4$ Te koud om buiten te spelen

D15. Hoeveel tijd spendeerde uw kind GISTEREN aan actief spelen (touwtje springen, fietsen)?

(vul "0" in, indien uw kind niet buiten heeft gespeeld)

|___|___| uur |___|___| minuten

Denk na over waar uw kind zijn/haar tijd spendeerde tijdens de *laatste WEEKENDDAG (zaterdag of zondag)*

D16. Hoe was het weer op die WEEKENDDAG? (Gelieve *één* antwoord aan te duiden)

❑$_1$ Goed om buiten te spelen
❑$_2$ Te nat om buiten te spelen
❑$_3$ Te warm of te vochtig om buiten te spelen
❑$_4$ Te koud om buiten te spelen

D17. Hoeveel tijd spendeerde uw kind aan actief spelen TIJDENS DE LAATSTE WEEKENDDAG?

(vul "0" in, indien uw kind niet heeft buiten gespeeld)

|___|___| uur |___|___| minuten

D18. Hoe ver is de afstand tussen de kleuterschool van uw kind en uw huis?

❑$_1$ Minder dan 500 meter
❑$_2$ Vanaf 500 meter tot <1 kilometer
❑$_3$ Vanaf 1 kilometer tot <2 kilometer
❑$_4$ Vanaf 2 kilometer tot <3 kilometer
❑$_5$ Vanaf 3 kilometer tot <4 kilometer
❑$_6$ 4 kilometer of meer

D19. Ik denk dat de richtlijnen voor de hoeveelheid FYSIEKE ACTIVITEIT voor kinderen tussen 4 en 6 jaar oud de volgende zijn:

❑$_1$ Eén keer per week fysiek actief zijn
❑$_2$ 2-3 dagen per week fysiek actief zijn
❑$_3$ Elke dag 30 minuten tot 1 uur fysiek actief zijn
❑$_4$ Elke dag gedurende 1-2 uur fysiek actief zijn
❑$_5$ Elke dag gedurende 3-4 uur fysiek actief zijn
❑$_6$ Elke dag gedurende 5-6 uur fysiek actief zijn
❑$_7$ Elke dag gedurende 7-8 uur fysiek actief zijn
❑$_8$ Elke dag meer dan 8 uur fysiek actief zijn
❑$_9$ Ik weet het niet

Gelieve de volgende uitspraken te lezen en het antwoord aan te duiden dat het meest van toepassing is op uw situatie:

	Helemaal niet akkoord	**Niet akkoord**	**Neutraal**	**Akkoord**	**Helemaal akkoord**
D20. Mijn kind is graag fysiek actief	❑1	❑2	❑3	❑4	❑5
D21. Mijn kind vindt het leuk om deel te nemen aan sporten	❑1	❑2	❑3	❑4	❑5
D22. Mijn kind doet liever passieve activiteiten (bv. met de auto's/poppen spelen, tekenen...) in plaats van actieve activiteiten	❑1	❑2	❑3	❑4	❑5
D23. Als mijn kind mag kiezen gaat hij/zij liever ergens naartoe op een passieve manier (bv. met de auto) dan op een actieve manier (bv. met de fiets)	❑1	❑2	❑3	❑4	❑5
D24. Fysiek actief zijn is goed voor mijn kind	❑1	❑2	❑3	❑4	❑5
D25. Ik voorzie regelmatig fysieke activiteit in het leven van mijn kind	❑1	❑2	❑3	❑4	❑5
D26. Ik vind het moeilijk om mijn gezin zo te organiseren dat we nog genoeg tijd hebben voor actief transport	❑1	❑2	❑3	❑4	❑5
D27. Speelgoed of materiaal (bal, touw, fiets, schommel...) zijn aanwezig zodat mijn kind actief binnen of buiten kan spelen	❑1	❑2	❑3	❑4	❑5
D28. Ik vind het moeilijk om mijn kind actief te laten zijn wanneer ik eigenlijk liever heb dat hij/zij stil is zodat ik mijn huishouden/werk kan doen	❑1	❑2	❑3	❑4	❑5
D29. Ik vind het moeilijk om mijn kind actief te laten zijn als het buiten slecht weer is of als het buiten koud/warm is.	❑1	❑2	❑3	❑4	❑5
D30. Ik vind het moeilijk om mijn kind buiten actief te laten zijn, omdat ik	❑1	❑2	❑3	❑4	❑5

hem/haar altijd in de gaten moet houden					
D31. Ik moedig mijn kind aan om fysiek actief te zijn	❑1	❑2	❑3	❑4	❑5
D32. Ik hou er van om samen met mijn kind fysiek actief te zijn	❑1	❑2	❑3	❑4	❑5
D33. Ik beloon of troost mijn kind door fysiek actief te zijn met hem/haar	❑1	❑2	❑3	❑4	❑5
D34. Ik vind het moeilijk om mijn kind fysiek actief te laten zijn, wanneer hij/zij niet wil en begint te zeuren	❑1	❑2	❑3	❑4	❑5
D35. Ik probeer om regelmatig fysiek actief te zijn, samen met mijn kind	❑1	❑2	❑3	❑4	❑5
D36. Mijn kind mag binnen in huis rondlopen en fysiek actief zijn	❑1	❑2	❑3	❑4	❑5
D37. Ik ben tevreden met het bewegingsniveau van mijn kind	❑1	❑2	❑3	❑4	❑5

Wanneer we spreken over SEDENTAIRE activiteiten, bedoelen we alle activiteiten die zittend of liggend worden uitgevoerd, zoals bijvoorbeeld tv/DVD kijken, de computer gebruiken, tekenen en in boeken kijken.

E. SEDENTAIRE ACTIVITEITEN

Het volgende deel van de vragenlijst peilt naar het sedentair gedrag bij u en bij uw kind. Gelieve alle vragen te beantwoorden. Het is belangrijk om te weten dat er geen goede of foute antwoorden zijn. Gelieve in te vullen wat van toepassing is op uw situatie.

➢ VRAGEN OVER U

Hoeveel uur per dag kijkt U gewoonlijk naar tv in uw vrije tijd (inclusief Dvd's en video's)? (Gelieve een antwoord aan te duiden voor de weekdagen en een antwoord voor de weekenddagen)

E1. Weekdagen **(gemiddelde per weekdag)**	**E2.** Weekenddagen **(gemiddelde per weekenddag)**
❑$_1$ Nooit	❑$_1$ Nooit
❑$_2$ Minder dan 30 minuten/dag	❑$_2$ Minder dan 30 minuten/dag
❑$_3$ 30 minuten tot <1 uur/dag	❑$_3$ 30 minuten tot <1 uur/dag
❑$_4$ 1-2 uur/dag	❑$_4$ 1- 2 uur/dag
❑$_5$ 3-4 uur/dag	❑$_5$ 3-4 uur/dag
❑$_6$ 5-6 uur/dag	❑$_6$ 5-6 uur/dag
❑$_7$ 7-8 uur/dag	❑$_7$ 7-8 uur/dag
❑$_8$ 8 uur/dag	❑$_8$ 8 uur/dag
❑$_9$ Meer dan 8 uur/dag	❑$_9$ Meer dan 8 uur/dag
❑$_{10}$ Ik weet het niet	❑$_{10}$ Ik weet het niet

Hoeveel uur per dag gebruikt U uw computer voor activiteiten zoals online chatten, internet, e-mails versturen, spelletjes spelen en/of gebruikt u spelconsoles (bv. Playstation, Xbox, GameCube) tijdens uw vrije tijd? Gelieve de werkgerelateerde uren niet mee te rekenen, zelfs al wordt het thuis uitgevoerd.

E3. Weekdagen **(gemiddelde per weekdag)**	**E4.** Weekenddag **(gemiddelde per weekenddag)**
❑$_1$ Nooit	❑$_1$ Nooit
❑$_2$ Minder dan 30 minuten/dag	❑$_2$ Minder dan 30 minuten/dag
❑$_3$ 30 minuten tot <1 uur/dag	❑$_3$ 30 minuten tot <1 uur/dag
❑$_4$ 1- 2 uur/dag	❑$_4$ 1- 2 uur/dag
❑$_5$ 3-4 uur/dag	❑$_5$ 3-4 uur/dag
❑$_6$ 5-6 uur/dag	❑$_6$ 5-6 uur/dag
❑$_7$ 7-8 uur/dag	❑$_7$ 7-8 uur/dag
❑$_8$ 8 uur/dag	❑$_8$ 8 uur/dag
❑$_9$ Meer dan 8 uur/dag	❑$_9$ Meer dan 8 uur/dag
❑$_{10}$ Ik weet het niet	❑$_{10}$ Ik weet het niet

E5. Hoe vaak kijken U of uw partner naar tv of een Dvd/video, samen met uw kind?

❑1 Nooit
❑2 Minder dan één keer per week
❑3 Eén keer per week
❑4 2-4 dagen per week
❑5 5-6 dagen per week
❑6 Elke dag, één keer per dag
❑7 Elke dag, meerdere keren per dag

E6. Beschikt u thuis over een internetverbinding?
❑1 Ja
❑2 Nee

Zijn volgende toestellen aanwezig in de slaapkamer van uw kind?

	Ja	Nee
E7. Tv	❑1	❑2
E8. DVD speler	❑1	❑2
E9. Game consoles, bv. Playstation	❑1	❑2
E10. Computer	❑1	❑2

➢ VRAGEN OVER UW KIND

Als we in de volgende vragen spreken over SEDENTAIR GEDRAG, bedoelen we: Alle zittende en liggende activiteiten, zoals tv-kijken, spelletjes spelen op de computer of gameconsole, rustig spelen (tekenen, bouwen, met de poppen), in boeken kijken.

Bij schermgerelateerde activiteiten verwijzen we naar gemiddelde tijd die gespendeerd wordt per dag aan een reeks activiteiten, inclusief tv/Dvd/video kijken, elektronische spelletjes en computergebruik in de vrije tijd.

Ongeveer hoeveel uur per dag kijkt <u>uw kind</u> naar tv (Dvd's en video's inbegrepen) in zijn/haar vrije tijd? (Gelieve een antwoord aan te duiden voor de weekdagen en een antwoord voor de weekenddagen)

E11. Weekdagen **(gemiddelde per weekdag)**	**E12.** Weekenddagen **(gemiddelde per weekenddag)**
❑1 Nooit	❑1 Nooit
❑2 Minder dan 30 minuten/dag	❑2 Minder dan 30 minuten/dag
❑3 30 minuten tot <1 uur/dag	❑3 30 minuten tot <1 uur/dag
❑4 1- 2 uur/dag	❑4 1- 2 uur/dag
❑5 3-4 uur/dag	❑5 3-4 uur/dag
❑6 5-6 uur/dag	❑6 5-6 uur/dag
❑7 7-8 uur/dag	❑7 7-8 uur/dag

❑$_8$ 8 uur/dag	❑$_8$ 8 uur/dag
❑$_9$ Meer dan 8 uur/dag	❑$_9$ Meer dan 8 uur/dag
❑$_{10}$ Ik weet het niet	❑$_{10}$ Ik weet het niet

Ongeveer hoeveel uur per dag gebruikt <u>uw kind</u> de computer voor activiteiten zoals spelletjes spelen op de computer of spelconsoles (bv. Playstation, Xbox, GameCube) in zijn/haar vrije tijd?

E13. Weekdagen **(gemiddelde per weekdag)**	**E14.** Weekenddagen **(gemiddelde per weekenddag)**
❑$_1$ Nooit	❑$_1$ Nooit
❑$_2$ Minder dan 30 minuten/dag	❑$_2$ Minder dan 30 minuten/dag
❑$_3$ 30 minuten tot <1 uur/dag	❑$_3$ 30 minuten tot <1 uur/dag
❑$_4$ 1- 2 uur/dag	❑$_4$ 1- 2 uur/dag
❑$_5$ 3-4 uur/dag	❑$_5$ 3-4 uur/dag
❑$_6$ 5-6 uur/dag	❑$_6$ 5-6 uur/dag
❑$_7$ 7-8 uur/dag	❑$_7$ 7-8 uur/dag
❑$_8$ 8 uur/dag	❑$_8$ 8 uur/dag
❑$_9$ Meer dan 8 uur/dag	❑$_9$ Meer dan 8 uur/dag
❑$_{10}$ Ik weet het niet	❑$_{10}$ Ik weet het niet

Ongeveer hoeveel uur per dag besteedt uw kind aan rustig spelen (in boeken kijken, met de blokken spelen, met de poppen spelen, tekenen, bouwen) tijdens zijn/haar vrije tijd?

E15. Weekdagen **(gemiddelde per weekdag)**	**E16.** Weekenddagen **(gemiddelde per weekenddag)**
❑$_1$ Nooit	❑$_1$ Nooit
❑$_2$ Minder dan 30 minuten/dag	❑$_2$ Minder dan 30 minuten/dag
❑$_3$ 30 minuten tot <1 uur/dag	❑$_3$ 30 minuten tot <1 uur/dag
❑$_4$ 1- 2 uur/dag	❑$_4$ 1- 2 uur/dag
❑$_5$ 3-4 uur/dag	❑$_5$ 3-4 uur/dag
❑$_6$ 5-6 uur/dag	❑$_6$ 5-6 uur/dag
❑$_7$ 7-8 uur/dag	❑$_7$ 7-8 uur/dag
❑$_8$ 8 uur/dag	❑$_8$ 8 uur/dag
❑$_9$ Meer dan 8 uur/dag	❑$_9$ Meer dan 8 uur/dag
❑$_{10}$ Ik weet het niet	❑$_{10}$ Ik weet het niet

Gelieve de volgende uitspraken te lezen en het antwoord aan te duiden dat het meest van toepassing is op uw situatie:

	Helemaal niet akkoord	**Niet akkoord**	**Neutraal**	**Akkoord**	**Helemaal akkoord**
E17. Ik denk dat schermgerelateerde activiteiten (bv. tv-kijken, computer gebruiken) voordelig en educatief zijn voor mijn kind	❑$_1$	❑$_2$	❑$_3$	❑$_4$	❑$_5$

E18. Mijn kind kijkt graag naar tv/Dvd/video	❑1	❑2	❑3	❑4	❑5
E19. Mijn kind kijkt liever gedurende een lange periode naar tv, in plaats van iets anders te doen	❑1	❑2	❑3	❑4	❑5
E20. Ik vind het moeilijk om de schermtijd van mijn kind te verminderen als hij/zij dit niet wil en begint te zeuren	❑1	❑2	❑3	❑4	❑5
E21. Ik kijk graag naar tv/Dvd/video, samen met mijn kind	❑1	❑2	❑3	❑4	❑5
E22. Ik zorg er voor dat er andere activiteiten beschikbaar zijn voor mijn kind, in plaats van schermgerelateerde activiteiten	❑1	❑2	❑3	❑4	❑5
E23. Mijn kind voert niet graag al rechtstaand een activiteit uit	❑1	❑2	❑3	❑4	❑5
E24. De hoeveelheid tv die mijn kind kijkt, bevindt zich binnen de aanbevolen hoeveelheden	❑1	❑2	❑3	❑4	❑5
E25. Ik denk dat het nodig is om de schermgerelateerde activiteiten van mijn kind te beperken	❑1	❑2	❑3	❑4	❑5
E26. Ik moedig mijn kind aan om iets anders te doen in plaats van te kijken naar tv/Dvd/video	❑1	❑2	❑3	❑4	❑5
E27. Het is een gewoonte om mijn gezin zo te organiseren dat we samen naar tv-programma's kunnen kijken die we graag zien	❑1	❑2	❑3	❑4	❑5
E28. Ik probeer mezelf er van te weerhouden om naar tv/Dvd/video te kijken als mijn kind aanwezig is	❑1	❑2	❑3	❑4	❑5
E29. Mijn kind mag tv-kijken zolang hij/zij wil	❑1	❑2	❑3	❑4	❑5
E30. Ik straf mijn kind door hem/haar te verbieden om naar tv te kijken	❑1	❑2	❑3	❑4	❑5
E31. Ik denk dat het niet nodig is om tv-kijken te	❑1	❑2	❑3	❑4	❑5

beperken bij mijn kind, indien hij/zij naar de geschikte kinderprogramma's kijkt					
E32. Ik ben tevreden met de mate waarin mijn kind tv-kijkt	❑1	❑2	❑3	❑4	❑5

E33. Ik denk dat de aanbevelingen voor kinderen tussen 4 en 6 jaar met betrekking tot <u>tv-kijken</u> de volgende zijn:

❑1 Nooit tv-kijken
❑2 Slechts enkele keren per week tv-kijken
❑3 Gedurende maximum 1 uur per dag tv-kijken
❑4 Gedurende 1 tot 2 uur per dag tv-kijken
❑5 Gedurende 3 tot 4 uur per dag tv-kijken
❑6 Gedurende 5 tot 6 uur per dag tv-kijken
❑7 Gedurende 7 tot 8 uur per dag tv-kijken
❑8 Meer dan 8 uur per dag tv-kijken
❑9 Tv-kijken zo vaak hij/zij wil
❑10 Ik weet het niet

Hoe vaak kijkt uw kind naar TV tijdens de volgende maaltijden?

	Nooit	Zelden	Soms	Meestal	Altijd
E34. Ontbijt	❑1	❑2	❑3	❑4	❑5
E35. Tussendoortje in de voormiddag	❑1	❑2	❑3	❑4	❑5
E36. Middagmaal	❑1	❑2	❑3	❑4	❑5
E37. Tussendoortje in de namiddag	❑1	❑2	❑3	❑4	❑5
E38. Avondmaal	❑1	❑2	❑3	❑4	❑5
E39. Tussendoortje 's avonds	❑1	❑2	❑3	❑4	❑5

F. Algemene vragen over uw kind
Gelieve de volgende vragen enkel in te vullen voor het kind dat deze vragenlijst mee naar huis heeft gebracht

F1. Gewicht van de moeder voor de zwangerschap (2 tot 3 maand voor de bevruchting)	Gelieve te verduidelijken |__|__|__|.|__|(kg)
F2. Hoeveel gewicht (kg) is de moeder aangekomen tijdens de	Gelieve te verduidelijken |__|__|__|.|__|(kg)

zwangerschap?			
F3. Was het een zwangerschap van meer dan één kind?	❑$_1$Nee ❑$_2$ Ja, |___| kinderen		
F4. Weken zwangerschap (maximum 40 weken)	Gelieve te verduidelijken |___|___| weken		
Roken tijdens de zwangerschap	**F5.** 1ste trimester	**F6.** 2de trimester	**F7.** 3de trimester
	❑$_1$Nee ❑$_2$Ja F5.1. Indien ja, gelieve het aantal sigaretten per dag te geven |___|___|	❑$_1$Nee ❑$_2$Ja F5.2. Indien ja, gelieve het aantal sigaretten per dag te geven |___|___|	❑$_1$Nee ❑$_2$Ja F5.3. Indien ja, gelieve het aantal sigaretten per dag te geven |___|___|

Gelieve de lengte en het gewicht van uw kind bij de geboorte in te vullen. Vul dit ook in voor de 6de, 7de, 11de en 12de maand in het leven van uw kind (gelieve te kijken naar het medisch dossier/de groeicurve van uw kind)

	Gewicht (kg)	Lengte (cm)
F8. Geboorte	|__|__|__|.|__|(kg)	|__|__|__|(cm)
F9. Maand 6	|__|__|__|.|__|(kg)	|__|__|__|(cm)
F10. Maand 7	|__|__|__|.|__|(kg)	|__|__|__|(cm)
F11. Maand 11	|__|__|__|.|__|(kg)	|__|__|__|(cm)
F12. Maand 12	|__|__|__|.|__|(kg)	|__|__|__|(cm)

<u>Borstvoeding en voeding gedurende de eerste 12 maanden in het leven van uw kind</u>

Gelieve alle maanden aan te duiden waarin uw kind systematisch borstvoeding kreeg:													
	1ste	**2de**	**3de**	**4de**	**5de**	**6de**	**7de**	**8ste**	**9de**	**10de**	**11de**	**12de**	**>12de**
F13. Borstvoeding	❑$_1$	❑$_2$	❑$_3$	❑$_4$	❑$_5$	❑$_6$	❑$_7$	❑$_8$	❑$_9$	❑$_{10}$	❑$_{11}$	❑$_{12}$	❑$_{13}$

In welke maand in het leven van uw kind introduceerde u het volgende in de voeding van uw kind (gelieve de maand waarbij u dit het eerst introduceerde, aan te duiden)													
	1ste	**2de**	**3de**	**4de**	**5de**	**6de**	**7de**	**8ste**	**9de**	**10de**	**11de**	**12de**	**>12de**
F14. Poeder melk	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8	❑9	❑10	❑11	❑12	❑13
F15. Thee, kamille (bv. voor krampjes)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8	❑9	❑10	❑11	❑12	❑13
F16. Vloeibaar voedsel (bv. afgelengd fruitsap)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8	❑9	❑10	❑11	❑12	❑13
F17. Vast en halfvast voedsel (bv. groentensoep, fruitpap, pudding…)	❑1	❑2	❑3	❑4	❑5	❑6	❑7	❑8	❑9	❑10	❑11	❑12	❑13

VAN HARTE BEDANKT OM DEZE VRAGENLIJST IN TE VULLEN!