

Short Communication

Involvement in home meal preparation is associated with food preference and self-efficacy among Canadian children

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Abstract

Objective: To examine the association between frequency of assisting with home meal preparation and fruit and vegetable preference and self-efficacy for making healthier food choices among grade 5 children in Alberta, Canada.

Design: A cross-sectional survey design was used. Children were asked how often they helped prepare food at home and rated their preference for twelve fruits and vegetables on a 3-point Likert-type scale. Self-efficacy was measured with six items on a 4-point Likert-type scale asking children their level of confidence in selecting and eating healthy foods at home and at school.

Setting: Schools (n 151) located in Alberta, Canada.

Subjects: Grade 5 students (n 3398).

Results: A large majority (83–93%) of the study children reported helping in home meal preparation at least once monthly. Higher frequency of helping prepare and cook food at home was associated with higher fruit and vegetable preference and with higher self-efficacy for selecting and eating healthy foods.

Conclusions: Encouraging children to be more involved in home meal preparation could be an effective health promotion strategy. These findings suggest that the incorporation of activities teaching children how to prepare simple and healthy meals in health promotion programmes could potentially lead to improvement in dietary habits.

Keywords
Elementary-school children
Meal preparation
Diet quality
Food preference
Self-efficacy

Meal preparation at home is associated with diet quality among adolescents and adults, where higher frequency of preparing meals at home is associated with higher fruit, vegetable and micronutrient intakes, and with lower fat, fried food and sugar-sweetened beverage intakes^(1–3). As the prevalence of childhood obesity continues to rise, increased understanding of the complex relationship between food preparation behaviours and diet quality is needed. Involvement in food-related tasks could likely increase a child's perception of his/her ability to perform these behaviours^(2,4,5), and greater participation in preparing home meals could foster increased self-efficacy for the selection of healthier food options. Furthermore, performing food-related activities can be an important opportunity to encourage children to try and to enjoy a variety of foods. Children and adolescents involved in such activities were generally more interested in nutrition

and vegetables⁽⁵⁾ and consumed healthier diets⁽⁶⁾. Research on the impact of school garden programmes has shown that a hands-on approach of exposing children to a variety of fruits and vegetables is a viable strategy to encourage children to develop increased food preference and subsequently increased intake^(7–9). It is possible that similar findings could be transferred to interventions teaching meal preparation skills.

Currently, the majority of reported studies describing this relationship have been conducted among adolescents and adults. Therefore, the purpose of the present analysis was to examine the association between frequency of home meal preparation and (i) fruit and vegetable preference and (ii) self-efficacy for selecting healthy foods, two factors that have been previously described to influence diet quality, in a younger population such as elementary-school children. The analysis was conducted

using data collected as part of the Raising healthy Eating Active Living kids in Alberta (REAL Kids Alberta) project, a survey administered among a provincially representative population of grade 5 children in Alberta, Canada.

Experimental methods

Participants and recruitment

All elementary schools with grade 5 students in Alberta, with the exception of francophone (2% of all schools), charter (1%), private (7%) and on-reserve federal schools (2%), were included in the sampling frame. Schools were selected using a one-stage stratified random sampling design. Schools were stratified according to metropolitan (cities of Edmonton and Calgary), city (municipalities with population $\geq 40\,000$) or rural-town (municipalities with population $< 40\,000$) regions, and then randomly selected within each stratum to ensure proportional representation. Of 164 invited schools, 151 (92%) schools agreed to participate. Schools that participated in the survey were provided with a report of the findings. In the spring of 2010, 5597 home surveys and parent consent forms were sent home, of which 3687 (66%) were returned and 3656 (65%) parents provided parental consent for their child to participate in the survey. Trained evaluation assistants recruited through posted job advertisements visited each school to administer student surveys. After excluding children who were absent during data collection and those who did not complete the survey, a total of 3398 (61%) completed surveys were collected. The Health Research Ethics Board of the University of Alberta approved all study procedures.

Measures of interest

Frequency of home meal preparation

Children were asked to indicate the frequency with which they helped prepare or cook food in the home, selecting from five response options ranging from 'never or almost never' to 'several times a day on most days'.

Fruit and vegetable preference

Preferences for three fruits (apples, oranges, blueberries) and nine vegetables (carrots, tomatoes, green beans, broccoli, spinach, zucchini, cabbage, squash, green peas) were rated using a 3-point scale with facial descriptors. Response options included 'like a lot', 'like a bit', 'don't like' and 'don't know'. Children were instructed by evaluation assistants to select the 'don't know' response if they had never tried the fruit or vegetable. A fruit or vegetable preference score was calculated for each child individually. Each of the response options was assigned a score ranging from 1 to 3, with a higher score indicating a higher preference rating. Scores were totalled for fruits (range 3 to 9) and vegetables (range 9 to 27) separately and standardized to a scale of 10 to allow for comparability of results between the two food groups. All 'don't know' responses were excluded from the analysis.

Self-efficacy

Self-efficacy was assessed using a 4-point scale consisting of six questions, where children were asked if they were confident they could (i) eat healthy food at school, (ii) eat a healthy snack between school and dinner, (iii) eat healthy food or choose a healthy snack when with friends, (iv) eat healthy food when eating dinner with the family, (v) choose a healthy snack when alone at home and (vi) choose a healthy snack when bored or sad. Response options ranged from 'very confident' to 'not at all confident'. An aggregate measure of self-efficacy was calculated based on methods previously described⁽¹⁰⁾, where a score (range 1 to 4) was assigned to each response option, with a higher score indicating higher self-efficacy. Scores were then totalled across all six questions to obtain an overall self-efficacy score (range 6 to 24). Internal consistency of the scale items was high (Cronbach's $\alpha = 0.85$), and a factor analysis with varimax rotation of the six items extracted one factor with loadings ≥ 0.70 . This factor accounted for 57% of the variance in the items. As such, the use of an aggregate measure of self-efficacy based on responses to these six questions is appropriate.

Other measures

Demographic information such as annual household income and parental education attainment was obtained from parent responses in the home survey. All survey instruments used in the present study can be found on the REAL Kids Alberta project website (www.realkidsalberta.ca).

Data analysis

All analyses were conducted with the STATA statistical software package version 11 (StataCorp, College Station, TX, USA). All analyses were weighted to represent provincial estimates of the grade 5 student population in Alberta. Random-effects regression models with children nested within schools were used to test for associations between fruit and vegetable preference, self-efficacy and frequency of helping with preparing home meals. Frequency of home meal preparation was included in the analyses as a categorical variable. Analyses were adjusted for the confounding effects of gender, household income, parent education attainment and urban, city or rural residency.

Results

Approximately half (51%) of the surveyed children were girls, and all levels of household incomes and parental education attainment were well represented (Table 1). Approximately 30% of children reported helping with home meal preparation at least once daily, while 12.4% reported never helping. In general, the study children preferred fruits to vegetables (mean fruit preference score = 8.91, range 3.33 to 10; mean vegetable preference

score = 6.64, range 3.33 to 10; Table 1). Fruit and vegetable preference increased with increasing frequency of helping cook food at home (Table 2). This association appeared to be more pronounced in vegetable preference compared with fruits, where helping with home meal preparations several times daily led to approximately a 10% (or 1 point) increase in vegetable preference. On average, children had

moderately high self-efficacy in selection of healthy foods (self-efficacy score = 18.54, range 6 to 24; Table 1). Self-efficacy increased with increasing frequency of helping with home meal preparation (Table 2).

Discussion

The present study shows that involvement in home meal preparation is associated with higher self-efficacy for making healthier food choices among grade 5 children. Researchers have previously proposed that involving children in household tasks possibly builds skills and self-efficacy⁽¹¹⁾. Adolescents who had higher self-efficacy tended to make healthier eating choices⁽¹²⁾ and ate more fruits and vegetables^(13,14). Therefore, children who are involved in meal preparation activities could have increased confidence in their ability to select and consume healthier foods.

Frequency of participation in home meal preparation was also associated with higher preference for fruits and vegetables in the present study. Food selection can be influenced by a variety of factors, of which food preference is most often shown to be associated with food intake^(15–17). Children and adolescents who ate meals more frequently with their families tended to have healthier dietary patterns^(18,19). Meal preparation, like family mealtimes, could provide the opportunity for family interaction where eating patterns and food preferences are modelled and developed. Currently, children do not consume the recommended amounts of fruits and vegetables^(20,21). As such, strategies to increase fruit and vegetable preference, and subsequently intake, should be explored. Nutrition education and programmes encouraging children to participate in meal preparation activities could be a viable approach.

Table 1 Characteristics of surveyed grade 5 children in Alberta, Canada (*n* 3398)*†

Characteristic	
Annual household income (\$CAN)	
≤50 000	16.1
50 001–75 000	11.7
75 001–100 000	13.6
>100 000	25.4
Not reported	33.2
Parental education attainment	
Secondary or less	23.8
College	37.1
University and above	33.6
Not reported	5.5
Geographic residency	
Metropolitan	46.6
City	15.8
Rural-town	37.6
Frequency of preparing home meals	
Never or almost never	12.4
Once per month	24.1
1–3 times per week	32.2
Once per day	16.5
Several times per day	14.7
Fruit preference score (mean)‡	8.91
Vegetable preference score (mean)‡	6.64
Self-efficacy score (mean)§	18.54

*Numbers presented are % unless otherwise stated.

†Results were weighted to represent provincial estimates of the grade 5 student population in Alberta.

‡Score standardized to a 10-point scale, higher score indicates higher preference. Children were instructed to select 'don't know' response if they had not tried the fruit or vegetable, all 'don't know' responses were excluded from calculation of preference scores.

§Score range 6 to 24, higher score indicates higher self-efficacy.

Table 2 Associations between helping with food preparation in the home and fruit and vegetable preference and self-efficacy among grade 5 children in Alberta, Canada (*n* 3398)

	Preference for fruits		Preference for vegetables		Self-efficacy	
	β	95% CI	β	95% CI	β	95% CI
Frequency of preparing home meals – unadjusted model*						
Never†	–	–	–	–	–	–
Once per month	0.35	0.15, 0.55	0.30	–0.03, 0.62	1.24	0.65, 1.83
1–3 times per week	0.63	0.45, 0.80	0.56	0.27, 0.85	1.98	1.46, 2.51
Once per day	0.63	0.44, 0.83	0.68	0.37, 1.00	2.28	1.76, 2.81
Several times per day	0.76	0.52, 0.99	1.05	0.73, 1.38	3.07	2.46, 3.68
Frequency of preparing home meals – adjusted model*‡						
Never†	–	–	–	–	–	–
Once per month	0.35	0.15, 0.54	0.26	–0.05, 0.58	1.11	0.52, 1.70
1–3 times per week	0.62	0.44, 0.79	0.52	0.24, 0.81	1.74	1.21, 2.26
Once per day	0.62	0.42, 0.82	0.65	0.34, 0.96	2.02	1.50, 2.55
Several times per day	0.74	0.51, 0.98	1.02	0.69, 1.35	2.88	2.27, 3.49

*Random-effects regression models with children nested within schools were used to test for associations.

†Reference level.

‡Analyses were adjusted for gender, annual household income, parental education attainment and geographic residency. Results were weighted to represent provincial estimates of the grade 5 student population in Alberta.

Fruit and vegetable preference and self-efficacy could be potential mediators in the complex relationship between involvement in meal preparation and the consumption of a healthier diet. Both of these factors were previously shown to be linked to higher diet quality in children and adolescents^(12–14,16,17) and were observed in the present study to be associated with a higher frequency of involvement in home meal preparation. The mechanism behind the association of participation in food-related activities and dietary outcomes is currently not well described. For instance, increased involvement in home meal preparation may lead to increased appreciation for fruits and vegetables, and subsequently to increased intake. Higher involvement in home meal preparation may also lead to increased self-efficacy for selecting healthier foods. Conversely, it is also possible that children with higher fruit and vegetable preference and self-efficacy are also healthier eaters who would be more interested in food-related activities such as meal preparation. As temporal causality cannot be inferred from cross-sectional surveys, an intervention study design such as evaluation of a school-based programme will be appropriate to investigate the directionality of this association.

The present study was conducted among a large provincially representative sample and its response rate can be considered high for school-based research. Limitations of the study include the use of self-reported information. It should also be taken into account when interpreting the results of the present analysis that the survey questions do not indicate if children were preparing home meals from scratch or if they were using ready-made foods. The use of convenience foods is increasingly common with the current demand for foods that require a minimum of time and effort to prepare⁽²²⁾. As use of convenience foods was negatively associated with diet quality^(23,24), this is a point that warrants further clarification in future studies. Furthermore, involvement in home meal preparation could be indicative of the frequency of eating meals at home, where children with higher involvement are from families where more meals are prepared and consumed at home. As eating meals at home has been associated with healthier diets^(25–28), it is thus possible that these children are likely to have better diet behaviours than their peers.

Conclusions

A higher degree of involvement in food-related activity may be instrumental in the development and maintenance of healthy eating behaviours in children. Encouraging the development of food preparation skills could be a viable approach in health promotion programmes, where a hands-on approach can be seen as a way to enhance the effectiveness of nutrition education. Teaching children how to prepare simple, cost-effective and healthful meals can help in the development of a life skill that could be maintained through adulthood.

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References

1. Larson NI, Perry CL, Story M *et al.* (2006) Food preparation by young adults is associated with better diet quality. *J Am Diet Assoc* **106**, 2001–2007.
2. Larson NI, Story M, Eisenberg ME *et al.* (2006) Food preparation and purchasing roles among adolescents: associations with sociodemographic characteristics and diet quality. *J Am Diet Assoc* **106**, 211–218.
3. McLaughlin C, Tarasuk V & Kreiger N (2003) An examination of at-home food preparation activity among low-income, food-insecure women. *J Am Diet Assoc* **103**, 1506–1512.
4. Bandura A (1977) Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* **84**, 191–215.
5. Hill L, Casswell S, Maskill C *et al.* (1998) Fruit and vegetables as adolescent food choices in New Zealand. *Health Promot Int* **13**, 55–65.
6. Cabalda AB, Rayco-Solon P, Solon JA *et al.* (2011) Home gardening is associated with Filipino preschool children's dietary diversity. *J Am Diet Assoc* **111**, 711–715.
7. Morgan PJ, Warren JM, Lubans DR *et al.* (2010) The impact of nutrition education with and without a school garden on knowledge, vegetable intake and preferences and quality of school life among primary-school students. *Public Health Nutr* **13**, 1931–1940.
8. Morris JL & Zidenberg-Cherr S (2002) Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *J Am Diet Assoc* **102**, 91–93.
9. Somerset S & Markwell K (2009) Impact of a school-based food garden on attitudes and identification skills regarding vegetables and fruit: a 12-month intervention trial. *Public Health Nutr* **12**, 214–221.
10. Spence JC, Blanchard CM, Clark M *et al.* (2010) The role of self-efficacy in explaining gender differences in physical activity among adolescents: a multilevel analysis. *J Phys Act Health* **7**, 176–183.
11. Rossman M (2002) Involving children in household tasks: is it worth the effort? <http://www.cehd.umn.edu/research/highlights/Rossmann/> (accessed April 2012).
12. Gracey D, Stanley N, Burke V *et al.* (1996) Nutritional knowledge, beliefs and behaviours in teenage school students. *Health Educ Res* **11**, 187–204.
13. Neumark-Sztainer D, Wall M, Perry C *et al.* (2003) Correlates of fruit and vegetable intake among adolescents. Findings from Project EAT. *Prev Med* **37**, 198–208.
14. Zabinski MF, Daly T, Norman GJ *et al.* (2006) Psychosocial correlates of fruit, vegetable, and dietary fat intake

- among adolescent boys and girls. *J Am Diet Assoc* **106**, 814–821.
15. Glanz K, Basil M, Maibach E *et al.* (1998) Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *J Am Diet Assoc* **98**, 1118–1126.
 16. Rasmussen M, Krolner R, Klepp KI *et al.* (2006) Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part I: Quantitative studies. *Int J Behav Nutr Phys Act* **3**, 22.
 17. Rollins BY, Loken E & Birch LL (2011) Preferences predict food intake from 5 to 11 years, but not in girls with higher weight concerns, dietary restraint, and %body fat. *Obesity (Silver Spring)* **19**, 2190–2197.
 18. Gillman MW, Rifas-Shiman SL, Frazier AL *et al.* (2000) Family dinner and diet quality among older children and adolescents. *Arch Fam Med* **9**, 235–240.
 19. Larson NI, Neumark-Sztainer D, Hannan PJ *et al.* (2007) Family meals during adolescence are associated with higher diet quality and healthful meal patterns during young adulthood. *J Am Diet Assoc* **107**, 1502–1510.
 20. Krebs-Smith SM, Guenther PM, Subar AF *et al.* (2010) Americans do not meet federal dietary recommendations. *J Nutr* **140**, 1832–1838.
 21. Storey KE, Forbes LE, Fraser SN *et al.* (2009) Diet quality, nutrition and physical activity among adolescents: the Web-SPAN (Web-Survey of Physical Activity and Nutrition) project. *Public Health Nutr* **12**, 2009–2017.
 22. Alexy U, Sichert-Hellert W, Rode T *et al.* (2008) Convenience food in the diet of children and adolescents: consumption and composition. *Br J Nutr* **99**, 345–351.
 23. Alexy U, Libuda L, Mersmann S *et al.* (2011) Convenience foods in children's diet and association with dietary quality and body weight status. *Eur J Clin Nutr* **65**, 160–166.
 24. Pryer JA & Rogers S (2009) Dietary patterns among a national sample of British children aged 1½–4½ years. *Public Health Nutr* **12**, 957–966.
 25. Bowman SA, Gortmaker SL, Ebbeling CB *et al.* (2004) Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics* **113**, 112–118.
 26. French SA, Story M, Neumark-Sztainer D *et al.* (2001) Fast food restaurant use among adolescents: associations with nutrient intake, food choices and behavioral and psychosocial variables. *Int J Obes Relat Metab Disord* **25**, 1823–1833.
 27. Staser KW, Zollinger TW, Saywell RM Jr *et al.* (2011) Dietary behaviors associated with fruit and vegetable consumption, Marion County, Indiana, 2005. *Prev Chronic Dis* **8**, A66.
 28. Veugelers PJ, Fitzgerald AL & Johnston E (2005) Dietary intake and risk factors for poor diet quality among children in Nova Scotia. *Can J Public Health* **96**, 212–216.