Mind that Gap! Exploring a family-based vegetable cooking programme for children and their parents

by

David Trill

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF SCIENCE

in the School of Exercise Science, Physical and Health Education

Supervisory Committee

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David Trill

Supervisory Committee

Dr. Patti-Jean Naylor, School of Exercise Science, Physical and Health Education
Supervisor

Dr. Ryan Rhodes, School of Exercise Science, Physical and Health Education
Departmental Member

Abstract

Supervisory Committee

Dr. Patti-Jean Naylor, Exercise Science, Physical and Health Education
Supervisor

Dr. Ryan Rhodes, Exercise Science, Physical and Health Education
Departmental Member

Increasing fruit and vegetable intake is important to obesity prevention but children's vegetable intake remains low. This study aimed to enhance parent vegetable serving behaviour and child vegetable intake through an 8-week theory-based family cooking program. Sixty-five families with children aged 9-13 (11.1 ±1.4) were randomized into a home activity program or home activity plus cooking workshop program. There was no significant increase in parent vegetable serving habits or children's intake. Both interventions enhanced feeding practices ($F(1, 63) = 42.09$, $p=.000$, $\eta^2=0.40$) and reduced perceived barriers ($F(1, 63) = 13.01$, $p=.001$, $\eta^2=.017$). Children in the cooking workshop condition liked vegetables more ($F(1, 63) = 3.87$, $p=.050$, $\eta^2=0.06$) and had greater diet-disease awareness ($F(1, 63) = 3.97$, $p=.050$, $\eta^2=0.06$) at follow-up (statistic). Family engagement in cooking was successful in enhancing some psychosocial measures for both children and parents, particularly for those receiving cooking workshops. A low sample size and sampling bias may have masked other findings.

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Acknowledgements

I would like to express my deep gratitude and thanks to Dr. PJ Naylor. Quite simply, without her guidance, phenomenal insights and encouragement the Family Healthy Eating project would not have come to fruition. Or more accurately, without her faith and patience in me, I would not have made it to this point in my life. Furthermore, this project would not have been possible without her efforts to secure grants and other funding opportunities to support this project. My thanks to my departmental member, Dr. Ryan Rhodes, whose contributions have helped shaped this project into a presentable piece of academic work. I would also like to offer my thanks and appreciation to Dan and Micayla Hayes at The London Chef for offering their incredible establishment to hold the cooking workshops. And my deep thanks to all the families who participated in this study and brought this project alive. Throughout and beyond the University walls, my thanks to my family and many dear friends who have offered nothing but the highest levels of support along the way. I am very grateful for everyone's help and encouragement. Tausend Dank für alles!

Dedication

This work is dedicated to the celebration of good food everywhere and for everyone.

"Live well
Eat well"

Chapter 1: Introduction

Overview

Healthy eating is highly important for preventing chronic disease, obesity and other health issues as well as promoting overall health and well-being (French & Stables, 2003; Rolls, Ello-Martin & Tohill, 2004). A high fruit and vegetable intake specifically is seen as crucial protection against obesity (Epstein, Paluch, Beecher & Roemmich, 2008) but also as protection against other chronic health diseases such as cardiovascular disease, hypertension, type II diabetes and certain cancers (Fontaine, Redden, Wang, Westfall & Allison, 2003; Manson & Bassuk, 2003). These diseases impair quality of life as well as shorten life expectancy (Fontaine et al., 2003).

Increasing fruit and vegetable consumption is effective for overall health and obesity prevention by increasing fiber, water and satiety while displacing unhealthy options (Rolls et al., 2004). Recent Canadian research has also shown that children who ate five or more servings of fruits and vegetables a day were substantially less likely to be obese than those children who consumed fewer than five servings a day (Tjepkema & Shields, 2005). Furthermore other research has shown that diets high in fruits and vegetables offer protection against developing cancer and cardiovascular disease (van't Veer, Jansen, Klerk & Kok , 2000). Indeed, research has demonstrated that interventions aimed at increasing fruit and vegetable consumption in children are a viable public health solution to preventing obesity and other chronic disease and health issues (Epstein et al., 2008; Tjepkema & Shields, 2005).

Despite evidence that healthy eating and a focus on increased fruit and vegetable intake is important, fruit and vegetable intake in children remains low and often fewer than the recommended five servings per day (Rolls et al., 2004). Research by Baranowski et al. (2000) reported that children consumed low levels of fruits and vegetables ranging from 1.9 servings to 2.5 servings daily. Other research has found similar results, and in particular, vegetable intake is reported to be lower in children than fruit intake (Day, Strange, McKay & Naylor, 2008).

Healthy eating interventions are beneficial for enhancing fruit and vegetable consumption (Ciliska et al., 2000) and many school-based healthy eating interventions have been implemented (Baranowski et al,. 2000; French & Stables, 2003, Perry et al., 1998). These interventions conducted via schools are practical because the majority of children spend a substantial amount of time each day throughout the year in schools, eat snacks or meals there as well as being an

institution responsible for health education (Naylor & McKay, 2009; Tak, te Velde & Brug, 2009). Healthy eating programs have been readily delivered through tangible exercises within classroom curriculum, family interactions, school cafeteria options or school nutritional policies. Furthermore, school-based healthy eating interventions carry an advantage because a successful program can be delivered to multiple schools without extensive tailoring (Tak et al., 2009).

Schools interventions have been shown to be effective in increasing fruit and vegetable intake (Tak et al., 2009; te Velde et al., 2008) and some aspects of academic performance have also been enhanced due to school-based healthy eating campaigns (Belot & James, 2009). However, while results have been statistically significant, actual increases in vegetable and fruit consumption have been small (French & Stables, 2003). These effects are commonly attributed to increased fruit consumption while nutrient-dense vegetable intake remains low (Day et al., 2008). To highlight an example, school-based intervention effects from research by Perry et al. (1998) demonstrated an increase of lunchtime fruit consumption of 0.47 servings compared to an increase of 0.26 servings of lunchtime vegetable consumption. Other increases in vegetable consumption have not been commonly reported with school-based interventions (Baranowski et al., 2000).

It has been suggested that the home environment may offer a better platform to deliver and promote healthy eating strategies for children as opposed to school settings due to certain limitations (Lytle et al., 2006). For instance, eating practices during school hours only constitute a small portion of dietary behavior throughout an average week. The family and home environment, in contrast, represents a substantial portion of weekly dietary behavior with the small exception of family outings where meals may be consumed elsewhere. It has been estimated that approximately two-thirds of the foods and calories that children consume are from home (Adair & Popkin, 2005; Lin, Guthrie & Frazao, 1999).

Moreover, it has been frequently noted that parents play a key role in establishing the dietary habits of their children (Cooke et al., 2004; Hingle, O'Connor, Dave & Baranowski, 2010; Tjepkema & Shields, 2005). While classroom activities and lessons are suitably delivered by generalist teachers, parents may be more likely to influence their children's dietary behavior on a domestic level (Baranowski et al., 2000; Cooke et al., 2004; Reynolds et al., 2000; Tjepkema & Shields, 2005) because they act as the "gatekeepers" for their young children's

dietary behavior (Evans et al, 2006; Hingle et al, 2010). Krølner et al. (2009) found that children's eating habits are largely established early on in the home environment. Since childhood habits are predictive of adult profiles (Meininger, 2000), establishing healthy dietary habits in young children can offer them an advantage in later years with regard to obesity protection and other health diseases.

Furthermore, the family settings may differ from school venues in terms of the types of food consumed. School-based interventions often focus on snack or lunchtime meals where fruits may be a more popular choice among children. Evening dinners are more likely to include vegetables and thus family-based interventions may result in more success related to vegetable promotion and intake (Arcan et al., 2007; St. Jeor, Perumean-Chaney, Sigman-Grant, Williams, & Foreyt, 2002; Verzeletti, Maes, Santinello, Baldassari & Vereecken, 2009).

Family-based interventions can also focus on food skills which include food preparation and other culinary skills. Cullen, Watson, Zakeri, Baranowski & Baranowski (2007) successfully increased fruit, juice and vegetable consumption in children when engaging them in recipe goal-setting tasks. Condrasky, Williams, Catalano and Griffin (2011) pointed out that programmes which developed kitchen skills and cooking confidence were likely to bring about numerous other benefits such as increased food preparation self-efficacy, healthier dietary habits (including greater fruit and vegetable consumption), and enhanced food knowledge. Other complimentary research has also noted that having youth partake in family meals was associated with improved diet quality including greater fruit and vegetable consumption (Gillman et al., 2000; Stead et al., 2004).

Attached to many healthy eating interventions, theoretical models attempt to explain behaviour and the factors that predict behavior. A sound theoretical model should be robust enough to be applicable across multiple situations as well as populations. Several prominent models are available and widely used across the large field of health research (Bandura, 2004). While different theoretical models offer unique components compared to others, the Social Cognitive Theory, developed by Albert Bandura (1977), shows particular promise for healthy eating interventions.

The Social Cognitive Theory has had and maintains a strong presence in the literature surrounding school-based healthy eating research (Baranowski, Cullen & Baranowski, 1999).

This theoretical model suggests that the environment, behaviour and an individual's cognition influence each other in a reciprocal manner which brings about behavioural changes (Bandura, 1977). The core principle of social cognitive theory is self-efficacy: a belief in one's self that they are able to execute a desired behavior leading them to engage in this behavior. Efficacy expectations (self-efficacy) can be facilitated through performance accomplishments, supportive environments, vicarious learning, verbal persuasion, and physiological states (Bandura, 1977). A sense of mastery in a certain behavior or skill is crucial for self-efficacy. Self-efficacy influences outcome expectations which, in turn, lead toward healthy eating behaviours. In terms of increasing vegetable intake in children as well as vegetable serving behavior in parents, Social Cognitive Theory would suggest that children and parents need to believe that they are able (from their own cognitions and environmental settings) to increase their intake or serving behavior. If the children and parents believe they can achieve this, then a behavioral change is likely to follow. If parents develop greater skill and confidence in their preparation and cooking abilities and their expectations of the outcomes change through successful experiences cooking and tasting with their children, verbal persuasion and modeling, they may be more likely to serve their children a healthy variety of vegetables during family meals.

There is limited research on both family-based healthy eating interventions for children as well as those focused on the consumption of vegetables. Public health experts and researchers suggest that involving parents and children in food preparation and cooking is a way forward. In fact, the literature shows that this has had an impact on improving children's dietary habits and fruit and vegetable consumption (Cullen et al., 2007; Pearson, Atkin, Biddle & Gorely, 2010; Wardle, Cooke et al., 2003). To the best of our knowledge there have been no studies to date that involve parent and child collaborative food preparation and cooking experiences and target vegetable consumption solely.

Purpose

The purpose of the study was to determine the effectiveness of a Social Cognitive Theory based family intervention focused on the preparation of, and exposure to, vegetables.

Specifically, the primary research questions were:

a) Do parents involved in a family cooking workshop intervention change their behavioural habits related to family feeding practices, access and accessibility, and serving habits of vegetables compared to those using a self-guided home-based intervention?
b) Do children aged 9 to 13 involved in a family cooking workshop intervention increase their practices of access and availability towards, and consumption of, vegetables compared to those using a self-guided home-based intervention?

Secondary research questions were

c) Does a family cooking workshop intervention significantly influence the theoretically derived mediating variables of self-efficacy (food purchasing and cooking skills), outcome expectancies and food neophobia (willingness to try) in parents compared to a self- guided home-based intervention?
d) Does a family cooking workshop intervention significantly influence the theoretically derived mediating variables related to vegetable consumption such as related knowledge, liking for vegetables and food neophobia in children compared to a self-guided home-based intervention?

Hypothesis (H_A)

There were four main hypotheses in the current study:

1) There will be a significant difference in preparation and serving behavior of parents related to vegetables in both groups over time and the differences will be significantly greater in the cooking workshop condition when compared to the home activity only condition.,
2) There will be a significant difference in the theoretically derived mediating variables of self-efficacy, outcome expectancies, perceptions of accessibility/availability, family feeding practices, and food neophobia related to vegetables in parents over time and these differences will be significantly greater in the cooking workshop condition than in the home activity only condition.

3) There will be a significant difference in self-reported vegetable intake by young children over time and the cooking workshop condition changes will be significantly greater than in the home activity only condition, and
4) There will be a significant difference in the theoretically derived mediating variables of knowledge and liking for fruits and vegetables, perceptions of accessibility/availability, and food neophobia in children related to vegetables over time and changes will be significantly greater in the cooking workshop condition.

Operational Definitions

Family

For the purposes of this study, a family was defined as a unit including:

- At least 1 parent and 1 child.
- Parents between the ages of 25 to 55 years at the commencement of the intervention.
- Children between the age range of 9 to 13 years at the commencement of the intervention.

Vegetable Intake and Serving habits

Child vegetable intake and parent vegetable serving behavior was defined as the number of servings consumed or served per day. Changes in vegetable consumption and serving habits were assessed by the number of servings measured by a food frequency questionnaire for children and a parallel food frequency serving questionnaire for the parents (Baranowksi et al., 1997). For the purpose of this research, measurement of vegetable servings was determined by the Canada Food Guide recommendations. Serving sizes was based on the following criteria:

- One serving of either vegetable or fruit constituted 125mL or was equal to a whole piece that could be held in the hand.
- One serving of vegetable or fruit juice equaled 125mL.
- One serving of uncooked loose leaf plants or greens equaled 250mL.
- One serving of dried fruits or vegetables equaled 60mL.

Family Feeding Practices

Family Feeding practices were defined as the extent to which parents model, restrict and/or encourage certain feeding practices in the home environment (Musher-Eizenman & Holunb, 2007). Several domains for family feeding practices included energy and balance, food environment, child involvement, parent modeling and teaching about nutrition

Access and Availability

Based on work done by Hearn and colleagues (1998), availability was defined as the status of whether or not fruit and vegetables were present in the home (ie: in the pantry or refrigerator). Accessibility was defined as the status of the whether or not fruits and vegetables were in a state that enabled children to consume them (ie: presented on a plate, cut-up or peeled).

Self-Efficacy

Self-efficacy was defined as one's belief that they were able to execute a desired behavior. Self-efficacy can be facilitated through performance accomplishments, supportive environments, vicarious learning, verbal persuasion, and physiological states (Bandura, 1977). Self-efficacy concepts in the current study specifically focused on cooking and provision self-efficacy in parents rather than on consumption related self-efficacy.

Outcome Expectations

Outcome expectations were defined as one's belief that certain behaviours they engaged in would lead to desirable results. Outcome expectancies also relate to how an individual copes with the perceived barriers or incentives that may hinder or enhance healthy eating behaviours and thus expectations were measured by specific questions about barriers to vegetable consumption.

Liking

Liking was defined as the preference for the taste of fruits and vegetables as measured by self-report rating scale.

Food Neophobia

Food Neophobia was defined as one's unwillingness to try novel food (Galloway, Lee & Birch, 2003). In the present study, the focus was on willingness to try novel vegetables for both children and their parents.

Delimitations

The following were study delimitations:

1) Participants were recruited from the Greater Victoria area, British Columbia
2) Families included at least 1 parent and 1 child
3) Parents were aged between 25-55 years
4) Children were between the ages of 9 to 13 years

Limitations

A prominent limitation of this research project was the nature of the measurement process. Data collection methods were based on self-report. This process relies on the assumption that participants will truthfully and accurately complete the assigned measures. Conversely, the limitation of such a design is that participants will not answer truthfully or accurately to the assigned measures. School-based interventions have noted several confounds in self-report measures such as exaggerating dietary behaviour, forgetfulness and inability to accurately recall food items and portion size as well as poor literary comprehension or language barriers; all of which may lessen the reliability of these instruments (Baranowski et al., 2000).

The appropriateness of the instruments used for assessment may also be a limitation. Currently, there is no gold standard for assessing objective dietary behavior (Hingle et al., 2010) and food frequency questionnaires, for example, have been shown to overestimate fruit and vegetable intake (Thompson et al., 2000). Moreover, several measures were adapted to meet the unique study objectives.

Another limitation was the potential for socially desirable responding (Thomas, Nelson & Silverman, 2005). The nature of this project (healthy eating) was not disguised to either cohort (home activity and cooking workshop groups). Thus, participants may have been more likely to describe their eating behavior in a manner that was more positive and favourable rather than undesirable or actual. Specifically, participants may have over-reported vegetable intake or serving behaviour.

Similarly, there may have been a bias towards healthy eating among the participants as they were all volunteers. It is likely that participants who volunteered may have been more ready to change their dietary behavior or were already practicing healthy eating habits.

On a different note, since the proposed intervention was based on the consumption of fresh produce, seasonality of these items was also a limitation. While fresh produce is available year round, seasonality can affect its availability, quality and price. Such factors can influence the willingness to purchase these items. For populations in the northern hemisphere, fruits are readily available from late spring (April) to early autumn (September). Vegetables crops follow afterwards from early summer (May) to late fall (November). The multiple waves of the present study were spread from spring to winter 2013 which included a range of seasonality issues for fresh produce.

Chapter 2: Review of Literature

This review of literature examines four areas of concern related to healthy eating research for children. First, the rationale for the prevention of chronic disease and other health issues like childhood obesity will be presented specifically highlighting the role of fruit and vegetables. Second, the correlates of fruit and vegetable consumption in children including theoretical constructs will be reviewed. The third area will examine healthy eating interventions that specifically relate to fruit and vegetable intake, particularly in the schools. The fourth will examine current research on family-based healthy eating interventions and those related to vegetable intake.

I. Rationale for Prevention of Chronic Disease and Obesity

Chronic disease and related risk factors are growing health concerns

Rates of chronic disease are increasing and the World Health Organization has described these patterns as a global epidemic (James et al., 2001). Risk factors such as obesity, unhealthy eating and physical inactivity contribute to these alarming trends (Canadian Institute for Health Research, 2004; Tremblay et al., 2011). The distribution of obesity is not restricted to adult populations; the prevalence of chronic disease and obesity rates are increasing in children (Roberts et al., 2012). Lifestyle habits that are protective against chronic diseases and promote overall health and wellness have their roots in childhood. Indeed research shows that children's healthy living practices (such as healthy eating and physical activity) are problematic and below national recommendations (Tjepkema & Shields, 2005; Tremblay et al., 2011). This is a serious issue given other research that suggests that risk factors and health issues in childhood track into adulthood (Meininger, 2000).

In Canada, rates of overweight and obese children have more than doubled in the past 25 years (Tjepkema & Shields, 2005). A recent national census reported that 32% of Canadian children aged 5 to 17 years were overweight or obese (Roberts et al., 2012). This is a serious issue given other research that suggests obesity is associated with other chronic health issues such as cardiovascular disease, hypertension, type II diabetes and multiple cancers (Fontaine, Redden, Wang, Westfall & Allison, 2003; Manson & Bassuk, 2003). Indeed, research has

associated these childhood health concerns with lower levels of self-esteem, increased vulnerability to depression, exposure to bullying and other psycho-social concerns on top of other physical health indicators such as elevated blood pressure and insulin resistance (Janssen et al., 2004; Puhl & Latner 2007; Viner et al., 2005). These diseases impair quality of life as well as shorten life expectancy (Fontaine et al., 2003). Furthermore, medical expenditure on these diseases places a considerable strain on health care resources (Canadian Institute for Health Research, 2004). The Public Health Agency of Canada (2011) estimated that the health care burden of these chronic disease and obesity related concerns amounted to $4.6 billion in 2008. Considering the health risks and associated costs, chronic disease prevention and obesity related interventions are clearly desirable steps

Chronic disease, obesity and their relationship with dietary habits

Healthy eating is considered to be important for preventing chronic disease and obesity (Rolls et al., 2004). Previous research has demonstrated that healthy eating practices, and fruit and vegetable consumption in particular, are effective measures in preventing chronic disease (Lock, Pomerleau, Causer, Altmann & McKee, 2005) and countering obesity (Epstein et al., 2008; French & Stables, 2003). Increasing fruit and vegetable consumption is effective for obesity prevention by increasing fiber, water and satiety while displacing unhealthy options (Rolls et al., 2004). Specifically, consuming at least five servings of fruits or vegetables a day is recommended (Perry et al., 1998). A serving of fruit or vegetable constitutes approximately 125mL of produce or an item that fits into an adult's hand (eg: an apple or medium carrot). Eating fruits and vegetables serves two primary functions. Firstly, it contributes to the daily caloric energy requirements, and secondly, fruits and vegetables are important sources of nutrients which are needed for body functioning, growth and development as well as disease protection (Belot & James, 2009). Tjepkema and Shields (2005) showed that Canadian children who ate five or more fruit and vegetable servings per day were substantially less likely to become obese than those children who consumed fewer than five servings a day.

A study conducted by Epstein et al. (2008) demonstrated that a commitment to consume more fruits and vegetables rather than simply reducing high fat and energy-dense foods was more effective in countering obesity. Moreover, the study suggested that emphasis on consuming

more fruits and vegetables may be easier to maintain over time than constantly avoiding high fat energy-dense foods. Efforts that increase fruit and vegetable consumption offer the dual benefit of obesity protection as well as chronic disease prevention.

F&V intake in children is low

Despite evidence that healthy eating and specifically that vegetable and fruit intake is important in preventing chronic disease and, fruit and vegetable intake in children remains low and often fewer than five servings per day (Wilkinson-Enns, Mickle & Goldman, 2002; French & Stables, 2003; Rolls et al., 2004). Research by Baranowski et al. (2000) reported that children consumed a low level of fruits and vegetables ranging from 1.9 servings to 2.5 servings daily. Other Canadian research has found similar results with youth and in particular, vegetable intake is reported to be lower in children than fruit intake (Day, Strange, McKay & Naylor, 2008). Unhealthy diets are often characterized by low fruit and vegetable consumption, food choices that are high in fat and sugar as well as consuming a high amount of calories (Dietz & Gortmaker, 1985; Prentice & Jebb, 2003; Rey-Lopez et al., 2008). A diet high in fruits and vegetables reduces the risk of chronic health diseases such as cardiovascular disease and cancers, offers crucial protection against obesity and supports developmental growth (Belot & James, 2009; Epstein et al., 2008; Fontaine et al., 2003; Manson & Bassuk, 2003).

II. Correlates of Fruit and Vegetable Consumption in Children

There are many identified correlates of fruit and vegetable intake in children (Pearson, Biddle & Gorely, 2009). Understanding these correlates is an important precursor to promoting and affecting change in actual eating behavior in children. Research by numerous authors have highlighted three key correlates of fruit and vegetable intake in children, namely 1) the amount of exposure (Cooke et al., 2004), 2) accessibility and availability of fruits and vegetables (Blanchette & Brug, 2005) and 3) parental factors (Verzeletti et al., 2009). In addition, the prevalence of these correlates can be tied into theoretical models of behavior. Each of the three correlates will be discussed briefly following and their connection to a theoretical framework.

Exposure, neophobia and taste preferences

As young children grow and develop they are likely to come across new foods and varying tastes. These early positive experiences of trying new food types and developing taste preferences are instrumental in the development of healthy eating (Birch, 1999). A key element in food exposure is food neophobia which relates to a child's unwillingness to try novel foods (Day et al., 2008; Galloway et al., 2003). A child with high food neophobia may be unwilling to try new fruits and vegetables and thus be unlikely to meet recommended dietary levels. Alternatively, if a child exhibits low food neophobia, then he or she would be more likely to try different fruits and vegetables not only locally but also from different countries. This is an important point considering the seasonal availability of fresh local produce and the off season supply of foreign choices.

Trying new fruits and vegetables is a critical correlate of establishing healthy eating habits. Several research studies have identified exposure to different fruits and vegetables as significantly correlated to higher fruit and vegetable intake (Blanchette & Brug, 2005; Cooke et al., 2004; Wardle, Cooke et al., 2003). Cooke et al. (2004) examined food neophobia in pre-school children and found that low food neophobia was a strong predictor of fruit and vegetable intake.

Another correlate seemingly related to food neophobia is taste preference for fruits and vegetables. Taste preference is also established early on and is frequently correlated with exposure to new fruits and vegetables (Wardle, Herrera, Cooke, & Gibson, 2003). Taste preference is an important factor contributing to healthy eating practices among children. Children who not only eat a high amount of fruits and vegetables but also consume a wide variety have better established taste preferences compared to those children who do not (Blanchette & Brug, 2005).

Accessibility & Availability

In order to promote healthy eating and higher rates of fruit and vegetable intake, these produce items must be literally in the hands of the children through accessibility and availability. Availability refers to the status of whether or not the foods are present in the home (ie: in the pantry) while accessibility refers to status of the foods being in a state that enables children to

consumed them (ie: presented, cut-up or peeled) (Hearn et al., 1998). Blanchette and Brug (2005) reviewed 38 articles examining the determinants of fruit and vegetable consumption among 6-12-year-old children. From several school-based programs they found that accessibility and availability of fresh fruits and vegetables in the school environment were central factors in promoting healthy eating among children. Other research has shown that school-based interventions which provided fruits and vegetables to students demonstrated that these students were more likely to eat a piece of fruit or vegetable (Davis, Cullen, Watson, Konarik & Radcliff, 2009; Tak et al., 2009). Comparably, access and availability to fruits and vegetables in the home environment also had a positive influence on children's consumption (Ding et al., 2012). Since accessibility and availability are strong determinants of higher fruit and vegetable intake in children, fresh produce should be readily available with any intervention aiming to increase intake. Children may not actively seek out fruits or vegetables and thus lessen their opportunities for healthy eating behaviours. Having readily available fruits and vegetables – either at school or at home – is likely to promote intake. For example, Christian, Evans, Hancock, Nykjaer and Cade (2013) reported that cutting up fruits and vegetables on a daily basis for children was associated with higher consumption compared to children who only had access occasionally. Furthermore, Heim, Stang and Ireland (2009) noted that exposure and experience with fruits and vegetables was a positive influence on children's preference for and asking behavior.

The availability and accessibility of fruit and vegetables for children is important across all eating environments. Interestingly, Kristjandottir, De Bourdeaudhuij, Klepp and Thorsdottir (2009) found that perceptions of the availability and accessibility of fruit and vegetables varied between children and their parents. In their study, the children reported lower levels of availability and accessibility of fruits at home than their parents; but there was more agreement with vegetables. On the other hand, research conducted by Robinson-O'Brien, Nuemark-Sztainer, Hannan, Burgess-Champoux and Haines (2009) found that perceptions between children and their parents were similar with regard to vegetable and fruit accessibility and availability. Although these results are mixed, they highlight the importance of access and availability through parents as determinants of children's fruit and vegetable consumption in the home environment.

Parental Correlates

Parental modeling has been shown to be an important correlate to children's fruit and vegetable intake especially in the home environment (Verzeletti et al., 2009). Several studies have shown that children whose parents eat a high amount of fruits or vegetables are more likely to eat fruits and vegetables than those children's parents where consumption is low (Rasmussen et al., 2006; Tjepkema & Shields, 2005). Specific parents may also influence a child's fruit and vegetable eating behavior. Mothers who demonstrated and practiced healthy eating habits were influential in the development of their children's healthy eating habits (Cooke et al., 2004). However, parents might also model inappropriate feeding practices that promote and lead to poor dietary habits. A training plan or education on healthy eating practices can be of value as children establish their own habits (Bante, Elliott, Harrod & Haire-Joshu, 2008; Harvey & Coleman, 2007).

Kristjandottir et al. (2009) found that family practices were also important when examining the determinants of fruit and vegetable intake in children. For instance, they found that family practice of eating vegetables together during meals was a strong modelling determinant for the child to establish the habit. This was also similarly supported by Sweetman, McGowan, Croker and Cooke (2011) who found that children's vegetable consumption was predicted when the children ate approximately the same foods as their parents; especially when these foods were made from scratch. It is also plausible that the children of parents who encourage them to eat more fruits and vegetables in family settings are more likely to independently exhibit this behavior in other settings such as the school environment, although this is yet to be sufficiently determined.

While parental modeling is an important correlate of a child's fruit and vegetable consumption, parenting style also plays a role in children's consumption habits (Cooke, et al. 2004). For example, Verzeletti et al. (2009) found that having strict family rules about eating and family dinners were significantly associated with higher fruit and vegetable intakes. Conversely, research conducted by de Bourdeaudhuij et al. (2008) found that specific parenting styles (authoritarian vs indulgent, for example) did not strongly correlate with high fruit and vegetable consumption in children. While these findings appear contradictory with those of Verzeletti et al. (2009), their findings were about overall family style rather than rules practiced by the family

related to fruit and vegetables. It is evident that parental influences on children's home eating practices are an important consideration.

Theoretical constructs relating to fruit and vegetable consumption

It should be noted that many healthy eating interventions are often based on sound theoretical models (Hildebrand & Betts, 2009). Theoretical models are developed to explain behaviour and the factors that surround the cognitive processes in order to predict behavior. A sound theoretical model should be sufficiently robust to be applicable across multiple situations as well as populations (Ciliska et al., 2000). School-based interventions which are founded on appropriate theoretical models show beneficial results for children's fruit and vegetable intake (Baranowski et al., 1999; Gratton, Povey & Clark-Carter, 2007). Furthermore, family-based healthy eating interventions also demonstrate intervention success when evaluated against theoretical constructs (Fulkerson et al., 2010; Pearson et al., 2010).

Although other theoretical models exist, the Social Cognitive Theory (SCT) has had a strong presence in the literature surrounding school and community-based health-promotion research (Baranowski et al., 1999; Day et al., 2008; Fulkerson et al., 2010; Glasson, Chapman, Gander, Wilson & James, 2012). Several components of the theory are a suitable fit for family-based interventions and specifically those that include cooking skills and food experiences/exposures. In addition, several relevant measurement instruments have been developed. This theoretical model (see figure 1) suggests that the environment, behaviour and an individual's cognition influence each other in a reciprocal manner which brings about the decision to adopt behavioural changes (Bandura, 1977). The core principle of social cognitive theory is self-efficacy: an individual's belief in their ability to execute a desired behavior that then leads them to engage in this behavior. Efficacy expectations (self-efficacy) can be facilitated through performance accomplishments, vicarious learning, physiological states (such as tasting experience) and verbal persuasion (Bandura, 1977). A sense of mastery in a certain behavior or skill is crucial for self-efficacy. Self-efficacy influences a second key component of SCT, outcome expectations (one's belief that a given behavior will lead to certain outcomes) which, combined, lead toward healthy eating behaviours. Furthermore, outcome expectancies also consider how an individual copes with the perceived barriers that may hinder healthy eating behaviours. Figure 1 demonstrates

how the three factors or environment, personal cognitions and behavior influence one another to lead to a behavior which results in a certain perception of outcome.

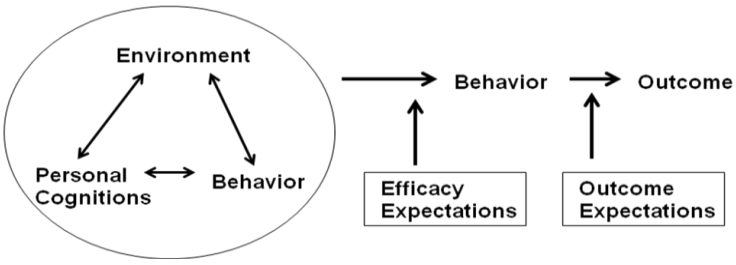

Figure 1. Model of Social Cognitive Theory proposes that environment, behavior and attitude influence an individual's intention to engage in a health behavior.

In terms of increasing one's fruit and vegetable intake, they should believe that they are able (from their own thoughts and environmental settings) to increase their number of servings of fruits and vegetables per day. According to Bandura (1986), if they believe they can do this, and they expect that doing so will coincide with their outcome expectancies, then a behavioral change is likely to follow. For example, in terms of eating new vegetables, if the children are encouraged that a particular vegetable is tasty which is supported through verbal encouragement from their parents to taste it, they are likely to expect that the vegetable is tasty. Similarly, if parents gain a sense of mastery in preparation and cooking skills with vegetables and they believe that performing the behaviour will result in a desired outcome, then an increase in serving behavior is likely to follow. The concept of self-efficacy for both the children and parents does not necessarily have to describe identical forms of behavioural change. For instance, the difference between the children's consumption habits and the parents serving habits can be viewed as a distinction of eating behavior self-efficacy and serving behaviour self-efficacy for the children and parents respectively. Another important component in this framework is reciprocal determinism: an interaction between two sources. For the current project, this accounts for the collaboration and interactions between children and their parents and how they influence each other healthy eating habits.

Other concepts that have emerged from the literature that appears to be a consequence of self-efficacy (ie: experiences and taste) and outcome expectancies is willingness to try (Day et

al., 2008; Galloway et al., 2003). Willingness to try new fruits and vegetables (ie: food neophobia) relates to self-efficacy in terms of successful tasting experiences. That is, through performance accomplishments and physiological states such as positive tasting experiences. Food neophobia also connects with outcome expectancies in terms of possibly lower apprehension to try new vegetables.

Previous research has highlighted the importance of concepts that influence children's fruit and vegetable intake such as food neophobia (Cooke et al., 2004) and accessibility and availability of these foods (Blanchette & Brug, 2005). However, another construct that is an important influence on fruit and vegetable consumption habits is knowledge about and liking for fruits and vegetables (Brug, Lechner & De Vries, 1995). Researchers have found that shifts in knowledge about healthy eating and disease prevention as well as enhancing liking towards novel fruits and vegetables can contribute to higher fruit and vegetable intake (Glasson et al., 2012).

III. School-Based Healthy Eating Interventions

Rationale for school-based interventions

Many healthy eating intervention for children have been implemented (French & Stables, 2003) and a majority of these interventions appear to be school-based. Reviewing school-based healthy eating interventions is useful because the methodology used is similar to that used with community or family-based approaches.

Schools have served as the primary vehicle for delivering healthy eating promotion interventions as the majority of children enroll in public school systems (te Velde et al., 2008; Tak et al., 2009). School-based interventions supply the benefit that a vast majority of children pass through the education system, spend a substantial amount of time each day throughout the year in schools and eat snacks or meals and they are responsible for health education (Naylor & McKay, 2009). A suitable intervention can tap into this extensive enrollment (Tak et al., 2009). These programs have been delivered through tangible exercises within classroom curriculum, family interactions, school cafeteria options or school nutritional policies. School-based healthy eating interventions carry an advantage because a successful program can be delivered to

multiple schools without extensive tailoring. The following summarizes the findings from major school-based interventions and their impact on fruit and vegetables.

School-based healthy eating intervention findings

Healthy eating interventions often have one of two primary targets for change: either a reduction in sodium and high fat, energy-dense foods, or an increase in fruit and vegetable consumption. Often, a combination of these two is delivered. This review focuses on those addressing fruits and vegetables.

Five school-based healthy eating interventions are highlighted based on their particular methodology and quantitative findings. To begin, Perry et al. (1998) initiated a randomized school-based trial labeled the "5-a-Day Power Plus Program". Its aim was to increase fruit and vegetable consumption in grades 3 to 5 students using a multi-component approach which involved classroom curricula activities including food preparation and taste testing opportunities, parental involvement, food service changes and industry involvement. Data was collected using lunchroom observations and 24-hour recall measures and subsequent dietary analysis. Their results showed a significant increase in daily fruit consumption (0.62 servings) as well as an increase in lunchtime fruit consumption (0.30 servings) and combined fruit and vegetable lunchtime consumption (0.47 servings). There was also a significant increase lunchtime vegetable consumption (0.26 servings) but this was only observed in girls (Perry et al., 1998). This research demonstrated that school-based interventions could increase fruit and vegetable consumption but that the effects were small to medium and varied somewhat by gender.

Baranowski et al. (2000) implemented a school-based intervention program called "Gimme 5". The intervention focused on fruit, fruit juice and vegetable consumption for fourth and fifth graders using a randomized controlled intervention trial with 16 elementary schools. The intervention included a classroom delivered curriculum which included elements of taste testing and snack preparation skills, family newsletters, videotapes and point-of-purchase education sessions. Fruit and vegetable intake was measured by a 7-day dietary food recall. Their findings revealed a significant average increase of 0.2 servings which was mostly attributed to an increase in vegetable consumption. Although small, these results were comparable to previous

research delivering similar programs (Baranowski et al., 2000). Baranowski commented that improvements in measurement reliability might show more substantive results.

Another school-based intervention was the "High 5 Project" (Reynolds et al., 2000). This study evaluated a healthy eating program aimed at fourth grade children to increase their daily intake of fruits and vegetables. This intervention randomized 28 schools into either an immediate intervention condition or a delayed intervention control condition. The intervention program included classroom activities (including taste testing opportunities), parent involvement with nutritional homework assignments and cafeteria components offering more fruits and vegetables. Fruit and vegetable intake was measured with a 24-hour dietary recall after one and two years post baseline measurement. A distinguishing feature of this study was that the classroom component of healthy eating was delivered by trained High 5 personnel. Results revealed that children in the treatment group reported a significantly higher intake of fruits and vegetables at follow-up 1 (3.96 servings, 95% CI, 3.51-4.44 versus 2.28 servings, 95% CI, 1.92-2.66) and at follow-up 2 (3.20 servings, 95% CI, 2.89-3.52 versus 2.21 servings, 95% CI 1.94-2.49) compared to the control condition. Although the results were promising, the researchers involved suggested that intervention effects may vary and the intervention might not be as successful when delivered by general classroom teachers rather than by trained personnel (Reynolds et al., 2000).

On a larger scale, the Pro Children Study evaluated a European wide intervention program on fifth and sixth graders fruit and vegetable intake (te Velde et al., 2008). The evaluation assessed 62 cluster randomized schools in Norway, Spain and the Netherlands at one and two years following baseline measurement. The intervention incorporated a classroom, school and parent component all based on healthy eating activities. Such activities included taste testing opportunities for access and exposure at school as well as homework assignments with parents. Fruit and vegetable intake - which was based on grams (g) consumed per day rather than servings per day - was measured by a 24-hour dietary recall. A central feature of this program was the frequent distribution of pieces of fruit or vegetables during school lunch hours. Results showed that fruit and vegetable consumption for children in the intervention group was an average of 56.9 g/day higher than the control students at one year follow-up assessment. However, during the second year of follow-up evaluation, this intervention difference was only

observed in Norwegian schools with an average increase of 91.5 g/day higher than compared to their control cohort while children in Dutch and Spanish intervention schools reported a decrease in consumption. The authors noted that intervention effects were primarily due to an increase in fruit consumption. As well, this loss of observable effects towards the end of this study might be attributed to a decline in program commitment and delivery (te Velde et al., 2008).

The Action Schools British Columbia (BC) Healthy Eating program targeted grade 4s and 5s to increase knowledge, attitudes and perceptions about fruits and vegetables plus increasing willingness to try new produce with the ultimate outcome being an increase in fruit and vegetable intake (Day et al., 2008). Intervention components included twice weekly healthy eating classroom activities plus monthly tasting sessions. The tasting sessions often included the preparation of foods by students, for instance, making smoothies or salads. Changes in fruit and vegetable intake were assessed using 24-hour recall and food frequency questionnaires. Results indicated a significant change in total fruit and vegetable intake at follow-up assessment (0.18 servings) compared to baseline measures. It should be noted that not only did intervention schools report an average increase in fruit and vegetable consumption but usual practice schools reported a decrease in consumption (-0.79 servings). Thus, results were due to an increase in intervention schools as well as a decrease in usual practice schools. This study also demonstrates an important point that healthy eating interventions, might not bring about large positive changes in fruit and vegetable consumption, but may indeed protect against drops in consumption as noted in other reviews (Knai, Pomerleau, Lock & McKee, 2006). Furthermore, one of the issues noted in this study was the seasonal availability of fresh produce which could affect consumption (Day et al., 2008). These seasonal variances on fruit and vegetable consumption have been noted elsewhere (Brug et al., 1995).

The limitations of school-based approaches

Notably, while intervention results have been statistically significant, the effect sizes have been small (French & Stables, 2003; Knai et al., 2006). These effects have also largely been attributed to increased fruit consumption while nutrient-dense vegetable intake remains low. Reported increases in fruit and vegetable consumption have often been as a result of increased

fruit or fruit juice consumption (Day et al., 2008). A substantive increase in vegetable consumption is not often reported with school-based interventions (Baranowski, 2000).

One reason may be that multi-components are not delivered in full (te Velde et al., 2008) and Ciliska et al. (2000) noted that this was a crucial factor for intervention success. A review by Sallis, Chen and Castro (1995) highlighted the fact that several school-based approaches failed to include all components during the course of their program. In the Pro Children Study, te Velde et al. (2008) attributed weaker program effects in three countries where the full range of the intervention was not completely delivered. In contrast, Norwegian schools, which were able to implement the widest scope of intervention (including the involvement of families and communities), demonstrated the greatest improvement over time (te Velde et al., 2008). Piecemeal program delivery could be due to several circumstances such as shortage of time, individual commitment or resources.

In contrast to the above, the breadth of the intervention may also be a limitation. If an intervention is too diverse or complicated to implement, then the quality of the program may diminish. Perry et al. (1998) suggested that a simple message focused on specific healthy eating behaviours might be more effective than a broad diverse message. Indeed, Behan (2012) recommended that healthy eating messages be clear, simple and quick; especially for participating families. Students and other populations may find it easier to grasp onto a simple clear-cut health-promotional message than a lengthy complicated one (Ciliska et al., 2000). School-based interventions or other schemes attempting to tackle a wide host of nutrition issues all at once could also meet with limited success.

In a similar concept, classroom-focused healthy eating interventions may not be strong enough to promote sizeable effects. A broader approach to healthy eating interventions may be required. This does not imply both specific and broad complex message simultaneously. Rather, that healthy eating interventions could benefit from a collected contribution of family input, community interaction or recreational centre assistance in addition to school and classroom activities. In essence, a potential intervention should focus on one clear message but spread and share that message across multiple mediums and venues. Notable examples of this were Action Schools BC that focused on fruit and vegetable consumption using a whole school approach and

the Pro-Child study that involved community members to implement exposure and tasting opportunities (Day et al., 2008; te Velde et al., 2008).

Interventions conducted in classroom settings might also be limited in their suitability to deliver and implement certain healthy eating practices. Many of the school-based interventions which included classroom components did not focus on specific food skills and cooking activities that the children could engage in. As well, many elementary pupils are taught by generalists in schools and classrooms without available cooking facilities. Furthermore, involvement of parents in these classroom settings (and during school hours) is not always viable. Without these elements, the translation of classroom learning of food skills to home settings may diminish.

A review by Meininger (2000) supports a similar claim that classroom-based activities tend not to show influence on eating behaviours beyond the classroom. Clearly, healthy eating promotions based in school settings aim to spread their effects beyond the walls of the lunch room but could benefit from external support. Studies that delivered an intervention program beyond the classroom environment to include such elements as family or communities showed a wider spread of effect on outcome measures (Perry, 1998; Reynolds et al., 2000; Te Velde et al., 2008) pointing to the potential importance of parental involvement.

Another point to consider is that eating practices during school hours only constitute a small portion of dietary behavior throughout an average week. Eating habits at schools primarily consist of lunch time meals with an optional mid-morning snack break (French & Stables, 2003). Thus, while school-based interventions appear suitable to affect change within their own settings, the school environments themselves are limited when seeking to affect change beyond the school realm.

IV. Family Environments

Rationale for family environments

Based on the evidence from school interventions, it is clear that the home environment may also be an important setting for delivering and promoting healthy eating strategies for children. In fact, the home environment is the most common location where young children establish their eating habits (Krølner et al., 2009). The family and home environment contribute

to the most substantive portion of dietary behavior with the small exception of family outings where meals may be consumed elsewhere. In fact, Adair and Popkin (2005) estimated that approximately two-thirds of the foods youth consume are from home. This is also coupled with the likelihood that much of the food children bring to school is from home. Still further, Lin, Guthrie and Frazao (1999) estimated that approximately 70% of the calories consumed by 6-11-year-old children are eaten in the home environment. This suggests the importance of directing attention to the home-setting when delivering healthy eating interventions for young children.

Furthermore, the family setting may differ from school venues in terms of the types of food consumed. School-based interventions often report little success with vegetable promotion (Baranowski et al., 2000, Day et al., 2008). These interventions are often focused on snack or lunchtime meals where fruits may be a more popular choice among children. Evening suppers are more common meals to include vegetables. For this reason, it is possible that family-based interventions may have more impact on vegetable intake than similar school-based ones (Arcan et al., 2007; Pearson et al., 2010; St. Jeor et al., 2002; Verzeletti et al., 2009).

It has also been frequently noted that parents play a key role in establishing the dietary habits of their children (Cooke et al., 2004; Tjepkema & Shields, 2005). Parents may be more likely to influence their children's dietary behavior than programs delivered through school curriculum (Baranowski et al., 2000; Cooke et al., 2004; Reynolds et al., 2000; Tjepkema & Shields, 2005). For example, fruits as snacks may come under parental rules restricting certain snack foods while vegetable intake may be influenced by family dinner rules (Verzeletti et al., 2009). Parents are important healthy eating role models for their children and act as the dietary gatekeepers for food accessibility and availability, particularly with young children (Fulkerson et al., 2010).

Furthermore, home environments and parental involvement could significantly contribute to a child's dietary habits through parents modeling healthy eating behaviours, nutritional education and engaging children in food preparation amongst many other elements (Pearson et al., 2010). Despite wide recognition of the importance of families in healthy eating interventions for young children, there is a paucity of research in this area.

Family-based healthy eating research

To date, the literature related to family-based healthy eating interventions is frequently integrated with physical activity promotions and other healthy living outcomes (Heimendinger et al., 2007; Sheeshka, Woolcott & MacKinnon, 1993). These family-based community constructed interventions built around parent-child collaboration have demonstrated encouraging results (Robertson et al., 2008). Nevertheless, there are few studies which focused on food-based interventions alone. The key targets for these studies are education, food exposure, cooking skills and family eating practices. Several studies which highlighted these targets are discussed following.

Wardle, Cooke et al. (2003) conducted a randomized parental-led exposure trial to increase children's (2-6 year old) acceptance of vegetables. The principle feature of this study was that it incorporated parental involvement in the home environment with a small variety of vegetables. Results showed a significant increase in liking and consumption of target vegetables for the exposure cohort over a control and nutritional information cohort. However, it should be noted that the method for assessing change in vegetable intake was not measured by intake serving sizes but from the proportion of children eating the target vegetable based on weighing the amount of vegetables on a plate before and after consumption. This study offered support for both family-based and exposure orientated interventions to promote vegetable consumption.

In a home-based trial, an Australian study by Glasson and colleagues (2012) set up a randomized controlled trial called "Fruit & Veg $ense" to evaluate the efficacy of a take-home nutritional education programme on fruit and vegetable intake. This study was also based on theoretical underpinnings of Social Cognitive Theory which examined confidence to prepare and serve vegetables (self-efficacy) and a reduction in barriers of cost (outcome expectancies). The hub of the 6-week intervention was launched with one 90 minute education session followed by mail-out newsletters at two and five weeks after programme commencement. The programme content and evaluation measures were directed exclusively at parents with primary school-aged children. Their findings demonstrated a significant increase in fruit and vegetable intake from baseline to follow-up assessment (from 4.02 (1.81) servings to 4.64 (1.85) servings) compared to the control condition (from 3.88 (1.65) servings to 4.00 (1.63) servings). They also found a significant reduction in lower perceptions of cost and increased perceptions of ease to prepare healthy foods. A highlight of the programme was that it included nutrition educational handouts,

newsletters and a brief cookbook. One important note about this project was that all participants were screened to be below the recommended intake of five servings of fruits and vegetables daily. This study offers support that take-home interventions are effective at enhancing healthy eating habits but it did not investigate the corresponding change for the children of the parents involved in the program.

Another small pilot study conducted in the United Kingdom involved a similar short-term delivery of a home-based healthy eating intervention through newsletters that included both the parents and their adolescent children (Pearson et al., 2010). The intervention tapped into Social Cognitive Theory concepts for behavioural change as well as healthy eating tips and recommendations over the course of four weeks. The researchers found a significant increase in parent fruit and vegetable consumption for the treatment group at follow-up assessment (from 3.3 servings to 4.9 servings) compared to the control condition (from 3.5 servings to 3.3 servings). As well, they found a significant increase in child fruit and vegetable consumption for the treatment group at follow-up assessment (from 4.3 servings to 6.7 servings) compared to the control condition (from 4.5 servings to 4.6 servings). The authors also found other significant effects with other secondary outcomes regarding healthy eating barriers, attitudes and practices. This study is promising in the sense that parent and child collaboration in such projects positively affected fruit and vegetable intake in such a short span of time. However, the authors identified a possible bias with their findings as their participants had relatively high socio-economic status of and were already above the national average in fruit and vegetable consumption.

Fulkerson and colleagues (2010) implemented a much expanded home-based healthy eating intervention titled Healthy Home Offerings via the Mealtime Environment (HOME) for both parents and their 8-10-year-old children. In this comprehensive 3-month pilot program based on Social Cognitive Theory, parents and their children collaborated on several healthy eating tasks in the home setting including fruit and vegetable meal preparation, self-efficacy concepts, cooking skills, making healthy nutritional choices and reducing unhealthy choices. A small highlight in the program was that it included a component of cooking and meal preparation tasks for both the parents and children. At a six month follow-up assessment, the researchers found significant changes in increased frequency of weekly family dinners, parent self-efficacy

measures of making healthful changes in the home and increased child fruit and vegetable consumption when compared to a control condition. Specifically, the authors reported a mean change in fruit and vegetable intake from baseline to post intervention of 3.5 (1.63) servings for children in the intervention groups compared to a change of 2.6 (1.63) servings for the control group. Similar to other studies (ie: Pearson et al., 2010), the participant families were fairly well educated and from a higher socio-economic bracket than average.

It is evident from a several examples of research that family-driven, community-based interventions can be effective in promoting and increasing fruit and vegetable consumption in children. Despite a bias towards participants of higher educational or socio-economic status with a strong interest in healthy eating activities and programmes, results from these studies reveal the potential efficacy and feasibility of family-based healthy eating interventions. A key area where there is a need for further research is in the area of food skills. Only a few of the family-based trials targeted food skills and parent and child involvement in cooking. Based on the literature on food skills interventions discussed previously this is an important area for further research.

Family-based interventions carry the advantage of incorporating food skill components into their structure. Condrasky et al. (2011) pointed out that programmes which developed and built kitchen skills and cooking confidence were likely to bring about numerous other benefits such as increased food preparation self-efficacy, healthier dietary habits (including greater fruit and vegetable consumption), and enhanced food knowledge. Gillman et al. (2000) conducted cross-sectional research with families that had children between the ages of nine to 14 years of age. They found that having youth partake in family meals was significantly associated with improved diet quality including greater fruit and vegetable consumption, lower consumption of high-fat and energy dense foods, as well as higher intakes of several nutrients including fibre and calcium (Gillman et al., 2000). This adds support for interactive family-based interventions given that research by Fulkerson, Story, Neumark-Sztainer and Rydell found that poor dietary habits were associated with the frequency of eating out (2008). Moreover, qualitative research by Stead et al. (2004) supported the need for community-based culinary education to enhance diet quality and cooking skills in an effort to reduce reliance on ready-made meals which often are of lower nutritional quality. The authors noted that this need was especially prevalent in low-income

areas. Combing this evidence together, it expresses a shared need and provides support to engage families in healthy eating interventions aimed at enhancing fruit and vegetable consumption.

Chapter 3: Methods

Research Design

The research design utilized in the current study was a randomized comparison trial with baseline and follow-up measures (see figure 2). A randomization trial controls for past history, participant maturation, testing effects, statistical regression, selection biases and experimental mortality (Thomas et al., 2005). The study featured two intervention conditions: one as a minimal contact intervention (consisting of home activities only) and another as a high contact condition (home activities plus cooking workshops). This study primarily took advantage of quantitative data techniques.

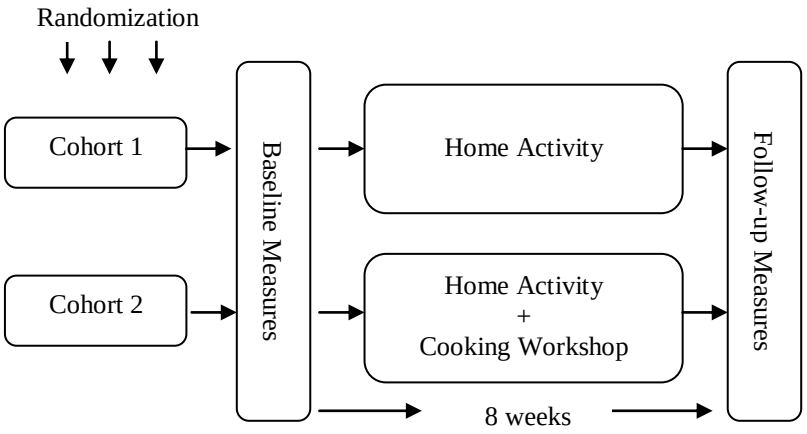

Figure 2. Research design diagram and timeline for the Family Healthy Eating project

Participants

To be eligible for the study, participants had to meet the following criteria at project commencement: 1) have at least 1 parent and 1 child, 2) parents were between the ages of 25 to 55 years, and 3) children were between nine and 13 years of age. Children of this age are ideal candidates for study participation because they begin to assert their independence in feeding practices as well as being able to provide valid and reliable answers on assessment tools used (Livingstone & Robson, 2000; McPherson, Hoelscher, Alexander, Scanlon & Serdula, 2000). The study was approved by the University of Victoria Human Research Ethics Committee and

written informed consent was obtained from the families (both parents and children) in accordance with University research and ethics protocols (see Appendices A & B).

Recruitment

Participants were recruited using a number of strategies. First, participants were recruited in person from local recreation centres from around the Capital Regional District of Greater Victoria, British Columbia, Canada. A second recruitment strategy utilized local media communication venues including advertisements in community newspapers/magazines and earned media (reporters were contacted with op-ed stories). Recruitment materials briefly outlined study details as well as contact information for interested volunteers. Since the families were randomly assigned to participate in one of two study conditions (i.e. cooking workshop or home activity) and in order to avoid measurement bias (e.g. the Avis Effect) initial recruitment information did not reveal this difference (Thomas et al., 2005). Participants were recruited into the study based on their desire to participate in healthy eating research. To prevent drop-out after random assignment and thus a sampling bias, all participants were told they would receive the cooking workshop (representing a wait-list control) and later recruitment efforts included information about the potential cooking workshop.

Potential participants who made contact with the study coordinator were immediately sent a brief information handout thanking them for their interest, study consent forms, and were advised that they would have to wait until enough participants had been recruited to run the group. Once sufficient recruitment numbers had been met randomization was conducted using a web-based random numbers generator (random.org). After randomization into condition occurred, an information package describing the study in detail was then sent to the participants. This information package included details which were specific to the participants' study condition. Lastly, when consent forms had been returned, notification was sent describing the study timeline, participation dates and evaluation guidelines. All study participants were informed of the research objectives and because of the nature of intervention (individuals had to be scheduled for the cooking workshop), the need to enhance recruitment and the use of waitlist control participants were not blinded to their study condition.

Project involvement was open to all potential families expressing interest to participate who met eligibility criteria. In total, 106 families contacted the researcher and of these, 34 families did not meet eligibility criteria as their children were too young (n=25), their children were too old (n=4), some declined to pursue participation (n=2) while others lost contact with the researcher (n=3). Thus, 72 families were randomized into either the cooking workshop programme (n=36) or the home activity only programme (n=36). Several families were not able to commence the project (n=7) which left 35 families starting the cooking workshop condition and 30 starting the home activity condition. Experimental mortality occurred in four cases with the cooking workshop cohort and in seven cases with the home activity cohort (see figure 3).

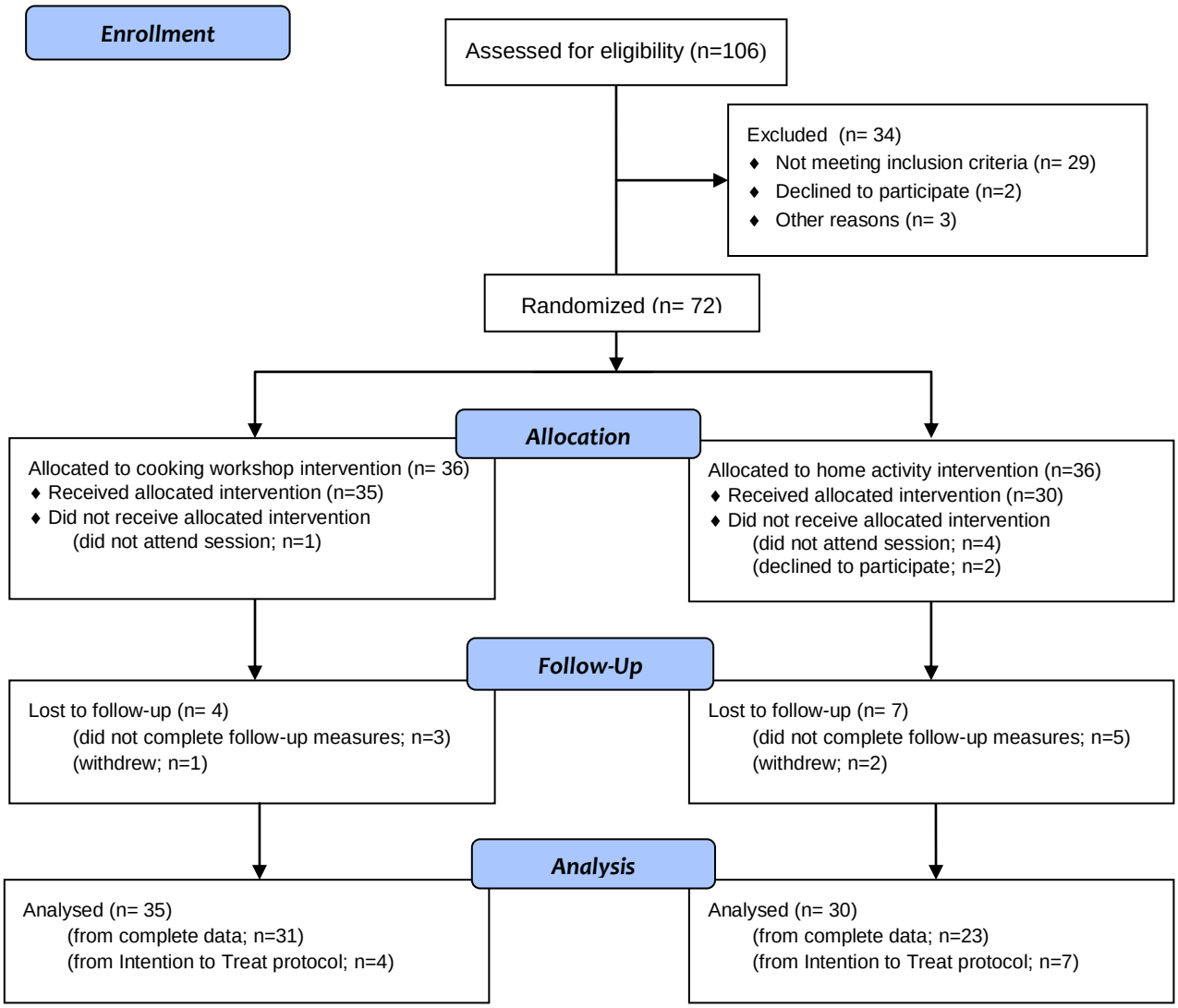

Figure 3 Flow of participants through the study

The entire study was partitioned into three waves of recruitment and implementation. The cooking workshops (2 sessions per family) could only accommodate 12 families at a time due to physical space restrictions and funding was available for three complete workshop sets. Hence, when a pool of 24 families was recruited, participants were randomized into conditions, the cooking workshops were then scheduled and program involvement proceeded. This was repeated twice more based on cooking facility availability and recruitment volume. The three waves of recruitment were spread from Spring to Winter 2012.

Procedures

After randomization, participants were invited to attend an orientation session (approximately one hour long) specific to their specific study condition. Upon arrival, participants in both conditions were greeted and asked to complete baseline measures prior to a presentation. Once baseline measurement was completed participants received a 1-hour introductory presentation that included a brief overview of the importance of healthy eating, a comprehensive talk on the project participation guidelines, its goals and expectations as well as distribution of a toolkit to the families. The toolkit included a project guidelines handout (see Appendix C), a recipe tracking sheet(see Appendix D), the recipe cook book(see Appendix E), Canada's Food Guide to Healthy Eating (Health Canada, 2011) and a few other additional supplements intended to foster awareness of healthy eating in the home environment (eg: serving size posters). Once the orientation session was concluded, participants in the home activity only condition returned home to implement the intervention activities while those in the home activity plus cooking workshop condition immediately proceeded into their first of two, two-hour cooking sessions. For each recruitment wave, both the home activity cohort and the cooking workshop cohort began their orientation session within one week of each other. Thus, the two independent cohorts ran parallel to each other during their respective recruitment waves. Follow-up measures were completed after the 8-week intervention. The home activity families were then offered a single cooking workshop. The overarching intervention concept and the two conditions are described following.

Intervention

The primary purpose of the eight-week intervention was to increase parent vegetable serving habits and to enhance children's vegetable intake by engaging them in food preparation, cooking and tasting. Collaboration between the parents and their children were required to fulfill intervention expectations. The core of the intervention program was structured around Social Cognitive Theory (SCT). Specifically, the intervention involved activities that primarily targeted cooking self-efficacy, self-efficacy for serving vegetables and outcome expectancies while also increasing social support and facilitating reciprocal determinism (parents influence their children and children influencing their parents). Table 1 describes the categorization of tasks as how they related to SCT.

Table 1

Outline of theoretical constructs and the associated intervention component

Theoretical Construct	Sub-construct	Target audience	Intervention Component
Self-Efficacy	Vicarious learning	Parent / Child	• Tasting together/ modeling (seeing others taste) • watching the chef • cooking with other children and parents
	Physiological states	Parent / Child	• tasting recipes • olfactory feedback
	Verbal persuasion	Parent / Child	• parents prompting • child asking for vegetables • chef prompts
	Performance accomplishments	Parent / Child	• producing the recipe successfully • tasting the food prepared • rating the palatability, ease of preparation and cost of the recipe • learning and performing new skills in the workshop and home kitchen (e.g. knife skills, skinning garlic) • purchasing success

Outcome Expectancies	Parent / Child	• parents observe children tasting and enjoying vegetable recipes • children taste and enjoy vegetables prepared • Chef messages about cost of vegetables compared to processed/packaged foods
	Parent	• Purchasing (enhanced awareness of cost/affordability)
Reciprocal Determinism	Parent / Child	• tracking recipe preparation and tasting together • children ask for vegetables • collaborative food preparation

Home Activity Only Condition

The primary focus of the home activity program was based on collaborative parent-child cooking activities which the families undertook themselves at home. There were two key tasks that families were asked to do: the first was to add one extra vegetable to the evening meal each day, the second was to select, prepare and cook a recipe from the cook book each week (see Appendix E). There were 12 recipe options which covered choices ranging from snacks, to side-dishes to main dishes. Each recipe featured a specific vegetable which was the highlight of the dish. Thus, over the 8-week project, the families were asked to try eight different vegetable recipes from a choice of 12 which represented trying eight different vegetables. Recipes could be repeated as often as desired throughout the study so long as one new recipe from the book was introduced each week. There were no other restrictions to dietary habits beyond cooking the one recipe each week. While the project only formally evaluated one parent and one child, the remaining family members could participate in the home activities as the families wished. This is similarly practiced in other interventions (Fulkerson et al., 2010; Pearson et al., 2010).

Beyond the joint effort of cooking the vegetable recipes, families were asked to complete a weekly recipe cooking calendar (see Appendix D). This was intended to track the progress and perceptions of each family throughout their project involvement. Specifically, the tracking sheet

required the parents and children to collaboratively rate each recipe on perception of cost, preparation effort and taste. The categories were rated on an ascending scale of 1 to 5 individually formatted for preparation effort (with a score of 5 as easiest), taste (with a score of 5 as tastiest) and perception of cost (with a score of 1 as least expensive).

Beyond this, the extent of parent-child collaboration during the project was ultimately up to the discretion of the individual families. Other tasks that were suggested as ways to engage children were involving them in grocery shopping, stocking the kitchen and kitchen clean-up.

Cooking Workshop Condition

The 8-week cooking workshop condition incorporated all of the home activities previously described, however, this cohort also participated in two, two-hour cooking workshops held at a local cooking school. The first of the two sessions was scheduled during the launch session while the second workshop was scheduled approximately half way through the 8-week project timeline. Workshops were scheduled either on weekday evenings (to overlap with the dinner hour as the participants ate the creations of their labour) or in afternoon weekends (to coincide with the consumption of lunch).

The main purpose of these workshops was to provide hands-on and successful food preparation and cooking experiences for the families and several opportunities to taste new vegetable-based recipes (7 recipes over 2 workshops) as well as promoting knowledge of cost and healthy eating. Children and their parents were then encouraged to take whatever was learned and apply it at home. Cooking workshop families could use recipes learned at these workshops in addition to what the cook book offered as one of their weekly vegetable recipe choices. As was shown in Table 1, these workshops primarily addressed self-efficacy and outcome expectancies by a) providing information about the benefits of vegetable consumption through verbal persuasion (motivating statements, encouragement) from the chef, b) teaching and reinforcing culinary skills (e.g. how to hold a knife, peel garlic), c) providing opportunities to experience success cooking vegetable recipes (as judged by seeing and tasting what they cooked), d) providing physiological feedback through tasting and e) allowing parents and children to observe each other and similar others cooking and enjoying eating vegetable recipes).The content and activities for the first and second cooking workshop sessions were

similar for all three waves of participation. Table 2 presents a breakdown of intervention differences between the home activity and cooking workshop conditions.

Table 2

Contrast of intervention features between the two comparative conditions

Intervention features	Cooking Workshop	Home Activity
Orientation session	yes	yes
Tool kit handouts	yes	yes
Recipe book	yes	yes
Tracking sheet	yes	yes
4hrs of cooking workshop	yes	no
Chef-led culinary skills	yes	no

Data Collection and Instruments

Data was collected in two distinct periods for each recruitment wave. The first collection occurred during the orientation phase and the second immediately following the completion of the 8-week intervention program. Follow-up measures were collected through one-on-one sessions between one to three weeks following intervention based on family availability.

Once the final questionnaires were completed, families were invited to share their comments and feedback allowing them to recount their experiences with the program, offer their suggestions for future improvements of the program and to provide other qualitative information as how the program affected their dietary behavior. Families were sent an initial request for feedback and two subsequent reminders. Families who did not provide feedback within this time frame were not pursued further.

Experimental Variables

The main independent variable in this study was experimental group assignment (i.e. cooking workshop versus home activity). The main dependent variables were weekly servings of vegetables provided by parents and weekly consumption of vegetables by the children. Other dependent measures included willingness to try new fruits and vegetables (food neophobia), perceptions of access to, and availability of, fruits and vegetables; knowledge about the health benefits of fruit and vegetables, family feeding practices, parental cooking skill self-efficacy and outcome expectations. Demographics were also collected to account for confounders. The specific measures are described following.

Parent Measures

Family Demographics

A brief family health history questionnaire was administered to parents at baseline to provide demographic information about study participants (see Appendix F). The information related to both parents and children and other family characteristics. Specifically, the questionnaire included a question about: parent education level achieved (5 options from "less than high school to post-graduate education including an option of "prefer not to mention"), annual family income on an ordinal scale ("less than $25,000", "$25,000 to $35,000" etc…), number of household members, age and gender of both participating children and parents and open-ended queries about other dietary traits (ie: allergies, diet types such as vegetarian, low sodium etc…).

Parent Food Serving Frequency

A key aspect of the present study was to affect change in vegetable serving behavior by parents. No serving behavior scales were identified in the literature and thus modifications were made to an existing previously validated food frequency scale (Baranowski et al., 1997) by slightly altering the wording. For example, rather than asking the parents "how often did you *eat* vegetables at lunchtime" the questions were revised to read "how often did you *serve* vegetables at lunchtime" (see Appendix G). The scale included nine items: six assessed fruit and vegetable serving behavior and three items assessed fried potato, white potato and 100% juice serving

habits (Baranowski et al., 1997). Scale responses were on a 9 point likert scale ranging from 0, which represented never to 9 which represented serving vegetables more than 5 times/per day.

For the entire scale, a conversion factor was used to transform responses into average daily servings for each item. To determine parental fruit and vegetable serving behavior, serving habits at breakfast, lunch and dinner for both fruits and vegetables were summed together to provide a score for overall number of servings served. This was also split into the specific number of fruits or vegetables served.

Self-efficacy measures

As no specific self-efficacy measure for parental vegetable serving was available in the literature at the outset of the study, a scale was created consisting of 12 original items (see Appendix H). Items addressing serving self-efficacy included questions such as, "do you think that you can prepare vegetables that you usually don't cook for your family." The 12 items were formatted on a 7-point likert scale read as "strongly disagree, disagree, slightly disagree, neutral, slightly agree, agree, strongly agree". Scale reliability analysis showed the efficacy measure was internally consistent (Cronbach's $\alpha = 0.91$). These 12 items were summed together to produce an overall score representing parent vegetable serving self-efficacy ranging from 12 to 84 with higher scores indicating greater self-efficacy towards purchasing and serving vegetables.

Confidence in parents' general cooking/culinary abilities was also measured using part of a scale developed by Barton, Wrieden and Anderson (2011) combined with two original items that were added to specifically address kitchen skills (see Appendix H). Items addressing cooking confidence included questions such as, "how confident do you feel about measuring ingredients." The scale used a 7-point likert scale (1= "very unconfident, 2=unconfident, 3=a little unconfident, 4=neutral, 5=a little confident, 6=confident and 7=very confident). The six items were summed together to produce an overall score ranging from 6 to 42 with higher scores indicating greater sense of cooking self-efficacy. Scale reliability analysis showed that this measure also had good internal consistency (Cronbach's $\alpha = 0.95$).

Outcome Expectations

There were few examples of healthy eating outcome expectancy measures in the literature, thus a validated scale from Sheeshka et al. (1993) was combined with other original items that were created specifically for this study (see Appendix I). Together, 13 items were used to assess outcome expectancies across three areas of known barriers; 1) expectations about taste, 2) expectations about the cost of healthy eating and 3) expectations about the level of effort required to prepare healthy meals. Each item represented a 7-point likert scale ranging from "strongly disagree" to "strongly agree." Items addressing barriers to healthy eating included statements such as, "it is quite expensive to follow a healthy diet." The overall scale was scored by summing all items and items that were negatively worded were reversed scored. Scale reliability analysis revealed the overall scale to have good internal consistency (Cronbach's α = 0.79) while the subscales of taste, cost and effort had reliabilities of 0.72, 0.69, 0.68 respectively.

Family Feeding Practices

The modified Comprehensive Feeding Practices Questionnaire (Musher-Eizenman & Holub, 2007) was used to measure feeding practices as several items aligned with social cognitive concepts like verbal persuasion and vicarious learning (see Appendix J). The Comprehensive Feeding Practices Questionnaire and its subscales have been previously validated with Cronbach's alpha values ranging from 0.58 to 0.84 (Musher-Eizenman & Holub, 2007). Eighteen items from the original 41-item scale were retained based on their relevance to Social Cognitive Theory. The other items not used from the scale did not have immediate relevance for this study (eg: child weight control and emotional regulation). Seventeen of the selected items were categorized by a 5-point likert scale with response formats as "disagree, slightly disagree, neutral, slightly agree, and agree." The remaining item was also based on a 5-point likert scale but had the response format as "never, rarely, sometimes, mostly, and always." Items addressing family feeding practices included questions such as, "I involve my child in planning family meals." Items that were negatively worded were reverse scored. The reliability for the 18-item scale and each of its subscales was reassessed. Scale reliability analysis revealed that for one particular subscale, two items loaded poorly with the other subscale items and were consequently removed for analysis. Thus, a total of 16 items were used for the overall Feeding Practices score establishing a reliability value of 0.83. Cronbach's alpha for the five subscales

ranged from 0.66 to 0.87. These items were summed together to produce an overall score. Higher scores represented healthier family feeding practices.

Access and Availability - Parents

A parent questionnaire from a study by Kristjansdottir et al. (2009) was used to measure household access and availability of fruits and vegetables. The reliability and validity reported by these authors and Chronbach's alpha for items was between 0.57 and 0.89 and test-retest reliability between 0.50 and 0.80. The questionnaire consisted of 10 items addressing the home accessibility and availability of fruits and vegetables that were formatted to either a 4-point or 5-point likert scale with a mixed category of frequency responses (ie: "yes, always" or "seldom") (see Appendix K). Items addressing fruit and vegetable access and availability included questions such as, "how often do you have different kinds of fruits and vegetables available at home." Scale reliability analysis conducted for this study revealed the overall scale of these 10 items to have good internal consistency (Cronbach's $\alpha = 0.79$). A total combined score to assess access and availability was calculated from the 10 items. Furthermore, each of the 10 items was analyzed independently of the combined score. Parent scores ranged from 10 to 48 and higher scores reflected more favourable fruit and vegetable access and availability in the household.

Exposure, Food Neophobia and Tast Preference - Parents

A previously validated and internally consistent (Cronbach's $\alpha = 0.88$) version of a food neophobia scale for children (Falciglia, Pabst, Couch & Goody 2004; Galloway et al., 2003) that had been successfully used in school-based healthy eating interventions (Day et al., 2008) was used to measure parent fruit and vegetable neophobia with one modification. The item "when my *parent* asks me to eat…" on the children's scale was changed to "when my *partner* asks me to eat…" on the parent's scale.

The food neophobia scale included eight items with all responses falling within a 7-point likert scale read as "strongly disagree, disagree, sort of disagree, no opinion, sort of agree, agree, and strongly agree" (see Appendix L). A total score was calculated by summing all eight items (three items were reversed scored) for a range of scores from 8 to 49. Higher scores represented a greater willingness to try new fruits and vegetables.

Child Measures

Food Frequency Questionnaire

A Food Frequency Questionnaire for children was used to measure typical weekly intake of fruit and vegetables including two items that addressed fried and white potato intake and one item that addressed 100% juice consumption. The scale was adapted from the US national cancer institute quick scan of FV and validated by Baranowski et al. (1997). Baranowski compared the validity of the FFQ to an established food record and found that it was weakly correlated (Spearman's $\rho = .221$). The questionnaire consisted of nine items formatted as a 9 point likert scale representing increased frequency from 0 representing never to 9 representing more than five times a day (see Appendix M). As with the parent version, a conversion factor was used to transform responses into average daily servings for each item, thus higher scores reflected the food choice being eaten more often on a daily basis. Similarly, assessing fruit and vegetable intake was determined by tallying the number of servings consumed across breakfast, lunch and dinner for both fruit and vegetables collectively and independently.

Knowledge and Liking for Fruit and Vegetables

A knowledge and liking for fruit and vegetables questions were adopted from previous research (Day et al., 2008). Five items measured children's: 1) perception of their fruit and vegetable intake, 2) knowledge about the importance of vegetables for heart disease prevention, 3) knowledge about the importance of vegetables for cancer prevention, 4) liking for the taste of fruit and 5) liking for the taste of vegetables (see Appendix N). Perception of intake was assessed by a 5-point likert scale item read as "very high, high, in the middle, low and very low." The two items regarding disease and cancer prevention were based on a 4-point likert scale read as "agree, in the middle, disagree, don't know." This was scored with the "agree" response representing the highest knowledge score and "don't know" as the lowest. Children's liking of fruits and vegetable tastes was assessed separately with a 3-point likert scale read as "agree, in the middle, disagree." This was scored with the "agree" response representing a high preference for either fruits or vegetable and the "disagree" response as the lowest.

Access and Availability - Child

Perceptions about household access and availability of fruit and vegetables was measured using a previously validated and reliable instrument (Cronbach's alpha between 0.57 and 0.89 and test-retest reliability between 0.50 and 0.80) (Kristjansdottir et al., 2009). Further scale reliability analysis during this study revealed the overall scale of these 10 items to have good internal consistency (Cronbach's $\alpha = 0.75$). The instrument consisted of 10 items based on a 5-point likert scale with a mixed category of frequency responses (ie: "yes, always" or "seldom") (see Appendix O). Items addressing fruit and vegetable access and availability included questions such as, "are you allowed to eat as much fruits and vegetables as you like." As before, a total score was calculated from the combined 10 items. The scale ranged in scores from 10 to 50 and higher scores reflected more favourable self-reported access and availability of fruits and vegetables at home. Each of the 10 items was also analyzed independently of the combined score.

Exposure, Food Neophobia and Tast Preference - Child

Willingness to try new fruit and vegetables was measured by a previously validated (Cronbach's $\alpha = 0.88$) version of a food neophobia scale for children (Falciglia et al., 2004; Galloway et al., 2003) that had been successfully used in school-based healthy eating interventions (Day et al., 2008). The scale included eight items that addressed willingness to try new fruits and vegetables with all responses falling within a 7-point likert scale read as "strongly disagree, disagree, sort of disagree, no opinion, sort of agree, agree, and strongly agree" (see Appendix P). Items addressing fruit and vegetable access and availability included questions such as, "I am very picky about eating unfamiliar foods." Three items were negatively worded and reversed scored accordingly. A total score was calculated by summing all eight items for a range of score from 8 to 49. Higher scores represented a greater willingness to try new fruits and vegetables.

Recipe Tracking Sheet

Fruit and vegetable monitoring charts have been used in previous research and assist families with meeting consumption goals and project guidelines (Pearson et al., 2010). A

vegetable cooking calendar was created and used that tracked the frequency of completed weekly recipes throughout the 8-week project (see Appendix D). Parents and children recorded which recipe was prepared each week and collaboratively rated the recipe on perception of cost and preparation effort. In addition, parents and children independently rated the recipes on taste preference. The four categories were based on a response scale of one to five but varied in their wording and alignment. Perception of effort rated a score of 5 as "easiest", perception of taste was rated a score of 5 "tastiest" while perception of cost rated a score of 1 being "least expensive." Completion of the tracking sheets was used as a measure of intervention fidelity.

Data Analysis

Quantitative data were entered and analyzed using Statistical Package for the Social Sciences 21.0 (IBM Corp., Armonk, NY, USA) to identify group characteristics and test for significant differences between group means on dependent measures. An independent samples t-test was used to test for significant differences between conditions on baseline measures. In some cases, a chi-square test was used on categories variables (i.e. gender) to determine if group was significantly associated with the distribution of the variable. For the majority of measures, a General Linear Model repeated measures analysis was used to determine if the groups differed over time and by condition. A repeated measures ANOVA controls for baseline differences between groups. An intention to treat protocol was used for those families who failed to complete follow-up measures. A statistical cut-off point based on an alpha level of 0.05 was used to determine significant effects.

Tracking sheet completion was counted and voluntary feedback at the end of program (approximately 30% response rate) was reviewed and summarized to further elaborate on the findings. These feedback sessions were informal and participants could discuss and share their views and opinions of the project as they chose.

Chapter 4: Results

Family Descriptives

Sixty-five families participated in the project over three waves of recruitment. Several family demographic variables were collected at baseline. Twenty-eight mothers and seven fathers participated in the cooking workshop condition with an average age of 45.2 (± 5.1) years. Twenty-three of their children were girls and 12 were boys with an average age of 11.1 (± 1.3) years. Twenty-six mothers and four fathers with an average age of 42.6 (± 5.4) years participated in the home activity condition. The children in the home activity condition consisted of 18 girls and 12 boys with an average age of 11.0 (± 1.4) years. An Independent samples t-test on baseline characteristics revealed no significant differences between groups on parent age ($p=0.063$) and child age ($p=0.892$). Furthermore, a Pearson's Chi-square test revealed no significant association between condition and the distribution of gender for parents ($p=0.475$) or children ($p=0.634$).

Data was also collected on other family characteristics such as family annual income, parent education level and number of children in the household. The most frequently reported average parent income was above $80,000 CDN annually (46.2%) with approximately 70% of all parents reporting an annual income of $50,000 CDN or more. Thus, nearly half of parents reported their family income to be above the British Columbia provincial average of $69,000 per annum (Statistics Canada, 2013). Eleven parents (16.9%) chose not to report their annual income. In addition, a majority of parents (85%) reported their education level as being either post-secondary or post graduate level. The average number of family members in the household was 4.2 people with an average of 2.1 children per household. There were no significant differences between conditions for any of these characteristics.

Of the 65 families who began the intervention, four cases of participant drop-out were noted with the cooking workshop cohort and seven cases were observed with the home activity cohort. A Pearson's Chi-square test revealed no significant association between condition and drop-out rate (χ^2 (1) = 1.628, $p=0.202$).

Recipe Tracking

From the 54 participants who completed follow-up assessment, 94% (n=51) reported cooking a new recipe each week for 8-weeks. Three of these 51 families misplaced their recipe tracking sheets but indicated that they had completed the expectation. Three families did not complete the full eight recipe expectation, logging 4-6 recipes.

All recipe ratings on the tracking sheet were scaled response from 1 through 5 depending on category. Regarding cost (5 being most expensive), for both parents and children the average rating was 2.01 (SD=.974). For preparation effort (5 being easiest) the average rating was 3.68 (SD=1.27). Parents reported an average taste rating (5 being tastiest) for the recipes of 4.25 (SD=.94) while the children's ratings averaged 3.46 (SD=1.35).

Parent Weekly Serving Habits

No intervention effects were found for weekly serving habits of vegetables for either cohort across time (see table 3). Expanding serving habits to both fruits and vegetables, as well as including 100% juice or potatoes in the serving count, made no difference to this finding. Both cohorts reported serving fruits and vegetables above the minimal recommendation of five servings a day at each time period.

Table 3

Intervention time by condition effects on parental daily average of F&V servings habits

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	p	η^2
Servings of Fruit	Cooking Workshop	2.7 (3.0)	2.8 (2.8)	.1			
-does not include juice	Home Activity	2.8 (2.0)	3.5 (3.0)	.7	.62	.43	.01
Servings of Vegetables	Cooking Workshop	2.8 (2.7)	3.0 (2.8)	.2			
-does not include potatoes	Home Activity	3.4 (2.8)	3.6 (2.3)	.2	.02	.89	.00
Servings of F&V	Cooking Workshop	5.5 (5.6)	5.8 (5.3)	.3			
	Home Activity	6.2 (4.3)	7.1 (4.7)	.9	.12	.73	.00
All serving types	Cooking Workshop	6.6 (5.7)	7.2 (5.6)	.6			
-includes potatoes and juice	Home Activity	7.2 (4.2)	8.2 (5.4)	1.0	.08	.78	.00

Parent Family Feeding Practices

No significant effects were noted for parental feedings practices by condition (see table 4) but several significant time effects were found (see Table 5). Specifically, a repeated measures GLM revealed a significant increase in household food environment ($F(1, 63) = 24.96$, $p=.000$, $\eta^2=0.28$), child involvement ($F(1, 63) = 22.97$, $p=.000$, $\eta^2=0.27$), parental modeling ($F(1, 63) = 15.30$, $p=.000$, $\eta^2=0.20$), parents teaching their child about nutrition ($F(1, 63) = 13.54$, $p=.000$, $\eta^2=0.18$) and overall combined feeding practices ($F(1, 63) = 42.09$, $p=.000$, $\eta^2=0.40$) for both groups across time. No difference was noted for changes in energy and balance over time.

Table 4

Intervention time by condition effects on parental family feeding practices

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Combined Feeding Practices (16-80)*	Cooking Workshop	63.7 (8.2)	69.1 (7.6)	5.4	2.81	.10	.04
	Home Activity	66.7 (7.1)	69.9 (6.4)	3.2			
Energy & Balance (2-10)	Cooking Workshop	9.6 (0.8)	9.7 (0.7)	.1	.09	.76	.00
	Home Activity	9.5 (0.8)	9.6 (0.7)	.1			
Food Environment (4-20)*	Cooking Workshop	15.3 (2.9)	16.6 (2.8)	1.3	.03	.86	.00
	Home Activity	15.7 (2.8)	16.9 (2.7)	1.2			
Child Involvement (3-15)*	Cooking Workshop	10.2 (2.8)	12.0 (2.5)	1.8	2.81	.10	.04
	Home Activity	10.5 (2.9)	11.4 (2.2)	.9			
Parent Modeling (4-20)*	Cooking Workshop	16.3 (3.1)	17.5 (3.1)	1.2	.73	.40	.01
	Home Activity	17.7 (2.5)	18.4 (1.9)	.7			
Teaching about Nutrition (3-15)*	Cooking Workshop	12.3 (2.4)	13.5 (1.8)	1.2	3.58	.06	.05
	Home Activity	13.3 (1.7)	13.6 (1.2)	.3			

*Significant change across time for both groups ($p \leq .05$)

Table 5

Intervention time effects on parental family feeding practices

Dependent Variable	F-ratio	p-value	η^2
Combined Feeding Practices (16-80)*	42.09	.00	.40
Energy & Balance (2-10)	1.31	.26	.02
Food Environment (4-20)*	24.96	.00	.28
Child Involvement (3-15)*	22.97	.00	.27
Parent Modeling (4-20)*	15.30	.00	.20
Teaching about Nutrition (3-15)*	13.54	.00	.18

*Significant change across time for both groups ($p \leq .05$)

Fruit and Vegetable Access and Availability - Parents

A significant difference between conditions was observed with parents in the cooking workshop group reporting more positive practices of fruit and vegetable access and availability on several items when compared to the home activity cohort. Specifically, parents in the cooking workshop group reported having significantly more kinds of fruits and vegetables at home F (1, 63) = 6.18, p=.016, η^2=0.09), persuading their children to eat more fruits and vegetables F (1, 63) = 7.89, p=.007, η^2=0.08) and a higher overall practices of fruit and vegetable access and availability practices F (1, 63) = 8.26, p=.006, η^2=0.12) (see table 6).

A repeated measures GLM revealed several significant time effects for parental perceptions of access and availability and are presented in table 7. The combined summary for parental fruit and vegetable practices significantly changed across time for both cohorts (F (1, 63) = 13.46, p=.001, η^2=0.18).

Table 6

Intervention time by condition effects on parent F&V access and availability practices

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Practices combined (10-48)*	Cooking Workshop	35.5 (4.8)	38.2 (5.4)	2.7**	8.26	.01	.12
	Home Activity	38.5 (4.1)	38.8 (3.2)	.3			
Variety of FV at home (1-5)	Cooking Workshop	4.2 (0.7)	4.5 (0.7)	.3**	6.18	.02	.09
	Home Activity	4.5 (0.7)	4.6 (0.6)	.1			
Buy FV when child asks (1-5)	Cooking Workshop	3.9 (0.8)	4.1 (0.8)	.2	1.01	.32	.02
	Home Activity	4.1 (0.9)	4.1 (1.0)	0			
Cut up snack FV for child (1-5)	Cooking Workshop	3.3 (1.0)	3.5 (0.9)	.2	1.44	.23	.02
	Home Activity	3.7 (0.7)	3.7 (0.7)	0			
Personal habit to eat FV (1-5)*	Cooking Workshop	4.3 (1.0)	4.5 (1.0)	.2	.17	.68	.00
	Home Activity	4.6 (0.7)	4.8 (0.5)	.2			
Eat FV together with child (1-5)*	Cooking Workshop	3.7 (0.9)	4.1 (1.1)	.4	3.03	.09	.05
	Home Activity	4.1 (0.6)	4.3 (0.6)	.2			
Persuade child to eat FV (1-4)*	Cooking Workshop	2.3 (0.9)	2.7 (0.9)	.4**	7.89	.01	.11
	Home Activity	2.6 (0.9)	2.6 (0.9)	0			
Oblige child to eat FV (1-5)	Cooking Workshop	3.3 (1.2)	3.6 (1.3)	.3	2.20	.14	.03
	Home Activity	3.6 (1.1)	3.6 (1.1)	0			
Allow child to eat FV anytime (1-5)	Cooking Workshop	4.7 (0.5)	4.8 (0.5)	.1	.17	.67	.00
	Home Activity	4.5 (0.8)	4.5 (0.6)	0			

Think child eats enough FV (1-4)*	Cooking Workshop	2.3 (1.0)	2.5 (1.0)	.2	.60	.44	.01
	Home Activity	2.4 (0.8)	2.6 (0.8)	.2			
Habit for child to eat FV (1-5)*	Cooking Workshop	3.5 (1.4)	3.8 (1.3)	.3	.37	.55	.01
	Home Activity	3.9 (1.1)	4.1 (0.9)	.2			

*Significant change across time for both groups ($p \leq .05$)

**Significant change from Home Activity cohort ($p \leq .05$)

Table 7

Intervention time effects for parent F&V access and availability practices

Dependent Variable	F-ratio	p-value	η^2
Practices combined	13.46	.001	.18
Variety of FV at home	1.01	.320	.02
Buy FV when child asks	.13	.720	.00
Cut up snack FV for child	1.44	.230	.02
Personal habit to eat FV	4.18	.045	.06
Eat FV together with child	12.12	.001	.16
Persuade child to eat FV	5.77	.019	.08
Oblige child to eat FV	1.00	.320	.02
Allow child to eat FV anytime	.19	.670	.00
Think child eats enough FV	5.93	.018	.09
Habit for child to eat FV	10.16	.002	.14

Parent Self Efficacy

There were no significant differences between parent scores on vegetable serving self-efficacy concepts or cooking confidence across time or by condition (see table 8). There appeared to be a ceiling effect in both categories of self-efficacy scores across conditions. However, the analysis highlighted a significant increase in the confidence item related to the frequency of families cooking meals from basic ingredients more often at follow-up assessment ($F(1, 63) = 6.35$, $p=.014$, $\eta^2=0.09$).

Table 8

Intervention time by condition effects for parent self-efficacy concepts

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	p	η^2
Vegetable self-efficacy (12-84)	Cooking Workshop	73.2 (8.0)	73.7 (6.8)	.5	.23	.63	.00

	Home Activity	75.0 (8.1)	73.8 (7.1)	-1.2			
Cooking Confidence (6-42)	Cooking Workshop	37.7 (6.8)	39.5 (3.1)	1.8	2.93	.09	.04
	Home Activity	39.2 (4.0)	39.0 (4.0)	-0.2			

Parent Outcome Expectancies

There were a several significant effects noted for parent outcome expectancy measures (see Table 9). There was a significant time effect for parents believing that their children would eat more fruits and vegetables ($F (1, 63) = 10.7$, $p=.002$, $\eta^2=0.15$). There was also a time by condition effect on this variable with parents in the cooking workshop group reporting that their children would eat more fruits and vegetables after the intervention than the home activity cohort ($F (1, 63) = 5.34$, $p=.024$, $\eta^2=0.08$).

The repeated measures GLM revealed significant time effects for self-reported barriers to healthy eating specifically for cost ($F (1, 63) = 5.53$, $p=.022$, $\eta^2=0.08$) and effort ($F (1, 63) = 13.14$, $p=.001$, $\eta^2=0.17$) and for all barriers combined ($F (1, 63) = 13.01$, $p=.001$, $\eta^2=.017$). No significant differences were noted for expectancies related to improved health or improved behavior when children consumed more fruits and vegetables.

Table 9

Intervention time by condition effects for parental outcome expectancies

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Barriers combined (13-91)*	Cooking Workshop	64.8 (10.2)	68.7 (11.3)	3.9	.61	.44	.01
	Home Activity	67.9 (10.2)	70.4 (7.6)	2.5			
Barrier on Taste (5-35)	Cooking Workshop	27.2 (4.2)	27.7 (4.4)	.5	.08	.77	.00
	Home Activity	29.2 (4.5)	29.5 (3.6)	.3			
Barrier on Cost (4-28)*	Cooking Workshop	19.5 (4.5)	21.2 (4.4)	1.7	1.24	.27	.02
	Home Activity	19.1 (4.7)	19.8 (3.3)	.7			
Barrier on Effort (4-28)*	Cooking Workshop	18.2 (4.9)	19.8 (5.2)	1.6	.00	.97	.00
	Home Activity	19.6 (4.0)	21.1 (3.9)	1.5			
Improved Health (1-7)	Cooking Workshop	6.5 (0.5)	6.5 (1.1)	0	.43	.51	.01
	Home Activity	6.4 (1.2)	6.5 (1.1)	.1			
Children will behave better (1-7)	Cooking Workshop	4.5 (1.7)	4.9 (1.6)	.4	1.27	.26	.02
	Home Activity	4.3 (1.4)	4.3 (1.5)	0			
Children will eat more FV (1-7)*	Cooking Workshop	4.6 (1.7)	5.4 (1.4)	.8**	5.34	.02	.08
	Home Activity	5.3 (1.4)	5.5 (1.2)	.2			

*Significant change across time for both groups ($p \leq .05$)

**Significant change from Home Activity cohort ($p \leq .05$)

Exposure, Food Neophobia and Taste Preference - Parent

No significant effects were found for parent willingness to try new fruits and vegetables across time or by condition (see table 10). Parent scores translated into a percentage of maximum scores indicated a potential ceiling effect with scores at 86-88% of the maximum score achievable. There was also no significant change in parental preference for liking the taste of fruits or vegetables.

Table 10

Intervention time by condition effects for parent willingness to try new fruits and vegetables

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Food Neophobia (7-56)	Cooking Workshop	48.4 (6.9)	48.1 (6.6)	-0.1	.00	.98	.00
	Home Activity	49.5 (6.3)	49.3 (5.5)	0			

Child Vegetable Consumption

No intervention effects were found between conditions across time for child vegetable consumption (see table 11). Expanding serving habits to both fruits and vegetables, as well as including 100% juice or potatoes in the summed variable did not change these results.

Table 11

Intervention time by conditions effects on child food frequency F&V consumption

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Servings of Fruit	Cooking Workshop	2.4 (2.6)	2.6 (2.7)	.2	.00	.98	.00
-does not include juice	Home Activity	3.1 (3.3)	3.3 (3.0)	.2			
Servings of Vegetables	Cooking Workshop	2.0 (1.6)	2.4 (2.3)	.4	.36	.55	.01
-does not include potatoes	Home Activity	3.4 (3.0)	3.4 (3.0)	0			
Servings of F&V	Cooking Workshop	4.4 (4.1)	5.0 (4.8)	.6	.10	.75	.00
	Home Activity	6.5 (5.8)	6.7 (5.6)	.2			
All serving types	Cooking Workshop	5.5 (4.2)	6.2 (5.4)	.7	.10	.76	.00
-includes potatoes and juice	Home Activity	7.7 (6.5)	8.2 (6.5)	.5			

Fruit and Vegetable Access and Availability - Child

Two differences were noted in child fruit and vegetable access and availability habits (see Table 12). The first was a significant time by condition effect with the cooking workshop children reporting their parents cutting up fruits and vegetables more often as a snack when compared to the home activity cohort ($F(1, 63) = 3.90$, $p = .050$, $\eta^2 = 0.06$). The second was a significant time effect with children from both groups reporting an increase in parents buying fruits and vegetables when asked for ($F(1, 63) = 9.93$, $p = .002$, $\eta^2 = 0.14$).

Table 12

Intervention time by condition effects on child F&V access and availability practices

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Practices combined (10-50)	Cooking Workshop	41.0 (4.5)	42.0 (4.4)	1.0	1.10	.30	.02
	Home Activity	42.4 (4.7)	42.5 (5.3)	.1			
Variety of FV at home (1-5)	Cooking Workshop	4.4 (0.6)	4.3 (0.8)	-0.1	.13	.26	.02
	Home Activity	4.4 (0.8)	4.5 (0.7)	.1			
Parents buy FV when asked for (1-5)*	Cooking Workshop	4.1 (0.8)	4.3 (0.7)	.2	.00	1.00	.00
	Home Activity	4.2 (0.7)	4.4 (0.7)	.2			
Parents cut up snack FV (1-5)	Cooking Workshop	3.5 (1.1)	3.7 (1.0)	.2**	3.90	.05	.06
	Home Activity	3.7 (0.9)	3.5 (1.2)	-0.2			
Parents eat FV daily (1-5)	Cooking Workshop	4.5 (0.6)	4.5 (0.6)	0	.03	.87	.00
	Home Activity	4.5 (0.8)	4.5 (0.7)	0			
Eat FV together with family (1-5)	Cooking Workshop	4.0 (1.1)	4.2 (1.0)	.2	.41	.53	.01
	Home Activity	4.1 (1.0)	4.1 (1.0)	0			
Parents encourage me to eat FV (1-5)	Cooking Workshop	4.6 (0.6)	4.6 (0.9)	0	.05	.83	.00
	Home Activity	4.7 (0.6)	4.6 (0.6)	-0.1			
Parents tell me to eat FV (1-5)	Cooking Workshop	4.3 (0.9)	4.4 (0.8)	-0.1	1.39	.24	.02
	Home Activity	4.6 (0.6)	4.5 (0.9)	-0.1			
Allowed to eat FV anytime (1-5)	Cooking Workshop	4.8 (0.4)	4.9 (0.4)	.1	2.20	.14	.03
	Home Activity	4.6 (0.7)	4.4 (0.7)	-0.2			
Think you eat enough FV (1-5)	Cooking Workshop	3.5 (1.0)	3.7 (0.9)	.2	.05	.83	.00
	Home Activity	3.9 (0.9)	4.0 (0.9)	.1			
Habit to eat FV daily (1-5)	Cooking Workshop	3.4 (1.1)	3.6 (1.1)	.2	.53	.47	.01
	Home Activity	3.9 (1.0)	4.0 (1.0)	.1			

*Significant change across time for both groups ($p \leq .05$)

**Significant change from Home Activity cohort ($p \leq .05$)

Child Knowledge and Liking for Fruit and Vegetables

A change in knowledge of, and liking for, vegetables was observed between conditions (see table 13). Firstly, children participating in the cooking workshop significantly increased their knowledge that eating fruits and vegetables could prevent cancer ($F(1, 63) = 3.97$, $p=.050$, $\eta^2=0.06$) as well as their liking for the taste of vegetables ($F(1, 63) = 3.87$, $p=.050$, $\eta^2=0.06$) compared to the home activity children. There was a significant change across time for children rating their level of fruit and vegetable intake as significantly higher at follow-up measurement ($F(1, 63) = 9.12$, $p=.004$, $\eta^2=0.13$) but there were no group effects on this variable.

Table 13

Intervention time by condition effects on child knowledge and liking of F&V

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Rating own FV intake (1-5)*	Cooking Workshop	3.2 (0.8)	3.4 (0.9)	.2	037	.55	.01
	Home Activity	3.4 (0.8)	3.7 (0.9)	.3			
FV prevent cancer (1-4)	Cooking Workshop	2.9 (0.8)	3.4 (1.0)	.5**	3.97	.05	.06
	Home Activity	3.1 (1.1)	3.1 (1.2)	0			
FV prevent heart disease (1-4)	Cooking Workshop	3.5 (0.9)	3.7 (0.6)	.2	1.18	.28	.02
	Home Activity	3.4 (0.8)	3.4 (0.9)	0			
Like taste of fruit (1-3)	Cooking Workshop	2.9 (0.4)	2.9 (0.4)	0	.00	1.00	.00
	Home Activity	2.9 (0.3)	2.9 (0.3)	0			
Like taste of Vegetables (1-3)	Cooking Workshop	2.2 (0.5)	2.4 (0.6)	.2**	3.87	.05	.06
	Home Activity	2.3 (0.6)	2.1 (0.7)	-0.2			

*Significant change across time for both groups ($p \leq .05$)

**Significant change from Home Activity cohort ($p \leq .05$)

Exposure, Food Neophobia and Taste Preference – Child

While it appeared that children in the cooking workshop had higher scores on the food neophobia scale at follow-up, no significant effects were found for willingness to try new fruits and vegetables across time or by condition (see table 14).

Table 14

Intervention time by condition effects for child willingness to try new F&V

Dependent Variable	Condition	Baseline (SD)	Follow-up (SD)	Change	F	P	η^2
Food Neophobia (7-56)	Cooking Workshop	39.7 ± 7.6	41.5 ± 8.1	1.8	1.64	.21	.03
	Home Activity	40.0 ± 9.0	40.1 ± 8.4	.1			

Chapter 5: Discussion

The current literature surrounding healthy eating interventions for children has highlighted the need for interventions to enhance vegetable consumption (Knai et al., 2006) as well as incorporating parent involvement (Fulkerson et al., 2010) and developing food skills (Cullen et al., 2007). This study aimed to examine the impact of an 8-week family-based healthy eating intervention based on social cognitive theory that focused on enhancing vegetable exposure, food preparation skills and efficacy for parents and their children (through cooking workshops) compared to a self-guided home-based intervention. Results of the evaluation were mixed, with several positive outcomes. Both the cooking workshop and home activity conditions enhanced outcome expectancies, family feeding practices, access and availability practices related to fruit and vegetables in the home, knowledge and liking of fruits and vegetables for both children and parents. The cooking workshop condition appeared to enhance effects significantly for specific outcome expectancies, and self-reported access and availability practices in parents as well as child reported accessibility, fruit and vegetable knowledge and liking in children. The following discussion provides an overview of the findings and places them in the context of the existing research.

Impact on parents

Primary Outcomes - behavioural measures

There were several changes in parental behavioural measures across time in both groups. Specifically, significant increases were found for parental feeding practices indicating that both interventions (home only and cooking workshop + home) facilitated a positive change in the home food environment; enhanced child involvement, parental modeling, and parents teaching their children about nutrition. These findings are important in light of past research which has found that parent modeling of healthy eating during family meals correlated to children's healthy eating practices (Cooke et al., 2004; Kristjandottir et al., 2009).

A significant increase in the parent reported weekly frequency of cooking from basic ingredients at follow-up was also found across both intervention groups. Cooking vegetable recipes from scratch was one of the key messages in both interventions. Cooking from basic

ingredients is associated with greater fruit and vegetable intake, greater nutrient value of meals and lower frequencies of certain physical health diseases (Belot & James, 2009; McLaughlin, Tarasuk & Kreiger, 2003; Tjepkema & Shields, 2005). Thus, the present results suggest that cooking vegetable recipes from scratch may be beneficial to enhancing these health outcomes.

The cooking workshop intervention also had significant impact on parent self-report of household fruit and vegetable practices. Parents reported improved access and availability of fruit and vegetables in their home following the cooking workshop intervention. Specifically parents reported that: a) their children's consumption of fruits and vegetables increased, b) their own consumption increased, c) that consumption of fruit and vegetables *with* their children increased and d) that they were engaging in more persuasive messaging. Parents in the cooking workshop condition also reported providing a wider variety of fruits and vegetables at home as well as persuading their children to eat more fruits and vegetables when compared to the home activity cohort. These results are similar to research conducted by Pearson et al. (2010) who utilized Social Cognitive Theory to enhance family fruit and vegetable eating practices. They found that parents in their family-based newsletter intervention reported a significantly higher accessibility of fruits and vegetables in the home. This is further supported by other research (Christian et al., 2013) that found that children of parents who always cut up fruits and vegetables at home ate 44g more fruit and vegetables compared to children of parents who did not practice this. Despite the similarities to other studies (ie: Fulkerson et al. 2010) it should be noted that home availability of fruits and vegetables was based on parent self-report rather than observed availability, although parent self-report was supported by child reported accessibility.

In contrast to the positive increase in family feeding practices and perceptions of practice, no significant differences were reported in the number of vegetable servings provided by the parents across time for either group. This was also the case for the number of fruit servings provided and the provision of both fruit and vegetable servings combined. This may be a result of high initial baseline values for provision of fruits and vegetables to children (above five servings a day). Specifically, total fruit and vegetable servings provided by parents to their children at baseline averaged 6.9 servings per day. This may result in a ceiling effect or regression to the mean at follow-up. At follow-up parents reported serving an average of 7.7 servings per day: an increase of 0.8 servings. While an improvement of 0.8 servings appears

encouraging, the standard deviation was large and combined with the small sample size it may not have been possible to observe the differences that may be there. These non-significant results contrast somewhat with the findings of other similar research that showed a significant positive effect of culinary parent-child partnership on fruit and vegetable consumption of parents (Fulkerson et al., 2010; Pearson et al., 2010; Glasson et al., 2012). However, it should be noted that these studies examined parental fruit and vegetable consumption habits rather than fruit and vegetable serving habits. Furthermore, the size of the mean change in the current study was comparable to other research yet not significant.

Not much research has examined parental serving behaviour (provision of fruit and vegetables); most have assessed parental consumption levels and access/availability of fruit and vegetables in the home (based on children's report). For example, in their pilot project, Pearson and colleagues (2010) enhanced parent consumption of fruits and vegetables in the treatment group by 1.6 servings following a 1-month intervention. This was from 3.3 servings a day at baseline to 4.9 servings a day at follow-up. Similarly, Glasson et al. (2012) noted a significant change of 0.62 servings with parents in their intervention condition from 4.02 servings to 4.64 servings. The aim both of these interventions which involved parents (similar to the current study) was based on research showing that parental consumption was an important predictor of child consumption (Glasson et al., 2012; Pearson et al., 2010). The mechanism for this may be modeling or actual changes in what is served at family meals. There is a paucity of data examining the mechanism for change and this study adds to the literature in this area by examining provision/serving of fruit and vegetables as the behaviour of interest rather than parental consumption. Satter (1987) emphasized that it is the parents job to choose, prepare and serve healthy food while it is the children's job to decide how much to eat. This perspective aligns with other observations that parents act as the dietary "gatekeepers" for their younger children but neglects other areas with the potential to enhance children's dietary behavior (Cooke et al., 2004; Hingle et al, 2010). Conversely, the differences found between this study and others may represent a measurement issue whereby the recall of fruit and vegetables consumed is more accurate than recall of the amount or frequency of provision.

Secondary Outcomes - psycho-social measures

A core theoretical component of this study was self-efficacy and this was measured in a number of ways. The main measures were parental confidence in their vegetable related practices and kitchen skills and there was no significant difference in these over time or between groups. These results contrast again with those found by Fulkerson and colleagues (2010) who reported significant increases in parental self-efficacy for making healthful changes at home. The lack of significance in the current study may be explained by a possible ceiling effect as baseline scores were very high. Parents reported being confident across the majority of scale items used in these instruments. Thus, as Sheeshka et al. notes (1993), if the benefits of adopting new healthy eating practices are already known and if recommended nutrition practices are already in place with participants, then there will be little shift in self-efficacy measures. This ceiling effect may be a consequence of participant recruitment bias. In combination with the high baseline efficacy it was evident that the sample had achieved a higher level of parental education and annual family income than the provincial and national average (Statistics Canada, 2013). This form of recruitment bias has been noted in other similar research (Fulkerson et al., 2010; Pearson et al., 2010).

In contrast to the minimal shift in self-efficacy for cooking confidence, there was significant change noted in another key construct of social cognitive theory: parental outcome expectations. Parent reports showed a significant reduction in the combined outcome expectancy scores for typical barriers; taste, cost and effort from baseline to follow-up for both groups across time. When the expectancies related to specific barriers were analyzed separately, there was a significant improvement in expectancies related to cost and effort of preparing healthy meals but not for taste. This lack of change in barriers for taste is not surprising given the potentially biased sample and ceiling effect. At baseline, parents expected vegetable recipes to be tasty. In contrast, the reduction in the negative expectations of cost and effort related to preparing vegetable recipes was observed. These findings are similar to previously reported research conducted by Glasson and colleagues (2012) who found a significant reduction in perceived barriers to purchasing and preparing vegetable dishes using a similar intervention timeline to this current study. Healthy foods are often perceived as costly and demanding in preparation which can elicit a disincentive to engage in healthy eating practices (Sheeshka et al., 1993). The results from this study

demonstrate the positive impact of engagement in cooking experiences to dispel these negative outcome expectancies.

In addition to the change in barriers, there was a significant positive shift in the parent reported outcome expectancy belief that if they prepared vegetable dishes for the evening meal that their children were likely to eat them. This effect was observed across time for both groups but with a significantly larger effect for the cooking workshop cohort. This finding is encouraging. Children in the cooking workshop were given time (and encouraged) to eat and enjoy the vegetable recipes they had created alongside their parents during the sessions. It appears that experiencing preparation and tasting together enhanced parental outcome expectancy beliefs and thus may, over time, result in improved home provision of vegetable dishes.

The remaining psycho-social measures for parents revealed that there was no significant change in willingness to try new vegetables (food neophobia) or the degree of liking for fruits and vegetables. Once again, baseline values showed that food neophobia was very low (ie: there was a high willingness to try vegetables) and that most parents liked fruits and vegetables. Indeed, parental scores for food neophobia and liking were very near the maximum score in the range at baseline. Again, the potential recruitment bias and consequent ceiling effect may have obscured the potential effect of the intervention. These repeating ceiling effects from high baseline levels have been previously reported in the literature and can occasionally mask intervention effects (Koblinsky, Guthrie & Lynch, 1992).

Impact on children

Primary Outcomes - behavioural measures

There were no significant increases in children's daily intake of vegetables, fruit or both fruit and vegetables at follow-up. Surprisingly, while the children's reported mean fruit and vegetable intake (excluding 100% juice and potatoes) increased by 0.4 servings from baseline to follow-up (5.5 servings to 5.9 servings), statistical significance was not achieved. Again, as previously noted with parent serving habits, the size of the mean change in children's fruit and vegetable consumption is comparable to other literature yet not statistically significant. This could be a consequence of the small sample size and related lack of statistical power which has

also been reported for other small-scale pilot trials (Fulkerson et al., 2010). Thus, it is difficult to draw conclusions about the impact of the intervention on children's fruit and vegetable intake. In addition, this may also be a result of measurement issues inherent when measuring food intake in children. For instance, assessing dietary intake can be challenging because of the reliability of the instruments and the accuracy of children's recall memories (Livingstone & Robson, 2000; McPherson et al., 2000).

The dose and length of the intervention may have also been an issue. Previous research suggested that 10-15 exposures of a novel food were required to enhance the preference for that food (Birch, McPhee, Shoba, & Steinberg, 1987). In the current study, the families were instructed to introduce a novel vegetable recipe from the cookbook each week for eight weeks but there was no control over whether a family actually implemented this, nor documentation as to whether the vegetable was novel to the child. Furthermore, exposure to other vegetables beyond the recipe book suggestions was also not documented (eg: dishes involving chard, beets, zucchini etc…) nor the total time invested (which was estimated at approximately an hour per week including preparation like shopping, tracking and cooking). Based on this, family engagement (ie: dose) was approximately 10 to 14 hours including orientation and evaluation measures. Time was also not stringently regulated or accounted for. The only measure of intervention compliance was the completion of the recipe tracking sheet; which revealed a 94% completion rate for the families that finished the project.

Apart from the frequency of exposures, the intensity of dose (minutes per session or over the whole intervention for example) may be important to the success of an intervention. For example, the Fruit & Veg $ense programme (Glasson et al., 2012) offered a singular 90 minute education session for a six week intervention. If that were the case, the dose per week would translate to 15 minutes per week for the six week intervention yet they achieved an increase of 0.62 servings in six weeks of intervention. Conversely, the HOME pilot study (Fullkerson et al., 2010) offered five 90 minute healthy eating education sessions over the course of 12 weeks which calculate out to a dose of 450 minutes of intervention which although comparable to the dose of the current study resulted in a significant increase in consumption. The optimal dose for family healthy eating interventions has not yet been established and may not be as important as the quality of program delivery. Furthermore, Roberson et al. (2008) noted that longer workshops involving families together tend to suffer participant dropout. Thus, there must a

careful balance between engaging families for sufficient dose while not competing for their private family time.

Although fruit and vegetable consumption did not change, children's reports of access and availability to fruits and vegetable practices in the home did. Specifically, at follow-up, children reported that their parents were more likely to buy specific fruits or vegetables if they mentioned them at home. Moreover, the children in the cooking workshop cohort were significantly more likely than the home-based cohort to indicate that their parents would cut up and prepare fruits and vegetables for them. This is an important point given that research by Busick, Brooks, Pernecky, Dawson and Petzoldt (2008) found that parents who purchased fruits and vegetables more often, resulting in greater exposure, had children who were more likely to accept and consume them. This supports the parent reported greater access and availability data and highlights the importance of parental practices.

Secondary Outcomes - psycho-social measures

Children's perception of their intake of fruits and vegetables was significantly higher at follow-up compared to baseline for both those participating in the home activity and cooking workshop programs. This finding is at odds with the lack of significance on the behavioural measure of fruit and vegetable intake. This discrepancy may be explained by: a) socially desirable responding, b) differences in the sensitivity of the tools to change or c) challenges in measuring dietary behaviour in children which have been outlined previously.

The children in the cooking workshop activity changed significantly in comparison to the home activity on two further psycho-social measures. First, they significantly increased their belief that eating fruits and vegetables could help prevent cancer. Second, they significantly improved their liking of vegetables compared to the home activity cohort. While the scale used to measure that was rather restricted in range (a scale of 1 to 3) this result is encouraging. It appears that participating in two cooking workshops helped to enhance children's preference for vegetables.

However, children's willingness to try vegetables (measured on the food neophobia scale) did not change significantly change from baseline to follow-up. The baseline levels of food neophobia were not high and were comparable to other research. For example, in this study,

children's mean neophobia scores at baseline were 39.85 (SD = 8.32) on a scale ranging from 8 to 56. This was comparable to mean baseline scores of 39.08 (SD = 8.54) reported by Day et al. (2008) from the children in the Action Schools! BC trial that used the identical scale. Change in the scores over time was also similar with this trial showing an average increase of 0.97 (on a score range of 8 to 56) from baseline (39.85) to follow-up (40.82, SD = 8.28) and Day et al. reporting an average increase of 1.08. This comparison is interesting given that the Action Schools BC project provided similar exposure level suggestions and tasting opportunities although delivered over a longer timeline. This suggests that any intervention seeking to significantly enhance willingness to try may need to provide a higher dose. As mentioned previously, Birch et al. (1987) suggested that 10 to 15 exposures to a novel food were required to enhance the preference for that food. In the current study, the actual frequency of exposures to specific vegetables were not recorded (beyond the one new recipe per week guideline from the intervention) nor was it determined if the vegetables highlighted in the recipe book were novel to the children or not. Child food neophobia may also be influenced by more than just simple exposures such as taste preference, parental influence, and hands-on cooking experience. Indeed, Birch (1999) emphasized the importance of social influences on children's developing food preferences such as parental and peer modeling. Such elements in the cooking workshop included chef encouragement (verbal persuasion), the children's parents eating their dishes (modeling) and the other children eating their recipes (modeling).

There were potential ceiling effects in the children's data as well but not as frequent compared to the parents. For example, child fruit preference was high at baseline and did not shift significantly at follow-up assessment. It has been noted across the literature that children's fruit preference is typically higher than vegetable preference which limits the pragmatic opportunity to improve this further (Ciliska et al., 2000; Pearson et al., 2010). Vegetable preference, in contrast, was slightly lower at baseline than fruit and did improve at follow-up assessment; particularly for the cooking workshop cohort. The cooking workshops featured several vegetables per class which may reflect an increase in vegetable exposure and experience by the children who took part in those sessions (a minimum of 6 recipes and at least 15 vegetables). The present results suggest that interventions seeking to enhance vegetable

preference are successful when vegetables are visibly promoted. This is supported by other research (Pearson et al., 2010).

Limitations

The results of the present study should be viewed in light of a number of limitations that are similar to other family-based interventions (Fulkerson et al., 2010; Pearson et al., 2010). For instance, the recruited sample was likely biased. First, it represented a high socio-economic bracket. A majority of the parents (85%) reported their education to be either post-secondary or post-graduate level; a crucial factor given that other research has demonstrated university education to be associated with purchasing greater quantities of fruits and vegetables (Ricciuto, Tarasuk & Yatchew, 2006). Furthermore, having a higher education level has been associated with better awareness of disease-diet relationships which in turn is associated with healthier food purchases (Canadian Council of Food and Nutrition, 2009). Education level of the participating families is an important consideration when designing a healthy eating intervention. For instance, Pearson et al. (2010) noted that when families may not be as highly educated, including newsletters, healthy eating tip sheets, handouts and informative recipe books (such as the one in the present study) is beneficial for promoting education on food.

Similarly, the majority of families (70%) reported their annual income to be at least $50,000 CDN per annum which is unlikely to impede fruit and vegetable purchasing as well as accommodating for fluctuating prices due to seasonality of crops. Research has revealed that low income households are particularly vulnerable to low fruit and vegetable purchasing patterns. For instance, Ricciuto and colleagues (2006) observed a relationship where, as household income increased, fruit and vegetable spending constituted a greater proportion of the family food budget. However, these effects were particularly apparent in low income families, those below $15,000 CDN per annum (based on 1996 data). Thus, given the characteristics of the current cohort, food security issues, including fruit and vegetable purchasing, were unlikely to be a concern. This may however be a strength of the study because there were no economic constraints on vegetable preparation and provision which may have added increased variability.

Second, the recruitment effort highlighted the project as an opportunity to enhance family eating habits. All families, regardless of their current dietary practices were eligible to

participate. However, as evidenced in the data, families that responded to the recruitment ads were likely to be more positively disposed towards healthy eating. Furthermore, during initial contact with the researcher, the majority of parents commented that they were interested in participating as a means to encourage their children to eat healthier and to spark their interest in enhancing their dietary habits. Similar participant bias issues have also been noted in other research. For example, Fulkerson et al. (2010) sought to increase the frequency of weekly family meals but noted that many families that enrolled in the study were already frequently eating family meals together. In contrast to these cases of already established healthy practices, the Fruit & Veg $ense project was only open to families that were not consuming the recommended daily intake of fruits and vegetables (Glasson et al., 2012). This inclusion criterion was likely to elicit a lower range of dietary habits and thus the opportunity for improvement. (Koblinsky et al., 1992). Ultimately, the opportunity for intervention related changes depends somewhat on the baseline characteristics and behaviours of the participants.

Apart from the potential sampling bias there were also several limitations related to the evaluation measures which must be considered when interpreting the results. For instance, while most of the evaluation tools were previously validated with demonstrated reliability, it is possible that several scales were not sensitive enough to detect changes that may have occurred throughout the course of the study. McPherson and colleagues (2000) noted that all dietary assessment methods for school-aged children have inherent errors and shortcomings. Indeed, related to the child measures in particular, there was a contrast noted between the non-significant findings of the quantitative data and the majority of qualitative post-project comments from the families. Specifically, based on the feedback, many parents reported a positive experience for their children as well as a noticeable change in perceptions and family dietary practices following the intervention. The numeric data may not reflect this positive shift for several reasons

To begin with, the entire assessment of the project was conducted using self-report methods. Self-report measures are widely used for dietary assessments (Lytle, Murray, Perry & Eldridge, 1998) but have been associated with measurement error (Livingstone & Robson, 2000) such as social desirability response bias (Robertson et al., 2008). It is possible that the accuracy of responses on these self-report measures was an issue. For instance, the children were

instructed to recall their dietary habits from the past week. It is likely that some responses were inaccurately recalled due to forgetfulness, inability to correctly recall portion size or in some cases, exaggeration of dietary behavior (Baranowski et al., 2000; McPherson et al., 2000).

The Food Frequency Questionnaire was chosen because it is simple to administer and time efficient. However it has lower validity than more labour intensive dietary intake measures such as 24-hour recalls (Baranowski et al., 1997; Domel et al., 1994). Indeed, Food Frequency Questionnaires often overestimate children's fruit and vegetable consumption when compared to other assessment methods (Baranowski et al., 1997; McPherson et al., 2000; Pearson et al., 2010). Lytle et al. (1998) found that children are likely to overestimate their consumption of fruit intake and accurately recall vegetable intake. McPherson and colleagues (2000) also noted that, in general, children reported greater consumption of foods with first administrations of the food frequency questionnaire compared to subsequent administrations. Moreover, research by Birmingham, Armstrong-Shultz and Edlefsen (2004) noted that the Food Frequency Questionnaire they used was insufficient to detect changes in consumption for a healthy eating program based on a guided recipe book.

Furthermore, while the 24-hour recall may be more intensive to administer, it has been recognized as a reasonable measure of children's dietary habits (Haraldsdottir et al., 2005) and carries the advantage of eliciting specific food item details which can be elusive to memory on a Food Frequency Questionnaire (Lytle et al., 1998; McPherson et al., 2000). Furthermore, 24-hour recalls may be repeated over multiple days in order to capture a greater range of dietary behavior, food servings and nutrient intake estimates. Children may be limited in their ability to accurately recall their eating habits across a week as opposed to a more precise timeframe such as a previous 24-hour period.

The Food Frequency Questionnaire in this study differed from typical Food Frequency Questionnaires in that it was adapted from the US National Cancer Institute (NCI) and served as a quick scan instrument to assess fruit and vegetable intake (NCI, 2000). The instrument did not provide a comprehensive list of fruit and vegetable choices but rather asked children to consider their frequency of all fruits and all vegetables. The only specific fruits and vegetables detailed in the tool were 100% juice and potatoes. Pearson and colleagues used a Food Frequency Questionnaire that detailed 13 different fruits and 14 different vegetables and found significant

intervention effects for increased fruit and vegetable consumption (2010). Providing a comprehensive list may promote greater accuracy to recall individual food items which may otherwise be elusive to memory. However, Baranowski et al. (1997) pointed out a pitfall that long listed inventories tend to overestimate consumption. Thus, Food Frequency Questionnaires have to balance providing sufficient cuing for accurate memory recall and minimizing prompting to avoid overestimation.

On a related note, other measures for children may also have been too restricted in range to sufficiently detect change at follow-up. For example, the items used to assess fruit and vegetable liking were based on a 3-point response scale of "agree", "in the middle" and "disagree". It is possible that a scoring range of three is too narrow to detect small changes in liking preference. Much research has constructed scales using larger response ranges. Pilner and Hobden (1992) developed their food neophobia scale on a 7-point range while research by Schutz and Cardello (2001) demonstrated the feasibility of a 9-point scale for assessing food preferences. Indeed, many significant intervention effects found with parents were noted on scales with 7-point response categories and in some cases, 5-point categories. Interestingly, parent measures included the same questions of fruit and vegetable preference as their children on an identical scale and similarly revealed no significant shift in preference. However, a ceiling effect was noted on these measures with the parents.

Despite the limitations of certain instruments to detect change, many families reported numerous positive experiences which were not highlighted in the evaluation instruments. Parents commented on their enjoyment of collaborating with their children in cooking recipes as well as the engaging experience at the cooking workshops. Furthermore, several parents noted that their children were more engaged in the kitchen and more open and positive about eating vegetables. Several children themselves commented that their interest in cooking vegetables was higher after participation in the intervention. This qualitative feedback provides some indication of areas for future exploration and measure development.

Another limitation of the present study was the limited sample size which affected statistical power. G-power analysis determined that 98 families were required to participate based on a power effect size of 0.80 and alpha set at 0.05. Unfortunately, only 65 families were recruited which included an intention to treat protocol for 11 families who did not complete

follow-up measures. Thus, it may be that the intervention elicited significant changes which were not detected. Furthermore, when some significant intervention effects were noted, the effect size was small (Cohen, 1988). Fulkerson et al. (2010) noted that these home-based pilot studies are often under-powered which made observing significant results challenging.

Summary and future research recommendations

The Family Healthy Eating project highlighted the potential efficacy of a cooking workshop intervention combined with home-based parent-child collaboration assignments aimed to promote vegetable consumption. It appeared that this approach enhanced parental practices related to fruit and vegetable access and availability, modeling, teaching and persuasive messaging when compared to a minimum dose comparison (home activities only). This was confirmed by child report. Unfortunately changes in practice did not result in changes in children's eating behavior. Interestingly there were also some potential improvements as a result of the minimal dose home activity intervention. Parents appeared to be responsive to the intervention and since they are important influences on children's eating behavior should be involved with establishing healthy eating habits in their children. Family-based interventions carry the advantage of focusing on evening meals where vegetables are often consumed and where the whole family has a chance to collaborate in meal preparation.

Several recommendations for future research are:

- Enhance recruitment timelines and strategies to ensure a sufficient enough sample size and adequate statistical power.
- Utilize a broader variety of inclusion/exclusion criteria and recruitment strategies to capture a more diverse socioeconomic population. It is often the case that small scale trials are dependent on volunteer participants which bring the risk of positive bias.
- Increase the trial duration and dose of intervention. This is a complex recommendation as no established minimal guidelines have been identified in the literature. However, research does agree that frequent exposure and increased

familiarity of fruits and vegetables over time help children establish healthy eating practices.

- Enhance the structure and accountability mechanisms related to the home activity portion of the intervention (ie: tracking). Maintaining participant commitment and connection during the project could help protect against experimental mortality as well as keep families on track with weekly goals. It is important to maintain accountability while at the same time not overburdening the participants with tasks and responsibilities. In addition, more tracking would allow for the assessment of dose response.
- Include a more substantive process evaluation to capture the qualitative feedback from the families involved more systematically.
- If resources allow, include a second comparison group that receives no intervention which would serve as a waitlist-control condition.

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Appendix A

Human Research Ethics approval certification

University of Victoria

Human Research Ethics Board
Office of Research Services
Administrative Services Building
PO Box 1700 STN CSC
Victoria British Columbia V8W 2Y2 Canada
Tel 250-472-4545, Fax 250-721-8960
Email ethics@uvic.ca Web www.research.uvic.ca

Certificate of Approval

PRINCIPAL INVESTIGATOR	**Patti-Jean Naylor**	**ETHICS PROTOCOL NUMBER**	**12-074**
UVic STATUS:	**Faculty**	ORIGINAL APPROVAL DATE:	20-Feb-12
UVic DEPARTMENT:	**EPHE**	APPROVED ON:	20-Feb-12
		APPROVAL EXPIRY DATE:	19-Feb-13

PROJECT TITLE: **Mind that Gap: increasing children's vegetable intake in the home environment**

RESEARCH TEAM MEMBERS: Dr. Ryan Rhodes, Co-Investigator (UVic); David Trill, Graduate Student (UVic)

DECLARED PROJECT FUNDING: **IRG-SSHRC**

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Modifications
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Renewals
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

Project Closures
When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants.

Dr. Rachael Scarth
Associate Vice-President, Research

Certificate Issued On: 21-Feb-12

12-074 Naylor, Patti-Jean

Appendix B

Family Healthy Eating Study Participant Consent Form

You are invited to participate in a study entitled: **The Family Healthy Eating Study** that is being conducted by Drs. PJ Naylor and Ryan Rhodes from the School of Exercise Science, Physical and Health Education at the University of Victoria.

What is the purpose of this study?
The purpose of the study is to determine the effectiveness of a social cognitive theory family-based healthy eating program.

Why is this study important?
There is concern about the increasing rate of childhood and adult obesity and other health issues such as type II diabetes, hypertension and certain cancers. Poor dietary behavior is associated with these health problems. Eating healthy is an effective way to offer protection from these health risks. This study seeks to address these issues by encouraging healthy eating practices in the home.

Procedures:
This study will take place in the spring of 2012 and run for a duration of eight weeks. The study includes weekly healthy eating activities and other healthy eating ideas that can be accomplished in the home. There is no cost involved to participate in this study. We will send you all of the materials you need to take part. We will ask you to complete questionnaires about your lifestyle and eating habits twice: once at the beginning and once after the 8-week program is complete. To do this, you will be invited to come to a conference room at the University of Victoria to complete these questionnaires. This procedure should take about 45 minutes to complete.

As a part of the study design all participants will be randomized into one of two study groups: cooking skills workshop or home-based activities.

Possible Harms:
None that exist beyond daily routine.

Benefits:
If you choose to participate in this study, you will have the opportunity to learn about the health benefits of healthy eating and other interesting facts about food and produce items. It is our hope that through this program, you will achieve a greater ability to cook and serve various snacks and dishes and enjoy the many other health benefits that accompany healthy eating practices.

The activities this project involves will be undertaken by you in your home at your preferred time of convenience. Materials for this project are fully provided for and are free of cost. In gratitude for your participation, you will receive a small culinary token of appreciation for your time and effort in the study. However, it is important for you to know that it is unethical to provide undue compensation or inducements to research participants and, if you agree to be a

participant in this study, this form of compensation must not be coercive. If you would not otherwise choose to participate if the compensation was not offered, then you should decline.

Your Rights:
You have the right to refuse participation in this program. It is understood that you are free to withdraw from any or all parts of the program at any time without penalty. Due to the nature of organizing a program assessment sessions (i.e. the questionnaire session at UVic), your anonymity cannot be completely guaranteed. However, personal information and other forms of data (i.e. questionnaire responses) will remain confidential as all individual records are filed by number code and only the results of group data will be presented.

If you decide to withdraw from the study, we will ask you to decide whether we can use the information that you have shared with us up until the point of withdrawal in the study's analysis. If you would not like us to use your data, you can simply let us know and we will remove all your coded data from the all sources in the databases.

Files are kept in a secure locked lab at the University of Victoria. The lab remains locked and only those directly involved in the study will have access to your records and results. You will not be referred to by name in any program reports or research papers. Reports or papers may be presented to research committee members, research conferences and other academic outlets. Your individual results will remain confidential as they will not be discussed with anyone outside the research team. All information will be kept for 5 years, after which it will be destroyed.

On-going Consent. Since the research will take place over the course of two to three months, we will make sure that you continue to consent to participate in this research. We will remind you at the beginning of each evaluation phase of the option to withdraw from the research at any time without explanation or penalty. If you decide to withdraw, we will only use the information we have collected from you up until that time with your permission unless you notify us otherwise.

Please be assured that you may ask questions at any time. We will be glad to discuss your results with you when they have become available and we welcome your comments and suggestions. Should you have any concerns about this program or wish further information please contact:

Dr. PJ Naylor: pjnaylor@uvic.ca 250-721-7844
David Trill: dtrill@uvic.ca 250-853-3141

You may verify ethical approval of this study or raise any concerns you might have about your rights or treatment as a participant in this study by contacting the "Human Research Ethics" at UVic: ethics@uvic.ca.

Compensation for Injury:
Signing this consent form in no way limits your legal rights against the sponsors, investigators or anyone else.

Please fill out this form and return it the address provided sealed in the attached envelope

Child's Consent Statement:

I _____ voluntarily consent to participate in the study: **The Family Healthy Eating Study**.

I have discussed this study and consent form with my parent(s)/guardian(s). I understand the purpose of the study and my part in it. I understand that I have the option to withdraw from the study at any time without penalty of any sort. I also understand that if I withdraw from the study at any time, I can ask that any data that I have provided will be destroyed. My information will be used for research purposes only, and any details that may reveal who I am will not be included in study reports and presentations. If I or my parent/caregiver has any questions, I may call PJ Naylor at 250-721-7844 or the Office of Research Services (250) 472-4545 at the University of Victoria.

Child's Signature:_____ Date:_____

Parent's Consent Statement:

I _____ voluntarily consent to participate in the study: **The Family Healthy Eating Study**.

I understand the purpose of the study and my part in it. I understand that I have the option to withdraw from the study at any time without penalty of any sort. I also understand that if I withdraw from the study at any time, I can ask that any data that I have provided will be destroyed. My information will be used for research purposes only, and any details that may reveal who I am will not be included in study reports and presentations. If I have any questions, I may call PJ Naylor at 250-721-7844 or the Office of Research Services (250) 472-4545 at the University of Victoria.

Parent's Signature:_____ Date:_____

If you have any questions or concerns about this study, please do not hesitate to contact Dr. PJ Naylor at any time at the address below

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PJ Naylor, Ph.D.
School of Exercise Science, Physical & Health Education
University of Victoria
Victoria, B.C. V8W 3P1
250-721-7844 (office phone)
250-472-4242 (office fax)

Appendix C

The Family Healthy Eating Project Guidelines

Welcome to the Family Healthy Eating Study and thank you for your support and participation in this project! We greatly appreciate it! This document will serve as your instructions and guidelines for your role in this project over the next eight weeks.

Outline

The purpose of this study is to promote, educate and encourage healthy eating habits within the family setting. For this, we will assign you healthy eating tasks to be completed each week for the next eight weeks. Completing these tasks involves collaboration between you and your child. There are two principle tasks: 1) add an extra vegetable per day for the family's main meal and 2) prepare and serve a weekly vegetable orientated recipe from the booklet provided. These tasks are based on preparing a culinary dish for your family one evening per week from a list of selected recipes that we provide.

Each week, we would like you to select one recipe from the booklet provided and prepare this dish for your family. Each recipe will feature a distinct vegetable-based theme. You are invited to try any recipe that you wish in any order. However, we ask that you continually choose one new recipe each week until the eight weeks of study duration are concluded. Thus, at the end of eight weeks, your family will have experienced 8 different recipes from the list of 12.

There are three main categories of recipes for you to try each week: 1) snacks, 2) side dishes, and 3) main dishes.

Snacks

First, the snack recipes are intended to supplement the periods of the day where you might not wish to have a full meal but desire something light in between main meals.

Side Dishes

Second, side dishes are options intended to comprise approximately half of the dinner plate. They are not intended to function as a complete meal on their own. You are free to add whatever combinations of other complimentary side dishes to these recipes that you wish. For instance, you may choose to add chicken, pork, rice or pasta to round off the evening meal.

Main Dishes

Third, main dishes are complete recipes for the whole dinner plate. Creating them will constitute the entire meal. We have suggested some vegetable-focused recipes although this main dishes can also be your own already established dishes where simply more vegetables are added.

During the study, you have the choice of repeating previously tried recipes as many times as you wish so long as you introduce one new recipe from the booklet each week. In fact, when the

study concludes, it is our hope that these recipes will be featured at your dinner table many times more!

As already indicated, the required workload for this project is to try one new recipe from the booklet each week for the next eight weeks. However, if you have the passion and desire to pursue other culinary creations during the course of the study, then please feel free to do so. For instance, if you are inspired to modify some of your existing recipes to enhance its vegetable content, then please go ahead. You are certainly welcome to experiment throughout the week beyond the project guidelines so long as the minimum criteria are maintained.

Due to the limited budget of this project, we unfortunately do not have the resources to offer your family a complete collection of all the ingredients needed to assemble these recipes. We kindly ask that you acquire the necessary ingredients on your own. To that effect, one critical component of this project is to promote the fact that healthy eating is inexpensive and affordable. We appreciate your understanding in this matter.

Time Commitment

The home activity program is intended to be flexible for families with busy and often hectic schedules. We ask you to reserve and dedicate just one evening per week to prepare and serve these recipes. The exact day and time to do this will up to you depending on your family's schedule. However, we encourage you to pick one day of the week to try these recipes and make a routine of the day each week over the next eight weeks. If you are out of town during the course of the study, please do your best to keep at the recipes while your family is away. By all means take the recipe booklet and tool kit with you!

These recipes are intended to be easy-to-follow and should not cost a significant amount of time to prepare. A general estimate is approximately an hour's commitment each week to complete these healthy eating tasks. In fact, preparing deliciously quick and simple recipes is one of the core elements of this project.

The Collaboration

A distinguishing feature of this study is to involve both the parent and the child together in the culinary process from start to finish. This collaboration could include tasks like shopping for your ingredients at the grocer's, kitchen prep work and actual cooking tasks. Ultimately, it is your decision how you would like your child to participate. The main objective here is to encourage your child to take an interest in the culinary experience.

In addition to the creating the culinary process, a central component of this project is the exposure and tasting experiences for you and your child. In this regard, we would like you to encourage your child to try each vegetable as the new dish is selected each week. We would like you to encourage your child to try the vegetable raw and/or cooked wherever you see occasion. We are seeking to encourage positive tasting experiences for all family members!

The Canada Food Guide

The Canada Food Guide is provided for you to serve as a reference for your family's dietary intake. We are recommending following the Canada Food Guide as a template for your involvement with this project over the next 8 weeks. If you are unfamiliar with the Canada Food Guide, it outlines the recommended intake of the four major food groups (fruits and vegetables, grain products, milk and alternatives, and meat and alternatives) for all ages. It also defines for each food group serving and portion sizes. You can use these guidelines to establish and construct meal plans and serving sizes over the course of this program. Please take some time to review and become familiar with its recommendations.

In addition to the Food Guide, we are providing two supplemental posters in the tool kit. These are to be put up in a visible space somewhere in your kitchen (like on the refrigerator if space isn't at a premium!). The intention of these posters is to provide your family with a visual reminder of healthy eating practices throughout the project.

The Evaluation

Evaluation of the Family Healthy Eating Project is an important component in the research process. There will be two principle dates of evaluation: Baseline measurement in week 1 and Follow-up measurement after week 8. Evaluation will be comprised of simple pencil and paper questionnaires for both you and your child. This step should not take longer than 45 minutes to complete.

Since the project evaluation spans multiple months, we are required by University ethics protocols to obtain on-going consent for our follow-up evaluation measures. This will simply be a phone call around week 7 of the project timeline asking for your verbal consent to conclude the project with our follow-up questionnaire package.

Thank you very much for your support and participation in this project. If you have any questions or concerns at any point, please feel free to contact me with the details found on your consent forms

Appendix D

The Recipe Tracking Sheet

Name: _____

The Family Healthy Eating Project
Vegetable Cooking Calendar

Timeline	Recipe Which recipe did you select this week?	Cost On a scale of 1 to 5, how costly did you find this recipe to prepare? (5 being most expensive)	Preparation On a scale of 1-5, how easy was it to prepare this recipe? (5 being easiest)	Parent's Taste On a scale of 1-5, how tasty did you find this recipe? (5 being tastiest)	Child's Taste On a scale of 1-5, how tasty did you find this recipe? (5 being tastiest)
Week 1	_____	_____	_____	_____	_____
Week 2	_____	_____	_____	_____	_____
Week 3	_____	_____	_____	_____	_____
Week 4	_____	_____	_____	_____	_____
Week 5	_____	_____	_____	_____	_____
Week 6	_____	_____	_____	_____	_____
Week 7	_____	_____	_____	_____	_____
Week 8	_____	_____	_____	_____	_____

Appendix E

The Family Healthy Eating Project

Recipe Book

Introduction

Welcome to the Family Healthy Eating Project! We are delighted to have you and your family aboard with this project and thank you for your support and participation.

In accordance with the project's activities, this booklet will serve as your weekly recipe source over the next several weeks. The goal is to select and prepare one new recipe from this booklet each week for the duration of the project. We hope that you enjoy the suggested recipes and that they lead you into many other culinary inspirations and adventures!

These recipes are described with the approximate number of servings that they provide. However, this does not have to be rigidly or strictly adhered to. With varying sizes of families involved, it is up to you if you would like to expand the ingredients in order to provide for more people than what is suggested. Feel free to modify the recipes slightly to suit your specific needs.

Another note, most of the recipes involve hot stove elements, sweltering oven temperatures, sharp knives or using fabulous cooking oils. For small young kitchen hands or helpers, please be cautious! But above all, have fun, get your hands dirty and enjoy what you achieve in the kitchen!

As you get into this culinary adventure, I strongly believe that the primary goal of any healthy eating project is to inspire passion and joy about great food. This project is about sparking curiosity, encouraging exposure and evoking passion about great food and fun for the family. We sincerely hope you enjoy the recipes within. Happy cooking and enjoyable eating!

Suggested by… THE LONDON CHEF

Kale Chips

Serves 2 to 4 as a snack

The leafy Kale! The #1 ranked vegetable for decorating fish and seafood displays at the grocery store. Plus you can eat it too! Kale chips are a great way to have a tasty snack in the middle of the day providing a good kick of nutrients and flavour.

Ingredients

- Bunch of kale leaves as needed (can use green, red or purple)
- Extra Virgin Olive Oil (enough to coat the kale leaves)
- Sea salt or seasoning salt

Recipe Instructions

Preheat oven to 350º Fahrenheit (180º C) and line a cookie sheet with parchment paper.

Thoroughly wash and dry the kale leaves using a salad spinner if you have one, otherwise pat dry with a clean tea-towel. Then, with a knife or kitchen shears, carefully remove the leaves from their stem and tear them into bit size pieces.

Once you place them on the baking sheet, drizzle the torn-up kale leaves with the oil and massage the oil into the leaves with your hands. After this, sprinkle the leaves with the salt or seasoning.

When your oven is up to temperature, bake the leaves until the edges brown slightly but are not burnt. This should take about 10-15 minutes. Let them cool and enjoy!

Follow the recipe online!

http://bettertogetherbc.ca/kid-friendly-recipes/single/colourful-kale-chips

Shopping and Handling

- Buy Kale that looks fresh, crisp and crunchy. You can mix and match colours with green, red or dark-blue to black leaves.
- The stems are edible but can be a little tough.
- Wrap in a plastic bag and store in the refrigerator. Consume within a week before the leaves wilt. Kale can grow bitter if stored for too long.

Did you Know?!?

- Kale is part of the Brassica family and is closely related to wild cabbage.
- Kale is very high in beta carotene, Vitamin A, Vitamin C, Vitamin K and reasonably rich in calcium.
- Kale also contains *sulforaphane* which has potent anti-cancer properties.
- Kale was also a featured vegetable in the UK during WW II in the "Dig for Victory" campaign owing to its dense nutrient content and robust growing qualities. A real winner!

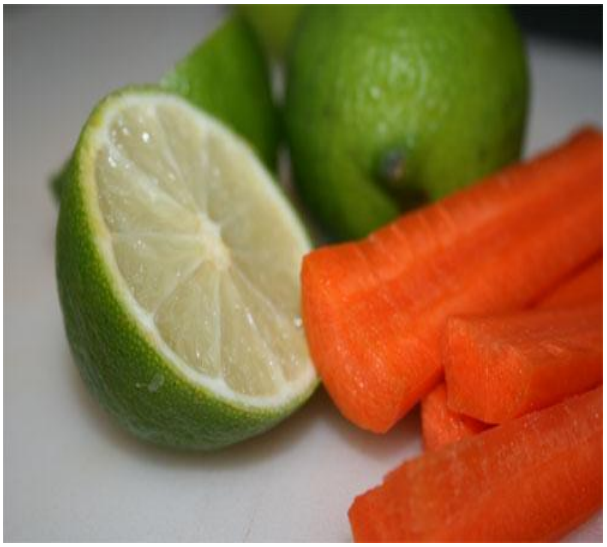
Tangy Fancy Carrots

Serves 2 to 4 as a snack

Carrots are a great snack option and are always easy to prepare. Here's an idea to give a little spicy twist to just plain carrot sticks.

Ingredients

- Carrots sticks as needed
- Sea Salt
- Lime Juice



Recipe Instructions

This is a simple snack recipe which fits well with post-exercise and sports events to replace a bit of sodium lost through sweating. First, wash and prep the carrots by cutting them into sticks around 4" (10cm long) in half or quartres. Arrange them on a plate and then squeeze some lime juice over top. Then grind or sprinkle some sea salt over top! Enjoy!

Follow the recipe online!
The internet is flooded with recipes regarding different ways to use carrots for dinner rather than the quick steam bath. Have a look around yourself or try this one:

http://allrecipes.com/recipe/carrots-with-dried-cherries/

Did you Know?!?

- Carrots are nutritional work horses being an exceptionally rich source of *beta-carotenes* (a reflection of its typical orange colour) and *Vitamin A* as well as many other *micro nutrients*.
- And yes! Extreme overconsumption of carrots can cause *carotenosis*, a benign condition in which the skin pigment turns orange.
- Ancient carrots (and wild versions) were typically purple and yellow hues. The modern day orange carrot was established by 16th to 17th century Dutch horticulturalists.
- There is a popular myth that these Dutch growers bred orange carrots to honour their sovereign, William of Orange.

Shopping and Handling

- When buying carrots, look for young, tender, bright colored roots with firm consistency. Avoid soft, flabby roots, with cuts or mold.
- Carrots with greenish tops arise from excessive exposure to sunlight which represents chlorophyll photo-pigment deposition.
- Generally, carrots store well in the refrigerator or in dark cool places.

Broccoli Salad

Serves 4-6 as a side dish or main dish

This is a great recipe to add some broccoli into your dinner line-up with slightly different twist.

Ingredients

- 2 large heads of broccoli
- 8 rashers of smoked streaky bacon, finely sliced
- Extra virgin olive oil
- 3 firm red tomatoes, halved, deseeded and finely sliced
- A small bunch of fresh chives, finely chopped

For the dressing:

- ½ a clove of garlic, peeled and finely grated
- 2 teaspoons Dijon mustard
- 6 tablespoons extra virgin olive oil
- 2 tablespoons white wine vinegar
- sea salt and freshly ground black pepper

Recipe Instructions

Use a small knife to remove the broccoli florets and cut them up into smaller ones. You'll be left with the stalk, so discard the thick dry base, then cut the remaining stalk in half lengthways and finely slice.

Blanch your broccoli florets and sliced stalks really quickly in boiling salted water for 60 seconds, just long enough to soften the broccoli but still leave it with a bit of a bite. Drain it in a colander, then spread it around a clean tea towel to steam dry (this is important because it will help the dressing cling to the broccoli). Once completely dry, transfer to a serving dish.

Fry the bacon over medium heat with a small splash of olive oil until crisp and golden, then spoon most of the bacon bits over your broccoli. Any leftover fat in the pan can be used in your salad dressing. Pour it into a mixing bowl with all the other dressing ingredients and whisk.

Add the sliced tomatoes and chopped chives to your broccoli and bacon bits. Dress it all really well, and check the seasoning. If it needs pimping up, add a splash more vinegar. It's beautiful on its own or served next to any grilled or roasted meat or fish.

Follow the recipe online!
http://www.jamieoliver.com/recipes/salad-recipes/broccoli-salad

Did you Know?!?

- Broccoli is a flowering vegetable. When you are eating broccoli, you are actually eating the flower!
- It's a nutrient storehouse of many vitamins and minerals such as *Vitamin A* and *C*, niacin as well as a good source of *dietary fibre*.
- Broccoli also contains many *phyto-nutrients* which are anti-cancer preventers!

Shopping and Handling

- Looks for heads with tightly closed, vivid green buds and avoid those that are yellowing or those with a hollow stem.
- Store broccoli in the refrigerator unwashed for up to 4 to 5 days.

Greek Salad

Serves 4 as a side dish

This salad is known and loved around the world and is a great way to get an amazing combination of juicy vegetables together. Kalamata olives are popular to use with this dish but many other types of dark olives suffice.

Ingredients

- 1 medium ripe tomato
- 200g ripe cherry tomatoes
- 1 beef tomato
- 1 medium red onion, peeled
- 1 cucumber
- 1 green pepper
- a handful of fresh dill
- a handful of fresh mint leaves
- a large handful of black olives
- sea salt
- 1 tablespoon red wine vinegar
- 3 tablespoons extra virgin olive oil
- 200g block of feta cheese
- 1 teaspoon dried oregano

Recipe Instructions

Try cutting up the different tomatoes in a variety of ways for a dynamic appeal! Put all the tomatoes into a large salad bowl. Slice the onion very finely so it's wafer thin and add to the tomatoes. Scratch a fork down the sides of the cucumber so it leaves deep grooves in the skin, then cut it into thick slices. Deseed your pepper, slice it into rings and add them to the salad along with the cucumber.

Roughly chop the dill and most of the mint leaves, reserving the smaller ones for garnish. Add the chopped herbs to the bowl of salad, then squeeze your handful of olives over so they season the vegetables, then drop them in.

Add a pinch of salt, the vinegar and the extra virgin olive oil. Quickly toss everything together with your hands. The minute all those flavors start working with the veg is when the magic starts to happen. Have a taste, and adjust the flavours if need be.

To serve, pop the block of feta right on the top of the salad. Sprinkle the oregano over the top along with the reserved mint leaves, drizzle with extra virgin olive oil and take it straight to the table. Delicious!

Follow the recipe online!
http://www.jamieoliver.com/recipes/vegetarian-recipes/greek-salad

Did you Know?!?

- Greek salad is a great way to bump up your vegetable intake with a multitude of different vegetables high in *anti-oxidants*.
- The Extra Virgin Olive oil used in Greek Salad is also a good source of *mono* and *polyunsaturated fats*.

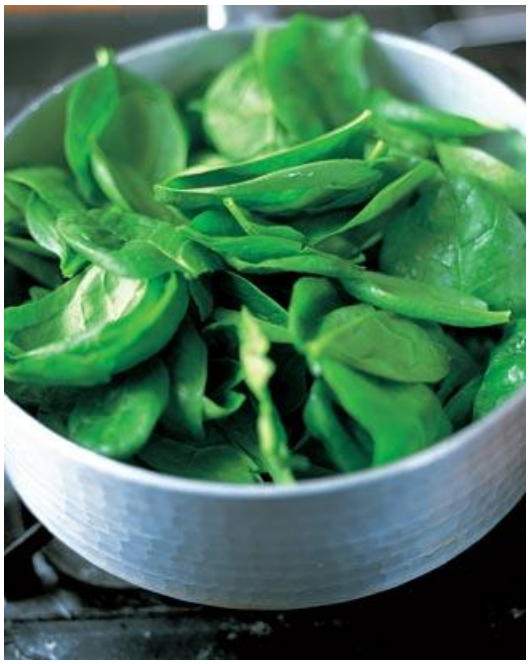
Shopping and Handling

- Small Japanese-style cucumbers are ideal for this salad recipe rather than long English cucumbers.
- For an extra level of visual appeal, try different coloured bell peppers.
- Another option is to crumble up the feta cheese within the salad.

Braised Spinach

Serves 4 as a side dish

Spinach is a hero in the vegetable domain as an energy booster! This is a great addition as a side dish to boost up your daily greens!



Ingredients

- 1 bunch of Spinach leaves (or as much as needed)
- Extra Virgin Olive Oil
- Butter
- Nutmeg
- Lemon Juice

Recipe Instructions

Make sure that you wash the spinach leaves really well before cooking. The simplest way to cook **spinach** is in a pan with a little **olive oil**, **butter**, a grating of **nutmeg** and a tiny squeeze of **lemon juice** with a lid on to let it steam. This will taste great, and it goes with just about anything: pasta, fish or meat. If there is any excess moisture when the spinach is cooked, just tilt the pan so it runs to the other side and pour it away. Let the spinach sit for a minute and then serve.

Follow the recipe online!
http://www.jamieoliver.com/recipes/vegetarian-recipes/perfect-braised-spinach

Shopping and Handling

- Look for spinach bunches that are dark green, with lots of vitality and crispness.
- Store wrapped in the refrigerator for up to a week, although it should be eaten as soon as possible to reap the nutritional benefits.

Did you Know?!?

- Popeye the Sailor had it right about spinach for strength and energy, as it is great plant source of *iron* as well as many other nutrients.
- The early comics of Popeye eating spinach boosted US spinach sales by ~30% in the 1930s.
- Spinach is also a great source of *Vitamins A* (which was actually the original inspiration for Popeye to eat spinach), *Vitamin B* and Vitamin *K* and other *phyto-nutrients* which are potent cancer and disease fighters.
- Spinach goes well with Olive Oyl!

Asparagus Rafts

Serves 4 as a side dish

Asparagus is great season opener vegetable with crops starting in May. As well, this recipe is an easy addition to your barbeque plans.

Ingredients

- 16 to 20 thick asparagus spears (approximately 1lb)
- 1 tablespoon soy sauce
- 1 teaspoon dark sesame oil
- 1 garlic clove, minced
- 2 teaspoons sesame seeds, toasted
- ¼ teaspoon ground black pepper
- Dash of salt

Recipe Instructions

Prepare grill to high heat.

Snap off the tough bottom ends of the asparagus. Then arrange 4-5 asparagus spears on a flat surface. Thread 2 (3-inch) skewers or toothpicks horizontally through the spears 1 inch from each end to form a raft. Repeat this procedure with remaining asparagus spears.

In a little dish, combine the soy sauce, oil, and minced garlic and mix thoroughly together. Use this to brush evenly over the asparagus rafts. Grill for 3 minutes on each side or until crisp-tender. Sprinkle evenly with sesame seeds, pepper, and salt. Enjoy!

Follow the recipe online!
http://www.myrecipes.com/recipe/grilled-asparagus-rafts-10000000686148/

Did you Know?!?

- Asparagus is one of the oldest recorded vegetables.
- Besides being rich in many *Vitamins* and *Minerals*, asparagus is a great source of *dietary fibre* and *folates*.
- The Germans have a beloved version of white "Spargel" by covering the young green shoots with mound depriving them of sunlight. This lack of photo-synthesis makes them turn white and a little bit tough and stringy. Your call!

Shopping and Handling

- Asparagus should be used as soon as possible after harvesting. Otherwise, it loses flavour as most its sugar will be converted to starch. So pick them from the local farms whenever possible.
- Select fresh, tender, firm, straight, smooth, uniform sized, dark green/purple stalks with tightly-closed tips.
- You can store them like cut flowers in a small pot of water in the refrigerator.
- The lower end of the asparagus spear is known as the "woody" end. Use your hands to snap off the woody end where the stem breaks naturally.

Bok Choy

Serves 4 as a side dish

Bok Choy is a popular Asian vegetable that goes really well on its own or in stir fry. Sesame seeds are a must whenever you cook with Bok Choy!

Ingredients

- 1 tablespoon grapeseed oil or equivalent (15 mL)
- 1 clove garlic, coarsely chopped
- 1 teaspoon coarsely chopped ginger (5 mL)
- 12 heads baby bok choy, washed, stem trimmed, cut in half
- 2 tablespoons tamari or soy sauce (30 mL)
- 2 teaspoons sesame seeds (10 mL)

Recipe Instructions

This recipe is simple and quick, packed with flavour and nutrition. Heat the grape seed oil in a wok or large sauté pan until almost smoking. (Compared to other common cooking oils, grape seed oil has a high cooking temperature before it burns so caution here!). Add the garlic and ginger being careful about possible splash of the hot oil. Stir-fry over high heat for 30 seconds. Add the baby bok choy and tamari. Cover for 1 to 2 minutes to steam bok choy. Remove from heat, toss with sesame seeds and serve.

Follow the recipe online!
http://www.foodnetwork.ca/recipes/Side/recipe.html?dishid=4920

Shopping and Handling

- Buy firm stalks and dark green crispy flavourful leaves. Avoid slump plant with leaves wilted and lost their luster.
- Store Bok Choy in the refrigerator with a relative high humidity where it should last for up to 3-4 days without the loss of much nutrients.
- For preparation, cut off the bottom stem of the plant and peel away some of the outer leaves if you wish.
- Bok Choy is a very nutritious plant with high water content. Therefore, it is very easy to overcook this vegetable. If you steam it, don't steam it too long.

David's Healthy Eating Tip:

Go for a Wok with your Vegetables!

Did you Know?!?

- The popular asian vegetable Bok Choy is part of the same family as broccoli and cabbage: the Brassica family.
- Bok Choy is loaded with *Vitamins* and *minerals* and has more potent *anti-oxidant* abilities than cabbage and cauliflower.
- Another version of this vegetable is called "*shanghai bok choy*" which is recognized by having a light green stalk instead of white.

Suggested by…

THE LONDON CHEF

Crunchy Asian Cabbage Slaw

Serves 4 as a main dish

This is a great dish to bring a little bit of an exotic feel to the dinner table. It's the Asian fireworks of flavour, colour and nutrients!

Ingredients

- ½ cup of blanched unsalted peanuts plus some extra for garnish
- 1 tablespoon of soy sauce
- 1 teaspoon of Nam Pla (ie: fish sauce)
- 1 small hot fresh chilli, with seeds removed
- 1 inch of unpeeled fresh ginger
- 4 cloves of fresh garlic with skin removed
- ½ bunch of cilantro including the leaves and stocks plus some extra for garnish
- ½ cup of water
- ¼ cup of canola oil
- 1 lime for juice and zest

For the salad base, you will need a selection of raw vegetables to cut into a julienne such as:

- Savoy, green and purple cabbage
- Green onions
- Carrots
- Cucumbers
- Zucchini
- Red, orange or yellow bell peppers

Recipe Instructions

For the dressing, blend the ingredients together until you have a smooth and creamy mixture. You can do this in a blender or a hand mixer. Taste the dressing along the way and adjust it to suit your preference.

Then set about prepping the raw vegetables into a julienne. These go into your favourite large serving bowl. Once prepped, add the dressing to the vegetables mixing and tossing it in thoroughly. This is your chance to get your bare hands right into what you are making! Have fun and get dirty in a culinary sense. When you've had your fun, garnish the salad with the remaining peanuts and cilantro. Enjoy!

Did you Know?!?

- This salad can be the considered the Triple Whammy of health benefits as it contains 3 massive vegetable rockstars: **CHILI** (for *anti-oxidant* and *anti-carcinogenic* properties), **GINGER** (for *anti-inflammatory* and *anti-bacterial* properties) and **GARLIC** (for your *immune* system). Cancer and Heart Disease beware!!!
- Chilis are part of the nightshade family which include tomatoes, bell peppers and aubergines. The compound *capsaicin* is what gives these fellas their fiery taste! Awesome stuff!

Shopping and Handling

- **Chilis**: buy fresh chilis that display brilliant colours with healthy stalks and appear wholesome and compact. You can store them wrapped in the refrigerator.
- **Ginger**: should feel "heavy" in your hand and be juicy. You can store it in a cold dark place
- **Garlic**: try to find garlic with a nice reddish-purple colour to it and store in a dry dark place.

Lemony Green Beans

Serves 4 as a side dish

Green beans often represent the frontrunners in most vegetarian diets. Why? They are highly versatile in recipes from stir fry to stews to side dishes. Plus their nutritional make-up covers A to Z.

Ingredients

- 1 lemon
- 1 tablespoon extra virgin olive oil
- Sea salt and freshly ground black pepper
- 300g green beans, trimmed

Recipe Instructions

Zest the lemon into a large bowl using a fine grater. Cut the lemon in half and squeeze in the juice from one half. Add in the extra virgin olive oil and season with sea salt and freshly ground black pepper. Mix well.

Put a pan of salted water on to boil. Once boiling, steam or boil your beans until tender. Drain well, then tip the cooked beans into the bowl with your dressing and toss everything together, making sure all the beans get coated. Have a taste and squeeze over the remaining lemon juice if you think it needs it, then serve.

Follow the recipe online!
http://www.jamieoliver.com/recipes/vegetarian-recipes/lemony-green-beans

Did you Know?!?

- Green beans are a rich source of *dietary fibre* which help reduce blood cholesterol levels.
- Thought only eating carrots were good for your eyes? Green beans contain *zeaxanthin*, an important *dietary carotenoid*, which serves as an antioxidant and offers protective UV light filtering functions for your eyeball. This plays a role in preventing Age Related Macular Disease. Thus, green beans, more or less, are sun glasses that you can eat!

Shopping and Handling

- Green beans should be tender, long, stiff, but flexible and give snap sound when broken.
- To store, place them in a perforated plastic bag and keep inside the refrigerator set at high relative humidity. They keep well for up to a week.
- Wash raw beans in cold water. Just before using, remove the strings and trim the ends.

Farmer's Market Quesadillas

Serves 4 as a side or main dish

This is a great recipe to bring a great mix of vegetables together. They are always fun to make and serve with your choice of guacamole, salsa or sour cream!

Ingredients

- 1/2 cup chopped bell pepper
- 1/2 cup chopped zucchini
- 1/2 cup chopped tomatoes
- 1/2 cup chopped red onion
- 1/2 cup chopped mushrooms
- 1 tablespoon extra virgin olive oil
- 6 (9 inch) whole wheat tortillas
- 1 1/4 cups shredded cheddar cheese

Other options:
You can easily add to this recipe by including some meat like chicken breast or your choice of seafood. You can also try using different types of cheeses instead of cheddar or trying a different mix of vegetables like broccoli, green onions, beans or even artichoke hearts. It's up to you!

Recipe Instructions

Bring a large (non-stick) fry pan up to heat (medium to medium-high) with some extra virgin olive oil in. Once hot, stir in and cook the red peppers, zucchinis, onions, and mushrooms for about 7 minutes, or until just tender. I like to hold off on the tomatoes until the last minute or so to keep them from going too soft. You can salt and pepper your vegetables if you wish. Remove the vegetables from pan and set aside.

Now place one tortilla in the same pan to warm-up although having a bit of lubricant in the pan helps with this but not too much! Sprinkle 1/4 cup of cheese evenly over tortilla, and layer 3/4 cup of the vegetable mixture over the cheese. Then sprinkle another 1/8 cup of cheese on the vegetables, and top with the second tortilla. Cook until golden on both sides, for approximately 2 to 3 minutes per side. Remove the quesadilla from the pan, and repeat with remaining ingredients. Cut each quesadilla into 8 triangles and serve hot.

Follow the recipe online!
http://allrecipes.com/recipe/farmers-market-vegetarian-quesadillas/

Did you Know?!?

- The best of both worlds... the quesadilla is often served with guacamole. The quesadilla has colonial Mexican-Spanish origins while guacamole is a traditional Aztec food.
- Load up your quesadillas with lots of vegetables to ensure top nutrition.

Shopping and Handling

- Depending on the ingredients you use for the quesadilla, in general, look for vegetables that show good colour, relatively good firmness and attractiveness.
- Store them wrapped in the refrigerator for up to several days.

Beef and Couscous Stuffed Peppers

Serves 4 as a main dish

This is a great recipe to try your hand at something fancier but is still simple and quick. Plus, bell peppers are a top notch nutritious

Ingredients

- 1 cup of couscous, cooked
- ½ cup of diced fresh tomatoes
- ½ cup of chickpeas, rinsed and drained
- 1 teaspoon of dried Italian seasoning
- ¼ teaspoon of freshly ground pepper
- 4 large red bell peppers
- ½ pound of lean ground beef
- 1 tablespoon of chopped shallots
- 2-3 cloves of fresh garlic
- 1 tablespoon of cooking oil
- ¼ cup of crumbled feta cheese

Recipe Instructions

First, cook the couscous per directions on its container (it cooks similar to rice). Once cooked, combine the couscous, diced tomatoes, chickpeas together in a large bowl. Mix in the Italian seasoning and ground pepper according to your taste preference. Set this aside.

Next, cut off the tops of the bell peppers then removing their seeds and membranes. Cook the peppers in boiling water for a few minutes (no more than 5 minutes!) and let them drain upside down on a paper towel.

Then bring a large fry pan up to heat with a small splash of cooking oil. Once hot, add the finely chopped garlic and shallots and give them a couple minutes head start before you add the ground beef. Cook this for 5 minutes at medium-high heat or until the beef is nicely browned. When done, toss this mixture into the couscous mixture. Make sure it is tossed and mixed evenly!

Now fill the peppers with your stuffing and top it off with the crumbled feta cheese. Place your stuffed peppers in a lightly greased baking dish large enough to hold everything. Bake this for 10 to 15 minutes at 350º F (180º C) until the peppers are tender and the cheese is melted. Enjoy!

Did you Know?!?

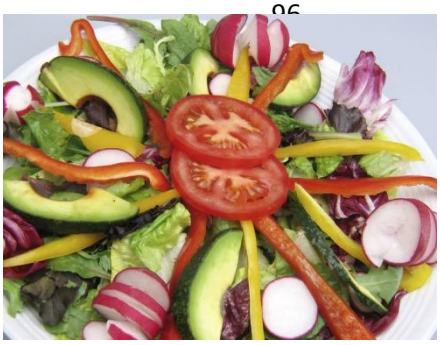
- Bell peppers belong to the same group as hot chili peppers: the Capsaicin family.
- They are typically the only member of this family that are used as a "vegetable" rather than as a spice.
- The hotness of peppers is measured in "Scoville heat units" (SHU). On the Scoville scale, a bell pepper scores 0, while a jalapeño pepper around 2,500-5,000!
- Want Vitamin C? One bell peppers contains more *Vitamin C* than a navel orange.

Shopping and Handling

- Buy fresh firm peppers than feel slightly heavy in your hand. Avoid ones with punctures or soft spots.
- Store them wrapped in a plastic bag in the refrigerator where they will keep for several days.

12th Recipe Special

Serves your whole family



This recipe is a special choice option for your family. There is no specific vegetable recommendation for this recipe. Instead, the goal of the 12th recipe special is to take and already established main dish that you have prepared many times in the past and simply enhance its vegetable content. You could either increase the amount of vegetables in this dish or try adding new ones on top of what you normally use. This is your chance to wander through the grocery store and get one of those vegetables you've seen many times but never managed to add into your shopping cart. Rouse the passion and try something new!

Here are some recommendations:

Stir fry:

Stir frys are a great way of boosting your daily vegetable intake. Take your regular stir fry to the next level by increasing its vegetable content as well as adding in some different vegetables that you might not normally use. For instance, try the incredibly nutritious "Gai Lan" also known as Chinese Broccoli.

Pizza:

Pizzas are classic family favourites with countless variations. This time, try loading up the toppings with fresh vegetables or go for an adventure with some new toppings that you've never tried before: aubergines, fennel or artichoke hearts for instance!

Salads:

While salads by nature are typically mostly vegetable comprised, this is an opportunity for you to try adding in new vegetables into your salad mixes. Try using different types of lettuces (arugula/roquette or endive) or radishes, or even raw zucchini.

Soup:

Soups can vary from far and wide with composition and flavour. If you have a classic soup recipe, try adding extra vegetables in or experimenting with new kinds for a slightly different flavour! For example, try sweet potatoes over regular potatoes.

Pasta dish:

If you are doing a pasta dish with a red meat sauce, try adding some more vegetables in the sauce. This could be, for instance, chopping up more bell peppers, fennel or zucchini into the sauce. Lots of possibilities here!

Appendix F

Family Information

THE PARENT'S NAME:
First Name: _____ Last Name: _____

Age:_____ Birth Date: dd_____mm_____yyyy_____
Gender: Male ___ Female ___

THE CHILD'S NAME:
First Name:_____ Last Name_____

Age:_____ Birth Date: dd_____mm_____yyyy_____
Gender: Male ___ Female ___

Home Address: _____

City:_____ Postal Code: _____

Phone Number: _____ E-mail address: _____

1.1 How many people live in your household (including yourself)? _____
How many children live in your household? _____
What are their ages? _____

1.2 What is your annual income? Please check one

Less than $25,000	O	$25,000 to $35,000	O
$35,000 to 50,000	O	$50,000 to $80,000	O
Above $80,000	O	Prefer not to mention	O

1.3 What is your education level? Please check one

Less than high school	O
High school level	O
Post-secondary education	O
Post-graduate education	O
Prefer not to mention	O

ABOUT YOUR FAMILY:

2.1 In which country were you (the parents) born?
Mother: _____ Father: _____

2.2 In which country were you (the child) born?
Country: _____

2.3 How long has your family lived in North America? Years: _____ Months: _____

2.4 In which country did your family live before moving to North America?_____
n/a _____

2.5 How would you classify your family ethnically? (i.e., Aboriginal-Canadian, Caucasian-Canadian, Chinese, Chinese-Canadian, etc.)

Nutrition History:
3.1 Who is the main food preparer for the family meals (i.e. mother, father, grandmother, nanny)?_____

3.2 Are you or your child on a special diet? _____ Yes _____ No
If yes: _____ vegetarian
_____ low sodium
_____ low cholesterol
_____ other
If 'other', please specify type of diet: _____

3.3 Have you ever been treated for food allergies?

	THE PARENT		THE CHILD	
	Yes	No	Yes	No
food allergies	O	O	O	O

3.4 Are there any foods that you or your child cannot consume? _____ Yes _____ No

If Yes, please indicate below what foods:

Appendix G
Weekly Serving Habits - Parents

Name:_____ Date:_____

We would like to know about some of the foods you serve to your family. For each food listed please fill in how often you usually serve a portion of the size stated.

Think about what you usually served last week. Please think about all the fruits and vegetables that you served last week. Include those that were:

- Raw and cooked,
- Served as snacks and at meals,
- Served at home and away from home (restaurants, friends), and
- Served alone or mixed with other foods

1) Over the past week, how many times per week or day **did you serve 100% fruit juice** such as orange, apple, grape or grapefruit juice? **Do not** count fruit drinks like Kool-Aid, lemonade, Hi-C, iced tea, cranberry juice drink and Tang.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

2) Over the last week, how often did you serve **french fries** or **fried potatoes**?

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

3) Over the past week, how often did you serve other **white potatoes**? Count baked, boiled, and mashed potatoes, potato salad, and white potatoes that were not fried.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

MORNING

4) Think about all the food you served at your morning meal and snacks over the last week. On how many days did you serve **fruit** for your morning meal or morning snacks? Count any kind of fruit – fresh, canned, and frozen. Do not count juices.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

5) Think about all the foods you served at your morning meal and morning snacks. On how many days did you serve **vegetables** for your morning meal or morning snacks? Count lettuce salads, vegetables in mixtures (ie. Sandwiches, omelettes casseroles, Chinese dishes, stew, stir-fry, soup etc.), tomato pasta sauce and all other raw, cooked and canned vegetables. Do not include white potatoes.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

LUNCHTIME AND AFTERNOON

6) Think about all the foods you served at lunchtime and for your afternoon snacks last week. On how many day did you serve **fruit** and lunchtime or for your afternoon snacks? Count any kind of fruit – fresh, canned, and frozen. Do not count juices.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

7) Think about all the foods you served at lunchtime and for your afternoon snacks. On how many days did you serve **vegetables** at lunchtime or for you afternoon snacks? Count lettuce salads, vegetables in mixtures (i.e. sandwiches, omelettes casseroles, Chinese dishes, stew, stir-fry, soup etc.), and all other raw, cooked and canned vegetables. Do not include white potatoes.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

SUPPERTIME AND EVENING

8) Think about all the foods you served at suppertime and for your evening snacks last week. On how many days did you serve **fruit** at suppertime or for your evening snacks? Count any kind of fruit – fresh, canned, and frozen. Do not count juices.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

9) Think about all the foods you served at suppertime and for your evening snacks. On how many days did you serve **vegetables** at suppertime or for your evening snacks? Count lettuce salads, vegetables in mixtures (i.e. sandwiches, omlettes, casseroles, Chinese dishes, stew, stir-fry, soup etc.), and all other raw, cooked and canned vegetables. Do not include white potatoes.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

Thank You

Appendix H
Food and Cooking Self-Efficacy Questionnaire

This questionnaire asks about your confidence with healthy eating and food preparation abilities. Please tick off the box in the corresponding column for your answer.

Do you think that you can…	**Strongly Disagree**	**Disagree**	**Slightly Disagree**	**Neutral**	**Slightly Agree**	**Agree**	**Strongly Agree**
1. Buy different vegetables that you usually don't buy for your family.							
2. Prepare vegetables that you usually don't cook for your family.							
3. Serve vegetables for your family's evening meal.							
4. Cut up different vegetables for your family.							
5. Encourage your child to eat different types of vegetables.							
6. Model eating different types of vegetables for your child.							
7. Enjoy tasting different types of vegetables.							
8. Spend a bit of the family's food budget on vegetables.							
9. Serve half the dinner plate as vegetables for your family's evening meal.							
10. Introduce one novel vegetable for your family every week in the next 8 weeks.							
11. Cook vegetables just right and avoid over-cooking them.							
12. Provide vegetables for your child as after school snacks.							
13. Serve vegetables for your family's evening meal more than 6 days per week.							

How confident do you feel about …	**Very Unconfident**	**Unconfident**	**A little Unconfident**	**Neutral**	**A little Confident**	**Confident**	**Very Confident**
14. About being able to cook from basic ingredients.							
15. About following a simple recipe.							
16. About tasting foods that you have not eaten before.							
17. About preparing and cooking new foods and recipes							

18. About measuring ingredients?							
19. About using a kitchen knife and practicing safe knife skills?							

20. What kind of cooking do you do at the moment? (please tick as many circles as appropriate)

Cook convenience foods and ready-made meals	O
Put together ready-made ingredients to make a complete meal (eg: use ready-made sauces)	O
Prepare dishes from basic ingredients	O
Other, please specify	O
Don't cook at all	O

21. In a normal week, how often do you prepare and cook a main meal from basic ingredients? (please tick one circle)

Daily	O
4 – 6 times a week	O
2 – 3 times a week	O
Once a week	O
Less than once a week	O
Hardly ever	O

22. I like the taste of fruit

O	O	O	O
Agree	In the middle	Disagree	Don't know

23. I like the taste of vegetables

O	O	O	O
Agree	In the middle	Disagree	Don't know

Appendix I
Outcome Expectancies Healthy Foods Scale

This questionnaire asks you about what you think if you eat healthy foods. Please tick off the box in the corresponding column for your answer.

Do you agree with the following statements…	**Strongly Agree**	**Agree**	**Slightly Agree**	**Neutral**	**Slightly disagree**	**Disagree**	**Strongly Disagree**
1. In my opinion, healthy food tastes good.							
2. I really don't think much about nutrition, I just eat food that tastes good to me.							
3. When I want a snack, I think more about what is tasty than what is "healthy".							
4. The cost of nutritious foods prevents me from improving my eating habits.							
5. It is quite expensive to follow a healthy diet.							
6. Most healthy foods are not too expensive for my diet							
7. I just don't have the time to eat properly							
8. Following a healthy diet does not require a great deal of effort							
9. It takes a lot of time to prepare nutritious meals							
10. Nutritious meals with fruits or vegetables are simple to make.							
11. Buying healthy foods is relatively inexpensive							
12. My health will improve if I eat lots of fruits and vegetables.							
13. Healthy foods taste delicious.							
14. Healthy Foods are typically not appealing in taste.							
15. If I prepare and serve fruits and vegetables for meals, my children will behave better							
16. If I prepare and serve fruits and vegetables for meals, my children will eat it.							

Appendix J
Family Feeding Practices Questionnaire

This questionnaire breaks into different sections asking you about several topics relating to how you feed your family. Please tick the box column which corresponds to your answer.

Energy and Balance

		never	rarely	sometimes	mostly	always
1)	Do you encourage your child to eat healthy foods before unhealthy ones?					

		disagree	slightly disagree	neutral	slightly agree	agree
2)	I encourage my child to try new foods					
3)	I tell my child that healthy foods taste good					
4)	I encourage my child to eat a variety of foods					

Food Environment

5)	Most of the food I keep in the home is healthy					
6)	I keep a lot of snack food (potato chips, doritos, cheese puffs) in my home					
7)	A variety of healthy foods are available to my child at each meal served at home					
8)	I keep a lot of sweets (candy, ice cream, cake, pies, pastries) in my home					

Involvement

9)	I involve my child in planning family meals					
10)	I allow my child to help prepare family meals					
11)	I encourage my child to participate in grocery shopping					

Modelling

12)	I model healthy eating for my child by eating healthy foods myself					
13)	I try to eat healthy foods in front of my child, even if they are not my favourite					
14)	I try to show enthusiasm about eating healthy foods					
15)	I show my child how much I enjoy eating healthy foods					

Teaching about Nutrition

16)	I discuss with my child why it's important to eat healthy foods					
17)	I discuss with my child the nutritional value of foods					
18)	I tell my child what to eat and what not to eat without explanation					

Appendix K
Fruit and Vegetable Access & Accessibility Scale – Parent

This questionnaire asks you about what you think about and how you use food at home. Please tick off the answer that best matches what you think.

1) How often do you have different kinds of fruits and vegetables available at home?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

2) How often do you buy specific fruits and vegetables because your child asks for them?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

3) How often do you cut up fruits and vegetables for your child to eat between meals?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

4) Eating fruits and vegetables every day is a habit for me

0	0	0	0	0
I fully agree	I agree somewhat	neither agree or disagree	I disagree somewhat	I fully disagree

5) How often do you eat vegetables together with your child?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

6) Do you have to persuade your child to eat fruit and vegetables?

0	0	0	0
yes, she/he never eats F&V unprompted	yes, sometimes	almost never	no, she/he eats F&V often unprompted

7) How often do you oblige your child to eat fruits and vegetables?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

8) How often do you allow your child to eat as much fruits and vegetables as he/she likes?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

9) Do you think that your child eats enough fruits and vegetables?

0	0	0	0
yes, definitely	yes probably	no, probably not	no definitely not

10) Eating fruits and vegetables every day is a habit for my child

0	0	0	0	0
I fully agree	I agree somewhat	neither agree or disagree	I disagree somewhat	I fully disagree

Appendix L
Food Neophobia Scale - Parent

Name:_____ Date:_____

Please rate the extent to which you agree or disagree with each statement.
Please write the appropriate number in the box beside each statement.

Strongly Agree	Agree	Sort of Agree	No Opinion	Sort of Disagree	Disagree	Strongly Disagree
7	6	5	4	3	2	1

1. I will eat a fruit or vegetable that I've never tried before. ☐
2. I am nervous to eat a fruit or vegetable that I've never tried before. ☐
3. I like fruit and vegetables from different countries. ☐
4. Fruit and vegetables from other countries look too strange to eat. ☐
5. At a friend's house, I will try a new fruit or vegetable. ☐
6. When my partner asks me to eat a fruit or vegetable I've never had before, I will eat it. ☐
7. I am very picky about eating unfamiliar foods. ☐
8. I will eat almost anything. ☐

Appendix M
Food Frequency Questionnaire - Children

Name:_____ Date:_____

We would like to know about some of the foods you eat. For each food listed please fill in how often you usually eat a portion of the size stated.

Think about what you usually ate last week. Please think about all the fruits and vegetables that you ate last week. Include those that were:

- Raw and cooked,
- Eaten as snacks and at meals,
- Eaten at home and away from home (restaurants, friends), and
- Eaten alone or mixed with other foods

1) Over the past week, how many times per week or day **did you drink 100% fruit juice** such as orange, apple, grape or grapefruit juice? **Do not** count fruit drinks like Kool-Aid, lemonade, Hi-C, iced tea, cranberry juice drink and Tang.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

2) Over the last week, how often did you eat **french fries** or **fried potatoes**?

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

3) Over the past week, how often did you eat other **white potatoes**? Count baked, boiled, and mashed potatoes, potato salad, and white potatoes that were not fried.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

MORNING

4) Think about all the food you ate at your morning meal and snacks over the last week. On how many days did you eat **fruit** for your morning meal or morning snacks? Count any kind of fruit – fresh, canned, and frozen. Do not count juices.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

5) Think about all the foods you ate at your morning meal and morning snacks. On how many days did you eat **vegetables** for your morning meal or morning snacks? Count lettuce salads, vegetables in mixtures (ie. Sandwiches, omelettes casseroles, Chinese dishes, stew, stir-fry, soup etc.). tomato pasta sauce and all other raw, cooked and canned vegetables. Do not include white potatoes.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

LUNCHTIME AND AFTERNOON

6) Think about all the foods you ate at lunchtime and for your afternoon snacks last week. On how many day did you eat **fruit** and lunchtime or for your afternoon snacks? Count any kind of fruit – fresh, canned, and frozen. Do not count juices.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

7) Think about all the foods you ate at lunchtime and for your afternoon snacks. On how many days did you eat **vegetables** at lunchtime or for you afternoon snacks? Count lettuce salads, vegetables in mixtures (i.e. sandwiches, omelettes casseroles, Chinese dishes, stew, stir-fry, soup etc.), and all other raw, cooked and canned vegetables. Do not include white potatoes.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

SUPPERTIME AND EVENING

8) Think about all the foods you ate at suppertime and for your evening snacks last week. On how many days did you eat **fruit** at suppertime or for your evening snacks? Count any kind of fruit – fresh, canned, and frozen. Do not count juices.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

9) Think about all the foods you ate at suppertime and for your evening snacks. On how many days did you eat **vegetables** at suppertime or for your evening snacks? Count lettuce salads, vegetables in mixtures (i.e. sandwiches, omlettes, casseroles, Chinese dishes, stew, stir-fry, soup etc.), and all other raw, cooked and canned vegetables. Do not include white potatoes.

O	O	O	O	O	O	O	O	O
Never	1-2x /wk	3-4x /wk	5-6x /wk	1x /day	2x /day	3x /day	4x /day	5+times /day

Thank You

Appendix N
Fruit and Vegetable Knowledge and Liking Scale - Child

Name:_____ Date:_____

How many servings of fruit and vegetables do you think you should eat every day to stay healthy?

_____

How would you rate the amount of vegetables and fruit you eat now? Would you say it is …
(*Tick the best answer)*

O	O	O	O	O
very high	high	in the middle	low	very low

Rate each question on whether you agree, in the middle (neutral), disagree or don't know.

a) Eating fruit and vegetables could help you prevent cancer

O	O	O	O
Agree	In the middle	Disagree	Don't know

b) Eating fruit and vegetables could help you prevent heart disease

O	O	O	O
Agree	In the middle	Disagree	Don't know

c) I like the taste of fruit

O	O	O	O
Agree	In the middle	Disagree	Don't know

d) I like the taste of vegetables

O	O	O	O
Agree	In the middle	Disagree	Don't know

Appendix O
Fruit and Vegetable Access & Accessibility Scale – Child

This questionnaire asks you about what you think about and how you use food at home. Please tick off the answer that best matches what you think.

1. Are there usually different kinds of fruits and vegetables available at home?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

2. If you mention at home what fruits and vegetables you would like to eat, will they be bought?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

3. Does either of your parents or caregiver usually cut up fruits and vegetables for you?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

4. My parents or caregivers eat fruits and vegetables every day

0	0	0	0	0
I fully agree	I agree somewhat	neither agree or disagree	I disagree somewhat	I fully disagree

5. I often eat vegetables together with my family

0	0	0	0	0
I fully agree	I agree somewhat	neither agree or disagree	I disagree somewhat	I fully disagree

6. My parents or caregiver encourages me to eat fruits and vegetables every day

0	0	0	0	0
I fully agree	I agree somewhat	neither agree or disagree	I disagree somewhat	I fully disagree

7. Do your parents or caregiver tell you to eat fruits and vegetables every day?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

8. Are you allowed to eat as much fruits and vegetables as you like?

0	0	0	0	0
yes, always	yes, most days/often	sometimes	seldom	never

9. Do you think that you eat much or little fruits and vegetables?

0	0	0	0	0
very many F&V	many F&V	not many, not few	few F&V	very few F&V

10. To eat fruits and vegetables every day is a habit for me

0	0	0	0	0
I fully agree	I agree somewhat	neither agree or disagree	I disagree somewhat	I fully disagree

Appendix P
Food Neophobia Scale - Child

Name:_____ Date:_____

Please rate the extent to which you agree or disagree with each statement.
Please write the appropriate number in the box beside each statement.

Strongly Agree	Agree	Sort of Agree	No Opinion	Sort of Disagree	Disagree	Strongly Disagree
7	6	5	4	3	2	1

1. I will eat a fruit or vegetable that I've never tried before. ☐
2. It is scary to eat a fruit or vegetable that I've never tried before. ☐
3. I like fruit and vegetables from different countries. ☐
4. Fruit and vegetables from other countries look too strange to eat. ☐
5. At a friend's house, I will try a new fruit or vegetable. ☐
6. When my parent or caregiver asks me to eat a fruit or vegetable I've never had before, I will eat it. ☐
7. I am very picky about eating unfamiliar foods. ☐
8. I will eat almost anything. ☐