ROLE OF FAMILY EATING PRACTICES ON DAILY NUTRIENT INTAKES, DIETARY PATTERNS AND MEASURES OF BODY COMPOSITION IN PERI-ADOLESCENTS

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To my dearest mom and dad for their
unfailing love and support.
I love you more than words can express.

Above all to my Heavenly Father.
You are my Light, my Strength, my Song.

Abstract

Although family eating practices (FEPs) play a role in the formation of eating practices in children, there is a lack of evidence regarding the role of FEPs on obesity (OB) risk. The purpose of this thesis was to assess the role of child, mother and father eating practices (CEPs; MEPS; FaEPs) on nutrient intakes, dietary patterns and body composition. Data were collected on approximately 2,400 peri-adolescents (≅250 with complete covariate data). Dietary patterns were assessed using scores that reflected how closely participants followed DASH and Health Canada (HC) recommendations. *In girls, poor* CEPs, MEPs and FaEPs were associated with increased BMI and risk of overweight and poor dietary patterns according to DASH, and DASH and HC, respectively. *In boys*, poor CEPs and FaEPs were associated with increased monounsaturated and trans fat, and Vitamin C intakes, respectively. These findings suggest FEPs are associated with OB risk, particularly in girls.

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List of Acronyms

OW (Overweight)

OB (Obesity)

BMI (Body Mass Index)

PA (Physical Activity)

FEPs (Family Eating Practices)

DASH (Dietary Approaches to Stop Hypertension)

HC (Health Canada)

WHO (World Health Organization)

PHAST (*Physical Health Activity Study Team*)

DSBN (District School Board of Niagara)

HMS (Harvard Medical School)

FAEH (Family Activity and Eating Habits Questionnaire)

aPHV (Age to Peak Height Velocity)

PQ (Participation Questionnaire)

CIs (Confidence Intervals)

Chapter 1 - Introduction

Background

Overweight (OW) and obesity (OB) are conditions in which there is an excessive and/or abnormal accumulation of body fat that places individuals at an increased risk of developing acute and chronic health impairments.[1,2] A commonly used indicator of OW and OB is body mass index (BMI), calculated as weight in kilograms divided by height in metres squared (kg/m^2).[3] In adults, OW is defined as a BMI between 25 and 29.9 kg/m^2 and OB is defined as a BMI of 30 kg/m^2 or more.[3,4] Since BMI is highly variable in children under the age of 18 years,[3,5-6] age-specific cut-offs have been established in this population.[3]

The determinants of OB are numerous and represent a complex interplay between factors operating at behavioural, psychological, environmental and social levels.[2,7-10] Diet and physical activity (PA), two behavioural determinants of OB, have been well established. However, the psychological, environmental and social determinants of OB risk have not been thoroughly investigated, particularly in children.[7,8,11] For example, despite evidence that family eating practices (FEPs) play a role in the formation of healthy eating practices in children,[10] minimal research is available on the role of FEPs on measures of OB risk (e.g., diet[12]).

In light of evidence that interventions that focus exclusively on the modification of individual behaviours (i.e., diet and PA) have limited success in helping populations achieve a healthy body weight;[7,8,10] establishing how overall FEPs affect diet and body composition in male and female children would aid in

the formation of targeted family-based interventions designed to decrease the risk of OB. Major health care organizations across North America, including the National Cancer Institute, the National Institute of Health and the Canadian Institute for Health Information, support this position, stating that 'by targeting the distal determinants of childhood OB, health policies will be better able to eliminate the underlying causes of the condition rather than just provide a Band-Aid cure'.[7,8,10,11] For a conceptual model of the distal and proximal (i.e., underlying) determinants of childhood OB in the context of previously examined relationships and those that require further examination, refer to Appendix A.

Study Objectives

There is a need for more family-based research in the area of childhood OB. The purpose of this study was to assess the overall role of child, mother and father eating practices on measures of OB risk in male and female peri-adolescent children. Establishing how overall FEPs within the home contribute to OB risk in peri-adolescent children will aid in the formation of targeted family-based interventions designed to decrease the risk of OB in this population.

Chapter 2 - Literature Review

Overweight and Obesity Around the World

Overweight and obesity result from a chronic inequality between energy expenditure and energy intake that leads to a net positive energy balance.[7,13] As a result of decreased PA (e.g., decreases in children walking to school,[11] increases in sedentary leisure activities,[14]) and unhealthy dietary practices (e.g., increases in the frequency of snacking,[15] increases in portion sizes,[16] increases in the consumption of sugar-sweetened drinks[17] and increases in the marketing of low-nutrient and high-energy foods[8]), OW and OB are reaching epidemic proportions.[14,18,19] Once considered problems of the developed world, OW and OB have now become worldwide concerns.[18,20,21]

Since 1980, global rates of OB have doubled for adults and tripled for children.[2,22] The most recent global statistics from WHO indicate that in 2005 1.6 billion adults (i.e., 15+ years) were OW and approximately 400 million were OB.[1] The trends are similar in children. In 2007, 22 million children under the age of five and 10% of children between the ages of five and 17 were OW or OB.[20,23] If the rise in OB is not halted, it is estimated that by 2015, 2.3 billion adults will be OW and 700 million adults will be OB,[1] with similar projections expected in children.

Overweight and Obesity-Related Burdens

OW and OB place a large monetary burden on the health care system and pose a significant threat to individual health.[8] Recent statistics indicate that over $1.8

billion is spent annually on the treatment of OB-related complications (e.g., heart disease, type 2 diabetes and hyperlipidemia) in Canada, accounting for 2.4% of the total expenditures of the Canadian health system.[11] The indirect costs of OW and OB are also large. For example, the annual per capita costs associated with increased workplace absenteeism, resulting from OB-related injury or illness, are significantly greater in individuals who are OW and OB than in individuals who are normal weight.[24] In terms of individual health, OW children and adults are at an increased risk for short (e.g., high blood pressure)[22,25,26] and long-term (e.g., cardiovascular disease, stroke, liver and gallbladder disease, type 2 diabetes, respiratory complications, osteoarthritis and endothelial, breast and colon cancer)[22,25,27-30] health complications. Nevertheless, because children who are OW or OB are at high risk for being OB as adults[28,31,32] and for developing chronic non-communicable diseases throughout their lifetime,[2,9,25,27,28,31,33] it is expected that the total burden placed on the health care system is greatest among individuals who develop OB as children.[33] Based on this, it has been argued that the prevention and treatment of childhood OB should be a public health priority.[8,33-36] The WHO and the Centre for Disease Control are two key players in the development of public health policies that have continued to advocate this position, stating that 'OB in children and adolescents is currently one of the most significant public health challenges facing society, posing a serious long-term threat to both the health of individuals and societal health care systems'.[8,20,22]

Determinants of Childhood Obesity

Although the determinants of childhood OB operate primarily at behavioural, psychological, environmental and social levels,[2,7,8,10] biological factors (e.g., melanocortin 4 receptor mutations) may also play a role.[37,38] However, because biological factors are causal in only a small number of OW/OB individuals,[39-42] the impact of these factors is expected to be low at the population level. Therefore, for the purposes of this literature review, only the major proximal (i.e., behavioural) and distal (i.e., psychological, environmental and social) determinants of childhood OB will be addressed.

Proximal Determinants

OB results from a chronic inequality between energy expenditure and energy intake that leads to a net positive energy balance.[7,13] A net positive energy balance is caused by either a lack of PA, a diet marked by excessive caloric intake, or a combination of these two factors.[13,43] Because diet and PA are the two main determinants of OB and are directly related to the lifestyle choices of individuals, they are commonly referred to as the *proximal* or the *behavioural* determinants of OB.

Diet

It has been known for decades that a chronic surplus of caloric input results in an elevated body fat mass in both adults and children. Early studies focused on investigating the role of total dietary energy density and the role of

macronutrients (i.e., fat, protein and carbohydrates) on the development of OB.[19,44,45] In more recent years, attention has shifted to investigating the role of micronutrient intakes and dietary patterns.[12,44]

Energy Density

Energy density is defined as the amount of energy consumed from all food sources (i.e., fat, protein and carbohydrates) divided by the weight of food consumed.[46] In adults, energy density has been consistently identified as one of the main dietary factors associated with OB risk.[13,46,47] The relationship between energy density and OB risk is less clear in children. Studies conducted in preschool-aged children suggest that there is no association between energy density and percentage body fat.[48-50] In studies of older children (i.e., 6 to 17 years), however, a significant association begins to appear[51,52] suggesting that the effect of diet emerges as a child matures. One hypothesis for this phenomenon is that because young children are relatively plastic in terms of their metabolic function,[53] a period of time may be required before the effects of excess energy intake become evident at the population level.[48,49] In light of evidence that PA is a significant predictor of adiposity in preschool-aged children, even when energy density is not,[48] another hypothesis for the lack of association between energy density and body composition is that frequent PA exerts a greater influence on body composition than does diet in this age group. [48,49] Although these two hypothesis may partially explain why the effect of diet emerges as a child matures, the attenuated association between these variables

has also been commonly attributed to methodological issues of the studies that have investigated this relationship, including information bias arising from suboptimal dietary assessments[52] and the use of surrogate measures of adiposity (e.g., BMI or skin folds).

Macronutrient Intake

In addition to investigating the role of energy density, research has also focused on determining how macronutrients that account for energy density relate to OB risk. Although alcohol is classified as a macronutrient,[45] since the focus of this review is childhood OB, the research that has been conducted on the association between alcohol and OB risk will not be addressed.

Fat Intake

Although total fat intake is positively associated with OB risk in adults[54,55] and in children,[55] it has been hypothesized that fat composition may mediate OB risk independently of the quantity of fat consumed.[56,57] Specifically, it has been suggested that differences in how fats mediate OB are a consequence of the unique sizes and structures of their fatty acid constituents, which dictate how the fats are metabolized.[57-60] Despite some conflicting results,[61] most studies have shown that saturated fatty acids[62,63] and trans fatty acids[64] are positively associated with OB risk, whereas monounsaturated fatty acids[65] and polyunsaturated fatty acids[56,63,66] are negatively associated with OB risk. However, because the majority of research that has been done in this area has

been limited to adults and the use of animal models,[65] more research will be need to be conducted to also elucidate this relationship in children.

Protein Intake

There is limited evidence that there is an association between protein intake and body composition in adults.[67] In children, although some studies have found no association,[68,69] most studies have shown that there is a positive association between protein intake, particularly during infancy, and subsequent OB risk.[70-74] Researchers have suggested that protein intake mediates OB risk by increasing the production of adipocytes by stimulating the production of insulin like-growth factor I during critical periods of cell proliferation.[75,76] Despite this hypothesis, a minimal amount of research is available on the association between protein intake and body composition during other critical periods of cell proliferation, such as adolescence.[77] In order for the role of protein intake on the etiology of childhood OB to be thoroughly understood, research will need to be conducted on children during every stage of growth and development.

Carbohydrate Intake

The percentage of energy obtained from carbohydrates is not a source of concern for weight gain as long as total energy intake does not exceed total energy expenditure.[45] In light of the OB epidemic and the concurrent rise in the amount of refined carbohydrates that are marketed to the public,[78,79] however, there has been an interest in examining the relationship between intakes of

refined carbohydrates and OB risk in children. Burkitt and Trowell were the first to identify an association between the loss of dietary fibres, a characteristic of many refined foods, and chronic disease risk.[78,80] Since then a significant amount of research has been conducted on the association between refined carbohydrate intake and OB risk.

Diets characterized by higher intakes of refined carbohydrates, particularly in the form of refined sugars (e.g., corn syrups found in many soft drinks and sugar-sweetened beverages) and refined grains (e.g., white flour) have been shown to contribute to excess weight gain in children.[45,78,79,81-86] Intake of refined sugar in liquid form is believed to mediate OB risk by attenuating appetite control.[45] It is hypothesized that due to the rapid transit of liquids through the digestive system, energy consumed in liquid form may induce less satiety than the same amount of energy consumed in solid form.[45,87] As such, children who regularly consume energy-dense drinks are more likely to consume calories in excess of their daily requirements and to become OW. Intake of refined grains may contribute to excess weight gain because diets characterized by higher intakes of refined grains are accompanied by a concomitant decrease in intakes of dietary fibre.[79] Foods high in dietary fibres have been shown to 1) contain smaller amounts of energy than comparable amounts of food containing less or no dietary fibre[45,88] 2) increase satiety[89] via stomach expansion, a consequence of dietary fibre's bulking nature[45,90] and the increased levels of digestive enzymes that are secreted as a result of the increased chewing time required for the ingestion of dietary fibres[88,91] and 3) decrease the intestinal absorption of fat via

mechanical blocking of the digestive enzymes and the absorptive membranes and the increased transit of material through the digestive system.[88,91] Therefore, it is hypothesized that children who eat more refined grains (i.e., less dietary fibre) are more likely to become OW as a consequence of consuming more calories in their quest to attain satiation and the uninhibited ability of their intestines to extract fat from the foods that they have ingested.

Micronutrient Intake

With the exception of calcium, which may play a role in the accrual of fat mass,[92] single micronutrients have not been shown to play a direct role in the etiology of OB.[93] Rather, suboptimal micronutrient intakes are 1) indicative of a poor overall dietary pattern[93,94] that may lead to OB in both adults[95,96] and children[19,97] or 2) are a consequence of secondary OB-related complications.[94] As such, investigating the role of FEPs on daily intakes of individual micronutrients may not contribute to the current state of knowledge regarding the etiology of OB, but it may provide an early indication of the development of a poor dietary pattern that may lead to OB risk. Some micronutrients that have been shown to be associated with poor dietary intake and that merit further investigation include calcium, iron, magnesium, phosphorus, potassium, folate and vitamins C, A, D and E.[92-94]

Dietary Patterns

Since the importance of understanding OB as a multifactorial disease became evident, there has been a shift from identifying the individual foods and nutrients to identifying the dietary patterns that play a role in the development of OB.[12,44] Despite this shift, there remains a paucity of information regarding the role of dietary patterns on OB risk in children and the research that has been done exhibits inconsistencies.[19,44] Some research indicates that there is a positive association between specific dietary patterns (e.g., energy-dense, low-fibre and high-fat diets) and body composition in children,[19,97] whereas other research indicates that no association exists.[44,98] It is hypothesized that the differences in these findings are a result of the difference in adiposity assessments (e.g., dual energy X-ray absorptiometry vs. BMI). In order for future studies to produce comparable results and to fully elucidate the relationship between dietary patterns and OB risk in children, it is suggested they utilize direct methods of adiposity assessment (e.g., Air-Displacement Plethysmography).[36] When such methods are not feasible, a combination of indirect methods (e.g., BMI and waist-to-hip ratio)[36] may be used.

Physical Activity

The relationship between PA and OB risk is well documented. Along with diet, PA is the second major behavioural determinant of OB risk in both children and adults.[11,14,36] Although the relationship between PA and OB has been studied since the early 1950's, it was not until a notable article was published in the

British Medical Journal in 1995[99] that there was rise in the amount of research that was conducted on the relationship between PA and OB in children. In this article, the authors brought to light the temporal relationship between the rise in OB and the decline in PA and highlighted the importance of understanding the interplay between diet and PA when studying OB and implementing interventions designed to reduce the rates of OB in a population.[99] Since the publication of this article, a significant body of research investigating the relationship between PA and childhood OB has emerged.

Although most cross-sectional and prospective studies have found that decreased PA in conjunction with caloric intake beyond what is required for daily energy expenditure is associated with an increased risk of OB in children[11,36,100-107] some studies have found a weak or no association.[36,108-110] Since obese children and their parents/caregivers are known to under-report the presence of obesogenic risk factors,[110,111] and the only major difference between the studies that found an association and those that did not was the method of quantifying PA, it is likely that the lack of findings in some studies was a result of their reliance on questionnaires highly subject to recall and reporting bias (e.g., 3-day PA diaries) rather than on more structured questionnaires or on more objective measures of PA (e.g., an accelerometer). In order to fully elucidate the relationship between PA and OB in children, more studies that adequately quantify the variables under investigation are required.

Distal Determinants

In order to completely understand the etiology of childhood OB, it is essential to also consider the underlying causes of the proximal determinants discussed in the previous section.[7,8] In the past couple of decades, researchers have identified a variety of psychological, environmental and social factors that directly impact the dietary and PA habits of children. These factors are commonly referred to as the distal determinants of OB.

Psychological Determinants

In 1957, Kaplan and Kaplan proposed the *Psychosomatic Theory of Obesity*. The theory states that overeating is a coping strategy used by many individuals during periods of negative emotional states.[112] Since 1957, over-consumption and OB have been linked to a number of psychological factors in children and adults[113,114] including depression,[115-118] self-esteem,[116,117] anger,[115,118] loneliness,[118] boredom,[115,118] and anxiety.[115,119] Based upon the result of the few longitudinal studies that have been conducted on these relationships,[120-122] there is reason to believe that psychological factors precede the development OB.

Environmental Determinants

The medical community and the public health sector are becoming increasingly aware of the significant role that the environment plays in the development of childhood OB.[7,8,11] Numerous environmental determinants of OB risk have been identified in children including neighbourhood infrastructure,[123,124] availability of

food within the home,[125-127] and school food environments.[128,129] Although each has been shown to influence OB risk, media exposure is arguably the most significant environmental factor that jeopardizes the health of children. Children are exposed to a variety of media forms including television advertisements, billboards, flyers in their schools and promotional material included in school textbooks and newspapers.[11,130,131] Of these, television advertising is believed to be the most significant.[132] Not only does television advertising increase the risk of OB by promoting the consumption of unhealthy foods,[11,133-136] but it also does so by promoting sedentary behaviour by encouraging children to sit and watch the advertisements.[11,133]

Social Determinants

Although there are numerous social factors that may impact OB risk in children (e.g., bullying[137] or culture[138]), because family-related social factors are able to mould the dietary and PA practices of children and to negate the effects of many of the other social, psychological and environmental factors associated with OB risk, they are considered to be the foundational determinants of OB risk in children.[34,127,139-142] The main family-related social factors that have been linked to OB risk in children include parental modeling,[127,143] parenting styles,[127,144] regular family meals,[145,146] and parent-child connectedness.[147]

Researchers have found a strong correlation between positive parental modeling and positive health behaviours in children.[127] For example, parental fruit and vegetable intakes have been shown to be positively associated with fruit

and vegetable intakes in children.[143,148-150] Other studies have shown that parents' own attitudes towards food consumption and PA patterns are strongly correlated to OB risk in children.[151-153] Children of parents who tend to demonstrate little control over what they eat have been found to have increased body masses in comparison to children of parents who demonstrate lower levels of uninhibited eating.[151] Similarly, children of parents who are physically active are nearly six times more likely to be physically active than children of parents who are not.[154] However, because these relationships may be mediated by factors that were not controlled for in many of these studies, such as the opportunity for PA, the results of these studies need to be interpreted in the context of the larger etiological framework of childhood OB.

Previous research has identified three parenting styles; namely authoritative, authoritarian and permissive.[144] Authoritative parenting refers to parents deciding on the foods that will be offered and providing the child with the opportunity to decide on what foods they will eat.[144] Authoritarian parenting refers to parents dictating which foods the child will or will not eat without considering the child likes and dislikes.[144] Finally, permissive parenting refers to parents placing no restrictions on what, when and how much their child eats.[144] It has been found that children of parents who practice authoritative parenting have better dietary profiles and eating habits[149,155,156] and more optimal body compositions[155] than children of parents who practice authoritarian or permissive parenting.[127,144]

It has also been shown that young children and adolescents who have regular meals with their family have healthier eating patterns and home environments that are supportive of healthy eating behaviours.[143,145,157,158] For example, not only do children who have regular family meals have eating patterns characterized by increased intakes of fruits, vegetables and fibre and decreased intakes of sweetened drinks and dietary fat,[146,157] but they also have higher levels of perceived family support in regards to their dietary practices, have restrictions on their television use, have fruits available in their home every day and have breakfast before they go to school.[158] Although this provides strong evidence that regular meals are predictive of healthy eating behaviours, because a minimal amount of research is available on the association between regular family meals and body composition, before conclusions can be draw regarding the direct impact of family meals on the development of OB, more targeted research is required.

Parent-child connectedness is another social factor that may play a prominent role in the development of OB risk in children.[147] As was the case with research on the role of regular family meals, a minimal amount of research is available on the association between parent-child connectedness and body composition in children. Instead, studies have focused on determining the effect that parent-child connectedness has on the psychological health of children. For example, it has been shown that increased parent-child connectedness is associated with increased body satisfaction[141,147] and self-esteem[147] and decreased depressive symptoms;[147] whereas decreased parent-child

connectedness is associated with significantly higher rates of unhealthy weight control habits and attempted suicide.[159] Although these psychological factors are related to OB risk in children as was discussed in the preceding *Psychological Determinants* section, before conclusions can be drawn regarding the direct impact of parent-child connectedness on body composition, more research on this association is required.

Gaps in Obesogenic Research To-date

A thorough review of the literature reveals that although the main determinants of OB risk have been identified in children there are still many unknowns regarding the distal determinants of the condition. One area of obesogenic research that requires further investigation and that is of particular public health interest is the role of FEPs on the development of OB risk in children.[12,140-142] There are four major gaps in knowledge pertaining to this area of research, each of which are addressed below.

1. Despite evidence that the family environment plays a significant role in the development of OB risk in children,[140-142] and that male and female children react differently to environmental stimuli[160,161] and have different caloric and dietary intake requirements,[162,163] minimal gender-specific research is available on the role of the FEPs on the development of OB risk in children. Research has shown that girls are more likely to experience disordered eating during negative emotional states (e.g., depression and stress)[164] and are less likely to be physically active as

compared to boys.[165,166,167] Based on this evidence, it is expected that family eating environments characterized by poor FEPs may be a greater risk factors for OB in girls than in boys. Investigating gender-specific differences in the role of family environment is imperative in fully understanding the role of the family in the development of OB and in developing family-based interventions that will minimize the risk of the condition in both male and female children.

2. There remains a gap in knowledge on the role of the family environment on the development of OB risk in peri-adolescent children.[12,19,44] The prenatal period[77] and adolescence[77,168,169] have been identified as two critical periods for the development of OB. Although the specific reason why children are at a higher risk of developing OB during these periods remains unclear, it is likely a consequence of the rapid growth and development that occurs.[170] In terms of the prenatal period, it has been postulated that over-nutrition *in utero* may predispose children to OB by modifying the structure of the hypothalamic centre responsible for food regulation and/or by modifying the development of adipocytes.[77] Similarly, because sex hormones induce the replication of regional adipocytes during adolescence, it has been suggested that fat is more likely to be stored during this time than when these sex-specific regional adipocytes are not yet expressed.[77] Although obesogenic research that focuses on prenatal populations is valuable in identifying early life experience that may place children at risk of OB later in life, investigating the impact of

FEPs in peri-adolescents, a population that 1) is about to start shaping a life-long trajectory of health behaviours[44] and that 2) has the most control over their own health behaviours, may provide valuable insight into how family-based interventions can most effectively halt the progression of OB from childhood into adulthood.[44,170]

3. Minimal research is available on the role of *overall* FEPs on the development of OB risk in children. Most studies that have investigated the role of the family environment on the development of OB risk have focused on the role of individual eating practices – particularly those pertaining to the behaviour of children (e.g., eating breakfast before school[158]). However, because multiple family eating practices operating at psychological, environmental and social levels may interact to increase OB risk,[8] assessing the role of *overall* FEPs, rather than individual FEPs, (e.g., using a FEP Index score) may provide a more accurate assessment of the role of FEPs on the development of OB risk.
4. Parents have been shown to play a critical role in the formation of positive eating behaviours in their children.[10,140] Despite this, the majority of research that has been conducted on the role of FEPs on the development of OB risk in children has focused on the role of children's eating practices and has failed to assess the impact of mother and the father eating practices.[10] In order to fully understand the role of *family* eating practices on the development of childhood OB and to make recommendations for the formation of effective family-based intervention

designed to curb the risk of childhood OB, it is imperative to consider the role of both child and parent eating practices on the development of OB risk in children.

In light of these four gaps in knowledge and the importance of understanding the role of FEPs in the development of OB risk,[12,140] the purpose of this study was to assess the overall role of child, mother and father eating practices on measures of OB risk, including daily intakes of selected macro and micro nutrients, dietary patterns and measures of body composition, in male and female peri-adolescent children. Establishing how overall FEPs affect these predictors of OB risk will aid in the formation of targeted family-based interventions designed to decrease the risk of childhood OB.

Chapter 3 - Methods

Study Design

A cross-sectional study design was implemented using data collected by two studies on the same children from the *Physical Health Activity Study Team (PHAST)* and the *Optimal Growth Study* from September 2007 to June 2008. The *PHAST* study collected PA, body composition and socioeconomic data and the *Optimal Growth Study* collected dietary intake and FEP data on a cohort of students (11 ± 2 years) from the District School Board of Niagara (DSBN). Refer to Appendix B for a data preparation summary. Since the analyses in this study were dependent on the availability of complete data, the sample size was variable depending on the model that was assessed. Of the 2,414 children in the final study population, approximately 250 had complete PA, body composition, socioeconomic, dietary and FEP data. The sample size was larger in models where fewer variables were required. The protocols for the *PHAST* and *Optimal Growth* studies were approved by Brock Universty's *Research Ethics Board* (File #: 03-342) and the DSBN's *Research Committee*. Approval for secondary data analysis was obtained from the study participants as well as from the primary investigators of the *PHAST* and *Optimal Growth* studies.

Measurement of Key Variables

Body Composition

The body composition variables that were assessed in this study included, BMI, waist-to-height ratio, waist-to-hip ratio, waist girth and hip girth. All

measurements were taken by trained research assistants with participants wearing clothing required for light PA and no footwear. Weight was measured to the nearest 0.1 kg using a calibrated electronic scale. Height was measured to the nearest 0.1 cm using a calibrated wall-mounted stadiometer. Waist girth was measured at the belly button and hip girth was measured around the widest portion of the buttocks using a flexible measuring tape. Values were recorded to the nearest 0.1 cm. BMI was calculated by dividing the study participants' weight in kilograms by their standing height in metres squared. Waist-to-height and waist-to-hip ratios were calculated by dividing waist girth by height and hip girth, respectively.

Diet

Daily nutrients intakes and dietary patterns were abstracted from responses to the Harvard Medical School (HMS) Eating Survey (C-02-1).[171] The survey consisted of 147 questions based on 77 food items, and took approximately 25 minutes to complete. The survey was completed by all of the study participants during school hours.

Daily Nutrient Intakes

Completed *HMS* Eating Surveys were collected and sent to Harvard Medical School (Boston, MA) where daily nutrient intakes of macronutrients (carbohydrates, protein, total, saturated, monounsaturated, polyunsaturated and trans fat), minerals (calcium, iron, magnesium, phosphorous, potassium), and

vitamins (C, A, D, E, and folate) were computed for each study participant via the *Nutrition Quest Data-On-Demand System* (Berkeley, CA).

Dietary Patterns

Dietary patterns were assessed using two index scores that reflected the dietary pattern guidelines established by the *National Heart, Lung, and Blood Institute's* Dietary Approaches to Stop Hypertension (DASH) trial[172-174] and by Health Canada's (HC) Eating Well with Canada's Food Guide.[175] Both index scores were calculated using methods described previously.[173,176,177] A description of how these index scores were calculated is provided in brief below. For a more detailed description, refer to Appendix C. *(Note: Because the majority of response options in the HMS* Eating Survey *represented a range of possible values (e.g., 2 to 6 servings per week), in order to account for the ambiguity of these responses, lower, upper and average DASH and HC Index scores were calculated. The lower index scores reflected the lowest possible dietary pattern scores, the upper index scores reflected the highest possible dietary pattern scores and the average index scores reflected the average dietary pattern scores for each study participant.)*

DASH Index Score

The DASH Index score was calculated using the responses to the *HMS* Eating Survey. Each of the responses from the *HMS* Eating Survey were categorized into one of the eight food groups including fruits, vegetables, grains, dairy,

meat/fish/eggs, legumes/nuts/seeds, oils/fats and sweets. For each food group, a maximum score of 10 was given if the recommended intake was met. Intakes below the recommended level were scored proportionally less. For example, if the maximum serving size of a food group was 4 and the child consumed 3 servings, they would receive a score of 7.5. For food groups where a lower intake was recommended (e.g., sweets), reverse scoring was applied and a score of 0 was assigned for intakes ≥200% the upper recommended limit.[173,176] The scores of each food group were summed to produce the final DASH Index score, where a higher score was indicative of a more optimal dietary pattern according the recommendations provided by the DASH trial (Range: 0-80).

HC Index Score

The HC Index score was calculated using the same method as described above. The only difference in the calculation of the HC Index score was the use of Health Canada's recommendations for daily food intake rather than the recommendations of the *National Heart, Lung, and Blood Institute's* DASH trial. Each of the responses from the *HMS* Eating Survey were categorized into one of four food groups including vegetables/fruits, grain products, milk alternatives and meat alternatives. Although oils/fats and sweets do not constitute individual food groups within Health Canada's Food Guide, because these foods weigh heavily on the quality of dietary patterns,[19,97] they were also included in the calculation of the HC Index score. In the manner described above, each food group was assigned a maximum score of 10, if the recommended intakes were met. Intakes

below the recommended level were scored proportionally less. For food groups where a lower intake was recommended (e.g., sweets), reverse scoring was applied and a score of 0 was assigned for intakes ≥200% the upper recommended limit. The scores of each food group were summed to produce the final HC Index score, where a higher score was indicative of a more optimal dietary pattern according the recommendations provided by Health Canada (Range: 0-60).

Family Eating Practices

FEP data were collected using a revised version of the Family Activity and Eating Habits Questionnaire (FAEH).[10] Participants received the questionnaire during school hours and were instructed to bring it home and give it to their parents. Parents who completed the questionnaires did so on behalf of themselves, their child and their spouse. Completed questionnaires were returned to school by the children.

Overall FEP quality was assessed using three index scores that reflected child, mother and father FEPs. The Child FEP Index score (Range: 0-76) represented the sum of the responses to 22 child-specific questions collected as part of the revised-FAEH (e.g., What is the frequency that the child eats snacks/sweets without parental permission? Never, Almost never, Sometimes, Frequently or Always). The Mother and Father FEP Index scores (Ranges: 0-42) represented the sum of the responses to 13 mother and father-specific questions collected as part of the revised-FAEH (e.g., How often do you ask for a second

helping? Never, Almost never, Sometimes, Frequently or Always). Higher index scores were indicative of poorer family eating practices. For a summary of the questions used in the calculation of the Child, Mother and Father Index scores, refer to Tables 6, 7 and 8, respectively (Appendix D).

Covariates

The covariates that were assessed in this study included age to peak height velocity, total PA, birth order, parental BMI, parental education and marital status.

Age to Peak Height Velocity

Age to peak height velocity (aPHV), a measure of maturity, was calculated specific to gender as per the methods of Mirwald and colleagues,[178] whereby:

$aPHV_{females}$ = *-9.376 + 0.0001882 * (leg length(cm) * sitting height(cm)) + 0.0022 * (age (yrs) * leg length (cm)) + 0.005841 * (age(yrs) * sitting height (cm)) – 0.002658 * (age (yrs) * weight (kg)) + 0.07693 * (weight (kg)/standing height (cm))*

$aPHV_{males}$ = *-9.236 + 0.0002708 * (leg length(cm) * sitting height(cm)) - 0.001663 * (age (yrs) * leg length (cm)) + 0.007216 * (age(yrs) * sitting height (cm)) + 0.02292 * (weight (kg)/standing height (cm)).*

Child age was collected as part of the *HMS* Eating Survey and was based on the study participants' selection of one of 11 response options ranging from

less than 9 to 18 or older. Weight and height measurements were collected as described previously. Leg length was calculated by subtracting sitting height from standing height.

Total Physical Activity

Total PA was a scored measure based on data collected by the *PHAST* study as part of the *Participation Questionnaire (PQ).* The *PQ* was a 61-item questionnaire consisting of eight sections. Six of the eight sections assessed the amount of time spent in organized activity, free-time activity and sedentary activity by each subject. Based on the study participants' responses to these six sections, a total PA score was derived (Range: 0-64), where a greater number of activity units represented a higher level of PA and a lower level of sedentary activity.

Birth Order and Parental BMI, Parental Education and Marital Status

Birth order was collected by the *PHAST* study as part of the *PQ*. It was based on responses to two questions including 'How many older brothers do you have?' and 'How many older sisters do you have?' and was defined as the sum of the two responses plus one to account for the birth of the study participant. Data on parental BMI, marital status and education was collected in May 2005 as part of the baseline testing conducted by the *PHAST* study using the *Parental Questionnaire.* The *Parental Questionnaire* was sent home with each child and completed by their parent/guardian and returned to the school by the child. A contact number was included with each questionnaire in the event that parents

had questions pertaining to the survey. Parental BMI was calculated based on self-reported weight and height. Parental education was dichotomized into parents with or without a university education. Parents with a university education included those who indicated that the highest level of education that they attained was an undergraduate degree (BA, BSc), a professional degree (MD, LLB, BEng, MBA) or a graduate degree (masters, doctorate). Parents without a university education included those who indicated that the highest level of education that they attained was less than high school, high school, some college, trade certificate or college. Marital status was dichotomized as either reflective of a two-parent or a one-parent household. A two-parent household included those parents who indicated they were now married, common law or living with a partner. A one-parent household included those parents who indicated that they were single/never married, widowed, separated or divorced.

Statistical Analyses

All analyses were performed using SAS 9.1 (SAS Institute Inc., Cary, NC, USA). P values of <0.05 were considered statistically significant. Differences in means/proportions were tested between male and female participants, between included and excluded participants and between participants with and without complete covariate data using Student t-tests for all continuous variables and Fisher exact tests for all dichotomous variables.

Multiple linear regression analyses, stratified by participant gender, were used to assess the relationship between the Child, Mother and Father FEP Index

scores and 1) measures of body composition (i.e., BMI, waist-to-height ratio, waist-to-hip ratio, waist girth and hip girth), 2) dietary patterns as per the recommendations of the DASH trial (i.e., DASH Index score) and Health Canada's Food Guide (i.e., HC Index score) and 3) daily intake of macronutrients (i.e., carbohydrates, protein, total, saturated, monounsaturated, polyunsaturated and trans fat), minerals (i.e., calcium, iron, magnesium, phosphorous, potassium) and vitamins (i.e., C, A, D, E, and folate). Multiple logistic regression analyses, stratified by participant gender, were used to assess the relationship between the Child, Mother and Father FEP scores and risk of 1) being overweight and 2) falling into the lowest tertiles of the DASH and HC Index scores. Parameter estimates and 95% confidence intervals (CIs) were calculated for quartiles of the Child, Mother and Father FEP Index scores. Regression analyses, stratified by participant gender, were also used to assess the relationship between the DASH and the HC Index scores and body composition. Specifically, multiple linear regression analyses, were used to assess the relationship between the DASH and the HC Index scores and BMI, waist-to-height ratio, waist-to-hip ratio, waist girth and hip girth and multiple logistic regression analyses were used to assess the relationship between the DASH and HC Index score and risk of being overweight. For the logistic regression models, parameter estimates and 95% CIs were calculated for tertiles of the DASH and HC Index scores.

Four models were implemented in all regression analyses. Model 1 was unadjusted. Model 2 was adjusted for aPHV. Model 3 was adjusted for aPHV and total PA. Model 4 was adjusted for aPHV, total PA, birth order, parental BMI,

parental education and marital status. Analyses were conducted on children with complete data on all of the variables under investigation. Thus, the sample size was variable depending on the model that was assessed. Refer to Appendix E for the sample sizes used in each model. Interactions were assessed between variables specified a priori, including the Child FEP Index score and total PA, the Child FEP Index score and birth order, the Child FEP Index score and the DASH Index score, the DASH Index score and total PA and the DASH Index score and birth order on measures of body composition, including BMI, waist-to-height ratio, waist-to-hip ratio, waist girth and hip girth. Correlations were assessed between Child, Mother and Father FEP Index scores.

Chapter 4 – Results

Basic Characteristics

Study results are presented in Appendix E. The distributions of baseline characteristics for all variables of interest by gender are presented in Table 9. Males were significantly less mature and had larger waist-to-height ratios, waist-to-hip ratios and waist girths and smaller hip girths compared to females ($p<0.05$). In terms of diet, males had significantly larger lower and smaller upper HC Index scores and had significantly larger daily intakes of macronutrients (carbohydrates, protein, total, saturated, monounsaturated, polyunsaturated and trans fat), minerals (i.e., calcium, iron, magnesium, phosphorous, potassium) and vitamins (D and folate) ($p<0.05$).

Differences in the characteristics of the study population of excluded and included participants are presented in Table 10. With the exception of vitamin D, for which participants without missing gender information had a significantly higher intake ($p<0.05$), there were no significant differences in daily nutrient intakes of macronutrients, minerals and vitamins. For all other variables under investigations, no observations were excluded from the study.

Differences in the characteristics of the study population, by participants with and without complete covariate data are presented in Table 11. Those with complete covariate data had significantly smaller BMIs, waist-to-height ratios, waist girths and hip girths than those without complete covariate data ($p<0.05$). In terms of eating practices, dietary patterns and daily nutrient intake, participants with complete covariate data had more optimal Child FEP Index scores, more

optimal upper HC Index scores and smaller daily intakes of carbohydrates and polyunsaturated fats ($p<0.05$).

Family Eating Practices

Child Eating Practices

Tables 12a, 12b, 12c and 12d show the linear regression coefficients for the relationship between the Child FEP Index score and the body composition, dietary patterns and daily nutrient intake variables of interest by gender. Regardless of which model was used, the Child FEP Index score was positively associated with daily monounsaturated fat (Model 4: b=0.38, 95% CI 0.0027/0.7643, p=0.0484) and trans fat (Model 4: b=0.05, 95% CI 0.0002/0.1048, p=0.0492) intakes in males and with BMI (Model 4: b=0.11, 95%CI -0.0016/0.2276, p=0.0533) in females. Although other associations were observed, significance was lost after complete adjustment (Model 4).

Tables 13, 14 and 15 show the logistic regression coefficients for the relationship between the Child FEP Index score and risk of being overweight and risk of falling into the lowest tertiles of the DASH and HC Index scores by gender. In females, regardless of which model was used, a poorer Child FEP Index score was associated with an increased risk of overweight (Model 4: Q1 vs. Q4: OR 6.33, 95% CI 1.35/29.63, p=0.02). The Child FEP Index score was not associated with risk of overweight and risk of falling into the lowest tertile of the DASH and HC Index scores in males and with risk of falling into the lowest tertile of the DASH and HC Index scores in females in any of the models.

Mother Eating Practices

The linear regression coefficients for the relationship between the Mother FEP Index score and the body composition, dietary patterns and daily nutrient intake variables of interest by gender are presented in Tables 16a, 16b, 16c and 16d. In females, positive associations were observed between the Mother FEP Index score and BMI, waist-to-height ratio, waist girth and hip girth and negative associations were observed between the Mother FEP Index score and the DASH Index score and daily intakes of Vitamin A and C, before (Model 1) and/or after partial adjustment (Model 2 and 3). Significance was lost after adjustment for aPHV, total PA, birth order, parental BMI, parental education and marital status (Model 4). In males, no associations were observed before (Model 1) or after (Models 2, 3 and 4) adjustment.

Tables 17, 18 and 19 show the logistic regression coefficients for the relationship between the Mother FEP Index score and risk of being overweight and risk of falling into the lowest tertiles of the DASH and HC Index scores by gender. Regardless of which model was used, a poorer Mother FEP Index score was associated with an increased risk of falling into the lowest tertile of the DASH Index score in females (Model 4: Q1 vs. Q4: OR 3.19, 95% CI 1.45/8.85, p=0.03). Although a poorer Mother FEP Index score was associated with an increased risk of being overweight in females in Models 1, 2 and 3 and with an increased risk of falling into the lowest tertile of the HC Index score in males in Model 1, these associations lost significance after further adjustment. No other associations were observed between the Mother FEP Index score and risk of

being overweight and risk of falling into the lowest tertiles of the DASH and HC Index scores in any of the models.

Father Eating Practices

Tables 20a, 20b, 20c and 20d show the linear regression coefficients for the relationship between the Father FEP Index score and the body composition, dietary patterns and daily nutrient intake variables of interest by gender. Regardless of which model was used, the Father FEP Index score was positively associated with daily intakes of vitamin C in males (Model 4: b=4.68, 95% CI 0.21/9.16, p=0.04). In females, the Father FEP Index score was negatively associated with the upper HC Index score after full adjustment (Model 4: b=-0.27, 95% CI -0.52/-0.02, p=0.03). Other associations were observed between the Father FEP Index score and dietary pattern variables in males and females and between the Father FEP Index score and body composition variables in females. However, these associations lost significance after complete adjustment (Model 4).

Tables 21, 22 and 23 show the logistic regression coefficients for the relationship between the Father FEP Index score and risk of being overweight and risk of falling into the lowest tertiles of the DASH and HC Index scores by gender. In females, a poor Father FEP Index score was associated with an increased risk of falling into the lowest tertile of the DASH (Q1 vs. Q3: OR 3.42, 95% CI 1.06/11.02, p=0.04; Q1 vs. Q4: OR 3.48, 95% CI 1.25/9.44, p=0.02) and the HC (Q1 vs. Q3: OR 3.55, 95% CI 1.10/11.41, p=0.03; Q1 vs. Q4: OR 2.86,

95% CI 1.03/7.90, p=0.04) Index scores after adjustment for aPHV, total PA, birth order, parental BMI, parental education and marital status (Model 4). No association was observed between the Father FEP Index score and risk of overweight in both males and females. Although associations were observed between the Father FEP Index score and risk of falling into the lowest tertile of the DASH and the HC Index scores in males (Models 1, 2 and 3 and Model 3, respectively), none of these associations remained significant after complete adjustment (Model 4).

Dietary Patterns

DASH Index Score

Table 24 shows the linear regression coefficients for the relationship between the DASH Index score and measures of body composition by gender. Regardless of which model was used, the DASH Index score was negatively associated with BMI (Model 4: b=-0.05, 95% CI -0.0926/-0.0093, p=0.0167), waist-to-height ratio (Model 4: b=-0.0008, 95% CI -0.0015/-0.0001, p=0.03), waist girth (Model 4: b=-0.14, 95% CI -0.25/-0.03, p=0.01) and hip girth (Model 4: b=-0.12, 95% CI -0.22/-0.02, p=0.0203) in males and with BMI (Model 4: b=-0.05, 95% CI -0.09/-0.01, p=0.01), waist-to-height ratio (Model 4: b=-0.0009, 95% CI -0.0015/-0.0003, p=0.0031), waist-to-hip ratio (Model 4: b=-0.0011, 95% CI -0.0019/-0.0004, p=0.0042) and waist girth (Model 4: b=-0.18, 95% CI -0.29/-0.07, p=0.0017) in females. Although significant negative associations were also observed between the DASH Index score and waist-to-hip ratio in males and between the DASH

Index score and hip girth in females (Models 1 and 2 and Models 1, 2 and 3, respectively), these associations lost significance (waist-to-hip ratio: p=0.2588; hip girth: p=0.0684) after full adjustment (Model 4).

Table 25 shows the logistic regression coefficients for the relationship between the DASH Index score and risk of overweight by gender. Regardless of which model was used, a more optimal DASH Index score was associated with a decreased risk of overweight in males (T1 vs. T2: OR 0.56, 95% CI 0.33/0.96, p=0.04; T1 vs. T3: OR 0.48, 95% CI 0.27/0.85, p=0.01). Although a more optimal DASH Index score was associated with a decreased risk of overweight in females in Models 1, 2 and 3, significance was lost after full adjustment (Model 4).

HC Index Score

Table 26 shows the linear regression coefficients for the relationship between the HC Index score and measures of body composition by gender. Regardless of model used, the HC Index score was negatively associated with waist-to-hip ratio (Model 4: b=-0.0012, 95% CI -0.0023/-0.00003, p=0.04) in females. Although significant negative associations were also observed between the HC Index score and BMI, waist-to-height ratio and waist girth in Models 1, 2 and 3 and between the HC Index score and hip girth in Model 1 in females, these associations lost significance after further adjustment. No significant associations were observed between the HC Index score and measures of body composition in males in any of the models.

The logistic regression coefficients for the relationship between the HC Index score and risk of overweight by gender are presented in Table 27. In males, the HC Index score was not associated with risk of overweight in any of the models. In females, the HC Index score was associated with risk of overweight before adjustment (Model 1). However, the association lost significance after adjustment.

No interactions were observed between the Child FEP Index score and total PA, birth order and the DASH Index scores and between the DASH Index scores and total PA and birth order on BMI, waist-to-height ratio, waist-to-hip ratio, waist girth and hip girth independent of gender, aPHV, total PA, birth order, parental BMI, parental education and marital status ($p<0.05$). Weak to moderate correlations were observed between the Child FEP Index score and the Mother FEP Index score (Males: $R=0.52$, $p<0.0001$; Females: $R=0.25$, $p=0.01$) and between the Child FEP Index score and the Father FEP Index score (Males: $R=0.54$, $p<0.0001$; Females: $R=0.29$, $p=0.004$) independent of gender, aPHV, total PA, birth order, parental BMI, parental education and marital status.

Chapter 5 – Discussion

The aim of this study was to assess the role of overall child, mother and father eating practices on daily intakes of numerous macro and micro nutrients, dietary patterns and measures of body composition in male and female peri-adolescent children. Results from this study indicate that 1) poor child eating practices were associated with increased monounsaturated and trans fat intakes in boys and with increased BMI and risk of overweight in girls; 2) poor mother eating practices were associated with an increased risk of poor dietary patterns in girls, according to the recommendations of the DASH trial; and 3) poor father eating practices were associated with increased daily vitamin C intakes in boys and an increased risk of poor dietary patterns in girls according to the recommendations of the DASH trial and Health Canada's Food Guide. These findings will be the focus of the discussion. To our knowledge, this is the first study to have examined gender-specific differences in the overall role of child, mother and father eating practices on measures of OB risk in peri-adolescents. Thus, the novelty of this study lies in the demonstration that peri-adolescent girls may be at greater risk of OB in the presence of poor eating practices than peri-adolescent boys and that overall mother and father eating practices, in addition to overall child eating practices, may play a significant role in the development of OB risk in girls. In order to further elucidate the association between overall FEPs and OB risk in children, the relationships between the DASH and the HC Index scores and measures of body composition were also examined. Results from this study indicate that closely following the food intake recommendations of the DASH trial

was associated with reduced measures of adiposity in girls and boys and reduced risk of overweight in boys; whereas closely following the food intake recommendations of Health Canada was only associated with reduced measures of adiposity in girls. This is the first study to have examined the role of following dietary recommendations that have been shown to have the potential to optimize cardiovascular health[172,179,180] and that have been provided to the general Canadian public.[181] Therefore, the novelty of this study also lies in the demonstration that following the food intake recommendations of the DASH trial may be more effective in reducing adiposity in both male and female children than following the recommendations of Health Canada's Food Guide.

Gender Differences in the Role of FEPs

In girls, poor child eating practices were associated with increased BMI and increased risk of overweight. Furthermore, poor mother eating practices were associated with an increased risk of poor dietary patterns according to the recommendations of the DASH trial and poor father eating practices were associated with an increased risk of having a poor dietary pattern according to the recommendations of the DASH trial and Health Canada's Food Guide. In boys, poor child eating practices were associated with increased monounsaturated and trans fat intakes and poor father eating practices were associated with increased vitamin C intakes. Increased trans fat and vitamin C intakes may be indicative of obesogenic dietary patterns.[182,183] However, due to a lack of association between FEPs and dietary patterns or risk of overweight in

boys, there is no evidence to suggest that poor FEPs pose a direct risk to health in boys, as they do in girls.

With the exception of monounsaturated fat intake, these findings were consistent with the previously stated hypothesis regarding the differential impact of poor FEPs in male and female peri-adolescent children. Previous research has shown that peri-adolescent girls are more likely to experience disordered eating during periods of stress and depression[164] and are less likely to be physically active than boys.[165,166] Since disordered eating and decreased PA are known risk factors for weight gain[100,113] and because family factors are critical in mitigating the effects of stress and forming positive eating and PA practices,[139,140,142] it was anticipated that poor FEPs would have the greatest impact on measures of OB risk in those children who are at greatest risk of OB due to the effects of stress and decreased PA (i.e., girls).

The finding that poor child eating practices were associated with increased monounsaturated fat intake in boys was unexpected. Based on evidence that increased monounsaturated fat intake is protective against OB risk and indicative of healthy dietary patterns[65,93] and that poor eating practices are linked to unhealthy dietary patterns,[146,157] it was expected that poor FEPs would be associated with a decrease in monounsaturated fat intake. Statistical variation may be the reason for this discrepancy. Most associations observed in this study had significance levels well below the predefined cut point of 0.05. However, the association between poor child eating practices and monounsaturated fat intake had borderline significance (i.e., $p=0.0484$). Since cut points are not definite

indicators of significance,[184] the results must be interpreted with caution. Despite this unexpected finding, this study provides evidence that peri-adolescent girls may be at greater risk of OB in the presence of poor eating practices than peri-adolescent boys. Therefore, family-based interventions for weight management in children should be gender-specific.

Importance of Parental Eating Practices

In girls, poor mother eating practices were positively associated with poor dietary patterns according to the recommendations of the DASH trial and poor father eating practices were positively associated with poor dietary patterns according to the recommendations of the DASH trial and Health Canada's Food Guide. In boys, no associations were found between parental eating practices and dietary patterns. Numerous studies have shown that parents play a critical role in the formation of positive eating behaviours in their children.[10,140] However, the finding that modification of parental eating practices may be more critical for the formation of healthful eating patterns in girls than for the formation of healthful eating patterns in boys is novel. Although more research will need to be conducted to validate this finding, there is evidence to suggest that family-based interventions may need to target the modification of parental eating practices, particularly for the reduction of OB risk in girls.

Dietary Patterns and Measures of Body Composition

In order to further elucidate the causal pathway between overall FEPs and OB risk in children, the relationships between the DASH and the HC Index scores

and measures of body composition were also assessed. In girls, closely following the food intake recommendations of the DASH trial was associated with decreases in BMI, waist-to-height ratio, waist-to-hip ratio and waist girth. Closely following the food intake recommendations of HC was associated with a decrease in waist-to-hip ratio. In males, closely following the food intake recommendations of the DASH trial was associated with decreases in BMI, waist-to-height ratio, waist girth and hip girth and reduced risk of overweight. No association was found between the recommendations of HC and measures of body composition. A previous study investigated the impact of following the DASH trial's dietary recommendations on OB risk in youth.[176] However, our study was the first to do so in the context of both the recommendations that have been shown to have the potential to optimize cardiovascular health (i.e., the DASH trial) and the recommendations that have been provided to the general Canadian public (i.e., Health Canada's Food Guide). Based on the results of this study, there is evidence to suggest that following the food intake recommendations of the DASH trial may be more effective in reducing adiposity in both male and female children than following the recommendations of HC's Food Guide.

The difference between HC's and the DASH trial's food intake recommendations that may account for the disparity in their ability to reduce the risk of OW are the recommendations they make regarding daily intakes of fruits and vegetables. In comparison to HC's Food Guide, the DASH trial promotes a diet rich in fruits and vegetables.[172,175] This is a reflection of the purposes for which each of the guidelines were designed. Health Canada's Food Guide was

designed for the maintenance of population health,[181] whereas the DASH trial's food guide was designed for the treatment of hypertension and related disorders.[172] HC's Food Guide promotes the consumption of foods that will satisfy the daily nutritional requirements of the majority of the population,[185] whereas the DASH trial promotes consumption of foods that have been shown to reduce the risk of hypertension, including fruits and vegetables.[172] However, in addition to reducing the risk of hypertension, diets rich in fruits and vegetables have also been shown to decrease the risk of OW and OB.[186,187] This association may be attributed to the high fibre content of fruits and vegetables.[88] Foods high in fibre have been shown to reduce the risk of OB by containing a smaller amount of energy than a comparable amount of food containing less or no dietary fibre,[45,88] by increasing satiety[89] and by decreasing the intestinal absorption of fat.[88,91] Since the DASH trials recommends 4 servings of fruit and vegetables per day (at an energy intake level of 2,000 kcal),[172] whereas HC recommends 6 servings of fruits and/or vegetables per day,[175] those who follow the recommendations of the DASH trial consume 8 servings of fruits and vegetables per day as opposed to 6 servings recommended by the HC Food Guide. Therefore, children who closely follow the recommendations of the DASH trial as opposed to the HC Food Guide may be at a reduced risk of OW as a result of having higher intakes of both fruits and vegetables. The HC Food Guide may enhance its ability to reduce the risk of OW in peri-adolescents by increasing the recommended intake of fruits and vegetables.

Strengths and Limitations

A strength of this study was the reliable assessment of the primary variables of interest. Dietary and FEP data were collected using questionnaires validated for use in peri-adolescent children.[10,171] Body composition data were collected by qualified research assistants. Use of validated questionnaires ensured that the reliability of the dietary and FEP data was high and use of qualified personnel for the collection of body composition data eliminated reporting bias that would have been associated with self-report.

There were a number of study limitations. First, this study used a representative sample of children from the Niagara Region. Because the Niagara Region consists predominantly of Caucasian middle-class citizens, the results cannot be generalized to populations with different demographic profiles. Second, due to the large number of hypotheses that were tested in this study, it is possible that some of the observed associations were spurious associations that arose by chance (i.e. false positives). Third, due to the cross-sectional design of the study, conclusions regarding causation could not be established. To assess causality, longitudinal analyses on the association between FEPs and OB risk are suggested.

Study Implications

Despite the aforementioned limitations, the findings of this study may be used to facilitate preliminary discussion regarding the formation of targeted family-based interventions that will minimize the risk of OB in both male and female children. Groups within the community who will play a critical role in the formation and

implementation of effective interventions will be those who are able to raise awareness on the importance of the family in minimizing the risk of childhood OB and educate families on how to alter family eating practices in a way that will minimize the risk of OB in their children. These groups may include, but are not limited to, health care providers, teachers, school boards and public health policy makers. Once family-based interventions are established, more research will be required to establish the efficacy of these interventions.

Future Research Directions

Before family-based interventions can be established, the relationship between FEPs and OB risk must be more fully understood. Future research directions that may help elucidate this relationship further include assessment of potential interactions between FEPs and known determinants of OB risk (e.g., PA) and identification of the major FEPs responsible for OB risk. Although no interactions were observed in this study, in light of evidence that factors such as PA modulate obesogenic relationships,[98,107] further research in this area is merited. The major FEPs responsible for OB risk may be identified in future studies by utilizing questionnaires that quantify the eating practices of children, mothers and fathers and assessing the degree to which each individual eating practice contributes to OB risk. It is only after the role of interacting factors are understood and the major FEPs responsible for OB risk are identified that specific recommendations regarding the formation of family-based interventions can be made.

Conclusion

The results of this study indicate that FEPs are significantly associated with measures of OB risk, particularly in peri-adolescent girls. Furthermore, following the dietary recommendations of the DASH trial is associated with decreases in adiposity measures of both peri-adolescent girls and boys. These findings suggest that family-based interventions designed to reduce the risk of OB in peri-adolescent children should 1) be gender-specific, 2) target the modification of eating practices of both parents and children and 3) suggest following the DASH diet. Support will be required from groups within the community who are able to raise awareness on the importance of the family in minimizing the risk of childhood OB and educate families on how to alter FEPs in a way that will minimize the risk of OB in their children.

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Appendix A

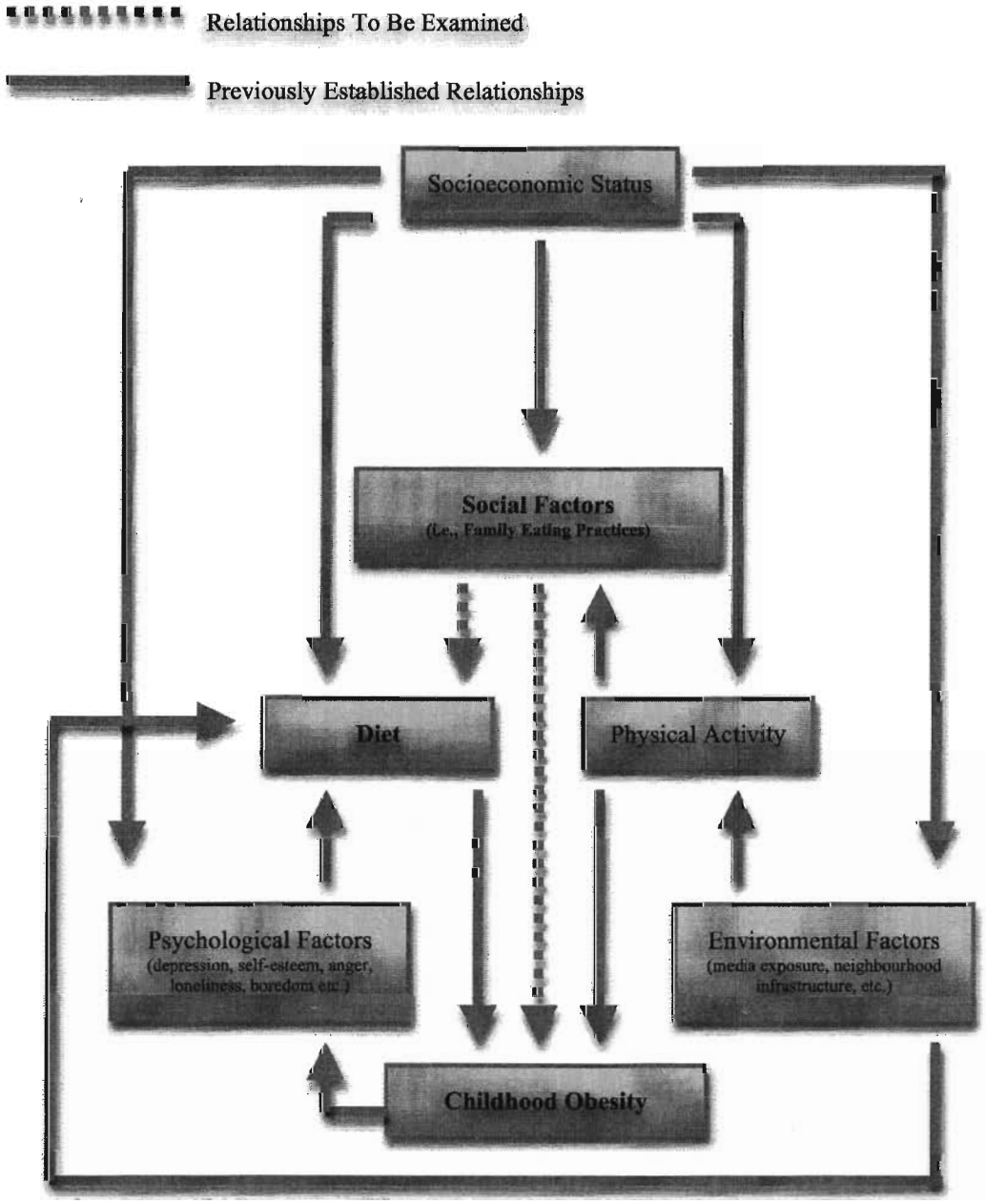


Figure 1. Conceptual model of previously established relationships between the behavioural, psychological, environmental and social determinants of childhood OB and those that will be examined in this study.

Appendix B

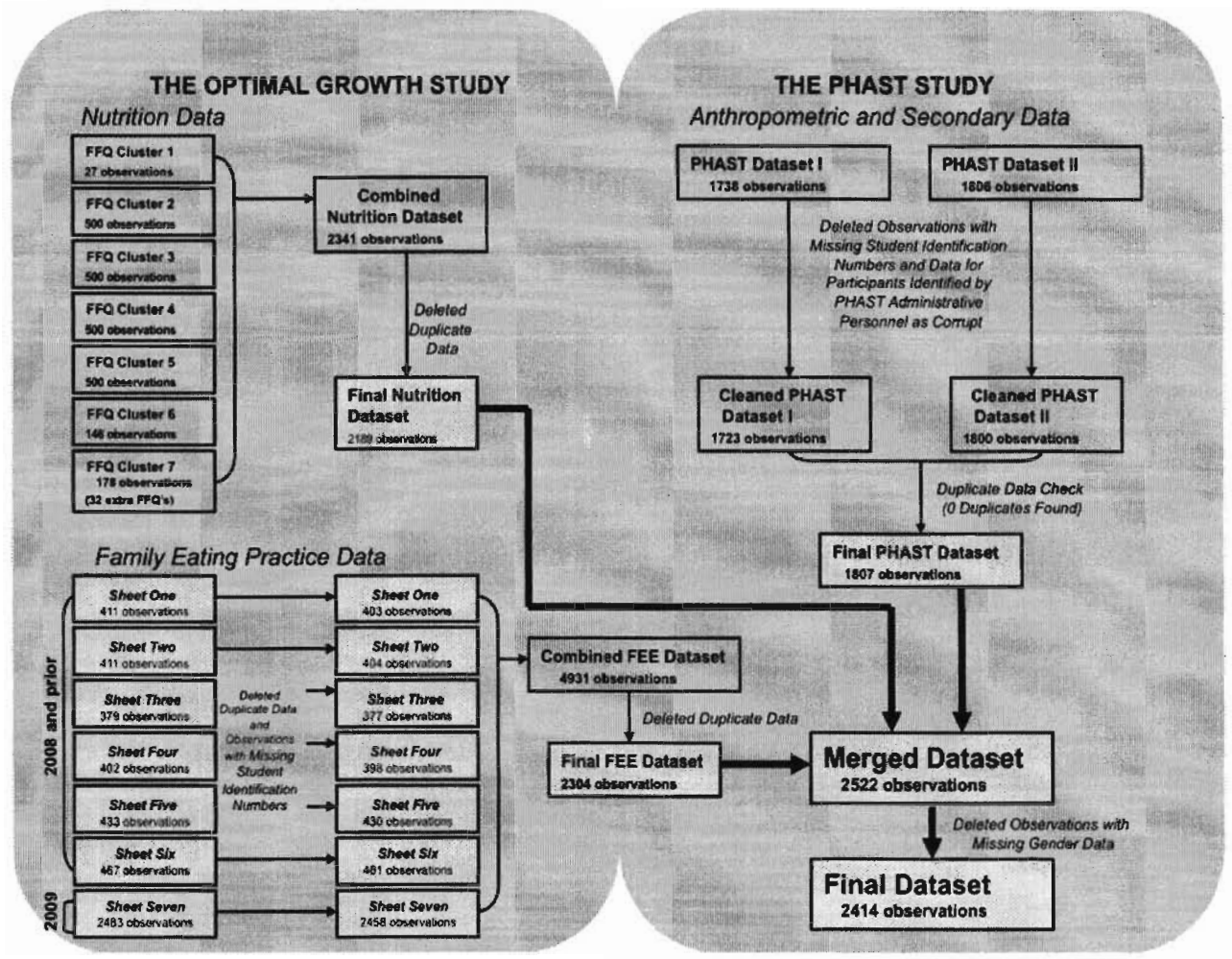


Figure 2. Data preparation summary.

Appendix C

For the calculation of the DASH Index scores, each food item assessed in the *HMS* Eating Survey was classified into one of eight food groups (Table 1). For the calculation of the HC Index scores, each food item assessed in the *HMS* Eating Survey was classified into one of six food groups (Table 2). Each response option to the *HMS* Eating Survey was converted to the participants' servings per day or servings per week equivalent, depending on the food group that was being assessed (Table 3). Lower, upper and average DASH and HC servings per day/week were calculated for each DASH and HC food group by summing the lowest, highest and average servings allowed by each response, after multiplying the food items that contributed to more than one food group or serving size with a weighting factor established *a priori.*

Using the total servings per day/week for each food group, lower, upper and average DASH and HC sub-Index scores were calculated for each group by assigning a score of 10 if the recommended food group intake was met. Intakes below the recommended level were scored proportionally less. For example, if the maximum serving size of a food group was 4 and the child consumed 3 servings, they would receive a score of 7.5. For food groups where a lower intake was recommended (i.e., meat/fish/eggs, oils/fats and sweets), reverse scoring was applied and a score of 0 was assigned for intakes ≥200% the upper recommended limit. Serving recommendations for each food group and the assignment of sub-index scores were based on participant-specific criteria. The HC sub-Index scores were calculated on the basis of Health Canada's daily serving recommendations

for males and female children aged 9 to 13 (Figure 3). The DASH sub-Index scores were calculated on the basis of the study participants' daily estimated energy requirements (EERs) and the DASH trial's daily serving recommendations for one of four predefined EER levels (Figure 4). In brief, EERs were calculated for each participant on the basis of age, gender and total PA using Health Canada's EER equations (Figure 5, Appendix F). The PA coefficients used in the calculation of the EERs were gender-specific and assigned according to quartile of total PA. DASH serving recommendations used in the calculation of DASH sub-Index scores were EER-specific, where EERs of <1800, $\geq$ 1800 < 2300, $\geq$ 2300 < 2850, and $\geq$ 2850 kcal/day corresponded to the DASH trial's serving recommendations for four predefined daily energy intake levels of 1600, 2000, 2600 and 3100 kcal/day, respectively.[172] After the lower, upper and average DASH and HC sub-Index scores were calculated, each sub-Index score was summed to produce final lower, upper and average DASH and HC Index scores. Specifically, each of the eight lower, upper and average DASH sub-Index scores were summed to produce final lower, upper and average DASH Index scores (Ranges: 0-80) and each of the six lower, upper and average HC sub-Index scores were summed to produce final lower, upper and average HC Index scores (Ranges: 0-60). For a summary of the scoring guidelines used in the calculation of the DASH and the HC sub-Index scores, refer to Table 4 and Table 5, respectively.

Table 1. Categorization of food items assessed by the *HMS* Eating Survey into the food groups used in the calculation of the DASH Index score.

DASH Food Groups[172] *(n=8)*	Food Sub-Groups[177] (n=18)	Corresponding Food Items*[171] (n=150)
Fruits	Fruits	Raisins, grapes, bananas, cantaloupe/melons, apples/applesauce, pears, oranges/grapefruit, strawberries, peaches/plums/apricots (1.0).
	Fruit Juices	Orange juice, apple juice/other juice (grape juice, cranberry juice) (2.0).
Vegetables	Cruciferous Vegetables	Broccoli, coleslaw (1.0).
	Other Vegetables	String beans, beats, corn, mixed vegetables, spinach, greens/beet greens, green/red peppers, zucchini/summer squash/eggplant, carrots (cooked), carrots (raw), celery, lettuce/tossed salad (1.0); egg rolls, clear soup (with rice, noodles, vegetables) (0.5).
	Tomatoes	Tomatoes, tomato/spaghetti sauce, lasagna, spaghetti (1.0); pizza, salsa, tacos/burritos (0.5).
Grains	Bread/Cereal	Cold breakfast cereal, hot breakfast cereal, white bread/pita bread/toast, dark bread, English muffins/bagels, muffins, cornbread, biscuit/roll, tortilla, other (kasha/couscous/bulgur), pancakes/waffles, Graham crackers, tacos/burritos, sandwiches (peanut butter, chicken/turkey, roast beef/ham, salami/bologna/other deli meat, tuna, grilled cheese, fish), hamburgers, cheeseburgers, hotdogs (1.0); French toast, pizza (2.0); egg rolls, clear soup (with rice, noodles, vegetables) (0.5).
	Salty Snacks	Potato chips, corn chips/Doritos, nachos with cheese, popcorn, pretzels, crackers (saltines, wheat thins) (1.0).
	Pasta and Rice	Rice, spaghetti, lasagna, macaroni and cheese, noodles/pasta (1.0).
	Potatoes	French fries (large order) (2.0); potatoes (baked, boiled, mashed), yams/sweet potatoes, potato salad (1.0).
Dairy	Milk and Products	Milk, chocolate milk, milkshake/frappe, yogurt (1.0); cream (milk) soups/chowder (0.5); French toast (0.75).
	Cheese	Pizza (2.0); cheese, cottage/Ricotta cheese, cream cheese, macaroni and cheese, grilled cheese sandwiches (1.0); nachos with cheese (0.5).
Meats/Fish/Eggs	Meats/Fish/Eggs	Hamburgers, cheeseburgers, hotdogs, chicken nuggets, sandwiches (chicken/turkey, roast beef/ham, salami/bologna/other deli meat sandwich, tuna), fish sticks/fish cakes/fish sandwich, main dishes (chicken/turkey, fresh fish, beef (steak, roast)/lamb, pork/ham), meatballs/meatloaf, eggs, liver (beef/calf/chicken/pork), shrimp/lobster/scallops, tacos/burritos, French toast (1.0).
Legumes/Seeds/Nuts	Legumes/Seeds/Nuts	Beans/lentils/soybeans, peas or lima beans, tofu, peanuts/nuts, peanut butter sandwich (1.0); tacos/burritos (0.5).

Table 1 (cont'd)

Oils/Fats	Oils/Fats	Butter, margarine, whipped cream, brown gravy, salad dressing, mayonnaise (1.0); low calorie/fat salad dressing (0.5); French fries (large order) (2.0); potato salad, tuna sandwich, fish sticks/fish cakes/fish sandwich, fresh fish (0.25).
Sweets	Pastry	Pop tarts, cake, snack cakes/Vachon Cakes, Danish/sweet rolls, donuts, cookies, brownies, pie (1.0).
	Sweets	Fun fruit/fruit rollups, chocolate (Hershey's, &M's), candy bars (Milky Way, Snickers), non-chocolate candy (Skittles), Jello, puddings, frozen yoghurt, ice cream, popsicles (1.0); ketchup (0.25).
	Soft Drinks	Diet pop, pop (1.0).
	Sweetened Beverages	Hawaiian Punch/Lemonade/Koolaid/other noncarbonated fruit drink, Iced Tea (sweetened), chocolate milk, milkshake/frappe (1.0).

* The values in parentheses indicate the weighting factors that were used in the calculation of the DASH Index score for food items that contributed to more than one food category or recommended serving size. Weighting factors were established *a priori* according to the serving size guidelines of the DASH trial (Figure 4). For mixed dishes, weighting factors were applied according to the methods of Liese and colleagues.[177] Where no guidelines were available, weighting factors were applied according to the standard ingredients used in the preparation of these dishes. For example, since one egg is used in the preparation of two slices of French Toast on average and one egg constitutes one Meats/Fish/Eggs serving according to the DASH trial's recommendations, a weighting factor of 1.0 was applied to French Toast under the Meats/Fish/Eggs category.

Table 2. Categorization of food items assessed by the *HMS* Eating Survey into the food groups used in the calculation of the HC Index score.

HC Food Groups[175] *(n=4)*	Food Sub-Groups[177] *(n=18)*	Corresponding Food Items*[171] *(n=150)*
Vegetables and Fruits	Fruits	Raisins, grapes, bananas, cantaloupe/melons, apples/applesauce, pears, oranges/grapefruit, strawberries, peaches/plums/apricots (1.0).
	Fruit Juices	Orange juice, apple juice/other juice (grape juice, cranberry juice) (2.0).
	Cruciferous Vegetables	Broccoli, coleslaw (1.0).
	Other Vegetables	String beans, beats, corn, mixed vegetables, spinach, greens/beet greens, green/red peppers, zucchini/summer squash/eggplant, carrots (cooked), carrots (raw), celery, lettuce/tossed salad (1.0); egg rolls, clear soup (with rice, noodles, vegetables) (0.5).
	Tomatoes	Tomatoes, tomato/spaghetti sauce, lasagna, spaghetti (1.0); pizza, salsa, tacos/burritos (0.5).
Grain Products	Bread/Cereal	Cold breakfast cereal, hot breakfast cereal, white bread/pita bread/toast, dark bread, English muffins/bagels, muffins, cornbread, biscuit/roll, tortilla, other (kasha/couscous/bulgur), pancakes/waffles, Graham crackers, tacos/burritos, sandwiches (peanut butter, chicken/turkey, roast beef/ham, salami/bologna/other deli meat, tuna, grilled cheese, fish), hamburgers, cheeseburgers, hotdogs (1.0); French toast, pizza (2.0); egg rolls, clear soup (with rice, noodles, vegetables) (0.5).
	Salty Snacks	Potato chips, corn chips/Doritos, nachos with cheese, popcorn, pretzels, crackers (saltines, wheat thins) (1.0).
	Pasta and Rice	Rice, spaghetti, lasagna, macaroni and cheese, noodles/pasta (1.0).
	Potatoes	French fries (large order) (2.0); potatoes (baked, boiled, mashed), yams/sweet potatoes, potato salad (1.0).
Milk and Alternatives	Milk and Products	Milk, chocolate milk, milkshake/frappe (1.0); yogurt (1.33); cream (milk) soups/chowder (0.5); French toast (0.75).
	Cheese	Pizza (2.0); cheese, cottage/Ricotta cheese, cream cheese, macaroni and cheese, grilled cheese sandwiches (1.0); nachos with cheese (0.5).
Meats and Alternatives	Meats/Fish/Eggs	Hamburgers, cheeseburgers, hotdogs, chicken nuggets, sandwiches (chicken/turkey, roast beef/ham, salami/bologna/other deli meat sandwich, tuna), fish sticks/fish cakes/fish sandwich, main dishes (chicken/turkey, fresh fish, beef (steak, roast)/lamb, pork/ham), meatballs/meatloaf, liver (beef/calf/chicken/pork), shrimp/lobster/scallops, tacos/burritos (1.0); eggs, French toast (0.5).
	Legumes/Seeds/Nuts	Beans/lentils/soybeans, peas or lima beans, tofu, peanuts/nuts, peanut butter sandwich (1.0); tacos/burritos (0.5).

Table 2 (cont'd)

Miscellaneous δ (n=2)[172]		
Oils/Fats	Oils/Fats	Butter, margarine, whipped cream, brown gravy, salad dressing, mayonnaise (1.0); low calorie/fat salad dressing (0.5); French fries (large order) (2.0); potato salad, tuna sandwich, fish sticks/fish cakes/fish sandwich, fresh fish (0.25).
Sweets	Pastry	Pop tarts, cake, snack cakes/Vachon Cakes, Danish/sweet rolls, donuts, cookies, brownies, pie (1.0).
	Sweets	Fun fruit/fruit rollups, chocolate (Hershey's, &M's), candy bars (Milky Way, Snickers), non-chocolate candy (Skittles), Jello, puddings, frozen yoghurt, ice cream, popsicles (1.0); ketchup (0.25).
	Soft Drinks	Diet pop, pop (1.0).
	Sweetened Beverages	Hawaiian Punch/Lemonade/Koolaid/other noncarbonated fruit drink, Iced Tea (sweetened), chocolate milk, milkshake/frappe (1.0).

* The values in parentheses indicate the weighting factors that were used in the calculation of the HC Index score for food items that contributed to more than one food category or recommended serving size. Weighting factors were established *a priori* according to Health Canada's serving size guidelines (Figure 3). For mixed dishes, weighting factors were applied according to the methods of Liese and colleagues.[177] Where no guidelines were available, weighting factors were applied according to the standard ingredients used in the preparation of these dishes. For example, since one egg is used in the preparation of two slices of French Toast on average and two eggs constitute one Meats and Alternatives serving, a weighting factor of 0.5 was applied to French Toast under the Meats and Alternatives category.

δ Although oils/fats and sweets do not constitute individual food groups within Health Canada's Food Guide and no specific recommendations are made regarding their consumption, because there is evidence that these foods weigh heavily on the quality of dietary patterns,[19,97] they were included in the calculation of the HC Index score. Weighting factors for food items in these two categories were based on the DASH trial's serving size guidelines and scoring standards for food items in these two categories were based on the DASH trial's intake recommendations for a 2,000 kcal diet (Figure 4).

Table 3. Standardization summary of the *HMS* Eating Survey responses to represent servings per day/week values that were used in the calculation of the lower, upper and average DASH and HC Index scores.*

Original Eating Survey Response Option	SDE Range	Servings per Day Equivalent (SDE)			SWE Range	Servings per Week Equivalent (SWE)		
		Lower	Upper	Average		Lower	Upper	Average
Never/less than 1 serving per month	≥ 0.000 < 0.033	0.000	0.032	0.017	≥ 0.000 < 0.232	0.000	0.232	0.116
1 serving per month	0.033	0.033	0.033	0.033	0.233	0.233	0.233	0.233
1 - 3 servings per month	≥ 0.033 ≤ 0.100	0.033	0.100	0.067	≥ 0.233 < 0.700	0.233	0.700	0.467
2 - 3 servings per month	≥ 0.067 ≤ 0.100	0.067	0.100	0.083	≥ 0.467 < 0.700	0.467	0.700	0.583
1 serving per week	0.143	0.143	0.143	0.143	1.000	1.000	1.000	1.000
1 serving per week or less	≥ 0.000 < 0.143	0.000	0.143	0.071	≥ 0.000 < 1.000	0.000	1.000	0.500
1 serving per week or more	0.143	0.143	0.143	0.143	1.000	1.000	1.000	1.000
1 - 4 servings per week	≥ 0.143 ≤ 0.571	0.143	0.571	0.357	≥ 1.000 ≤ 4.000	1.000	4.000	2.500
1 - 6 servings per week	≥ 0.143 ≤ 0.857	0.143	0.857	0.500	≥ 1.000 ≤ 6.000	1.000	6.000	3.500
2 - 4 servings per week	≥ 0.286 ≤ 0.571	0.286	0.571	0.429	≥ 2.000 ≤ 4.000	2.000	4.000	3.000
2 - 6 servings per week	≥ 0.286 ≤ 0.857	0.286	0.857	0.572	≥ 2.000 ≤ 6.000	2.000	6.000	4.000
5 - 6 servings per week	≥ 0.714 ≤ 0.857	0.714	0.857	0.786	≥ 5.000 ≤ 6.000	5.000	6.000	5.500
5 - 7 servings per week	≥ 0.714 ≤ 1.000	0.714	1.000	0.857	≥ 5.000 ≤ 7.000	5.000	7.000	6.000
2 servings per week or more	0.286	0.286	0.286	0.286	2.000	2.000	2.000	2.000
5 servings per week or more	0.714	0.714	0.714	0.714	5.000	5.000	5.000	5.000
1 serving per day	1.000	1.000	1.000	1.000	7.000	7.000	7.000	7.000
1 serving per day or more	1.000	1.000	1.000	1.000	7.000	7.000	7.000	7.000
1 - 2 servings per day	≥ 1.000 ≤ 2.000	1.000	2.000	1.500	≥ 7.000 ≤ 14.000	7.000	14.000	10.500
2 servings per day or more	2.000	2.000	2.000	2.000	14.000	14.000	14.000	14.000
2 - 3 servings per day	≥ 2.000 ≤ 3.000	2.000	3.000	2.500	≥ 14.000 ≤ 21.000	14.000	21.000	17.500
2 - 4 servings per day	≥ 2.000 ≤ 4.000	2.000	4.000	3.000	≥ 14.000 ≤ 28.000	14.000	28.000	21.000
3 servings per day or more	3.000	3.000	3.000	3.000	21.000	21.000	21.000	21.000
4 servings per day or more	4.000	4.000	4.000	4.000	28.000	28.000	28.000	28.000
5 servings per day or more	5.000	5.000	5.000	5.000	35.000	35.000	35.000	35.000

* Thirty days per month were assumed in the calculation of serving per week/day equivalents.

Table 4. Scoring summary for the calculation of the DASH Index score based on the DASH trial's serving recommendations and four predefined daily energy intake requirement levels (1,600/2,000/2,600/3,100 kcal/day).[172,176]

		Predefined Energy Intake Levels							
		1,600 kcal		2,000 kcal		2,600 kcal		3,100 kcal	
DASH Food Group	Score Range	*MinScore*	*MaxScore*	*MinScore*	*MaxScore*	*MinScore*	*MaxScore*	*MinScore*	*MaxScore*
Fruits	0 - 10	0/day	≥4/day	0/day	≥4/day	0/day	≥5/day	0/day	≥6/day
Vegetables	0 - 10	0/day	≥3/day	0/day	≥4/day	0/day	≥5/day	0/day	≥6/day
Grains	0 - 10	0/day	≥6/day	0/day	≥6/day	0/day	≥10/day	0/day	≥12/day
Dairy	0 - 10	0/day	≥2/day	0/day	≥2/day	0/day	≥3/day	0/day	≥3/day
Meat/Fish/Eggs	0 - 10	≥12/day	≤6/day	≥12/day	≤6/day	≥12/day	≤6/day	≥18/day	≤9/day
Legumes/Seeds/Nuts	0 - 10	0/wk	≥3/wk	0/wk	≥4/wk	0/wk	≥7/wk	0/wk	≥7/wk
Oils/Fats	0 - 10	≥4/day	≤2/day	≥6/day	≤3/day	≥6/day	≤3/day	≥8/day	≤4/day
Sweets	0 - 10	≥7/wk	0/wk	≥10/wk	≤5/wk	≥28/wk	≤14/wk	≥28/wk	≤14/wk

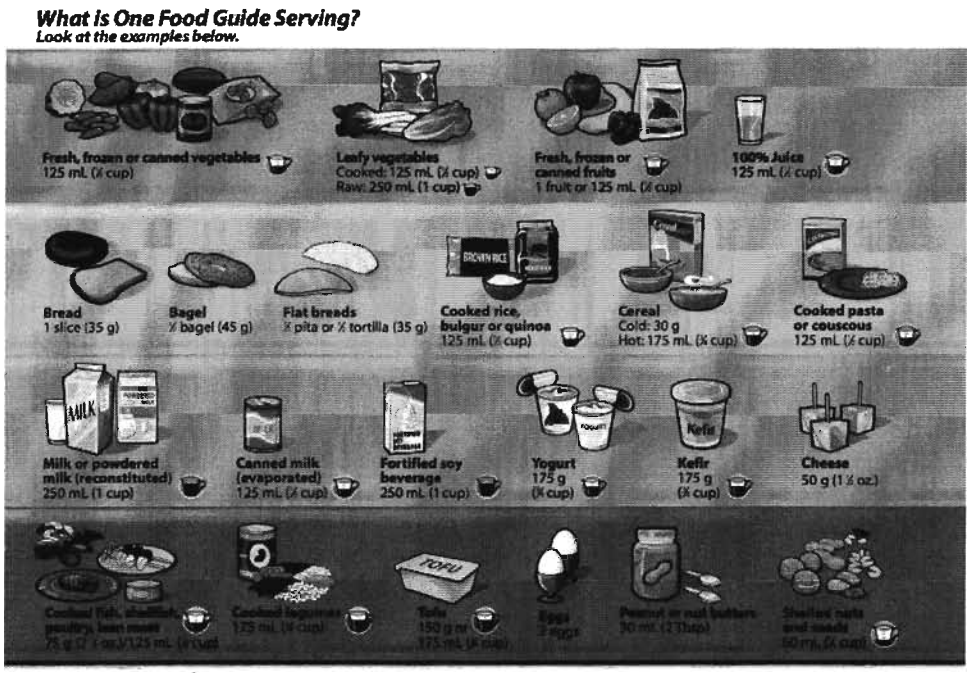
MinScore: Serving standard for minimum score; MaxScore: Serving standard for maximum score. Intakes between the maximum and minimum score serving guidelines were scored proportionally.

Table 5. Scoring summary for the calculation of the HC Index scores based on Health Canada's Food Guide recommendations for males and females, aged 9 to 13.[175]

		Serving Standard †	
HC Food Groups	Score Range	*MinScore*	*MaxScore*
Vegetables and Fruits	0 - 10	0/day	≥6/day
Grain Products	0 - 10	0/day	≥6/day
Milk Alternatives	0 - 10	0/day	≥3/day
Meat Alternatives	0 - 10	0/day	≥1/day
Oils/Fats δ	0 - 10	≥6/day	≤3/day
Sweets δ	0 - 10	≥10/wk	≤5/wk

† MinScore: Serving standard for minimum score; MaxScore: Serving standard for maximum score. Intakes between the maximum and minimum score serving guidelines were scored proportionally.

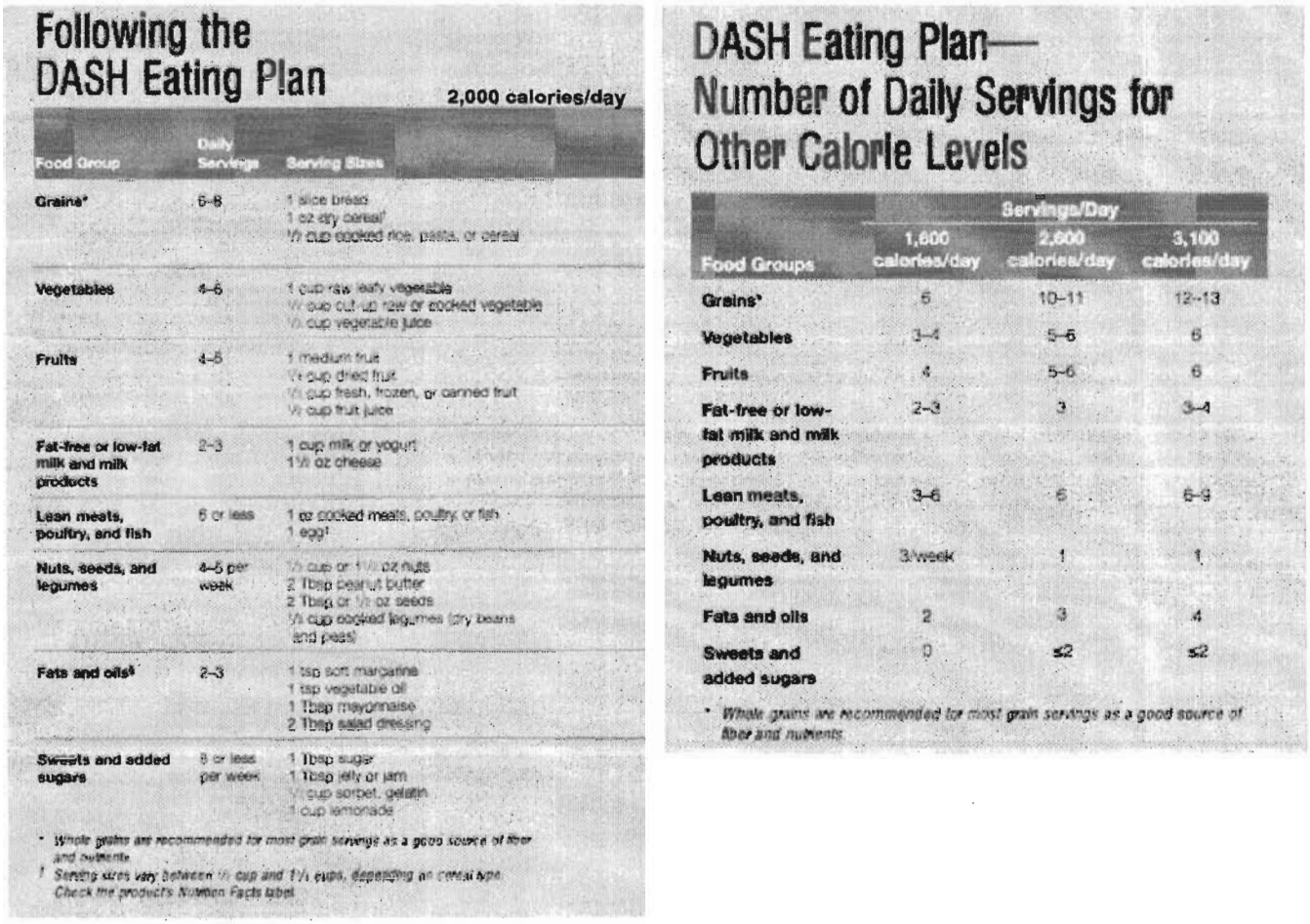
δ Other than limiting consumption, no specific recommendations are made by Health Canada regarding the consumption of oils/fats and sweets. As such, scoring for oils/fats and sweets are based on the DASH trial's intake recommendations for a 2,000 kcal diet (Figure 4).



Recommended Number of Food Guide Servings per Day

	Children			Teens		Adults			
Age in Years	2-3	4-8	9-13	14-18		19-50		51+	
Sex	Girls and Boys			Females	Males	Females	Males	Females	Males
Vegetables and Fruit	4	5	6	7	8	7-8	8-10	7	7
Grain Products	3	4	6	6	7	6-7	8	6	7
Milk and Alternatives	2	2	3-4	3-4	3-4	2	2	3	3
Meat and Alternatives	1	1	1-2	2	3	2	3	2	3

Figure 3. Health Canada's serving size guidelines and daily intake recommendations.[175]



Following the DASH Eating Plan

2,000 calories/day

Food Group	Daily Servings	Serving Sizes
Grains*	6–8	1 slice bread 1 oz dry cereal† ½ cup cooked rice, pasta, or cereal
Vegetables	4–5	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice
Fruits	4–5	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice
Fat-free or low-fat milk and milk products	2–3	1 cup milk or yogurt 1½ oz cheese
Lean meats, poultry, and fish	6 or less	1 oz cooked meats, poultry, or fish 1 egg†
Nuts, seeds, and legumes	4–5 per week	⅓ cup or 1½ oz nuts 2 Tbsp peanut butter 2 Tbsp or ½ oz seeds ½ cup cooked legumes (dry beans and peas)
Fats and oils‡	2–3	1 tsp soft margarine 1 tsp vegetable oil 1 Tbsp mayonnaise 2 Tbsp salad dressing
Sweets and added sugars	5 or less per week	1 Tbsp sugar 1 Tbsp jelly or jam ½ cup sorbet, gelatin 1 cup lemonade

* *Whole grains are recommended for most grain servings as a good source of fiber and nutrients.*

† *Serving sizes vary between ½ cup and 1½ cups, depending on cereal type. Check the product's Nutrition Facts label.*

DASH Eating Plan— Number of Daily Servings for Other Calorie Levels

Food Groups	Servings/Day		
	1,600 calories/day	2,600 calories/day	3,100 calories/day
Grains*	6	10–11	12–13
Vegetables	3–4	5–6	6
Fruits	4	5–6	6
Fat-free or low-fat milk and milk products	2–3	3	3–4
Lean meats, poultry, and fish	3–6	6	6–9
Nuts, seeds, and legumes	3/week	1	1
Fats and oils	2	3	4
Sweets and added sugars	0	≤2	≤2

* *Whole grains are recommended for most grain servings as a good source of fiber and nutrients.*

Figure 4. The DASH trial's serving size guidelines and daily intake recommendations for four predefined levels of daily energy intake.[172]

Appendix D[10]

Table 6. Child Family Eating Practice (FEP) Index score calculation summary.

Item	Description	Scoring Assignment	Scoring Range	
			Minimum Score	*Maximum Score*
1	Servings of sweet beverages consumed by child in a typical day.			
	≤1	0		
	2	1		
	3	2	0	4
	4	3		
	≥5	4		
2	Frequency child eats traditional fast food in a typical week.			
	≤1	0		
	2	1		
	3	2	0	4
	4	3		
	≥5	4		
3	Frequency child eats snacks/sweets without parental permission.			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
4	Frequency child buys his/her own snacks/sweets.			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
5	Does child claim to be hungry when asking for snacks/sweets?			
	Yes	0	0	1
	No	1		

Table 6 cont'd

6	Parental response when child not hungry at mealtime.			
	Irrelevant (child is always hungry)	0		
	Eat later	1		
	Sit at table and not eat	2	0	4
	Sit at table and eat less	3		
	Convince to eat	4		
7	Compared to people your age, how fast do you eat? Child			
	Slow	0		
	Average	1	0	2
	Fast	2		
8	How often do you ask for a second helping? Child			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
9	How often do you/your spouse eat breakfast with the child?			
	Always	0		
	Frequently	1		
	Sometimes	2	0	4
	Almost never	3		
	Never	4		
10	How often do you/your spouse eat lunch with the child?			
	Always	0		
	Frequently	1		
	Sometimes	2	0	4
	Almost never	3		
	Never	4		
11	How often do you/your spouse eat an afternoon snack with the child?			
	Always	0		
	Frequently	1		
	Sometimes	2	0	4
	Almost never	3		
	Never	4		

Table 6 cont'd

12	How often do you/your spouse eat dinner with the child?			
	Always	0		
	Frequently	1		
	Sometimes	2	0	4
	Almost never	3		
	Never	4		
13	How often do you eat while standing? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
14	How often do you eat straight from the pot/pan/bowl? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
15	How often do you eat while watching television/reading/working? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
16	How often do you eat when bored? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
17	How often do you eat when angry/in a negative mood? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
18	How often do you eat in a disordered way between meals? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		

Table 6 cont'd

19	How often do you eat late in the evening or at night? Child			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
20	How often do you eat in the living room/TV room? Child			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
21	How often do you eat in the bedroom? Child			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
22	How often do you eat in the study? Child			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
		CHILD FEP INDEX SCORE RANGE:		**0 to 76**

Table 7. Mother Family Eating Practice (FEP) Index score calculation summary.

Item	Description	Scoring Assignment	Scoring Range	
			Minimum Score	*Maximum Score*
1	When mealtime and you are not hungry what do you do? Mother			
	Never happens	0		
	Not eat	1	0	3
	Eat less	2		
	Eat the same	3		
2	Compared to people your age, how fast do you eat? Mother			
	Slow	0		
	Average	1	0	2
	Fast	2		
3	How often do you ask for a second helping? Mother			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
4	How often do you eat while standing? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
5	How often do you eat straight from the pot/pan/bowl? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
6	How often do you eat while watching television/reading/working? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		

Table 7 cont'd

7	How often do you eat when bored? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
8	How often do you eat when angry/in a negative mood? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
9	How often do you eat in a disordered way between meals? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
10	How often do you eat late in the evening or at night? Mother			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
11	How often do you eat in the living room/TV room? Mother			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
12	How often do you eat in the bedroom? Mother			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		

Table 7 cont'd

13	How often do you eat in the study? Mother			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
	MOTHER FEP INDEX SCORE RANGE:		**0 to 42**	

Table 8. Father Family Eating Practice (FEP) Index score calculation summary.

Item	Description	Scoring Assignment	Scoring Range	
			Minimum Score	*Maximum Score*
1	When mealtime and you are not hungry what do you do? Father			
	Never happens	0		
	Not eat	1	0	3
	Eat less	2		
	Eat the same	3		
2	Compared to people your age, how fast do you eat? Father			
	Slow	0		
	Average	1	0	2
	Fast	2		
3	How often do you ask for a second helping? Father			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
4	How often do you eat while standing? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
5	How often do you eat straight from the pot/pan/bowl? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
6	How often do you eat while watching television/reading/working? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		

Table 8 cont'd

7	How often do you eat when bored? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
8	How often do you eat when angry/in a negative mood? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
9	How often do you eat in a disordered way between meals? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
10	How often do you eat late in the evening or at night? Father			
	Never	0		
	Sometimes	1	0	3
	Frequently	2		
	Always	3		
11	How often do you eat in the living room/TV room? Father			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
12	How often do you eat in the bedroom? Father			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		

Table 8 cont'd

13	How often do you eat in the study? Father			
	Never	0		
	Almost never	1		
	Sometimes	2	0	4
	Frequently	3		
	Always	4		
	FATHER FEP INDEX SCORE RANGE:		**0 to 42**	

Appendix E

Table 9. Characteristics of the study population, by gender.

	Females (n=1,191)		Males (n=1,223)		
	N	Mean (SD)[1]	N	Mean (SD)[1]	p-value[2]
Body Composition Variables					
BMI (kg/m^2)	851	20.34 (4.13)	870	20.36 (4.08)	0.9096
Waist-to-height ratio	849	0.46 (0.06)	867	0.47 (0.07)	***0.0027***
Waist-to-hip ratio	844	0.90 (0.06)	864	0.93 (0.07)	***<0.0001***
Waist Girth	849	71.01 (10.62)	867	72.19 (11.30)	***0.0262***
Hip Girth	851	79.28 (10.14)	874	77.83 (10.19)	***0.0032***
Family Eating Practice (FEP) Index Scores					
Child FEP Index Score [Range: 0-76]	345	24.22 (5.94)	329	24.46 (6.46)	0.6218
Mother FEP Index Score [Range: 0-42]	361	11.02 (3.93)	356	10.85 (3.75)	0.5443
Father FEP Index Score [Range: 0-42]	311	12.20 (4.38)	294	11.90 (4.13)	0.3901
Dietary Pattern Variables					
DASH Index Scores [Range: 0-80]					
Lower DASH Index Score	824	44.60 (9.50)	839	44.51 (9.48)	0.8382
Upper DASH Index Score	824	59.68 (8.38)	839	59.23 (8.16)	0.2740
Average DASH Index Score	824	52.64 (8.95)	839	52.48 (8.75)	0.7094
HC Index Scores [Range: 0-60]					
Lower HC Index Score	1011	34.92 (8.39)	1070	35.80 (8.41)	***0.0175***
Upper HC Index Score	1011	48.89 (5.44)	1070	47.94 (5.26)	***<0.0001***
Average HC Index Score	1011	43.00 (6.10)	1070	42.77 (6.03)	0.3887

Table 9 cont'd

Nutrient Intake Variables					
Carbohydrates (g/day)	1006	294.40 (144.08)	1066	322.61 (159.84)	***<0.0001***
Protein (g/day)	1009	79.40 (38.39)	1064	86.58 (42.13)	***<0.0001***
Total fat (g/day)	1007	69.38 (34.83)	1065	78.51 (40.25)	***<0.0001***
Saturated Fat (g/day)	1007	25.79 (13.04)	1066	29.24 (14.89)	***<0.0001***
Monounsaturated fat (g/day)	1007	24.21 (12.56)	1065	27.78 (14.63)	***<0.0001***
Polyunsaturated fat (g/day)	1005	12.86 (6.64)	1062	14.11 (7.63)	***<0.0001***
Trans fat (g/day)	1007	2.99 (1.75)	1064	3.50 (2.03)	***<0.0001***
Calcium (mg/day)	1011	1314.61 (702.67)	1067	1418.27 (748.09)	***0.0012***
Iron (mg/day)	1009	16.48 (8.95)	1065	17.85 (9.87)	***0.0009***
Magnesium (mg/day)	1007	293.14 (144.16)	1065	314.92 (158.53)	***0.0011***
Phosphorus (mg/day)	1010	1525.04 (759.44)	1066	1662.94 (821.75)	***<0.0001***
Potassium (mg/day)	1007	3124.92 (1537.97)	1066	3300.31 (1655.83)	***0.0125***
Vitamin C (mg/day)	1007	152.34 (94.45)	1068	152.75 (101.16)	0.9237
Vitamin A (IU/day)	1006	9882.17 (6554.61)	1061	9444.24 (6218.80)	0.1192
Vitamin D (IU/day)	1011	329.83 (205.11)	1069	368.36 (225.15)	***<0.0001***
Vitamin E (mg/day)	1008	7.50 (4.16)	1064	7.85 (4.36)	0.0619
Folate (DFE/day)[3]	1008	679.53 (369.49)	1067	735.92 (415.66)	***0.0011***
Covariates					
Total Physical Activity [Range: 0-64]	845	14.76 (6.31)	870	15.20 (6.36)	0.1435
Age to Peak Height Velocity (years)	830	2.78 (0.38)	840	2.99 (0.50)	***<0.0001***
Birth Order	845	2.05 (1.53)	868	2.14 (1.69)	0.2256
Parental BMI (kg/m^2)	415	24.53 (5.00)	450	24.38 (4.63)	0.6468
		No. (%)[4]		**No. (%)[4]**	
Age (years)[5]					
≤ 11		980 (96.93)		1026 (95.89)	0.2393
>11		31 (3.07)		44 (4.11)	
Parental Education					
College or less		377 (79.70)		394 (79.60)	1.0000
University		96 (20.30)		101 (20.40)	

Table 9 cont'd

Marital Status			
Two-parent household	387 (84.13)	418 (84.79)	0.7890
Single-parent household	73 (15.87)	75 (15.21)	
Body Composition Variables			
BMI Group[6]			
Non-overweight	541 (64.25)	542 (63.10)	0.6500
Overweight	301 (35.75)	317 (36.90)	

[1] Mean (Standard Deviation)

[2] P values were calculated for continuous variables using the *Student t* test and for dichotomous variables using the *Fisher Exact* test (***P<0.05***).

[3] DFE (Dietary Folate Equivalents)

[4] To calculate the sample size on which each cell is based divide the frequency of interest by the proportion in brackets. For example, the number of overweight female participants was based on 301/ 0.3575 = 842 individuals.

[5] Because the X^2 assumption of having an expected cell count of >5 was violated when examining age as a categorical variable, age was dichotomized into groups of participants ≤11 and >11 years of age and the p-value was calculated using the *Fisher Exact* test. Refer to Table 1 for a detailed summary of the age distribution of the study population.

[6] BMI cut-offs were age and gender-specific and corresponded to the widely used cut off point of 25 kg/m^2 for adult overweight.[3] Refer to Appendix G for the age and gender-specific cut-offs used in the categorization of participants into BMI groups.

Table 10. Characteristics of the study population, by excluded and included participants.

	Included Participants[1] (n=2,414)		Excluded Participants[1] (n=108)		
	N	Mean (SD)[2]	N	Mean (SD)[2]	p-value[3]
Body Composition Variables					
BMI (kg/m^2)	1721	20.35 (4.11)	0	-	-
Waist-to-height ratio	1716	0.46 (0.07)	0	-	-
Waist-to-hip ratio	1708	0.91 (0.07)	0	-	-
Waist Girth	1716	71.61 (10.98)	0	-	-
Hip Girth	1725	78.54 (10.19)	0	-	-
Family Eating Practice (FEP) Index Scores					
Child FEP Index Score [Range: 0-76]	674	24.34 (6.20)	0	-	-
Mother FEP Index Score [Range: 0-42]	717	10.94 (3.84)	0	-	-
Father FEP Index Score [Range: 0-42]	605	12.06 (4.26)	0	-	-
Dietary Pattern Variables					
DASH Index Scores [Range: 0-80]					
Lower DASH Index Score	1663	44.55 (9.48)	0	-	-
Upper DASH Index Score	1663	59.45 (8.27)	0	-	-
Average DASH Index Score	1663	52.56 (8.84)	0	-	-
HC Index Scores [Range: 0-60]					
Lower HC Index Score	2081	35.37 (8.41)	108	34.74 (8.80)	0.4456
Upper HC Index Score	2081	48.40 (5.37)	108	47.89 (6.23)	0.4005
Average HC Index Score	2081	42.88 (6.06)	108	42.17 (6.70)	0.2368
Nutrient Intake Variables					
Carbohydrates (g/day)	2072	308.91 (153.01)	106	320 .45 (172.02)	0.4516
Protein (g/day)	2073	83.09 (40.50)	106	87.81 (52.51)	0.3634
Total fat (g/day)	2072	74.07 (37.98)	104	75.32 (41.82)	0.7454
Saturated Fat (g/day)	2073	27.57 (14.13)	106	28.20 (16.81)	0.7048
Monounsaturated fat (g/day)	2072	26.05 (13.78)	104	26.79 (15.35)	0.5938
Polyunsaturated fat (g/day)	2067	13.50 (7.19)	104	14.27 (7.96)	0.2878

Table 10 cont'd

Trans fat (g/day)	2071	3.25 (1.92)	105	3.44 (2.18)	0.3359
Calcium (mg/day)	2078	1367.84 (728.02)	107	1295.96 (780.92)	0.3211
Iron (mg/day)	2074	17.18 (9.45)	106	17.51 (10.76)	0.7302
Magnesium (mg/day)	2073	304.34 (152.07)	106	312.22 (171.71)	0.6053
Phosphorus (mg/day)	2076	1595.85 (794.86)	106	1583.24 (887.04)	0.8742
Potassium (mg/day)	2073	3215.11 (1601.68)	106	3220.25 (1746.29)	0.9744
Vitamin C (mg/day)	2075	152.55 (97.94)	107	155.59 (104.88)	0.7550
Vitamin A (IU/day)	2067	9657.38 (6386.65)	107	10028.60 (6776.41)	0.5590
Vitamin D (IU/day)	2080	349.63 (216.45)	107	305.79 (218.35)	***0.0412***
Vitamin E (mg/day)	2072	7.68 (4.26)	105	7.85 (4.32)	0.7047
Folate (DFE/day)[4]	2075	708.53 (394.82)	107	715.35 (435.48)	0.8624
Covariates					
Total Physical Activity [Range: 0-64]	1715	14.98 (6.34)	0	-	-
Age to Peak Height Velocity (years)	1670	2.88 (0.46)	0	-	-
Birth Order	1713	2.09 (1.61)	0	-	-
Parental BMI (kg/m^2)	865	24.45 (4.81)	0	-	-
		No. (%)[5]		**No. (%)[5]**	
Parental Education					
College or less		771 (79.65)		-	-
University		197 (20.35)		-	-
Marital Status					
Two-parent household		805 (84.47)		-	-
Single-parent household		148 (15.53)		-	-

[1] Participants without gender data were excluded from the study. All others were included.
[2] Mean (Standard Deviation)
[3] P values were calculated for continuous variables using the *Student t* test and for dichotomous variables using the *Fisher Exact* test (***P<0.05)***.
[4] DFE (Dietary Folate Equivalents)
[5] To calculate the sample size on which each cell is based, divide the frequency of interest by the proportion in brackets. For example, the number of included participants that come from a two-parent household was based on 805/ 0.8447 = 953 individuals.

Table 11. Characteristics of the study population, by participants with and without complete covariate data.

	Participants *with* Complete Covariate Data[1] (*n=782*)		Participants *without* Complete Covariate Data[1] (*n=1632*)		
	N	Mean (SD)[2]	N	Mean (SD)[2]	p-value[3]
Body Composition Variables					
BMI (kg/m^2)	782	20.01 (4.05)	939	20.63 (4.13)	***0.0017***
Waist-to-height ratio	778	0.46 (0.06)	938	0.47 (0.07)	***0.0124***
Waist-to-hip ratio	778	0.91 (0.07)	930	0.91 (0.07)	0.7642
Waist Girth	778	70.72 (10.43)	938	72.34 (11.37)	***0.0022***
Hip Girth	778	77.63 (9.86)	947	79.30 (10.40)	***0.0007***
Family Eating Practice (FEP) Index Scores					
Child FEP Index Score [Range: 0-76]	276	23.74 (5.95)	398	24.75 (6.33)	***0.0377***
Mother FEP Index Score [Range: 0-42]	304	10.78 (3.58)	413	11.05 (4.01)	0.3415
Father FEP Index Score [Range: 0-42]	247	12.12 (4.08)	358	12.01 (4.38)	0.7604
Dietary Pattern Variables					
DASH Index Scores [Range: 0-80]					
Lower DASH Index Score	782	44.74 (9.34)	881	44.38 (9.61)	0.4390
Upper DASH Index Score	782	59.58 (8.21)	881	59.34 (8.32)	0.5546
Average DASH Index Score	782	52.70 (8.74)	881	52.43 (8.94)	0.5262
HC Index Scores [Range: 0-60]					
Lower HC Index Score	782	35.30 (8.27)	1299	35.42 (8.50)	0.7532
Upper HC Index Score	782	48.73 (5.33)	1299	48.20 (5.38)	***0.0285***
Average HC Index Score	782	42.99 (5.97)	1299	42.81 (6.12)	0.5111
Nutrient Intake Variables					
Carbohydrates (g/day)	782	299.58 (146.98)	1290	314.57 (156.34)	***0.0306***
Protein (g/day)	781	81.92 (38.48)	1292	83.80 (41.67)	0.2977
Total fat (g/day)	782	72.32 (37.07)	1290	75.14 (38.49)	0.1017
Saturated Fat (g/day)	781	27.07 (14.00)	1292	27.87 (14.20)	0.2112
Monounsaturated fat (g/day)	782	25.39 (13.33)	1290	26.44 (14.03)	0.0917

Table 11 cont'd

Polyunsaturated fat (g/day)	781	13.04 (6.83)	1286	13.78 (7.39)	***0.0195***
Trans fat (g/day)	781	3.16 (1.85)	1290	3.31 (1.95)	0.0778
Calcium (mg/day)	782	1367.51 (727.88)	1296	1368.04 (728.38)	0.9873
Iron (mg/day)	782	17.01 (9.23)	1292	17.28 (9.59)	0.5193
Magnesium (mg/day)	782	298.97 (146.15)	1291	307.59 (155.51)	0.2112
Phosphorus (mg/day)	782	1573.78 (768.11)	1294	1609.19 (810.59)	0.3255
Potassium (mg/day)	782	3183.43 (1569.09)	1291	3234.31 (1621.41)	0.4834
Vitamin C (mg/day)	782	151.69 (97.47)	1293	153.07 (98.25)	0.7550
Vitamin A (IU/day)	779	9791.02 (6401.69)	1288	9576.55 (6378.66)	0.4595
Vitamin D (IU/day)	782	359.76 (222.77)	1298	343.53 (212.40)	0.0975
Vitamin E (mg/day)	781	7.64 (4.22)	1291	7.71 (4.29)	0.7128
Folate (DFE/day)[4]	780	698.45 (379.50)	1295	714.60 (403.80)	0.3670

[1] Covariates included age to peak height velocity, total physical activity, birth order, parental BMI, parental education and marital status.
[2] Mean (Standard Deviation)
[3] P values were calculated using the *Student t* test ***(P<0.05)***.
[4] DFE (Dietary Folate Equivalents)

Table 12a. Regressions of the Child Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants before adjustment (Model 1).

	Child FEP Index Score Model 1							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	273	0.0944	0.0177/0.1710	***0.0160***	293	0.2035	0.1209/0.2862	***<0.0001***
Waist-to-height ratio	273	0.0015	0.0002/0.0028	***0.0233***	293	0.0032	0.0019/0.0045	***<0.0001***
Waist-to-hip ratio	273	-0.0003	-0.0016/0.0009	0.6087	293	0.0010	-0.0004/0.0023	0.1733
Waist Girth	273	0.3075	0.0936/0.5215	***0.0050***	293	0.5417	0.3250/0.7584	***<0.0001***
Hip Girth	273	0.3561	0.1598/0.5525	***0.0004***	293	0.5161	0.3092/0.7230	***<0.0001***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	260	-0.1209	-0.3072/0.0655	0.2026	287	-0.1142	-0.3001/0.0718	0.2280
Upper DASH Index Score	260	-0.2191	-0.3767/-0.0614	***0.0066***	287	-0.2600	-0.4263/-0.0938	***0.0023***
Average DASH Index Score	260	-0.01546	-0.3258/0.0167	0.0768	287	-0.2020	-0.3795/-0.0244	***0.0259***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	309	0.0098	-0.1364/0.1559	0.8955	334	-0.06936	-0.2154/0.0767	0.3509
Upper HC Index Score	309	-0.1491	-0.2401/-0.0582	***0.0014***	334	-0.1816	-0.2774/-0.0858	***0.0002***
Average HC Index Score	309	-0.0728	-0.1754/0.0298	0.1635	334	-0.1445	-0.2525/-0.0366	***0.0088***
Nutrient Intake Variables								
Carbohydrates (g/day)	309	3.17	0.3817/5.9588	***0.0260***	334	2.4107	-0.0654/4.8868	0.0563
Protein (g/day)	308	0.6037	-0.1348/1.3422	0.1087	334	0.0912	-0.5771/0.7574	0.7906
Total fat (g/day)	308	0.8968	0.2109/1.5826	***0.0106***	334	0.3109	-0.2925/0.9143	0.3115
Saturated Fat (g/day)	309	0.32256	0.0640/0.5811	***0.0146***	334	0.1132	-0.1147/0.3411	0.3293
Monounsaturated fat (g/day)	308	0.3299	0.0836/0.5762	***0.0088***	334	0.1389	-0.0791/0.3568	0.2108
Polyunsaturated fat (g/day)	308	0.1841	0.0488/0.3194	***0.0078***	334	0.03114	-0.0869/0.1491	0.6040
Trans fat (g/day)	309	0.0444	0.0098/0.0791	***0.0120***	334	0.0114	-0.0178/0.0405	0.4430
Calcium (mg/day)	309	2.4289	-11.1940/16.0519	0.7260	334	0.9269	-11.4571/13.3110	0.8830
Iron (mg/day)	309	0.0418	-0.1353/0.2188	0.6427	334	0.0880	-0.0746/0.2506	0.2877
Magnesium (mg/day)	309	1.3329	-1.5223/4.1881	0.3590	333	-0.3873	-2.8491/2.0745	0.7571
Phosphorus (mg/day)	309	8.1976	-6.5174/22.9125	0.2739	334	2.6995	-10.3375/15.7365	0.6840
Potassium (mg/day)	309	13.3956	-17.1390/43.9301	0.3887	333	-6.5334	-33.2126/20.1457	0.6303

Table 12a cont'd

Vitamin C (mg/day)	309	1.1961	-0.6652/3.0574	0.2070	333	0.4124	-1.3508/2.1757	0.6457
Vitamin A (IU/day)	308	28.4243	-86.4155/143.2641	0.6266	333	-137.1413	-254.2191/-20.0635	***0.0218***
Vitamin D (IU/day)	309	-1.0810	-5.1224/2.9603	0.5990	334	-0.6078	-4.2789/3.0633	0.7449
Vitamin E (mg/day)	309	0.0472	-0.0331/0.1274	0.2481	334	0.0331	-0.0436/0.1098	0.3960
Folate (DFE/day)*	309	2.1386	-5.2723/9.5496	0.5706	334	4.4545	-2.1198/11.0287	0.1835

* DFE (Dietary Folate Equivalents)

Table 12b. Regressions of the Child Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after partial adjustment (Model 2).

	Child FEP Index Score Model 2*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	260	0.0579	-0.0152/0.1309	0.1198	290	0.1320	0.0591/0.2048	***0.0004***
Waist-to-height ratio	260	0.0012	-0.0002/0.0025	0.0825	290	0.0018	0.0007/0.0029	***0.0009***
Waist-to-hip ratio	260	-0.0005	-0.0018/0.0008	0.4227	290	0.0003	-0.0010/0.0017	0.6561
Waist Girth	260	0.2027	0.0021/0.4034	***0.0477***	290	0.3865	0.1851/0.5879	***0.0002***
Hip Girth	260	0.2623	0.0741/0.4506	***0.0065***	290	0.4067	0.2041/0.6093	***<0.0001***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	260	-0.1172	-0.3060/0.0716	0.2228	287	-0.1034	-0.2928/0.0859	0.2831
Upper DASH Index Score	260	-0.2130	-0.3727/-0.0533	***0.0091***	287	-0.2473	-0.4164/-0.0781	***0.0043***
Average DASH Index Score	260	-0.1492	-0.3227/0.0244	0.0917	287	-0.1915	-0.3722/-0.0108	***0.0379***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	260	-0.0142	-0.1722/0.1437	0.8592	290	-0.0628	-0.2294/0.1038	0.4586
Upper HC Index Score	260	-0.1552	-0.2546/-0.0557	***0.0024***	290	-0.1692	-0.2810/-0.0574	***0.0031***
Average HC Index Score	260	-0.0836	-0.1926/0.0253	0.1319	290	-0.1489	-0.2747/-0.0230	***0.0206***
Nutrient Intake Variables								
Carbohydrates (g/day)	260	2.9190	-0.0753/5.9133	0.0560	290	1.3804	-1.3262/4.0869	0.3163
Protein (g/day)	259	0.5365	-0.2632/1.3361	0.1876	290	-0.1710	-0.8692/0.5273	0.6302
Total fat (g/day)	259	0.8836	0.1361/1.6311	***0.0207***	290	0.0896	-0.5656/0.7447	0.7881
Saturated Fat (g/day)	260	0.3401	0.0565/0.6237	***0.0189***	290	0.0288	-0.2236/0.2812	0.8224
Monounsaturated fat (g/day)	259	0.3334	0.0650/0.6018	***0.0151***	290	0.0716	-0.1643/0.3075	0.5506
Polyunsaturated fat (g/day)	259	0.1729	0.0260/0.3198	***0.0213***	290	-0.0146	-0.1401/0.1110	0.8195
Trans fat (g/day)	260	0.0505	0.0127/0.0882	***0.0090***	290	0.0038	-0.0281/0.0356	0.8167
Calcium (mg/day)	260	1.3870	-13.2708/16.0448	0.8523	290	-0.5621	-14.3517/13.2276	0.9361
Iron (mg/day)	260	0.0568	-0.1376/0.2512	0.5654	290	-0.0158	-0.1952/0.1635	0.8622
Magnesium (mg/day)	260	1.2021	-1.8632/4.2673	0.4407	290	-0.2486	-2.9008/2.4035	0.8537
Phosphorus (mg/day)	260	7.2978	-8.5331/23.1286	0.3648	290	-0.5465	-14.5503/13.4572	0.9388
Potassium (mg/day)	260	10.5614	-22.4409/43.5636	0.5291	290	-2.3399	-31.9433/27.263	0.8765

Table 12b cont'd

Vitamin C (mg/day)	260	1.0818	-0.9563/3.1199	0.2969	290	0.4292	-1.5904/2.4487	0.6761
Vitamin A (IU/day)	258	43.8096	-83.0999/170.7191	0.4972	290	-134.9383	-266.2015/-3.6700	***0.0440***
Vitamin D (IU/day)	260	-0.6474	-5.0876/3.7927	0.7742	290	-1.4953	-5.7-90/2.7184	0.4855
Vitamin E (mg/day)	260	0.0547	-0.0342/0.1436	0.2265	290	-0.0089	-0.0932/0.0754	0.8360
Folate (DFE/day)**	260	3.3712	-4.7656/11.5081	0.4153	290	0.8892	-6.3659/8.1442	0.8096

* Model 2: Adjusted for age to peak height velocity (aPHV).

** DFE (Dietary Folate Equivalents)

Table 12c. Regressions of the Child Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after partial adjustment (Model 3).

	Child FEP Index Score Model 3*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	260	0.0558	-0.0168/0.1285	0.1314	287	0.1255	0.0519/0.1990	***0.0009***
Waist-to-height ratio	260	0.0011	-0.0002/0.0024	0.0906	287	0.0018	0.0007/0.0028	***0.0014***
Waist-to-hip ratio	260	-0.0006	-0.0018/0.0007	0.3984	287	0.0002	-0.0011/0.0016	0.7222
Waist Girth	260	0.1972	-0.0025/0.3968	0.0529	287	0.3769	0.1730/0.5808	***0.0003***
Hip Girth	260	0.2588	0.0707/0.4469	***0.0072***	287	0.4012	0.1962/0.6063	***0.0001***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	260	-0.1069	-0.2907/0.0768	0.2529	287	-0.0848	-0.2684/0.0987	0.3636
Upper DASH Index Score	260	-0.2063	-0.3635/-0.0490	***0.0103***	287	-0.2366	-0.4039/-0.0693	***0.0057***
Average DASH Index Score	260	-0.1405	-0.3103/0.0292	0.1042	287	-0.1749	-0.3509/0.0010	0.0513
HC Index Scores [Range: 0-60]								
Lower HC Index Score	260	-0.0040	-0.1557/0.1477	0.9586	287	-0.0621	-0.2267/0.1025	0.4583
Upper HC Index Score	260	-0.1510	-0.2490/-0.0530	***0.0027***	287	-0.1726	-0.2839/-0.0613	***0.0025***
Average HC Index Score	260	-0.0765	-0.1810/0.0281	0.1509	287	-0.1475	-0.2717/-0.0233	***0.0201***
Nutrient Intake Variables								
Carbohydrates (g/day)	260	3.0367	0.0806/5.9928	***0.0441***	287	1.5026	-1.2139/4.2192	0.2772
Protein (g/day)	259	0.5728	-0.2127/1.3583	0.1522	287	-0.1433	-0.8438/0.5571	0.6874
Total fat (g/day)	259	0.9083	0.1650/1.6516	***0.0168***	287	0.0928	-0.5686/0.7543	0.7825
Saturated Fat (g/day)	260	0.3487	0.0669/0.6304	***0.0155***	287	0.0276	-0.2274/0.2827	0.8313
Monounsaturated fat (g/day)	259	0.3418	0.0748/0.6089	***0.0123***	287	0.0710	-0.1670/0.3090	0.5574
Polyunsaturated fat (g/day)	259	0.1780	0.0320/0.3240	***0.0171***	287	-0.0101	-0.1368/0.1166	0.8757
Trans fat (g/day)	260	0.0515	0.0139/0.0890	***0.0074***	287	0.0031	-0.0290/0.0352	0.8510
Calcium (mg/day)	260	2.1525	-12.145916.4510	0.7671	287	0.1241	-13.6331/13.8812	0.9858
Iron (mg/day)	260	0.0639	-0.1284/0.2562	0.5133	287	-0.0126	-0.1939/0.1688	0.8917
Magnesium (mg/day)	260	1.3524	-1.6476/4.3523	0.3755	287	-0.0356	-2.6733/2.6020	0.9788
Phosphorus (mg/day)	260	8.0972	-7.3736/23.5681	0.3037	287	0.2835	-13.711/14.2786	0.9682
Potassium (mg/day)	260	12.2815	-19.9154/44.4784	0.4532	287	-0.1277	-29.3747/29.1193	0.9931

Table 12c cont'd

Vitamin C (mg/day)	260	1.1652	-0.8442/3.1747	0.2545	287	0.5394	-1.4696/2.5484	0.5976
Vitamin A (IU/day)	258	49.4065	-75.2922/174.1052	0.4360	287	-116.4779	-244.9111/11.9554	0.0753
Vitamin D (IU/day)	260	-0.4213	-4.7586/3.9160	0.8485	287	-1.4672	-5.6983/2.7637	0.4954
Vitamin E (mg/day)	260	0.0582	-0.0295/0.1459	0.1922	287	-0.0044	-0.0894/0.0807	0.9196
Folate (DFE/day)**	260	3.6924	-4.3394/11.7243	0.3661	287	1.0488	-6.2554/8.3531	0.7777

* Model 3: Adjusted for age to peak height velocity (aPHV) and total physical activity.

** DFE (Dietary Folate Equivalents)

Table 12d. Regressions of the Child Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after complete adjustment (Model 4).

	Child FEP Index Score Model 4*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	143	-0.0141	-0.1148/0.0866	0.7824	133	0.1130	-0.0016/0.2276	***0.0533***
Waist-to-height ratio	143	0.0002	-0.0017/0.0020	0.8606	133	0.0013	-0.0005/0.0030	0.1591
Waist-to-hip ratio	143	-0.0004	-0.0021/0.0014	0.6711	133	0.0009	-0.0016/0.0035	0.4729
Waist Girth	143	0.0780	-0.1972/0.3532	0.5761	133	0.3142	-0.0134/0.6418	0.0600
Hip Girth	143	0.1123	-0.1510/0.3757	0.4003	133	0.2907	-0.0340/0.6154	0.0789
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	143	-0.0195	-0.2769/0.2378	0.8810	133	0.1145	-0.1965/0.4255	0.4677
Upper DASH Index Score	143	-0.1702	-0.3853/0.0449	0.1201	133	-0.0999	-0.3813/0.1816	0.4837
Average DASH Index Score	143	-0.0773	-0.3095/0.1549	0.5116	133	-0.0521	-0.3461/0.2420	0.7266
HC Index Scores [Range: 0-60]								
Lower HC Index Score	143	0.0531	-0.1587/0.2649	0.6211	133	0.0490	-0.2252/0.3232	0.7242
Upper HC Index Score	143	-0.1333	-0.2742/0.0077	0.0636	133	-0.0768	-0.2584/0.1047	0.4039
Average HC Index Score	143	-0.0546	-0.1995/0.0902	0.4570	133	-0.0820	-0.2869/0.1228	0.4294
Nutrient Intake Variables								
Carbohydrates (g/day)	143	3.2588	-0.8628/7.3804	0.1202	133	3.0802	-1.2672/7.4277	0.1633
Protein (g/day)	143	0.6824	-0.4108/1.7756	0.2192	133	0.2822	-0.8549/1.4193	0.6242
Total fat (g/day)	143	0.9939	-0.0770/2.0648	0.0686	133	0.2573	-0.7828/1.2975	0.6253
Saturated Fat (g/day)	143	0.3466	-0.0548/0.7480	0.0900	133	0.0717	-0.3406/0.4841	0.7312
Monounsaturated fat (g/day)	143	0.3835	0.0027/0.7643	***0.0484***	133	0.1078	-0.2582/0.4738	0.5611
Polyunsaturated fat (g/day)	143	0.1605	-0.0478/0.3688	0.1300	133	0.0522	-0.1500/0.2545	0.6101
Trans fat (g/day)	143	0.0525	0.0002/0.1048	***0.0492***	133	0.0097	-0.0392/0.0585	0.6961
Calcium (mg/day)	143	4.0540	-15.1662/23.2741	0.6772	133	10.6712	-13.2966//34.6389	0.3799
Iron (mg/day)	143	0.0776	-0.1962/0.3513	0.5761	133	0.0221	-0.2910/0.3351	0.8892
Magnesium (mg/day)	143	1.4628	-2.7200/5.6455	0.4904	133	1.8032	-2.6282/6.2346	0.4221
Phosphorus (mg/day)	143	9.0044	-11.6292/29.6381	0.3896	133	9.9243	-13.3656/33.2142	0.4006
Potassium (mg/day)	143	15.8283	-29.4484/61.1050	0.4905	133	31.1140	-18.4408/80.6687	0.2163

Table 12d cont'd

Vitamin C (mg/day)	143	2.1628	-0.5961/4.9217	0.1234	133	1.4453	-2.1730/5.0636	0.4307
Vitamin A (IU/day)	141	115.0900	-43.4859/273.6658	0.1535	133	-14.4025	-242.3134/213.5084	0.9007
Vitamin D (IU/day)	143	1.8890	-4.2311/8.0092	0.5426	133	2.7854	-4.6285/10.1994	0.4585
Vitamin E (mg/day)	143	0.0859	-0.0432/0.2151	0.1902	133	0.0426	-0.1047/0.1899	0.5680
Folate (DFE/day)**	143	2.9745	-8.2269/14.1758	0.6003	133	1.0248	-11.7909/13.8405	0.8745

* Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

** DFE (Dietary Folate Equivalents)

Table 13. Odds ratios (95% CIs) of overweight for quartiles of the Child Family Eating Practice (FEP) Index score by gender.*

	Child FEP Index Score Quartiles[1] (Q1 <20; Q2 ≥20<23; Q3 ≥23<28; Q4 ≥28)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	267	1.624	0.733/3.598	0.2322	1.289	0.629/2.640	0.4880	1.684	0.841/3.373	0.1413	293	2.738	1.172/6.394	***0.0199***	3.279	1.492/7.205	***0.0031***	4.054	1.764/9.319	***0.0010***
Model 2 §	260	1.444	0.608/3.430	0.4047	1.136	0.522/2.472	0.7472	1.384	0.650/2.945	0.3990	290	2.399	0.942/6.111	0.0666	3.359	1.400/8.059	***0.0066***	3.357	1.339/8.420	***0.0098***
Model 3 †	260	1.515	0.635/3.616	0.3494	1.115	0.509/2.442	0.7847	1.324	0.618/2.836	0.4700	287	2.397	0.941/6.105	0.0668	3.354	1.397/8.056	***0.0069***	3.111	1.228/7.881	***0.0167***
Model 4 Ω	143	1.024	0.322/3.254	0.9677	0.779	0.249/2.434	0.6679	0.928	0.318/2.706	0.8907	133	4.184	0.953/18.371	0.0580	3.526	0.895/13.900	0.0717	6.330	1.352/29.631	***0.0191***

* Body Mass Index (BMI) was used to model the probability of overweight. BMI cut-offs were age and gender-specific and corresponded to the widely used cut off point of 25 kg/m^2 for adult overweight.[3] Refer to Appendix G for the cut-offs used in the categorization of participants as overweight or non-overweight.

[1] *Child FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 14. Odds ratios (95% CIs) of falling into the lowest tertile of the DASH Index score‡ for quartiles of the Child Family Eating Practice (FEP) Index score by gender.

	Child FEP Index Score Quartiles[1] (Q1 <20; Q2 ≥20<23; Q3 ≥23<28; Q4 ≥28)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	260	1.441	0.715/2.904	0.3065	1.246	0.672/2.313	0.4851	1.676	0.912/3.081	0.0963	287	0.781	0.407/1.499	0.4576	1.217	0.675/2.197	0.5139	1.563	0.816/2.995	0.1780
Model 2 §	260	1.442	0.715/2.906	0.3061	1.247	0.672/2.315	0.4834	1.679	0.910/3.099	0.0974	287	0.746	0.387/1.441	0.3835	1.180	0.651/2.139	0.5856	1.485	0.767/2.874	0.2410
Model 3 †	260	1.537	0.756/3.123	0.2347	1.290	0.690/2.409	0.4251	1.677	0.903/3.114	0.1019	287	0.779	0.402/1.513	0.4612	1.342	0.734/2.453	0.3393	1.428	0.734/2.778	0.2943
Model 4 Ω	143	1.932	0.743/5.025	0.1771	0.853	0.351/2.076	0.7267	1.728	0.732/4.079	0.2117	133	0.788	0.295/2.104	0.6339	0.992	0.418/2.357	0.9858	1.032	0.361/2.949	0.9536

‡ The *average* DASH Index Score was used in the logistic regression model (Tertile 1 (T1) <48, T2 ≥48<56, T3 ≥56).

[1] *Child FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 15. Odds ratios (95% CIs) of falling into the lowest tertile of the HC Index score‡ for quartiles of the Child Family Eating Practice (FEP) Index score by gender.

	Child FEP Index Score Quartiles[1] (Q1 <20; Q2 ≥20<23; Q3 ≥23<28; Q4 ≥28)																			
	Males										Females									
	Q2 vs Q1				Q3 vs Q1				Q4 vs Q1			Q2 vs Q1				Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	309	0.922	0.483/1.759	0.8043	1.200	0.674/2.136	0.5361	1.757	0.989/3.119	0.0545	334	1.131	0.612/2.091	0.6947	1.226	0.706/2.130	0.4688	1.728	0.958/3.116	0.0690
Model 2 §	260	0.757	0.373/1.536	0.4407	1.174	0.633/2.179	0.6102	1.806	0.977/3.337	0.0594	290	0.802	0.416/1.545	0.5089	1.044	0.577/1.891	0.8862	1.446	0.750/2.787	0.2705
Model 3 †	260	0.804	0.392/1.649	0.5517	1.220	0.651/2.286	0.5340	1.780	0.954/3.322	0.0699	287	0.826	0.427/1.598	0.5706	1.137	0.623/2.075	0.6754	1.511	0.777/2.939	0.2236
Model 4 Ω	143	0.639	0.245/1.669	0.3604	0.656	0.265/1.620	0.3604	1.790	0.745/4.298	0.1929	133	0.856	0.320/2.289	0.7572	0.944	0.367/2.245	0.8967	1.053	0.369/3.009	0.9225

‡ The *average* HC Index Score was used in the logistic regression model (Tertile 1 (T1) <40, T2 ≥40<46, T3 ≥46).

[1] *Child FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 16a. Regressions of the Mother Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants before adjustment (Model 1).

	Mother FEP Index Score Model 1							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	296	0.0071	-0.1150/0.1292	0.9090	307	0.2518	0.1313/0.3722	***<0.0001***
Waist-to-height ratio	296	-0.0004	-0.0024/0.0016	0.6916	307	0.0038	0.0020/0.0058	***<0.0001***
Waist-to-hip ratio	295	-0.0010	-0.0031/0.0011	0.3473	306	0.0020	-0.00004/0.0040	0.0548
Waist Girth	296	0.0588	-0.2816/0.3992	0.7342	307	0.6463	0.3344/0.9582	***<0.0001***
Hip Girth	295	0.1447	-0.1712/0.4607	0.3681	307	0.5259	0.2191/0.8326	***0.0008***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	281	-0.0556	-0.3530/0.2418	0.7132	301	-0.2487	-0.5389/0.0415	0.0927
Upper DASH Index Score	281	-0.1416	-0.4048/0.1215	0.2903	301	-0.3439	-0.5975/-0.0902	**0.0081**
Average DASH Index Score	281	-0.0692	-0.3478/0.2094	0.6251	301	-0.3215	-0.5944/-0.0487	***0.0211***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	335	0.0229	-0.2157/0.2616	0.8501	347	-0.1009	-0.3336/0.1318	0.3943
Upper HC Index Score	335	-0.1705	-0.3240/-0.0170	***0.0296***	347	-0.0932	-0.2491/0.0626	0.2401
Average HC Index Score	335	-0.0792	-0.2531/0.0946	0.3705	347	-0.0733	-0.2465/0.0998	0.4053
Nutrient Intake Variables								
Carbohydrates (g/day)	335	1.6560	-2.9073/6.2192	0.4758	347	-1.3448	-5.4665/2.7770	0.5215
Protein (g/day)	333	0.6819	-0.5239/1.8878	0.2668	347	-0.0663	-1.1647/1.0321	0.9056
Total fat (g/day)	334	0.5337	-0.5999/1.6673	0.3551	347	0.0218	-0.9611/1.0047	0.9653
Saturated Fat (g/day)	335	0.3231	-0.1010/0.7471	0.1349	347	0.0095	-0.3590/0.3781	0.9594
Monounsaturated fat (g/day)	334	0.1589	-0.2460/0.5637	0.4408	347	0.0554	-0.2980/0.4088	0.7579
Polyunsaturated fat (g/day)	333	0.1187	-0.1001/0.3375	0.2868	346	-0.0197	-0.2061/0.1666	0.8350
Trans fat (g/day)	335	0.0299	-0.0259/0.0857	0.2926	347	0.0031	-0.0441/0.0502	0.8982
Calcium (mg/day)	335	3.1760	-19.1574/25.5094	0.7799	347	1.1009	-18.5476/20.7494	0.9123
Iron (mg/day)	334	0.0156	-0.2783/0.3095	0.9167	347	-0.1093	-0.3620/0.1434	0.3954
Magnesium (mg/day)	334	1.1737	-3.3753/5.7228	0.6121	346	-1.8683	-5.8906/2.1540	0.3616
Phosphorus (mg/day)	334	8.1250	-15.4906/31.7405	0.4990	347	-0.4182	-21.6306/20.7940	0.9691
Potassium (mg/day)	334	8.8726	-39.8332/57.5784	0.7203	346	-22.7094	-65.6174/20.1985	0.2986

Table 16a cont'd

Vitamin C (mg/day)	335	0.0974	-2.9089/3.1037	0.9492	346	-2.7088	-5.4569/0.0394	0.0534
Vitamin A (IU/day)	333	-17.4627	-206.4648/171.5394	0.8559	346	-221.0661	-409.3485/-32.7837	***0.0215***
Vitamin D (IU/day)	335	-1.8633	-8.5906/4.8641	0.5862	347	1.1931	-4.4060/6.7921	0.6754
Vitamin E (mg/day)	334	-0.0128	-0.1464/0.1208	0.8502	347	-0.0808	-0.2007/0.0391	0.1858
Folate (DFE/day)*	335	-4.5156	-17.1041/8.0730	0.4809	346	-4.2996	-14.5507/5.9516	0.4100

* DFE (Dietary Folate Equivalents)

Table 16b. Regressions of the Mother Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after partial adjustment (Model 2).

	Mother FEP Index Score Model 2*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	281	-0.0236	-0.1374/0.0902	0.6838	304	0.1513	0.0439/0.2587	***0.0059***
Waist-to-height ratio	281	-0.0008	-0.0029/0.0012	0.4269	304	0.0020	0.0004/0.0035	***0.0118***
Waist-to-hip ratio	280	-0.0015	-0.0036/0.0006	0.1567	303	0.0011	-0.0009/0.0031	0.2957
Waist Girth	281	-0.0334	-0.3467/0.2799	0.8338	304	0.4226	0.1282/0.7169	***0.0050***
Hip Girth	280	0.0937	-0.2016/0.3890	0.5327	303	0.3660	0.0619/0.6700	***0.0185***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	281	-0.0529	-0.3511/0.2453	0.7272	301	-0.2503	-0.5443/0.0437	0.0949
Upper DASH Index Score	281	-0.1349	-0.3982/0.1285	0.3143	301	-0.3323	-0.5891/-0.0754	***0.0114***
Average DASH Index Score	281	-0.0650	-0.3442/0.2142	0.6471	301	-0.3180	-0.5945/-0.0416	***0.0243***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	281	0.0115	-0.2403/0.2634	0.9282	304	-0.1179	-0.3725/0.1367	0.3628
Upper HC Index Score	281	-0.1599	-0.3260/0.0062	0.0591	304	-0.0417	-0.2148/0.1313	0.6353
Average HC Index Score	281	-0.0674	-0.2505/0.1158	0.4695	304	-0.0682	-0.2608/0.1244	0.4865
Nutrient Intake Variables								
Carbohydrates (g/day)	281	1.7892	-2.9118/6.4902	0.4544	304	-2.2469	-6.4583/1.9645	0.2946
Protein (g/day)	279	0.7585	-0.4883/2.0054	0.2321	304	-0.3277	-1.4419/0.7865	0.5632
Total fat (g/day)	280	0.5668	-0.6303/1.7638	0.3521	304	-0.2071	-1.2062/0.7919	0.6835
Saturated Fat (g/day)	281	0.3485	-0.1031/0.8000	0.1299	304	-0.0080	-0.3909/0.3750	0.9673
Monounsaturated fat (g/day)	280	0.1716	-0.2570/0.6002	0.4314	304	-0.0378	-0.3934/0.3179	0.8346
Polyunsaturated fat (g/day)	280	0.1004	-0.1360/0.3368	0.4039	303	-0.1073	-0.2925/0.0780	0.2555
Trans fat (g/day)	281	0.0370	-0.0223/0.0963	0.2205	304	-0.0052	-0.0524/0.0419	0.8274
Calcium (mg/day)	281	2.6562	-20.5951/25.9076	0.8222	304	1.5853	-19.3257/22.4963	0.8815
Iron (mg/day)	281	0.0231	-0.2905/0.3366	0.8849	304	-0.1904	-0.4562/0.0755	0.1598
Magnesium (mg/day)	280	1.6614	-3.0270/6.3497	0.4860	304	-2.4484	-6.6576/1.7608	0.2533
Phosphorus (mg/day)	280	8.9007	-15.5426/33.3439	0.4741	304	-2.7699	-24.5899/19.0501	0.8029
Potassium (mg/day)	280	11.0301	-39.5111/61.5713	0.6678	304	-23.6651	-70.0171/22.6868	0.3158

Table 16b cont'd

Vitamin C (mg/day)	281	-0.0433	-3.2238/3.1373	0.9787	304	-2.7102	-5.7662/0.3457	0.0820
Vitamin A (IU/day)	279	-5.3150	-206.5772/195.9472	0.9586	304	-251.0352	-457.1497/-44.9208	***0.0172***
Vitamin D (IU/day)	281	-1.8293	-9.0077/5.3490	0.6163	304	1.2022	-4.9675/7.3718	0.7017
Vitamin E (mg/day)	280	0.0012	-0.1423/0.1447	0.9869	304	-0.1211	-0.2462/0.0039	0.0575
Folate (DFE/day)**	281	-2.2731	-15.5434/10.9971	0.7362	303	-6.7010	-17.4153/4.0134	0.2194

* Model 2: Adjusted for age to peak height velocity (aPHV).

** DFE (Dietary Folate Equivalents)

Table 16c. Regressions of the Mother Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after partial adjustment (Model 3).

	Mother FEP Index Score Model 3*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	281	-0.0278	-0.1414/0.0858	0.6303	301	0.1488	0.0412/0.2564	***0.0069***
Waist-to-height ratio	281	-0.0009	-0.0030/0.0011	0.3804	301	0.0020	0.0005/0.0036	***0.0096***
Waist-to-hip ratio	280	-0.0016	-0.0037/0.0005	0.1331	300	0.0011	-0.0009/0.0031	0.2912
Waist Girth	281	-0.0461	-0.3586/0.2663	0.7715	301	0.4291	0.1334/0.7248	***0.0046***
Hip Girth	280	0.0871	-0.2086/0.3828	0.5625	300	0.3747	0.0691/0.6804	***0.0164***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	281	-0.0264	-0.3175/0.2646	0.8584	301	-0.2818	-0.5626/-0.0011	***0.0491***
Upper DASH Index Score	281	-0.1206	-0.3820/0.1409	0.3649	301	-0.3520	-0.6033/-0.1007	***0.0062***
Average DASH Index Score	281	-0.0442	-0.3189/0.2305	0.7517	301	-0.3465	-0.6116/-0.0814	***0.0106***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	281	0.0384	-0.2043/0.2811	0.7556	301	-0.1530	-0.4005/0.0945	0.2248
Upper HC Index Score	281	-0.1497	-0.3142/0.0148	0.0742	301	-0.0568	-0.2282/0.1146	0.5149
Average HC Index Score	281	-0.0483	-0.2252/0.1285	0.5911	301	-0.0911	-0.2788/0.0966	0.3403
Nutrient Intake Variables								
Carbohydrates (g/day)	281	2.1260	-2.5066/6.7585	0.3671	301	-2.6792	-6.8460/1.4875	0.2067
Protein (g/day)	279	0.8403	-0.3852/2.0658	0.1782	301	-0.4376	-1.5403/0.6652	0.4355
Total fat (g/day)	280	0.6343	-0.5562/1.8249	0.2951	301	-0.2547	-1.2586/0.7493	0.6180
Saturated Fat (g/day)	281	0.3732	-0.0751/0.8215	0.1024	301	-0.0263	-0.4113/0.3588	0.8933
Monounsaturated fat (g/day)	280	0.1941	-0.2326/0.6208	0.3713	301	-0.0504	-0.4080/0.3071	0.7815
Polyunsaturated fat (g/day)	280	0.1137	-0.1215/0.3489	0.3420	300	-0.1189	-0.3045/0.0666	0.2081
Trans fat (g/day)	281	0.0399	-0.0191/0.0989	0.1847	301	-0.0063	-0.0537/0.0410	0.7923
Calcium (mg/day)	281	4.8915	-17.6916/27.4746	0.6702	301	-0.5103	-21.0600/20.0394	0.9611
Iron (mg/day)	281	0.0402	-0.2710/0.3515	0.7994	301	-0.2082	-0.4742/0.0577	0.1244
Magnesium (mg/day)	280	2.0229	-2.5571/6.6029	0.3853	301	-2.9296	-7.0366/1.1774	0.1614
Phosphorus (mg/day)	280	10.8440	-12.9940/34.6821	0.3713	301	-5.0075	-26.4694/16.4544	0.6464
Potassium (mg/day)	280	15.1856	-34.0066/64.3778	0.5439	301	-29.6843	-74.5666/15.1979	0.1941

Table 16c cont'd

Vitamin C (mg/day)	281	0.1964	-2.9319/3.3247	0.9017	301	-3.0607	-6.0602/-0.0613	***0.0455***
Vitamin A (IU/day)	279	7.6723	-190.4936/205.8382	0.9393	301	-272.5834	-471.3258/-73.8411	***0.0073***
Vitamin D (IU/day)	281	-1.2385	-8.2719/5.7948	0.7291	301	0.7646	-5.3468/6.8761	0.8057
Vitamin E (mg/day)	280	0.0098	-0.1324/0.1520	0.8921	301	-0.1302	-0.2547/-0.0056	0.0406
Folate (DFE/day)**	281	-1.4749	-14.6205/11.6707	0.8254	300	-7.6808	-18.3220/2.9605	0.1565

* Model 3: Adjusted for age to peak height velocity (aPHV) and total physical activity.

** DFE (Dietary Folate Equivalents)

Table 16d. Regressions of the Mother Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after complete adjustment (Model 4).

	Mother FEP Index Score Model 4*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	157	-0.1201	-0.2752/0.0349	0.1278	147	0.0699	-0.0997/0.2395	0.4166
Waist-to-height ratio	157	-0.0012	-0.0040/0.0017	0.4160	147	0.0006	-0.0019/0.0031	0.6431
Waist-to-hip ratio	157	0.0004	-0.0024/0.0032	0.7703	147	-0.0002	-0.0039/0.0034	0.8947
Waist Girth	157	-0.1229	-0.5510/0.3053	0.5715	147	0.2335	-0.2404/0.7074	0.3316
Hip Girth	157	-0.1634	-0.5806/0.2537	0.4401	147	0.2795	-0.2005/0.7595	0.2516
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	157	-0.0239	-0.4292/0.3813	0.9072	147	-0.4294	-0.9116/0.0528	0.0805
Upper DASH Index Score	157	-0.0761	-0.4443/0.2920	0.6833	147	-0.3716	-0.7981/0.0550	0.0872
Average DASH Index Score	157	-0.0267	-0.4048/0.3515	0.8893	147	-0.4162	-0.8628/0.0304	0.0675
HC Index Scores [Range: 0-60]								
Lower HC Index Score	157	0.1895	-0.1489/0.5279	0.2703	147	-0.2458	-0.6574/0.1658	0.2397
Upper HC Index Score	157	-0.0486	-0.2875/0.1903	0.6882	147	-0.1286	-0.4152/0.1580	0.3765
Average HC Index Score	157	0.0757	-0.1669/0.3183	0.5383	147	-0.1504	-0.4611/0.1603	0.3401
Nutrient Intake Variables								
Carbohydrates (g/day)	157	2.6328	-3.7368/9.0024	0.4154	147	-3.9579	-10.7817/2.8660	0.2534
Protein (g/day)	157	0.9244	-0.7804/2.6292	0.2857	147	-0.6469	-2.4943/1.2004	0.4898
Total fat (g/day)	157	0.8512	-0.8178/2.5202	0.3152	147	-0.8126	-2.4602/0.8350	0.3312
Saturated Fat (g/day)	157	0.3653	-0.2583/0.9889	0.2489	147	-0.2062	-0.8537/0.4413	0.5299
Monounsaturated fat (g/day)	157	0.2622	-0.3314/0.8558	0.3842	147	-0.2538	-0.8251/0.3176	0.3813
Polyunsaturated fat (g/day)	157	0.1291	-0.1986/0.4568	0.4375	146	-0.2409	-0.5328/0.0511	0.1052
Trans fat (g/day)	157	0.0289	-0.0514/0.1092	0.4778	147	-0.0173	-0.0916/0.0570	0.6463
Calcium (mg/day)	157	15.4595	-14.4504/45.3693	0.3088	147	-0.7912	-36.4794/34.8971	0.9651
Iron (mg/day)	157	0.0447	-0.3923/0.4817	0.8401	147	-0.3756	-0.8406/0.0893	0.1125
Magnesium (mg/day)	157	2.2071	-4.0497/8.4640	0.4869	147	-4.6714	-11.6823/2.3395	0.1899
Phosphorus (mg/day)	157	14.2558	-17.3158/45.8273	0.3737	147	-8.8760	-44.9927/27.2407	0.6278
Potassium (mg/day)	157	21.2802	-46.4838/89.0441	0.5359	147	-37.4550	-114.7532/39.8433	0.3397

Table 16d cont'd

Vitamin C (mg/day)	157	1.0818	-3.2393/5.4029	0.6215	147	-4.3106	-9.6032/0.9819	0.1096
Vitamin A (IU/day)	156	49.2927	-201.9794/300.5647	0.6988	147	-288.9911	-642.3107/64.3284	0.1081
Vitamin D (IU/day)	157	4.1852	-5.6642/14.0347	0.4025	147	1.1340	-9.4000/11.6679	0.8318
Vitamin E (mg/day)	157	0.0279	-0.1770/0.2329	0.7881	147	-0.2141	-0.4311/0.0029	0.0531
Folate (DFE/day)**	157	1.9514	-15.7051/19.6079	0.8274	146	-11.9065	-30.5039/6.6910	0.2077

* Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

** DFE (Dietary Folate Equivalents)

Table 17. Odds ratios (95% CIs) of overweight for quartiles of the Mother Family Eating Practice (FEP) Index score by gender.*

	Mother FEP Index Score Quartiles[1] (Q1 <8; Q2 ≥8<10; Q3 ≥10<13; Q4 ≥13)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	290	2.081	0.951/4.553	0.0667	1.170	0.564/2.430	0.6731	1.488	0.722/3.064	0.2812	307	0.857	0.357/2.060	0.7305	1.335	0.641/2.780	0.4406	3.679	1.770/7.648	***0.0005***
Model 2 §	281	1.667	0.704/3.948	0.2457	0.921	0.416/2.041	0.8401	1.305	0.601/2.835	0.5009	304	0.985	0.382/2.539	0.9754	1.549	0.699/3.431	0.2806	3.383	1.529/7.482	***0.0026***
Model 3 †	281	1.697	0.714/4.032	0.2313	0.911	0.411/2.018	0.8180	1.245	0.570/2.720	0.5831	301	0.987	0.382/2.549	0.9788	1.546	0.697/3.430	0.2837	3.220	1.447/7.163	***0.0042***
Model 4 Ω	157	1.474	0.439/4.950	0.5300	1.029	0.328/3.226	0.9606	1.106	0.353/3.467	0.8628	147	0.614	0.129/2.914	0.5392	1.093	0.289/4.139	0.8954	3.718	0.956/14.454	0.0580

* Body Mass Index (BMI) was used to model the probability of overweight. BMI cut-offs were age and gender-specific and corresponded to the widely used cut off point of 25 kg/m^2 for adult overweight.[3] Refer to Appendix G for the cut-offs used in the categorization of participants as overweight or non-overweight.

[1] *Mother FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 18. Odds ratios (95% CIs) of falling into the lowest tertile of the DASH Index score‡ for quartiles of the Mother Family Eating Practice (FEP) Index score by gender.

	Mother FEP Index Score Quartiles[1] (Q1 <8; Q2 ≥8<10; Q3 ≥10<13; Q4 ≥13)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	281	1.211	0.602/2.438	0.5917	1.791	0.967/3.317	0.0639	1.386	0.748/2.566	0.2997	301	2.104	1.054/4.201	***0.0349***	1.479	0.808/2.708	0.2046	2.407	1.284/4.511	***0.0062***
Model 2 §	281	1.037	0.652/1.651	0.6105	1.201	0.593/2.433	0.0659	1.787	0.963/3.315	0.3060	301	2.161	1.080/4.325	***0.0295***	1.509	0.823/2.766	0.1833	2.372	1.262/4.460	***0.0073***
Model 3 †	281	1.196	0.588/2.433	0.6215	1.665	0.895/3.100	0.1075	1.256	0.674/2.341	0.4731	301	2.338	1.156/4.729	***0.0181***	1.635	0.883/3.026	0.1176	2.735	1.437/5.205	***0.0022***
Model 4 Ω	157	1.305	0.491/3.465	0.5932	1.383	0.570/3.353	0.4730	1.015	0.413/2.498	0.9737	147	1.666	0.593/4.686	0.3330	1.286	0.501/3.300	0.6006	3.185	1.146/8.854	***0.0264***

‡ The *average* DASH Index Score was used in the logistic regression model (Tertile 1 (T1) <48, T2 ≥48<56, T3 ≥56).

[1] *Mother FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 19. Odds ratios (95% CIs) of falling into the lowest tertile of the HC Index score‡ for quartiles of the Mother Family Eating Practice (FEP) Index score by gender.

	Mother FEP Index Score Quartiles[1] (Q1 <8; Q2 ≥8<10; Q3 ≥10<13; Q4 ≥13)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	335	1.168	0.608/2.245	0.6405	1.906	1.071/3.390	***0.0282***	1.746	0.979/3.112	0.0589	347	1.626	0.856/3.088	0.1373	1.187	0.672/2.096	0.5542	1.334	0.748/2.379	0.3296
Model 2 §	281	1.029	0.506/2.090	0.9372	1.852	0.997/3.439	0.0511	1.667	0.897/3.096	0.1057	304	1.818	0.916/3.606	0.0874	1.241	0.684/2.253	0.4775	1.434	0.774/2.658	0.2522
Model 3 †	281	1.009	0.492/2.070	0.9795	1.709	0.914/3.195	0.0933	1.454	0.777/2.721	0.2414	301	1.935	0.966/3.877	0.0624	1.336	0.729/2.446	0.3485	1.595	0.850/2.992	0.1459
Model 4 Ω	157	0.515	0.189/1.400	0.1934	0.997	0.406/2.447	0.9954	0.585	0.234/1.463	0.2520	147	0.898	0.324/2.489	0.8367	0.783	0.310/1.977	0.6049	1.409	0.520/3.818	0.5002

‡ The *average* HC Index Score was used in the logistic regression model (Tertile 1 (T1) <40, T2 ≥40<46, T3 ≥46).

[1] *Mother FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 20a. Regressions of the Father Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants before adjustment (Model 1).

	Father FEP Index Score Model 1							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	244	-0.0159	-0.1398/0.1079	0.8001	262	0.2136	0.0894/0.3377	***0.0008***
Waist-to-height ratio	244	-0.0001	-0.0022/0.0020	0.8996	262	0.0029	0.0010/0.0049	***0.0031***
Waist-to-hip ratio	243	0.0002	-0.0018/0.0023	0.8172	262	0.0009	-0.0012/0.0030	0.4020
Waist Girth	244	0.1020	-0.2550/0.4590	0.5742	262	0.5175	0.1987/0.8363	***0.0016***
Hip Girth	243	0.0702	-0.2576/0.3981	0.6735	262	0.4798	0.1759/0.7838	***0.0021***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	233	0.0339	-0.2902/0.3580	0.8367	256	-0.2168	-0.4904/0.0567	0.1198
Upper DASH Index Score	233	-0.1618	-0.4432/0.1196	0.2583	256	-0.3038	-0.5451/-0.0625	***0.0138***
Average DASH Index Score	233	-0.0222	-0.3257/0.2813	0.8856	256	-0.2780	-0.5387/-0.0173	***0.0367***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	277	-0.0057	-0.2516/0.2403	0.9638	297	-0.1782	-0.3933/0.0369	0.1040
Upper HC Index Score	277	-0.1871	-0.3430/-0.0311	***0.0189***	297	-0.2070	-0.3490/-0.0649	***0.0044***
Average HC Index Score	277	-0.1384	-0.3159/0.0390	0.1257	297	-0.1729	-0.3306/-0.0151	***0.0318***
Nutrient Intake Variables								
Carbohydrates (g/day)	277	3.5958	-1.0116/8.2031	0.1256	296	-0.7858	-4.4540/2.8824	0.6736
Protein (g/day)	275	0.3874	-0.8459/1.6206	0.5369	297	-0.5790	-1.6094/0.4515	0.2697
Total fat (g/day)	277	0.6610	-0.5261/1.8482	0.2739	296	-0.0503	-0.9555/0.8549	0.9129
Saturated Fat (g/day)	277	0.2312	-0.2021/0.6646	0.2944	296	-0.0329	-0.3753/0.3095	0.8501
Monounsaturated fat (g/day)	277	0.2224	-0.2014/0.6461	0.3025	296	0.0317	-0.2924/0.3557	0.8476
Polyunsaturated fat (g/day)	276	0.1583	-0.0737/0.3902	0.1803	296	-0.0352	-0.2134/0.1429	0.6974
Trans fat (g/day)	277	0.0205	-0.0356/0.0765	0.4728	296	-0.0039	-0.0480/0.0402	0.8617
Calcium (mg/day)	277	6.5907	-16.0801/29.2615	0.5676	297	-9.5851	-27.8644/8.6942	0.3029
Iron (mg/day)	276	0.0623	-0.2348/0.3594	0.6801	297	-0.1015	-0.3441/0.1412	0.4112
Magnesium (mg/day)	276	0.7857	-3.8427/5.4142	0.7385	295	-1.8275	-5.4096/1.7547	0.3162
Phosphorus (mg/day)	276	3.7421	-20.2560/27.7401	0.7591	297	-10.3315	-30.2481/9.5851	0.3081
Potassium (mg/day)	276	18.5466	-30.9714/68.0646	0.4615	295	-20.9246	-59.0333/17.1840	0.2807

Table 20a cont'd

Vitamin C (mg/day)	277	4.3841	1.2859/7.4823	***0.0057***	295	-0.2630	-2.7634/2.2374	0.8362
Vitamin A (IU/day)	275	-41.6017	-233.9264/150.7230	0.6706	296	-114.3107	-297.1056/68.4841	0.2194
Vitamin D (IU/day)	277	0.7461	-6.1187/7.6109	0.8307	297	-1.6954	-7.2414/3.8506	0.5479
Vitamin E (mg/day)	277	0.0595	-0.0766/0.1956	0.3901	297	-0.0029	-0.1183/0.1124	0.9601
Folate (DFE/day)*	277	4.0257	-8.7615/16.8128	0.5359	297	-3.3679	-13.3747/6.6388	0.5082

* DFE (Dietary Folate Equivalents)

Table 20b. Regressions of the Father Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after partial adjustment (Model 2).

	Father FEP Index Score Model 2*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	233	-0.0610	-0.1784/0.0563	0.3067	259	0.1491	0.0416/0.2566	***0.0067***
Waist-to-height ratio	233	-0.0008	-0.0030/0.0014	0.4645	259	0.0017	0.0002/0.0032	***0.0290***
Waist-to-hip ratio	232	-0.0002	-0.0023/0.0019	0.8532	259	0.0002	-0.0018/0.0022	0.8221
Waist Girth	233	-0.0272	-0.3597/0.3052	0.8720	259	0.3854	0.0945/0.6762	***0.0096***
Hip Girth	232	-0.0256	-0.3308/0.2796	0.8690	259	0.3951	0.0997/0.6905	***0.0089***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	233	0.0339	-0.2914/0.3592	0.8374	256	-0.2094	-0.4856/0.0668	0.1366
Upper DASH Index Score	233	-0.1562	-0.4383/0.1259	0.2765	256	-0.2937	-0.5372/-0.0502	***0.0183***
Average DASH Index Score	233	-0.0185	-0.3230/0.2860	0.9048	256	-0.2699	-0.5331/-0.0068	***0.0444***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	233	-0.0375	-0.3076/0.2326	0.7846	259	-0.1099	-0.3523/0.1325	0.3729
Upper HC Index Score	233	-0.2049	-0.3798/-0.0301	***0.0218***	259	-0.1482	-0.3121/0.0158	0.0763
Average HC Index Score	233	-0.1475	-0.3423/0.0472	0.1370	259	-0.1172	-0.2983/0.0640	0.2040
Nutrient Intake Variables								
Carbohydrates (g/day)	233	3.5045	-1.4650/8.4740	0.1660	258	-0.5509	-4.2378/3.1360	0.7688
Protein (g/day)	231	0.3026	-1.0262/1.6314	0.6541	259	-0.4220	-1.4741/0.6301	0.4303
Total fat (g/day)	233	0.7840	-0.5151/2.0832	0.2356	258	0.0455	-0.8748/0.9659	0.9225
Saturated Fat (g/day)	233	0.2581	-0.2225/0.7388	0.2911	258	0.0659	-0.2955/0.4272	0.7199
Monounsaturated fat (g/day)	233	0.2661	-0.1974/0.7296	0.2591	258	0.0493	-0.2742/0.3728	0.7642
Polyunsaturated fat (g/day)	233	0.1797	-0.0786/0.4381	0.1717	258	-0.0641	-0.2429/0.1148	0.4811
Trans fat (g/day)	233	0.0306	-0.0308/0.0920	0.3268	258	-0.0008	-0.0450/0.0434	0.9725
Calcium (mg/day)	233	3.2916	-21.7868/28.3700	0.7962	259	-6.7613	-26.5927/13.0701	0.5026
Iron (mg/day)	233	0.0594	-0.2719/0.3908	0.7242	259	-0.0622	-0.3189/0.1944	0.6334
Magnesium (mg/day)	232	0.3581	-4.6552/5.3713	0.8882	258	-0.7879	-4.5167/2.9409	0.6777
Phosphorus (mg/day)	232	0.7116	-25.4048/26.8280	0.9572	259	-7.1933	-27.9337/13.5470	0.4952
Potassium (mg/day)	232	9.1756	-45.0977/63.4488	0.7394	258	-10.5537	-52.1024/30.9951	0.6174

Table 20b cont'd

Vitamin C (mg/day)	233	3.8541	0.4449/7.2634	***0.0269***	258	-0.3057	-3.1536/2.5423	0.8328
Vitamin A (IU/day)	231	-39.5167	-255.6062/176.5729	0.7189	259	-88.0278	-295.2820/119.2265	0.4037
Vitamin D (IU/day)	233	0.2564	-7.5146/8.0274	0.9482	259	0.1527	-6.1158/6.4213	0.9618
Vitamin E (mg/day)	233	0.0751	-0.0761/0.2263	0.3289	259	0.0011	-0.1215/0.1237	0.9858
Folate (DFE/day)**	233	5.5693	-8.3464/19.4850	0.4312	259	-0.9769	-11.5466/9.5928	0.8557

* Model 2: Adjusted for age to peak height velocity (aPHV).

** DFE (Dietary Folate Equivalents)

Table 20c. Regressions of the Father Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after partial adjustment (Model 3).

	Father FEP Index Score Model 3*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	233	-0.0666	-0.1835/0.0503	0.2628	256	0.1513	0.0438/0.2588	***0.0060***
Waist-to-height ratio	233	-0.0009	-0.0030/0.0013	0.4229	256	0.0017	0.0002/0.0033	***0.0253***
Waist-to-hip ratio	232	-0.0002	-0.0024/0.0019	0.8221	256	0.0003	-0.0018/0.0023	0.7978
Waist Girth	233	-0.0393	-0.3714/0.2929	0.8160	256	0.3926	0.1000/0.6851	***0.0087***
Hip Girth	232	-0.0354	-0.3407/0.2700	0.8198	256	0.4001	0.1032/0.6970	***0.0085***
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	233	0.0590	-0.2610/0.3790	0.7168	256	-0.2434	-0.5100/0.0232	0.0734
Upper DASH Index Score	233	-0.1416	-0.4222/0.1390	0.3211	256	-0.3145	-0.5544/-0.0746	***0.0104***
Average DASH Index Score	233	0.0012	-0.3001/0.3025	0.9938	256	-0.3017	-0.5561/-0.0473	***0.0203***
HC Index Scores [Range: 0-60]								
Lower HC Index Score	233	-0.0112	-0.2737/0.2512	0.9328	256	-0.1338	-0.3710/0.1035	0.2679
Upper HC Index Score	233	-0.1929	-0.3656/-0.0202	***0.0288***	256	-0.1587	-0.3220/0.0047	0.0569
Average HC Index Score	233	-0.1290	-0.3186/0.0606	0.1813	256	-0.1348	-0.3131/0.0436	0.1379
Nutrient Intake Variables								
Carbohydrates (g/day)	233	3.8142	-1.1085/8.7370	0.1282	255	-0.8392	-4.4852/2.8067	0.6507
Protein (g/day)	231	0.4010	-0.9105/1.7124	0.5475	256	-0.4957	-1.5378/0.5464	0.3497
Total fat (g/day)	233	0.8544	-0.4366/2.1455	0.1935	255	0.0514	-0.8727/0.9755	0.9128
Saturated Fat (g/day)	233	0.2834	-0.1945/0.7614	0.2438	255	0.0675	-0.2956/0.4306	0.7146
Monounsaturated fat (g/day)	233	0.2905	-0.1703/0.7514	0.2155	255	0.0560	-0.2688/0.3807	0.7346
Polyunsaturated fat (g/day)	233	0.1941	-0.0624/0.4507	0.1374	255	-0.0670	-0.2463/0.1122	0.4621
Trans fat (g/day)	233	0.0334	-0.0278/0.0946	0.2832	255	0.0005	-0.0438/0.0449	0.9807
Calcium (mg/day)	233	5.3359	-19.2743/29.9461	0.6696	256	-8.7198	-28.2131/10.7736	0.3792
Iron (mg/day)	233	0.0789	-0.2498/0.4076	0.6366	256	-0.0734	-0.3301/0.1832	0.5736
Magnesium (mg/day)	232	0.7600	-4.1802/5.7002	0.7621	255	-1.1539	-4.8170/2.5091	0.5355
Phosphorus (mg/day)	232	2.8957	-22.7975/28.5888	0.8245	256	-8.9901	-29.4347/11.4544	0.3873
Potassium (mg/day)	232	13.6398	-39.7895/67.0691	0.6154	255	-15.4437	-55.8912/25.0038	0.4528

Table 20c cont'd

Vitamin C (mg/day)	233	4.0837	0.7139/7.4535	***0.0178***	255	-0.6153	-3.4070/2.1764	0.6646
Vitamin A (IU/day)	231	-28.3807	-243.6436/186.8822	0.7953	256	-110.7023	-311.9315/90.5269	0.2796
Vitamin D (IU/day)	233	0.8616	-6.7794/8.5027	0.8244	256	-0.3577	-6.5817/5.8663	0.9100
Vitamin E (mg/day)	233	0.0847	-0.0650/0.2343	0.2663	256	-0.0062	-0.1282/0.1157	0.9197
Folate (DFE/day)**	233	6.5369	-7.2038/20.2775	0.3496	256	-1.7063	-12.2062/8.7936	0.7492

* Model 3: Adjusted for age to peak height velocity (aPHV) and total physical activity.

** DFE (Dietary Folate Equivalents)

Table 20d. Regressions of the Father Family Eating Practice (FEP) Index score on body composition, dietary pattern and nutrient intake variables in male and female participants after complete adjustment (Model 4).

	Father FEP Index Score Model 4*							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
Body Composition Variables								
BMI (kg/m^2)	129	-0.0812	-0.2362/0.0737	0.3015	118	0.0198	-0.1448/0.1844	0.8118
Waist-to-height ratio	129	-0.0013	-0.0041/0.0016	0.3921	118	0.0002	-0.0022/0.0027	0.8586
Waist-to-hip ratio	129	-0.0004	-0.0033/0.0024	0.7658	118	-0.0003	-0.0039/0.0033	0.8514
Waist Girth	129	-0.0709	-0.5090/0.3673	0.7494	118	0.0917	-0.3690/0.5524	0.6941
Hip Girth	129	-0.0530	-0.4677/0.3616	0.8005	118	0.1226	-0.3401/0.5853	0.6006
Dietary Pattern Variables								
DASH Index Scores [Range: 0-80]								
Lower DASH Index Score	129	0.0822	-0.3586/0.5229	0.7127	118	-0.3195	-0.7543/0.1154	0.1483
Upper DASH Index Score	129	-0.1686	-0.5444/0.2072	0.3762	118	-0.3113	-0.6909/0.0683	0.1070
Average DASH Index Score	129	0.0163	-0.3832/0.4158	0.9356	118	-0.3738	-0.7722/0.0245	0.0656
HC Index Scores [Range: 0-60]								
Lower HC Index Score	129	0.0520	-0.3085/0.4126	0.7755	118	-0.1166	-0.4905/0.2574	0.5379
Upper HC Index Score	129	-0.1651	-0.4118/0.0815	0.1875	118	-0.2697	-0.5177/-0.0217	***0.0333***
Average HC Index Score	129	-0.1247	-0.3843/0.1349	0.3437	118	-0.1928	-0.4671/0.0816	0.1667
Nutrient Intake Variables								
Carbohydrates (g/day)	129	4.3661	-2.5809/11.3131	0.2158	118	-0.9800	-6.6288/4.6688	0.7316
Protein (g/day)	129	0.5508	-1.3275/2.4291	0.5626	118	0.2630	-1.2471/1.7730	0.7307
Total fat (g/day)	129	0.6887	-1.1235/2.5010	0.4533	118	0.2891	-1.1028/1.6811	0.6814
Saturated Fat (g/day)	129	0.3044	-0.3701/0.9789	0.3734	118	0.2112	-0.3582/0.7807	0.4638
Monounsaturated fat (g/day)	129	0.2364	-0.4024/0.8751	0.4653	118	0.1311	-0.3500/0.6121	0.5903
Polyunsaturated fat (g/day)	129	0.0779	-0.2844/0.4402	0.6710	118	-0.0612	-0.3286/0.2062	0.6510
Trans fat (g/day)	129	0.0335	-0.0521/0.1191	0.4398	118	0.0137	-0.0514/0.0789	0.6773
Calcium (mg/day)	129	11.1976	-21.2933/43.6886	0.4964	118	8.3726	-22.9682/39.7134	0.5976
Iron (mg/day)	129	0.0925	-0.3769/0.5620	0.6970	118	-0.1704	-0.5954/0.2546	0.4286
Magnesium (mg/day)	129	0.9430	-6.0449/7.9309	0.7898	118	-0.6077	-6.4907/5.2753	0.8382
Phosphorus (mg/day)	129	9.5875	-25.3227/44.4977	0.5876	118	7.4346	-22.9570/37.8263	0.6288
Potassium (mg/day)	129	21.5363	-53.2031/96.2758	0.5694	118	-0.3136	-65.7898/65.1625	0.9924

Table 20d cont'd

Vitamin C (mg/day)	129	4.6827	0.2099/9.1555	***0.0403***	118	-1.4446	-6.1934/3.3041	0.5478
Vitamin A (IU/day)	128	38.2523	-233.8763/310.3810	0.7813	118	-91.7696	-425.3069/241.7677	0.5867
Vitamin D (IU/day)	129	3.5292	-6.9269/13.9853	0.5053	118	3.7282	-6.0264/13.4828	0.4504
Vitamin E (mg/day)	129	0.0636	-0.1510/0.2783	0.5584	118	-0.0465	-0.2469/0.1540	0.6469
Folate (DFE/day)**	129	6.7904	-11.5500/25.1309	0.4650	118	-8.7956	-26.0891/8.4979	0.3157

* Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

** DFE (Dietary Folate Equivalents)

Table 21. Odds ratios (95% CIs) of overweight for quartiles of the Father Family Eating Practice (FEP) Index score by gender.*

	Father FEP Index Score Quartiles[1] (Q1 <9; Q2 ≥9<11; Q3 ≥11<14; Q4 ≥14)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	239	1.456	0.626/3.386	0.3829	1.237	0.570/2.684	0.5907	1.202	0.566/2.556	0.6317	262	0.849	0.358/2.012	0.7104	0.955	0.445/2.047	0.9055	1.105	0.525/2.324	0.7926
Model 2 §	233	1.217	0.483/3.068	0.6777	1.214	0.527/2.797	0.6490	0.996	0.441/2.250	0.9929	259	0.986	0.374/2.601	0.9776	1.249	0.535/2.920	0.6072	1.071	0.470/2.445	0.8697
Model 3 †	233	1.256	0.493/3.199	0.6327	1.266	0.546/2.937	0.5826	0.984	0.432/2.240	0.9686	256	0.991	0.375/2.616	0.9852	1.154	0.488/2.730	0.7440	1.080	0.472/2.471	0.8558
Model 4 Ω	129	1.190	0.312/4.536	0.7993	0.903	0.256/3.178	0.8733	0.957	0.293/3.131	0.9423	118	1.178	0.255/5.437	0.8335	2.413	0.497/11.714	0.2745	0.958	0.240/3.830	0.9518

* Body Mass Index (BMI) was used to model the probability of overweight. BMI cut-offs were age and gender-specific and corresponded to the widely used cut off point of 25 kg/m^2 for adult overweight.[3] Refer to Appendix G for the cut-offs used in the categorization of participants as overweight or non-overweight.

[1] *Father FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 22. Odds ratios (95% CIs) of falling into the lowest tertile of the DASH Index score‡ for quartiles of the Father Family Eating Practice (FEP) Index score by gender.

	Father FEP Index Score Quartiles[1] (Q1 <9; Q2 ≥9<11; Q3 ≥11<14; Q4 ≥14)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	233	2.929	1.357/6.325	***0.0062***	0.939	0.475/1.856	0.8564	1.571	0.813/3.036	0.1786	256	1.152	0.545/2.433	0.7111	1.774	0.905/3.475	0.0949	1.768	0.915/3.417	0.0900
Model 2 §	233	2.909	1.346/6.287	***0.0066***	0.936	0.474/1.850	0.8489	1.562	0.807/3.020	0.1853	256	1.182	0.559/2.498	0.6622	1.819	0.927/3.569	0.0819	1.756	0.907/3.399	0.0947
Model 3 †	233	2.993	1.379/6.498	***0.0056***	0.986	0.497/1.959	0.9687	1.596	0.823/3.098	0.1668	256	1.362	0.636/2.919	0.4267	2.106	1.059/4.188	***0.0338***	2.106	1.072/4.135	***0.0306***
Model 4 Ω	129	1.900	0.641/5.627	0.2468	0.590	0.217/1.599	0.2994	1.189	0.461/3.069	0.7206	118	1.407	0.472/4.195	0.5406	3.418	1.060/11.020	***0.0397***	3.484	1.247/9.438	***0.0173***

‡ The *average* DASH Index Score was used in the logistic regression model (Tertile 1 (T1) <48, T2 ≥48<56, T3 ≥56).

[1] *Father FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 23. Odds ratios (95% CIs) of falling into the lowest tertile of the HC Index score‡ for quartiles of the Father Family Eating Practice (FEP) Index score by gender.

	Father FEP Index Score Quartiles[1] (Q1 <9; Q2 ≥9<11; Q3 ≥11<14; Q4 ≥14)																			
	Males										Females									
		Q2 vs Q1			Q3 vs Q1			Q4 vs Q1				Q2 vs Q1			Q3 vs Q1			Q4 vs Q1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	277	1.605	0.797/3.232	0.1853	0.840	0.449/1.571	0.5847	1.442	0.786/2.645	0.2366	297	1.081	0.533/2.192	0.8285	1.867	1.007/3.462	***0.0475***	1.800	0.980/3.306	0.0579
Model 2 §	233	2.103	0.982/4.505	0.0557	0.834	0.420/1.656	0.6037	1.671	0.862/3.238	0.1281	259	1.012	0.480/2.134	0.9753	1.763	0.904/3.438	0.0959	1.364	0.707/2.632	0.3542
Model 3 †	233	2.209	1.022/4.772	***0.0438***	0.897	0.447/1.800	0.7594	1.769	0.906/3.455	0.0946	256	1.113	0.525/2.361	0.7803	2.057	1.042/4.060	***0.0377***	1.542	0.794/2.996	0.2010
Model 4 Ω	129	1.073	0.365/3.157	0.8984	0.548	0.198/1.512	0.2452	1.256	0.484/3.262	0.6397	118	1.512	0.510/4.482	0.4559	3.547	1.103/11.406	***0.0337***	2.855	1.032/7.898	***0.0434***

‡ The *average* HC Index Score was used in the logistic regression model (Tertile 1 (T1) <40, T2 ≥40<46, T3 ≥46).

[1] *Father FEP Score Quartile One (Q1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 24. Regressions of the DASH Index score on measures of body composition in male and female participants.

	DASH Index Score‡							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
BMI (kg/m^2)								
Model 1 ¥	839	-0.0649	-0.0965/-0.0332	***<0.0001***	824	-0.0937	-0.1247/-0.0626	***<0.0001***
Model 2 §	839	-0.0540	-0.0832/-0.0248	***0.0003***	824	-0.0776	-0.1047/-0.0504	***<0.0001***
Model 3 †	839	-0.0506	-0.0804/-0.0207	***0.0009***	824	-0.0747	-0.1025/-0.0470	***<0.0001***
Model 4 Ω	407	-0.0509	-0.0926/-0.0093	***0.0167***	375	-0.0529	-0.0946/-0.0111	***0.0132***
Waist-to-height ratio								
Model 1 ¥	835	-0.0011	-0.0016/-0.0006	***<0.0001***	822	-0.0017	-0.0021/-0.0012	***<0.0001***
Model 2 §	835	-0.0010	-0.0015/-0.0005	***0.0002***	822	-0.0014	-0.0018/-0.0010	***<0.0001***
Model 3 †	835	-0.0009	-0.0014/-0.0004	***0.0007***	822	-0.0013	-0.0017/-0.0009	***<0.0001***
Model 4 Ω	405	-0.0008	-0.0015/-0.0001	***0.0255***	373	-0.0009	-0.0015/-0.0003	***0.0031***
Waist-to-hip ratio								
Model 1 ¥	833	-0.0006	-0.0011/-0.0001	***0.0277***	818	-0.0014	-0.0019/-0.0009	***<0.0001***
Model 2 §	833	-0.0005	-0.0010/-0.00003	***0.0376***	818	-0.0013	-0.0017/-0.0008	***<0.0001***
Model 3 †	833	-0.0005	-0.0010/0.000008	0.0535	818	-0.0012	-0.0017/-0.0008	***<0.0001***
Model 4 Ω	405	-0.0004	-0.0012/0.0003	0.2588	373	-0.0011	-0.0019/-0.0004	***0.0042***
Waist Girth								
Model 1 ¥	835	-0.1908	-0.2785/-0.1032	***<0.0001***	822	-0.2801	-0.3590/-0.2011	***<0.0001***
Model 2 §	835	-0.1595	-0.2400/-0.0791	***0.0001***	822	-0.2524	-0.3268/-0.1781	***<0.0001***
Model 3 †	835	-0.1465	-0.2286/-0.0644	***0.0005***	822	-0.2424	-0.3183/-0.1665	***<0.0001***
Model 4 Ω	405	-0.1443	-0.2548/-0.0339	***0.0106***	373	-0.1797	-0.2916/-0.0678	***0.0017***
Hip Girth								
Model 1 ¥	833	-0.1571	-0.2364/-0.0778	***0.0001***	818	-0.1866	-0.2635/-0.1097	***<0.0001***
Model 2 §	833	-0.1262	-0.1976/-0.0548	***0.0006***	818	-0.1679	-0.2429/-0.0929	***<0.0001***
Model 3 †	833	-0.1152	-0.1881/-0.0423	***0.0020***	818	-0.1615	-0.2379/-0.0851	***<0.0001***
Model 4 Ω	405	-0.1202	-0.2217/-0.0188	***0.0203***	373	-0.1047	-0.2174/0.0079	0.0684

‡ The *average* DASH Index Score was used in the regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 25. Odds ratios (95% CIs) of overweight for tertiles of the DASH Index score by gender.*‡

	DASH Index Score Tertile[1] (T1 <48; T2 ≥48<56; T3 ≥56)													
	Males							Females						
		T2 vs T1			T3 vs T1				T2 vs T1			T3 vs T1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	839	0.745	0.531/1.045	0.0878	0.533	0.376/0.756	***0.0004***	824	0.549	0.388/0.777	***0.0007***	0.395	0.277/0.563	***<0.0001***
Model 2 §	839	0.710	0.497/1.014	0.0597	0.565	0.392/0.815	***0.0023***	824	0.660	0.449/0.970	***0.0344***	0.417	0.282/0.618	***<0.0001***
Model 3 †	839	0.729	0.509/1.043	0.0839	0.593	0.409/0.862	***0.0061***	824	0.663	0.451/0.976	***0.0370***	0.422	0.284/0.628	***<0.0001***
Model 4 Ω	407	0.559	0.325/0.961	***0.0355***	0.479	0.271/0.847	***0.0113***	375	0.905	0.498/1.646	0.7441	0.586	0.314/1.091	0.0919

* Body Mass Index (BMI) was used to model the probability of overweight. BMI cut-offs were age and gender-specific and corresponded to the widely used cut off point of 25 kg/m^2 for adult overweight.[3] Refer to Appendix G for the cut-offs used in the categorization of participants as overweight or non-overweight.

‡ The *average* DASH Index Score was used in the regression model.

[1] *DASH Index Score Tertile One (T1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 26. Regressions of the HC Index score on measures of body composition in male and female participants.

	HC Index Score‡							
	Males				Females			
	N	b	95% CI	p	N	b	95% CI	p
BMI (kg/m^2)								
Model 1 ¥	840	-0.0205	-0.0671/0.0262	0.3894	830	-0.0674	-0.1131/-0.0217	***0.0039***
Model 2 §	840	-0.0228	-0.0657/0.0201	0.2972	830	-0.0463	-0.0862/-0.0064	***0.0229***
Model 3 †	839	-0.0134	-0.0577/0.0309	0.5534	824	-0.0432	-0.0845/-0.0020	***0.0397***
Model 4 Ω	407	-0.0293	-0.0921/0.0336	0.3604	375	-0.0060	-0.0681/0.0561	0.8501
Waist-to-height ratio								
Model 1 ¥	837	-0.0005	-0.0013/0.0002	0.1694	828	-0.0015	-0.0022/-0.0008	***<0.0001***
Model 2 §	836	-0.0005	-0.0013/0.0002	0.1570	828	-0.0012	-0.0018/-0.0006	***<0.0001***
Model 3 †	835	-0.0003	-0.0011/0.0004	0.3836	822	-0.0011	-0.0017/-0.0005	***0.0003***
Model 4 Ω	405	-0.0007	-0.0017/0.0004	0.2363	373	-0.0006	-0.0015/0.0003	0.2084
Waist-to-hip ratio								
Model 1 ¥	835	-0.0002	-0.0009/0.0006	0.6299	824	-0.0016	-0.0023/-0.0009	***<0.0001***
Model 2 §	834	-0.0002	-0.0009/0.0006	0.6118	824	-0.0014	-0.0021/-0.0008	***<0.0001***
Model 3 †	833	-0.0001	-0.0009/0.0007	0.7801	818	-0.0014	-0.0021/-0.0008	***<0.0001***
Model 4 Ω	405	-0.0002	-0.0013/0.0010	0.7902	373	-0.0012	-0.0023/-0.00003	***0.0437***
Waist Girth								
Model 1 ¥	837	-0.0578	-0.1872/0.0717	0.3812	828	-0.2399	-0.3565/-0.1234	***<0.0001***
Model 2 §	836	-0.0626	-0.1809/0.0557	0.2994	828	-0.2047	-0.3144/-0.0950	***0.0003***
Model 3 †	835	-0.0291	-0.1513/0.0931	0.6405	822	-0.1936	-0.3068/-0.0804	***0.0008***
Model 4 Ω	405	-0.1011	-0.2679/0.0657	0.2343	373	-0.1177	-0.2849/0.0495	0.1671
Hip Girth								
Model 1 ¥	838	-0.0484	-0.1653/0.0685	0.4164	825	-0.1274	-0.2397/-0.0150	***0.0264***
Model 2 §	834	-0.0523	-0.1573/0.0527	0.3287	824	-0.1049	-0.2143/0.0045	0.0602
Model 3 †	833	-0.0246	-0.1331/0.0839	0.6564	818	-0.0955	-0.2085/0.0175	0.0975
Model 4 Ω	405	-0.0971	-0.2501/0.0558	0.2123	373	-0.0354	-0.2027/0.1318	0.6774

‡ The *average* HC Index Score was used in the regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Table 27. Odds ratios (95% CIs) of overweight for tertile of the HC Index score by gender.*‡

	HC Index Score Tertile[†] (T1 <40; T2 ≥40<46; T3 ≥46)													
	Males							Females						
		T2 vs T1			T3 vs T1				T2 vs T1			T3 vs T1		
MODEL	N	OR	95% CI	p	OR	95% CI	p	N	OR	95% CI	p	OR	95% CI	p
Model 1 ¥	840	0.828	0.588/1.167	0.2813	0.872	0.620/1.226	0.4305	830	0.823	0.586/1.157	0.2624	0.620	0.435/0.883	***0.0080***
Model 2 §	840	0.833	0.581/1.194	0.3206	0.856	0.597/1.228	0.3992	830	0.848	0.581/1.238	0.3933	0.706	0.478/1.044	0.0815
Model 3 †	839	0.888	0.615/1.282	0.5256	0.926	0.638/1.343	0.6860	824	0.851	0.582/1.246	0.4081	0.691	0.463/1.031	0.0701
Model 4 Ω	407	0.628	0.360/1.094	0.1005	0.708	0.396/1.268	0.2460	375	1.026	0.565/1.861	0.9335	0.740	0.396/1.384	0.3466

* Body Mass Index (BMI) was used to model the probability of overweight. BMI cut-offs were age and gender-specific and corresponded to the widely used cut off point of 25 kg/m^2 for adult overweight.[3] Refer to Appendix G for the cut-offs used in the categorization of participants as overweight or non-overweight.

‡ The *average* HC Index Score was used in the regression model.

[†] *HC Index Score Tertile One (T1)* was used as the reference group in the logistic regression model.

¥ Model 1: Unadjusted; § Model 2: Adjusted for age to peak height velocity (aPHV); † Model 3: Adjusted for aPHV and total physical activity; Ω Model 4: Adjusted for aPHV, total physical activity, birth order, parental BMI, parental education and marital status.

Appendix F

Dietary Reference Intakes
Equations to estimate energy requirement

Infants and young children Estimated Energy Requirement (kcal/day) = Total Energy Expenditure + Energy Deposition	
0-3 months	EER = (89 × weight [kg] –100) + 175
4-6 months	EER = (89 × weight [kg] –100) + 56
7-12 months	EER = (89 × weight [kg] –100) + 22
13-35 months	EER = (89 × weight [kg] –100) + 20
Children and Adolescents 3-18 years Estimated Energy Requirement (kcal/day) = Total Energy Expenditure + Energy Deposition	
Boys 3-8 years	EER = 88.5 – (61.9 × age [y]) + PA× { (26.7 × weight [kg]) + (903 × height [m]) } + 20
9-18 years	EER = 88.5 – (61.9 × age [y]) + PA× { (26.7 × weight [kg]) + (903 × height [m]) } + 25
Girls 3-8 years	EER = 135.3 – (30.8 × age [y]) + PA× { (10.0 × weight [kg]) + (934 × height [m]) } + 20
9-18 years	EER = 135.3 – (30.8 × age [y]) + PA× { (10.0 × weight [kg]) + (934 × height [m]) } + 25
Adults 19 years and older Estimated Energy Requirement (kcal/day) = Total Energy Expenditure	
Men	EER = 662 – (9.53 × age [y]) + PA× { (15.91 × weight [kg]) + (539.6 × height [m]) }
Women	EER = 354 – (6.91 × age [y]) + PA× { (9.36 × weight [kg]) + (726 × height [m]) }
Pregnancy Estimated Energy Requirement (kcal/day) = Non-pregnant EER + Pregnancy Energy Deposition	
1st trimester	EER = Non-pregnant EER + 0
2nd trimester	EER = Non-pregnant EER + 340
3rd trimester	EER = Non-pregnant EER + 452
Lactation Estimated Energy Requirement (kcal/day) = Non-pregnant EER + Milk Energy Output – Weight Loss	
0-6 months postpartum	EER = Non-pregnant EER + 500 – 170
7-12 months postpartum	EER = Non-pregnant EER + 400 – 0

These equations provide an estimate of energy requirement. Relative body weight (i.e. loss, stable, gain) is the preferred indicator of energy adequacy.

Physical Activity Coefficients (PA values) for use in EER equations

	Sedentary (PAL 1.0-1.39)	**Low Active** (PAL 1.4-1.59)	**Active** (PAL 1.6-1.89)	**Very Active** (PAL 1.9-2.5)
	Typical daily living activities (e.g., household tasks, walking to the bus)	Typical daily living activities PLUS 30 - 60 minutes of daily moderate activity (ex. walking at 5-7 km/h)	Typical daily living activities PLUS At least 60 minutes of daily moderate activity	Typical daily living activities PLUS At least 60 minutes of daily moderate activity PLUS An additional 60 minutes of vigorous activity or 120 minutes of moderate activity
Boys 3 - 18 y	1.00	1.13	1.26	1.42
Girls 3 - 18 y	1.00	1.16	1.31	1.56
Men 19 y +	1.00	1.11	1.25	1.48
Women 19 y +	1.00	1.12	1.27	1.45

Figure 5. Health Canada's equations used for the calculation of daily estimated energy requirements.[162]

Appendix G

Table 28. BMI cut-offs (kg/m^2) used in the categorization of study participants as non-overweight (non-OW) or overweight (OW).*

	BMI (kg/m^2)									
	Age 9		Age 10		Age 11		Age 12		Age 13	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Non-OW	≤19.10	≤19.07	≤19.84	≤19.86	≤20.55	≤20.74	≤21.22	≤21.68	≤21.91	≤22.58
OW	>19.10	>19.07	>19.84	>19.86	>20.55	>20.74	>21.22	>21.68	>21.91	>22.58

** BMI cut-offs corresponded to the widely used cut-off point of 25 kg/m^2 for adult overweight.*[3]