



Developing Long-term Healthy Eating Behaviours in Canadian Kindergarten Curricula

Le développement de saines habitudes alimentaires à long terme dans les programmes-cadres de la maternelle au Canada

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Abstract

This document analysis examines kindergarten curricula documents regarding healthy eating from the 13 Canadian provincial and territorial governments. Curricula are analyzed using a framework composed of five concepts drawn from the healthy eating behaviour development literature and kindergarten pedagogical literature. Results reveal the variability in the healthy eating curricula in Canadian educational jurisdictions. Many healthy eating curricula developed for kindergarten programs across Canada are designed to help teachers' foster children's lifelong healthy eating behaviours. Present findings identify current gaps in knowledge about kindergarten healthy eating curricula across Canada. This article concludes with a call for the development of kindergarten curricula to better match current research knowledge regarding children's long-term healthy eating behaviour development and suggestions for future research in this area.

Résumé

Cette analyse documentaire s'est intéressée aux programmes-cadres d'alimentation saine mis au point par les 13 gouvernements provinciaux et territoriaux du Canada à l'intention des enfants de la maternelle. Pour ce faire, un cadre d'analyse fondé sur cinq concepts clés d'acquisition de saines habitudes alimentaires abordés dans la littérature a été mis au point et la documentation sur la pédagogie au niveau maternelle a été examinée. Les résultats ont révélé des disparités entre les programmes-cadres en ce qui a trait à l'alimentation saine enseignée dans les diverses provinces et territoires du pays. Un grand nombre de ces programmes-cadres veulent aider les enseignantes et enseignants à encourager l'adoption à long terme de saines habitudes alimentaires. Les résultats font ressortir des connaissances incomplètes à ce sujet d'une région à l'autre. Pour conclure, l'article invite les pédagogues à concevoir des programmes-cadres de

niveau maternelle qui tiennent davantage compte des connaissances actuelles sur l'acquisition de saines habitudes alimentaires à long terme chez les enfants et propose la réalisation d'autres recherches en ce sens.

Introduction

Canada has one of the highest rates of childhood obesity in the developed world, with close to a third of 5- to 17-year-old Canadians identified as obese (Roberts, Shields, de Groah, Aziz, & Gilbert, 2012). A well-established body of literature has concurred that there are numerous negative consequences of childhood obesity, where the term covers a range of physical, psychological, and social health issues (Biro & Wien, 2013; Karnik & Kanekar, 2012; Public Health Agency of Canada, 2011; Rogers, Shields, de Groah, Aziz, & Gilbert, 2012). Additionally, it is estimated that obesity-related complications cost the Canadian economy over a billion dollars annually (Public Health Agency of Canada, 2011; Tran, Nair, Kuhle, Ohinmaa & Veuglers, 2013). Though the origins of childhood obesity stem from an indeterminate combination of genetic and environmental factors (Lytle, 2005; Stunkard, Berkowitz, Stallings, & Schoeller, 1999; Wells & Ritz, 2001), one major contributing and modifiable factor is children's eating behaviours, such as food preferences, food choices, and mealtime behaviours (which will be referred to collectively in this article as 'eating behaviours') (Brown & Ogden, 2004; Schwarz & Puhl, 2003; Wells & Ritz, 2001). Eating behaviours are matters of much concern, as they have been linked not only with healthy weight status but also with improved cognitive function, physical performance levels, and psychosocial health (O'Dea, 2003).

Early childhood—under-six-years of age—has been described as a period when development occurs at a rate faster than any other (Shonkoff & Phillips, 2000). This makes kindergarten a critical time for creating long-term biases for certain behaviours, including eating behaviours (Faith & Kral, 2009). Though a preference for the sweet and salty and a rejection of the sour and bitter are innate, nearly all other food preferences are learned (Addessi, Galloway, Visalberghi, & Birch, 2005; Patrick & Nicklas, 2005). Much research has confirmed the influence of the social environment (that is, the influence of parents, teachers, childcare providers, and peers) in the development and maintenance of children's eating behaviours (Brown & Ogden, 2004; Faith, 2005; Liem & Menella, 2002). For example, adults around them can shape children's eating behaviours in a variety of ways, such as through modelling, use of food as rewards, repeated exposure to new foods, and how food is discussed (Faith, 2005; Lytle et al., 1997; Patrick & Nicklas, 2005; Schwartz & Puhl, 2003). In response to the continuing rise in childhood obesity rates, a variety of programs for teaching healthy eating have been developed for elementary schools; however, reviews of these programs have reported minimal effectiveness for developing healthy, long-lasting eating behaviours (Brown & Summerbell, 2009; Jaime & Lock, 2009; Thomas, 2006; Wadden, Brownell, & Foster, 2002). Current implementation activities for teaching healthy nutrition can confuse kindergarten children, who are unable to grasp abstract concepts of food groups and portion sizes; in any case, the rote learning involved is ineffective in developing healthy behaviours (Baskale, Bahar, Baser, & Ari, 2009; Lytle, Eldredge, Kotz, Piper, Williams, & Kalina, 1997; Matheson, Spranger, & Saxe, 2002). Consequently, in spite of the many obvious benefits of healthy eating behaviours, progress in supporting improved nutritional behaviours through school-based curricula remains limited because of continuing knowledge gaps in choosing effective activities. This point is particularly

salient in Canada, where minimal research has examined the different elementary school health curricula used in each province or territory (Lu & McLean, 2011; Paquette, 2005; Taylor, Evers, & McKenna, 2005). Canadian school curricula are not nationally set but are developed by each individual provincial or territorial ministry of education. There are ten provincial kindergarten curricula [Alberta, British Columbia (BC), Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Prince Edward Island (PEI), Quebec, and Saskatchewan]. Two of the three territories (Nunavut and Yukon) use kindergarten curricula developed by two provinces (Yukon follows BC and Nunavut follows Alberta [Lu & McLean, 2011]). In the past, Northwest Territories (NWT) followed Alberta's kindergarten curriculum (Lu & McLean, 2011). However, in 2012, NWT developed its own "Integrated Kindergarten Curriculum: A holistic approach to children's early learning" (2012) that was piloted over the 2012-2013 school year.

The purpose, therefore, of this research was to gain insight into provincial and territorial Canadian kindergarten healthy eating curricula using the analysis framework described in the following section. Specifically, the goals were to examine the healthy eating features of each curriculum and determine how these features align with research-based literature on children's healthy eating behaviour development. As this study was exploratory, data consisted of official curricula and additional resources (where needed and possible), obtained from each provincial/territorial ministry of education website (for the remainder of this article both curricula and resources will be referred to as "curricula" to eliminate repetition). The focus was on examining the data from an intended curriculum (Eisner, 2005) standpoint; which is to say, analyzing how healthy eating lessons are described in the provincial/territorial curricula. While teaching healthy eating involves more than simply following these guides, the guides nonetheless constitute important influences on teachers' practice, since they represent official expectations regarding children's learning (Heydon, 2013). This examination of the intended curriculum helps to provide the necessary foundation from which future researchers can examine the operational curriculum – analyzing how the curriculum unfolds in the classroom (Eisner, 2005).

Analysis Framework

This section briefly describes the five concepts that formed the analysis framework of the present study. Working from the review of the literature, the five identified concepts represent the salient research-based considerations for developing children's lifelong healthy eating behaviours. In particular, suggestions were drawn from the Guidelines for School Health Programs to Promote Lifelong Healthy Eating [Centers for Disease Control and Prevention (CDCP, 2011)]. CDCP (2011) recommends that effective healthy eating curricula be theory-driven, focus on specific behavioural outcomes, aim to build students' confidence in skills, and draw upon implementation activities that are engaging and age and developmentally-appropriate, such as increasing students' exposure to healthy foods. Even though the guidelines (CDCP, 2011) were created for schools in the United States, the comprehensive section on recommended healthy eating curricula characteristics can be applied to Canadian curricula. Drawing upon the CDCP guidelines and other relevant literature, five identified concepts were organized into a framework that was then used to analyze each province/territory's curriculum documents (See Table 1 for a summary of analysis framework concepts and the specific questions that guided the analysis of the curricula for each concept): Theoretical basis, learning outcomes, implementation activities, play-based activities (and sociodramatic play), and food familiarity.

Theoretical Basis. The first concept examined was whether the document in question described using theory (apparent or inferred) to build the healthy eating curriculum. A theoretical basis is one of the most frequently cited and stressed recommendations for school-based nutrition education programs (Anonymous, 1997; Lytle, 2005; Lytle & Achterberg, 1995; Canadian Cancer Society Manitoba Division, 2011; Contendo et al., 1995; CDCP, 2011; Perez-Rodrigo & Aranceta, 2001; Sharma, 2006; Zenzen & Kridli, 2009). Theory-based programs are critical for understanding health behaviours because theory provides a framework by which to study the relationships among constructs. Theory also adds coherence to programs through identifying facilitating situations and relevant processes. And finally, theory can guide timing and the sequencing of events (McClain et al., 2009). But while it is widely known that theory should form the basis for designing educational programs, many programs instead are based pragmatically on the nature of the subject matter being taught (Pellegrini, 2009), such as abstract nutrition concepts that kindergarten children cannot grasp (for example, concepts such as vitamins) (Baskale et al., 2009; Lytle et al., 1997; Matheson et al., 2002). For this first concept, examination of curricula was guided by the following two questions: Is there a theory used (or implied) in describing how the healthy eating lessons were developed? Or do healthy eating lessons consist of various implementation activities?

Learning Outcomes. The second concept involved analyzing the goal(s) of the healthy eating curricula, in other words, the learning outcomes students are expected to achieve. Many kindergarten nutrition lessons focus on teaching students knowledge-based messages, such as food group identification (Benton, 2003; Brown & Ogden, 2004; Evers, Arnold, Hamilton, & Midgett, 2007; Mata, Scheibehenne, & Todd, 2007). Indeed, improving children's abilities to memorize food groups and identify different fruits and vegetables are the most frequently cited learning outcomes of school-based nutrition education programs (Blom-Hoffman, Wilcox, Dunn, Leff, & Power, 2008; Canadian Cancer Society Manitoba Division, 2011; Cason, 2001; Contendo et al., 2002). Unfortunately, despite this popular and prevailing focus in nutrition education, little evidence exists to demonstrate that an improvement in children's nutritional knowledge corresponds with behaviour changes (Baskale et al., 2009; Contendo et al., 2002; Noble, Corney, Evers, Kipps, & Lumbers 2000; Taylor et al., 2005). It has been suggested that this problem of children being unable to translate nutritional knowledge into behaviour stems from their simply repeating the correct 'learned' response regarding healthy nutrition rather than possessing the understanding of how to use that information to make healthful food choices (Hart, Bishop, & Truby, 2002; Holub & Musher-Eizenman, 2010; Taylor et al., 2005). For instance, Lytle and colleagues (1997) found that kindergarten children struggled to understand, explain, and apply abstract concepts such as food groups, variety, and moderation. In light of these findings, they recommended that learning outcomes focus on children learning about specific healthy foods, and not abstract concepts, such as "low-fat" or "protein." Other researchers have noted that when children are asked to classify foods, they typically group them based on such physical characteristics as colour and shape (Baskale et al., 2009; Hart et al., 2002; Matheson et al., 2002). Thus, the traditional approach of knowledge transfer appears to prepare children inadequately to develop healthy eating behaviours in their day-to-day lives (Bronfenbrenner, 2005; Contendo et al., 1995; Lytle, 2005; Lytle et al., 1997; Matheson et al., 2002; Niehoff, 2009).

Curricula were examined with the following question in mind: What are students expected to learn from the lessons? Learning outcomes were further grouped into three categories slightly adapted from a previous study that similarly examined nutrition curricula (Hernandez-Garbanzo et al., 2013): increase knowledge of healthy eating, increase motivation to eat healthy, and teach/practice healthy eating behaviours. Learning outcomes were categorized as “increase knowledge of healthy eating” if the goal is for students to know the recommended daily servings from each food group, know a variety of foods from each food group, or name examples of healthy foods. Increasing students’ motivation to eat healthy can be accomplished through focusing on the benefits of healthy eating (Hernandez-Garbanzo et al., 2013); consequently, learning outcomes were categorized under “increase motivation to eat healthy learning” if outcomes included students learning about the benefits of eating healthy foods. Finally, learning outcomes were categorized as “teach/practice healthy eating behaviours” if the goal is for students to taste new foods or plan and prepare healthy meals (Hernandez-Garbanzo et al., 2013).

Implementation Activities. The third concept focused on analyzing the activities suggested to teachers for instructing the healthy eating lessons. The popular teaching style of teacher-centered instruction that focuses on worksheets, memorization, and assessments of domain-specific lessons, is known to result only in short-term cognitive gains (Fisher, Hirsh-Pasek, Golinkoff, Singer, & Berk, 2011). In contrast, student-centred activities aim to actively involve students in their learning and give them opportunities to practice new behaviours in multiple contexts (Briggs, Fleischhacker, & Mueller, 2010; CDCP, 2011; Contendo et al., 1995; Lytle, 2005).

Curricula were analyzed with the question: What types of suggestions are provided for teaching healthy eating lessons? The suggested implementation activities were then categorized as being either teacher-centred or student-centred. Activities were categorized as teacher-centred if they possessed the following characteristics: teacher instructs a topic and the focus is on acquisition of information (Chandler, 1999). Activities were categorized as student-centred if the activity gives students opportunities to actively learn, problem-solve, use manipulatives, and explore materials (Brooks & Brooks, 1999; Capraro, 2001). Characteristics of effective student-centred learning strategies for teaching healthy eating lessons include enjoyable, interactive activities (as opposed to lectures) and teaching healthy eating in a context relevant to students where they have multiple opportunities to practice healthy eating behaviours (Briggs et al., 2010; CDCP, 2011; Perez-Rodrigo & Aranceta, 2001; Rickard, Gallahue, Gruen, Tridle, Bewley, & Steele, 1995). These characteristics can be achieved through food tasting and cooking activities, drama activities, and shopping exercises (Perez-Rodrigo & Aranceta, 2001). Play-based activities, including food-themed sociodramatic areas, represent important opportunities for implementing healthy eating curricula (Matheson et al., 2002; Rickard et al., 1995). The opportunity play-based activities present for teaching healthy eating is explored in the following concept “Play-based learning” (and its sub-theme “Sociodramatic play.”).

Play-based activities. Drawing upon pedagogical research, the fourth concept emerges from the previously described limitations of teacher-centered instruction, and potential strengths of student-centered teaching styles (Briggs et al., 2010; Rickard et al., 1995). Through play, children develop an increased awareness of their social lives and better understand the skills that

they can use in everyday life (Pellegrini, 2011). Play thus provides children with an opportunity to practice newly developed behaviours and strategies (Pellegrini, 2009). Indeed, play should be of particular interest to those involved in teaching children healthy eating behaviours, given research recommendations to teach healthy eating in developmentally appropriate, fun, and participatory ways that focus on actual experiences (Anonymous, 1997; Briggs et al., 2010; Lytle et al., 1997; Perez-Rodrigo & Aranceta, 2001).

A couple of examples from the literature serve to illustrate an approach to nutrition that employs play activities (sociodramatic play activities are given their own distinct sub-theme and are therefore not included here). Baskale and colleagues (2009) used Piaget's Cognitive Development Theory in developing a nutrition education program for preschool children. Their program aimed to have children play an active role in their nutrition education. Like others (Lytle et al., 1997), they recommended not using abstract words and concepts such as nutritious, healthy, and unhealthy, and instead encouraged teaching through games. Likewise, Rickard and colleagues (1995) advised a developmentally-based (again Piaget-based) play approach to teach nutrition; they posited that the play of young children offers an effective vehicle for learning healthful eating behaviours. Thus, curricula were examined with the following question: Have play-based activities been suggested? Activities were classified as play-based if they possessed the characteristics of being fun and participatory and did not consist of teacher instruction or classifying foods into food groups (Anonymous, 1997; Briggs, et al., 2010; Lytle et al., 1997; Perez-Rodrigo & Aranceta, 2001).

Sociodramatic play. Researchers classify different types of play into categories such as locomotor and rough-and-tumble play (Burghardt, 2011). However, the most commonly studied form of human play is called "dramatic play" (also known as symbolic, pretend, fantasy, or make-believe play), and refers to behaviours taken out of their real-life context (Burghardt, 2011). What this means is that the play behaviours resemble real behaviours, but do not serve that purpose (Pellegrini, 2009). For example, dramatic play of healthy eating behaviours could involve a child pretending to cook a meal using toy foods and cookware. Dramatic play is referred to as "sociodramatic play" when the dramatic play occurs in a social context, such as students in a classroom. Sociodramatic play has been described as enabling children to better understand the world they live in, as while engaged in dramatic play, children imitate roles and behaviours they have observed in their environments (Kavanaugh, 2011). Research suggests that children's sociodramatic play fosters mathematics, language, literacy, and socio-emotional skills (Fisher et al., 2011). As described previously, this may be because children learn behaviours better when taught through experiential, hands-on learning, such as through role-playing with peers and adults, as opposed to teacher-centred instruction (Bronfenbrenner, 2005; Taylor et al., 2005). Curricula were examined to determine: Is sociodramatic play suggested as a strategy for teaching any of the lessons? Activities were classified under sociodramatic play if they involved the dramatic play centre or role playing.

Food Familiarity. The fifth concept examined whether the curriculum used the concept of "food familiarity," which refers to children's preference for foods that are already known to them (Cooke, 2007). Research has shown that food familiarity is one of the most important means of encouraging children to develop healthy food preferences by increasing their willingness to try new foods. Introducing children to new foods is critical because biological

factors influencing childhood eating behaviours include a resistance to unfamiliar foods (Schwartz & Puhl, 2003), with the result that children restrict themselves to familiar foods (Cooke, 2007). There is a very strong affective aspect to food preferences: children learn what to like and dislike (Birch, 1998; Birch & Davidson, 2001). Birch (1998) suggested it is essential for those in children's social environments to understand that children's initial rejections of new foods do not represent innate food preferences, but transient reactions that can be changed and developed through exposure and learning. Which is to say, children's initial rejections of new foods can be overcome by providing them with multiple opportunities to taste those foods (Sullivan & Birch, 1994). What this suggests is that the formation of children's food preferences is linked to their exposure to certain foods during early childhood – the more familiar the food, the more it is liked (Birch & Marlin, 1982; Cooke, 2007). It is to be expected, then, that exposing children to unfamiliar foods has been recommended as an important aspect of healthy eating programs in schools (Anonymous, 1997; CDCP, 2011; Knai, Pomerleau, Lock, & McKee, 2006). Curricula were thus analyzed to determine: Is an objective of the curriculum to familiarize students with new foods?

In sum, an emerging consensus of research suggests that for children to learn long-lasting healthy eating behaviours, the curricula should include these features: (a) a basis in theory; (b) learning outcomes focused on behaviours (as opposed to the memorization of facts); (c) student-centred implementation activities (d) play and sociodramatic play; and (e) food familiarity.

Table 1
Summary of Analysis Framework Concepts

<i>Theoretical basis</i>	<i>Learning outcomes</i>	<i>Implementation activities</i>	<i>Play-based activities & Sociodramatic play</i>	<i>Food familiarity</i>
Is there a theory used (or implied) in describing how the healthy eating lessons were developed? Or do healthy eating lessons consist of various implementation activities?	What are students expected to learn from the lessons? -Increase knowledge of healthy eating -Increase motivation to eat healthy - Teach/practice healthy eating behaviours	What types of suggestions are provided for teaching healthy eating lessons? -Are activities teacher-centred or student-centred	Have play-based activities been suggested? Is sociodramatic play suggested as a strategy for teaching any of the lessons?	Is an objective of the curriculum to familiarize students with new foods?

Methods

Data Collection and Analysis

This study draws upon document analysis – a systematic process for examining documents (Corbin & Strauss, 2008) that combines elements of content analysis (organizing information into categories related to the central questions) and thematic analysis (recognizing emerging themes and categories in the data) (Bowen, 2009). Document analysis is well-suited to

exploratory research into curricula such as the present study enacts, as it is an efficient, unobtrusive, and low-cost method (Corbin & Strauss, 2008).

Using the analysis framework described above, provincial and territorial kindergarten healthy eating curricula available from the provincial/territorial education websites were examined. While the main focus was an analysis using this framework, similarities, differences, re-occurring themes and ideas in the curricula were also examined (Bowen, 2009; Hollander & Gordon, 2006). Regardless, this study was not designed to be a discourse analysis of curricula, as such an analysis would involve looking beyond the literal meanings in order to analyze the emphasis an issue is given within the documents (O'Connor & Payne, 2006). That being said, as has been previously described, curricula were examined to discern if any theory had been applied, but not explicitly described, which will be explained shortly.

Specifically, key search terms, such as “Kindergarten curriculum,” “Kindergarten lesson plans,” and “Kindergarten program” were used to search for curriculum documents on provincial and territorial ministry of education websites. More terms were developed based on what was located in the curricula of these initial searches. To be included, curricula were required to be the most recently available, designed specifically for kindergarten classes, and available in English. Curricula were excluded if they were not the most recently available, did not include sections for kindergarten classes, or were only available in a language other than English. Curricula were excluded from analysis if any of the exclusion criteria were met. All digitally accessible kindergarten curricula from each provincial and territorial ministry of education website were then accessed and catalogued.

Next, any part of the kindergarten curriculum that pertained to healthy eating was examined. To be included, the healthy eating curriculum component was required to be administered in the school setting, part of the school curriculum, and not simply a time-limited intervention. Components were excluded if they did not involve a school setting or were not described as being part of the official curriculum. Healthy eating components were examined according to data analysis procedures described by Corbin and Strauss (2008), a process that will be briefly outlined here. Analysis began with reading each healthy eating component in the curricula documents. Next, the components were re-read numerous times and a general overview of each province/territory’s healthy eating section was developed and refined. Then, guided by the framework outlined above, the documents were examined to determine if they included any of the five framework concepts, and if they did, to what extent. For example, analysis for the third concept, implementation activities, involved examining and categorizing any lesson activity suggestion for teachers. First, any part of the curriculum document that involved a lesson activity suggestion for teachers was coded. Next, the activity was classified as being student-centred or teacher-centred, based on the previously described characteristics. This activity classification then led into analysis for the fourth concept, play-based activities, as any student-centred activity was examined to determine if it involved play, and finally, the activity was analyzed if it could be categorized as sociodramatic play.

Following this initial analysis of curricula, it became clear that a high degree of variability exists in the healthy eating curricula components of Canadian educational jurisdictions. For example, some components include detailed information on implementation activities for teachers, whereas others only include general outcome expectations. Consequently, to gain a more complete understanding of the intended curriculum in each province/territory, two additional steps were taken. First, depending on what was found in the healthy eating curricula

components, the introductory sections of the overall kindergarten curricula (not specific to healthy eating) were also analyzed. This step was taken to determine if theory was described as an element of the overall kindergarten curricula. If theory was described, then the healthy eating component was re-examined for elements of the theory. Second, the ministry of education websites were searched again to determine if any additional official resources were available that related to implementing the healthy eating curricula. This was particularly necessary if the curricula did not include specific implementation activity suggestions for teachers. For this second search, resources were included if the ministry of education developed them and specifically pertained to the healthy eating component of the curriculum. Any resources meeting these criteria were stored and analyzed in a process similar to the one described above. Finally, a descriptive summary of the findings was developed, as follows.

Results and Discussion

General Overview

Before turning to the results of the framework analysis, this section provides the results from the general overview of the curricula (for the remainder of the article, unless otherwise specified, “curricula” will refer to the health eating components of curricula). Every ministry of education website had a kindergarten curriculum document readily accessible, some also had additional documents, such as resources and implementation guides which were designed to aid teachers in implementing curricula (See Table 2 for a summary of the curricula documents analyzed in this study). It was beyond the scope of this article to analyze all of the resources available beyond those developed by the ministries of education (for example, several websites included links to resources for teachers that had been developed by Canadian Dairy Farmers, Heart & Stroke Foundation, and Dieticians of Canada), and it is therefore important to bear in mind that the documents analyzed represent a sample of the resources available to teachers. As already described, a range – in terms of information and number – of kindergarten healthy eating curricula documents were retrieved from provincial and territorial education websites. For example, Nova Scotia’s (1998) curriculum consists of series of curriculum statements describing what students are expected to demonstrate with a separate document describing the learning outcomes (Nova Scotia Department of Education, 2012). In contrast, PEI’s (2008) curriculum provides both overall outcomes and implementation activities in one single document.

Additionally, virtually all kindergarten curricula detail how curriculum development was a collaborative effort involving the ministry of education, teachers, education professors, early childhood educators, and other health professionals (BC, 2010; Newfoundland & Labrador, 2010; New Brunswick, 2005; NWT, 2012; Ontario, 2010; PEI, 2008; Saskatchewan, 2010). Others also include information on pilot testing and revisions prior to the final document (BC; 2009; NWT, 2012; Ontario, 2010). Space constraints limit the amount of information that can be provided on how the curricula were developed, beyond the limited information provided here. Readers interested in the kindergarten curriculum development process are encouraged to visit the provincial and territorial ministry of education websites for information [for example, see Ontario Ministry of Education (2012)].

A few of the curricula did not make any, or very little, reference to healthy eating. In contrast, other provinces had one comprehensive or several different healthy eating curricula. On the scanty healthy eating curricula end of the spectrum, Saskatchewan’s “Kindergarten

Curriculum” (2010) health section discusses healthy habits and choices, but does not refer to healthy eating, with food mentioned only as examples of “factors that individuals have in common” (p. 65) and for when “sharing is not advisable” (due to allergies) (p. 68). Similarly, Quebec’s “Education Program – Preschool and Elementary Education” (2001) document does not mention healthy eating. The most relevant section was the Physical Education and Health/Personal Development Section, whose goal is “To adopt a healthy, active lifestyle” (p. 272). Of note, some provinces, such as Quebec (2012) included resources that described ensuring the availability of healthy foods in the school setting. Although these documents describe a much-needed aspect of healthy school environment, they were not the focus of the present study and were therefore not included in the analysis.

On the other hand, some provinces have comprehensive curricula for kindergarten programs. BC’s “Kindergarten: Healthy Eating and Physical Activity Learning Resource” (2010) describes a sociodramatic play-based healthy eating program involving four food-themed sociodramatic play areas. This program provides teachers with healthy eating lesson plans described as being based on the latest research in healthy eating, physical activity, and social learning theory. The document not only describes the program but also includes background information on the principles and benefits of healthy eating. Though not as well-developed as BC’s, Ontario’s “Full-Day Early Learning – Kindergarten Program” (2010) includes a Health and Physical Activity Unit that stresses both the need for children to develop positive attitudes toward health from a young age and the importance of introducing children to concepts and behaviours that promote healthy lifestyles, referring to these aspects of their education as making them “health literate” (Ontario Ministry of Education, 2010, p. 128). The healthy eating component of the program focuses on the acquisition of nutritional knowledge. For example, teachers are encouraged to question children thusly: “Why do we need to eat lots of fruit and vegetables?” “Why is pizza a better snack than a doughnut?” (Ontario Ministry of Education, 2010, p. 131). Additionally, a few provinces had two or three documents with kindergarten healthy eating components. However, it was not always clear how teachers are expected to integrate the various recommendations into the general kindergarten curriculum, except in BC’s “Kindergarten: Healthy Eating and Physical Activity Learning Resource” (2010), where it is explicitly stated that the healthy eating program was designed to be integrated as part of the overall kindergarten curriculum outcomes. In summary, these results indicate that teaching healthy eating varies widely from province to province, and that children have varying opportunities to learn healthy behaviours depending on their provincial/territorial residence.

Table 2

Curricula Obtained from each Provincial/Territorial Ministry of Education Website

<i>Province or Territory</i>	<i>Curricula Documents</i>
Alberta	• 3 documents - 2 curricula + 1 implementation guide
New Brunswick	• 2 documents - 2 curriculum guides that include suggestions for implementation activities
Nova Scotia	• 2 documents – curriculum + resource – no resources on implementation activities were found

Northwest Territories	• 2 documents - curriculum guide + lesson plans
Prince Edward Island	• 1 document - curriculum guide that includes suggestions for implementation activities
Saskatchewan	• 1 document – curriculum guide – no suggestions for implementation activities were found
British Columbia	• 3 documents – curriculum guide + program outcomes guide + healthy eating learning resource
Newfoundland and Labrador	• 1 document- curriculum guide that includes suggestions for implementation activities
Ontario	• 1 document - curriculum guide that includes suggestions for implementation activities
Quebec	• 2 documents - curriculum guide + resource – no suggestions for implementation activities were found
Nunavut	• Uses NWT and Manitoba’s curricula
Yukon	• Uses BC’s curriculum

To provide a more focused discussion, the following section describes the results of the analysis framework. For each of the five concepts, the main findings are highlighted and followed by a table that summarizes the findings from each provincial/territorial healthy eating curriculum.

Framework Analysis Findings

Theoretical basis. No theoretical basis was mentioned in any kindergarten healthy eating curricula, with the lone exception of BC’s “Kindergarten: Healthy Eating and Physical Activity Learning Resource” (2010), where the healthy eating program is described as being based on social learning theory. However, resulting from this observation that applies specifically to the healthy eating component of the curricula, the introductory sections of each kindergarten curricula was re-examined for any reference to a theoretical basis (Table 3). In contrast to the healthy eating components, all curricula were found to either describe their overall kindergarten curricula as being based in theory and/or research, as was attested in the introductions of Nova Scotia’s “Foundation for Active, Healthy Living,” “Physical and Health Education Curriculum” (1998) and PEI’s “Kindergarten Integrated Curriculum” (2008). For example, both Quebec (2001) and Alberta’s (2008) kindergarten curricula introductory sections describe the curricula as being based in theory and were found to include elements of social ecological theory, through descriptions of ways to target individuals, families, and communities. Thus, if it was established that theory was described in the overall kindergarten curriculum, attempts were made to determine, based on the lessons and descriptions, if theory had indeed been used in the healthy eating components. This involved examining the curricula for elements beyond simply listing student-centred implementation activities. For example, Alberta’s “Kindergarten Program

Statement” (2008) includes elements that demonstrate concepts from social ecological theory (McLeroy, Bibeau, Steckler, & Glanz, 1988), such as suggestions for how to include parents and communities in the healthy eating curricula. Although the overall kindergarten curricula often describe being grounded in theory and play-based research, according to this analysis, these elements were not applied in the healthy eating component of many curricula. The lack of obvious translation of theory into practice was somewhat surprising, given the emphasis research places on school-based nutrition education programs needing to be based on a theoretical framework (Anonymous, 1997; Lytle, 2005; Lytle & Achterberg, 1995; Canadian Cancer Society Manitoba Division, 2011; Sharma, 2006; Zenzen & Kridli, 2009).

Table 3
Theoretical Basis of Curricula

<i>Province or Territory</i>	<i>Theoretical basis</i>
Alberta	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum describes kindergarten program having theoretical basis • Can see social ecological theory elements in healthy eating component: information on how parents and communities can be included to promote students’ healthy eating development
New Brunswick	<ul style="list-style-type: none"> • Theory used in overall health curriculum (Comprehensive School Health), but not discernable in healthy eating component
Nova Scotia	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum describes how overall framework is built on ‘current research and theories’ • Healthy eating component is described as being based ‘on movement’
Northwest Territories	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum details many references to ‘research’ • Healthy eating component based on 12 competencies, including ‘play and inquiry’ and ‘healthy lifestyle’
Prince Edward Island	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum describes play research
Saskatchewan	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum play-based and inquiry-based • General ‘Health Education’ section does not refer to healthy eating or nutrition anywhere. • Only mention of food is describing ‘things people have in common’ and ‘things people shouldn’t share’ (due to allergies)
British Columbia	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum describes research and value of play • Introductory section of healthy eating component describes how lessons are based on social learning theory
Newfoundland	<ul style="list-style-type: none"> • Introductory section of kindergarten curriculum describes play research

and Labrador	
Ontario	• Introductory section of kindergarten curriculum describes being based on early childhood research and play research
Quebec	• Introductory section of kindergarten curriculum takes social ecological theory approach by targeting individual and environmental levels, but this is not for a healthy eating component

Learning outcomes. Learning outcomes were categorized to fit into three main groups: Increase knowledge of healthy eating, increase motivation to eat healthy, and learn/practice behaviour strategies (Table 4). In some provinces, outcomes are unclear or unspecified. Learning outcomes often focus partially or entirely on increasing knowledge of healthy eating knowledge acquisition through categorizing foods and learning about Canada’s Food Guide (CFG). Many examples can be drawn from the examined curricula. In Manitoba, the objective of the lesson plan for “Food, Growth, and Feeling Good” (Healthy Lifestyle Practices, 2001) has students identifying healthy eating goals. In New Brunswick “You and your world – Kindergarten” (2005) focuses on having students identify healthy practices.

Two particular learning outcomes within the increase knowledge of healthy eating category emerged in nearly all the curricula documents. The first is the importance placed on introducing children to CFG, an objective of nearly every curriculum. With this came a number of activities that used CFG, such as Alberta’s “Nutrition Resource Kit Kindergarten Lesson Plans” (2012), whose learning outcomes include introducing students to CFG, reviewing it, and teaching food groups. Similarly, Manitoba’s “Healthy Lifestyle Practices” (2001) steers students towards identifying different colours of the food rainbow and sorting foods into groups. Such findings are typical, as interventions often aim to have children gain knowledge about food guides and food group recommendations (Auld, Romaniello, Heimendinger, Hambidge, Hambidge, 1998). The second theme emphasizes teaching children to categorize foods as “sometimes,” “everyday,” or “most of the time” as opposed to “good” and “bad.” For instance, New Brunswick’s “You and Your World Curriculum” (2005) suggests that students group pictures of foods into “sometimes” and “everyday” foods. Alberta likewise recommends teachers avoid terminology such as “good” and “bad” foods and instead use “every day” and “sometimes” (Nutrition Resource Kit Kindergarten Lesson Plans, 2012). PEI’s “Kindergarten Integrated Curriculum Document” (2008) aims to have students name food choices that can be made daily or on certain occasions. Likewise, Newfoundland and Labrador’s “Completely Kindergarten” (2010) also has “food I should eat daily” and “foods I should eat once in a while.”

Fewer learning outcomes were found to fall under the second category, which involved outcomes that aimed to increase students’ motivations to eat healthily. PEI’s “Kindergarten Integrated Curriculum Document” (2008) states that by the end of kindergarten children are expected to recognize the benefits of healthy food choices, such as Alberta’s “Health & Life Skills - Kindergarten” (2002) that aims to teach students that eating healthy would result in them feeling good and being energetic. NWT’s “Kindergarten Integrated Curriculum” (2012) similarly aims to teach students about the benefits of growing healthy and strong.

The third category involved outcomes that focused on having students learn and practice healthy eating behaviours. Behaviour-focused learning outcomes include activities that aim to teach students to plan and prepare healthy snacks, such as Alberta’s “Nutrition Resource Kit Kindergarten Lesson Plans” (2012) that aims for students to learn about selecting healthy snacks.

Similarly, BC's "Kindergarten: Healthy Eating and Physical Activity Learning Resource" (2010) involves students preparing healthy meals in the sociodramatic play centre. Other behaviour-focused learning outcomes can be found in Nova Scotia's "Learning Outcomes Framework P-6" (April 2012) that describes an objective of students using their senses to explore a variety of healthy foods. And Ontario's "Full-Day Early Learning - Kindergarten Program" (2010) likewise describes students learning to explore ways of healthy eating.

Table 4
Learning Outcomes

<i>Province or Territory</i>	<i>Increase knowledge</i>	<i>Increase motivation</i>	<i>Learn/practice behaviours</i>
Alberta	<ul style="list-style-type: none"> • Overall goal is to teach about Canada Food Guide • Recognize appropriate nutritional habits • Introduce/ review Canada Food Guide • Understand 'everyday' foods and 'sometimes' foods 	<ul style="list-style-type: none"> • Recognize that nutritious foods are needed for growth and to feel good/have energy 	<ul style="list-style-type: none"> • Learn about selecting healthy snacks
New Brunswick	<ul style="list-style-type: none"> • Identify and explain types of activities that support a healthy lifestyle • Describe a healthy child 		
Nova Scotia	<ul style="list-style-type: none"> • Identify good nutritional habits • Demonstrate knowledge of healthy eating 		<ul style="list-style-type: none"> • Use their senses to explore a variety of healthy foods
Northwest Territories	<ul style="list-style-type: none"> • Understand healthy foods vary in cultures • Understand Dene food system 	<ul style="list-style-type: none"> • Describe how food will help grow healthy and strong 	<ul style="list-style-type: none"> • Experience natural nutritious food
Prince Edward Island		<ul style="list-style-type: none"> • Recognize and explore the benefits of healthy food choices 	
Saskatchewan	<ul style="list-style-type: none"> • Develop language with which to talk about healthy behaviours • Recognize examples of 		

	healthy habits		
British Columbia	<ul style="list-style-type: none"> • Identify opportunities to make choices: name choices that can be made daily or on certain occasions (one example is which snack to eat) • Identify practices that contribute to health, including healthy eating...name a variety of activities that promote physical health (choose foods from Canada Food Guide, choose healthy snacks) 		<ul style="list-style-type: none"> • Each of 4 learning centres has several different objectives, such as: Engage in conversation about choosing foods, create nutritious meals and menus, demonstrate appropriate hygiene such as proper hand washing
Newfoundland and Labrador	<ul style="list-style-type: none"> • Understand healthy foods, as defined by Canada Food Guide • Assess the importance of healthy food and beverage choices 		<ul style="list-style-type: none"> • Demonstrate the ability to make healthy food and beverage choices
Ontario		<ul style="list-style-type: none"> • Investigate the benefits of nutritious foods 	<ul style="list-style-type: none"> • Explore ways of ensuring healthy eating
Quebec	<ul style="list-style-type: none"> • Adopt a healthy, active lifestyle 		

Implementation activities. In the next step, the curricula were examined for the types of activities suggested for teachers to implement the healthy eating lessons. Three provinces, Nova Scotia, Saskatchewan, and Quebec, did not include resources involving implementation activities on their ministry of education websites. The remaining provincial/territorial curricula draw on a range of implementation activities for teaching healthy eating lessons. Activities were categorized as being either teacher-centred or student-centred.

As illustrated in Table 5, there are implementation activities that rely on teacher-centered instruction whereby teachers present knowledge-based messages, but these are far less common than activities that involve students, or the teacher-centered method is but one of a variety of different ways students learn about healthy eating. For example, in Newfoundland and Labrador's "Completely Kindergarten: Kindergarten Curriculum Guide" (2010) and Alberta's "Nutrition Resource Kit Kindergarten" (2012), teachers are encouraged to teach through both teacher-centered instruction and group activities such as playing games and singing songs. In fact, the majority of curricula described teaching nutrition in student-centred, interactive ways, such as Manitoba's "Healthy Lifestyle Practices" (2001), where children are taught to play healthy eating games in physical education class, and NWT's "Health Program" (1991), where students prepare a healthy snack with parents or older students. While many curricula involve students playing an active role, the activities typically do not involve students practising actual

healthy eating skills or behaviours. Instead, they involve students sorting pictures of food or food models into food groups (or other designated food categories).

Table 5
Implementation Activities

<i>Province or Territory</i>	<i>Teacher-centred activities</i>	<i>Student-centred activities</i>
Alberta	<ul style="list-style-type: none"> • Teacher instructs • Many pencil and paper activities 	<ul style="list-style-type: none"> • Brainstorm snack ideas • Sing food song • Create own Canada Food Guide Rainbow • Clip pictures from flyers to create art, design own cereal box • Feature different food group each week and encourage students to bring in snacks from that group
New Brunswick	<ul style="list-style-type: none"> • Introduce Canada Food Guide 	<ul style="list-style-type: none"> • Class discussion • Cut out pictures to create healthy collage • Sort food pictures into “every day” and “sometimes” foods
Nova Scotia	<ul style="list-style-type: none"> • None available 	
Northwest Territories		<ul style="list-style-type: none"> • Learn food cheer • Make food collages • Sort items into food or non-food • Make and eat fish soup • Prepare and discuss snacks
Prince Edward Island	<ul style="list-style-type: none"> • Discuss importance of food choices • Introduce Canada Food Guide, sort foods into food groups 	<ul style="list-style-type: none"> • Create class collage of healthy food • Add healthy food props to dramatic play area • Visit grocery store
Saskatchewan	<ul style="list-style-type: none"> • None available 	
British Columbia		<ul style="list-style-type: none"> • Teach healthy eating through four different dramatic play centers: • Cut up grocery store flyers to create meal/grocery list

		<ul style="list-style-type: none"> • Have students shop for items in play area grocery store • Have students role play different roles in restaurant (chef, customer) • Create collage of healthy food items for display in restaurant • Have students role play preparing meals for each other in kitchen
Newfoundland and Labrador	<ul style="list-style-type: none"> • Teacher instructs • Discuss with class healthy food and introduce Canada Food Guide 	<ul style="list-style-type: none"> • Make a healthy pizza as a class • Role play in restaurant suggested as activity • Categorize food pictures into ‘foods I should eat daily’ and ‘foods I should eat once in a while’ • Pit Stop game • Sort food pictures or food models
Ontario	<ul style="list-style-type: none"> • Introduce Canada Food Guide 	<ul style="list-style-type: none"> • Role play in dramatic play centre • Trip to grocery store
Quebec	<ul style="list-style-type: none"> • None available 	

Play-based activities. Student-centred implementation activities were further categorized as being play-based or sociodramatic play (Table 6). As stated earlier, explanations of the importance of play in kindergarten were found in the introductory sections of the overall kindergarten curricula. Play-based implementation activities are also suggested in the healthy eating curricula. For example, in NWT’s “Integrated Kindergarten Curriculum” (2012), Alberta’s “Health & Life Skills: K Wellness choices: Kindergarten illustrative examples” (2002), and PEI’s “Kindergarten Integrated Curriculum Document” (2008) play-based activities consisted of creating collages out of pictures of foods or creating CFG rainbows or cereal boxes.

Sociodramatic play. BC’s “Kindergarten: Healthy Eating and Physical Activity Learning Resource” (2010) presents a thorough sociodramatic play nutrition education curriculum for kindergarten children, and there were other provinces that involved teaching healthy eating through sociodramatic play as one aspect of their curricula. In Ontario, the “Full-Day Early Learning – Kindergarten Program” (2010) curricula suggests that “After the children set up a store in the dramatic play centre, the teacher is encouraged to observe the kinds of items they have chosen to sell and ask them to talk about their choices” (p. 131). A similar integration is made in PEI’s ‘Kindergarten Integrated Curriculum’ (2008) where there is a suggestion to add healthy food props to the dramatic play area. Newfoundland and Labrador’s “Completely Kindergarten” (2010) additionally suggests role-play in the restaurant. Lastly, as previously stated, Saskatchewan (2010) did not have healthy eating implementation activities available

online, but it noteworthy that in the general health education section of the curricula sociodramatic play is suggested as a way for students to learn about healthy behaviours.

Table 6

Play-based Activities and Sociodramatic Play

<i>Province or Territory</i>	<i>Play-based activities</i>	<i>Sociodramatic play</i>
Alberta	<ul style="list-style-type: none"> • Sing food song • Create own Canada Food Guide Rainbow • Clip pictures from flyers to create art, design own cereal box 	
New Brunswick	<ul style="list-style-type: none"> • Cut out pictures to create healthy collage 	
Nova Scotia	<ul style="list-style-type: none"> • None available 	
Northwest Territories	<ul style="list-style-type: none"> • Learn food cheer • Make food collages 	
Prince Edward Island	<ul style="list-style-type: none"> • Create class collage of healthy food 	<ul style="list-style-type: none"> • Play suggested through adding food props to dramatic play area
Saskatchewan		<ul style="list-style-type: none"> • Explore healthy behaviours through creative expression (e.g. dramatization)
British Columbia		<ul style="list-style-type: none"> • Food-themed sociodramatic play centres main component of curriculum
Newfoundland and Labrador	<ul style="list-style-type: none"> • Pit Stop game 	<ul style="list-style-type: none"> • Role play in restaurant
Ontario		<ul style="list-style-type: none"> • Store in dramatic play centre where children encourage customers to buy fruits and vegetables • Play suggested as way for children to ‘do’ healthy eating
Quebec	<ul style="list-style-type: none"> • None available 	

Food familiarity. Familiarizing students with new foods is rarely stated as an objective in the kindergarten curricula, though it is often an implicit part of lessons (Table 7). Noteworthy, food familiarization is explicitly listed as an objective in Newfoundland and Labrador’s “Completely Kindergarten Curriculum” (2010), where students are expected to taste familiar and unfamiliar foods. Likewise an objective of NWT’s “Kindergarten Integrated Curriculum” (2012)

is to have children experience natural nutritious foods. Manitoba's "Healthy Lifestyle Practices" (2001) similarly includes having students sample a variety of foods from each food group. In other curricula students could also be familiarized with different foods, though such experience would depend on the foods having been selected as props for various activities. For instance in BC's "Kindergarten: Healthy Eating and Physical Activity Learning Resource" (2010), PEI's 'Kindergarten Integrated Curriculum' (2008), and Ontario's "Full-Day Early Learning – Kindergarten Program" (2010), the dramatic play area is described as offering food props and eating scenarios. Similarly, curricula that involve activities with food flyers and magazines, such as Alberta's "Nutrition Resource Kit Kindergarten Lesson Plans" (2012) and New Brunswick's "You and Your World Curriculum" (2005), could be visually exposing children to new foods, but again this would depend on the foods featured.

Table 7
Food Familiarity

<i>Province or Territory</i>	<i>Food familiarity</i>
Alberta	• Not explicitly stated, but possible through discussions about different snacks
New Brunswick	• Not explicitly stated but possible through sorting pictures of food
Nova Scotia	• No food familiarization
Northwest Territories	• Possible but not explicitly stated; recommends real-life household materials and play food in dramatic centre
Prince Edward Island	• Not explicitly stated but possible, as healthy food props suggested added to dramatic play for restaurant or store
Saskatchewan	• No food familiarization
British Columbia	• Not explicitly stated but possible, as dramatic play area described as having food, through real food props used in centres, clipping food flyers, etc.
Newfoundland and Labrador	• Yes, stated as Objective 2.3 "taste familiar and unfamiliar healthy foods"
Ontario	• Not explicitly stated but possible through dramatic play centre food props
Quebec	• No food familiarization

Conclusions

Kindergarten class offers a critical opportunity for establishing children's lifelong eating behaviours that will promote health and prevent obesity. The school provides an ideal setting for teaching large groups of children healthy eating behaviours in age-appropriate and feasible ways.

Following a document analysis that examined the extent to which official Canadian provincial/territorial kindergarten curricula includes concepts that are important for the development of lifelong healthy eating behaviours, the present study found that provinces and territories differ greatly in their kindergarten healthy eating curricula. The introductions to the overall kindergarten curricula typically describe how the curricula are based in theory. However, theory was rarely mentioned in the healthy eating curricula components, nor was it found to translate into the design of the healthy eating learning outcomes or implementation activities. Instead of describing theoretically-organized opportunities for children to learn and practice healthy eating behaviours, many curricula consist of various implementation activities, such as introducing children to CFG and categorizing foods. Such activities are designed to achieve learning outcomes focused on improving children's nutritional knowledge. Indeed, while curricula were found to include learning outcomes that focus on increasing students' motivation to eat healthy and aiming to have students learn/practice healthy eating behaviours, out of the three categories of learning categories applied in this analysis, increasing students' knowledge of healthy eating was the most frequently found outcome. These findings require further examination, because improving children's nutritional knowledge through food identification and classification activities has been found not to result in lasting behavioural changes (Baskale et al., 2009; Contendo et al., 1995; Contendo et al., 2002; Noble et al., 2000; Taylor et al., 2005). As Bandura (2004) argued, the acquisition of nutritional knowledge does little to develop the behaviours needed to counter the social, emotional, and advertising pressures that contribute to unhealthy eating behaviours.

Another key finding related to the implementation activities used to achieve healthy eating curricula outcomes. Almost all provinces and territories use student-centred implementation activities, many of which are play-based, that involve students in learning healthy eating through games, discussions, and creative activities such as creating food collages. Some curricula also involve teacher-centred activities, but these were found much less frequently and are suggested in combination with student-centred activities. Such findings are encouraging, given the importance of teaching children about nutrition in engaging interactive ways (Baskale et al., 2009; CDCP, 2011; Rickard et al., 1995). One specific type of implementation activity examined in this study was sociodramatic play. Sociodramatic play enables children to practice situations and acquire knowledge and skills needed later in life (Bateson & Martin, 2000). While BC included the most comprehensive kindergarten healthy eating curriculum, which included theory-based sociodramatic play lessons, other provincial curricula, such as those of PEI, Newfoundland and Labrador, and Ontario, also included some sociodramatic play activities that could be expanded into more comprehensive sociodramatic play-based healthy eating curricula. Equally noteworthy, even though many curricula do not include sociodramatic play as a suggested implementation activity for teaching healthy eating, the majority *do* include play-based activities or describe play as forming the basis of their kindergarten curricula. This is an important finding (especially for future researchers looking to implement play-based healthy eating), as new programs —such as play-based nutritional learning— that fit with present practices are more likely to succeed with teachers (Dearing, 2008; Rogers, 2003). Consequently a play-based healthy eating program would likely have a better chance at successful implementation in those curricula that already value play-based learning as opposed to those kindergarten classrooms where play-based curricula would be an innovative concept.

A final noteworthy finding involves the concept of food familiarization in the curricula. While few curricula explicitly state that familiarizing students with new foods is a learning outcome, in several it is implied that children could become familiar with foods through activities using food props and pictures, the practice known as ‘visual familiarity.’ Visual familiarity has been found to be key to children’s trying novel foods, as they prefer foods that they frequently see in their environments (Story, Neumark-Sztainer, & French, 2002). It follows, then, that a key means of encouraging the development of healthy food preferences is to increase children’s exposure to new foods. Novel food familiarizing opportunities are crucial because children’s food preferences are strongly influenced by experience, and repeatedly presenting a food in a positive context results in increased preference for that food (Birch, 1998). Moreover, research recommends more nutrition programs that focus on increasing familiarity with healthy foods (Wardle & Cooke, 2008).

This study’s findings are relevant for both developers of kindergarten healthy eating curricula and future researchers. For curriculum developers, a curriculum that is based in theory, that focuses on improving students’ healthy eating motivation, skills, and behaviours in addition to healthy eating knowledge, and that includes food familiarization will experience a better chance for success in educating children with healthy eating behaviours in their day-to-day lives (Bronfenbrenner, 2005; Contendo et al., 1995; Lytle, 2005; GSHP, 2011; Lytle et al., 1997; Matheson et al., 2002; Niehoff, 2009; Perez-Rodrigo & Aranceta, 2001). Curricula developers need to be aware of the drawbacks entailed by a scarcity of theory, because teaching randomly selected nutrition concepts with a view towards improving children’s knowledge leads to failure in achieving the goal of desired behavioural change (Anonymous, 1997). Despite research showing that targeting nutritional knowledge is not an effective way to develop long-term healthy eating behaviours in children, such teaching remains too much a focus of nutritional education programs (Baskale et al., 2009; Tuuri et al., 2009), as was the case with many of the curricula analyzed in the present study. The present study suggests further that curriculum developers should involve more sociodramatic play in healthy eating lessons as a means to fostering children’s long-term development, an outcome that has been achieved in BC’s healthy eating curriculum (2010). As other researchers have suggested, healthy eating programs need to use experiential, hands-on learning, and problem-solving in group settings (CDCP, 2011; Lytle & Achterberg, 1995; Taylor et al., 2005) – all of which can be realized through sociodramatic play (Fisher et al., 2011). Finally, curricula developers should consider including food familiarization in their curricula. The failure to explain to principals and teachers the importance of regularly exposing children to novel foods misses a handy opportunity to encourage the development of healthy food preferences. However, all of these suggestions for curriculum developers require greater understanding of complex kindergarten environments (for example, when incorporating theory into the practical situations of kindergartens), which involves implications for future research in this field.

The present study’s most significant conclusion can be stated as follows: the goal of nutrition education for kindergarten children should not be only focused on increasing nutritional knowledge, but also nurturing enduring retention through sociodramatic play and food familiarity; perhaps only by these means will their educational experiences be transferred to real-life situations over a lifetime. Of course, this conclusion must be considered within the limitations of the study. The curricula analyzed were chosen and the selection process justified for the reasons given earlier, and they represent but a sample of available provincial/territorial

curricula. Though curricula were obtained from every provincial/territorial ministry of education website, they may not be fully representative of all curricula developed for each province/territory or those actually used by teachers. Thus this study's conclusion pertains to official kindergarten curricula and a necessarily limited sample of resource documents. To increase understanding of what and how Canadian children are being taught about healthy eating in kindergarten classes, future research will need to build on the findings of the present study, particularly in two areas. First, there is a need to examine resources developed to support the curriculum. It was beyond the scope of the present study to analyze all of the additional implementation guides, achievement indicators, and recommended resources in addition to considerable number retrieved from the official provincial or territorial ministry of education websites. Second, there is also a pressing need to examine how such curricula are actually put into practice in the classroom. Following from this and other studies' analyses of the intended curriculum (Eisner, 2005), researchers now need to know how kindergarten teachers interpret and implement the curricula in their classes, particularly with regards to categorizing implementation activities. For example, the present study found many curricula suggest students create their own CFG rainbow or food collages, but depending on how the teacher implements these activities, they could fit under either definition of student-centred or teacher-centred activity. Consequently, further research is much needed. Classroom observations and interviews with teachers should enable us to understand whether kindergarten classes following these curricula are actually providing children with opportunities to learn about healthy eating in ways that encourage the development of healthy attitudes and behaviours that will last a lifetime. Following these suggestions for future research and development, curriculum developers, researchers, and school communities should be in a better position to cooperate in ensuring developmentally appropriate, evidence-based, and culturally sensitive healthy eating curricula.

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