Introduction

Dairy products are implicated as part of a healthy diet, and across various stages of life, they have been linked to numerous health benefits such as improving bone and tooth health; reducing the risk of developing obesity, high blood pressure, cardiovascular disease, and type 2 diabetes, and providing hydration and muscle repair after exercise. Canadian national survey data suggest that dairy products are grossly underconsumed in children and adolescents, as 61% of boys and 83% of girls aged 10 to 16 years do not meet the minimum recommended three servings of dairy foods per day. The same trends are seen in the United States, as only 15% of Americans aged 2 and older meet the recommended servings of dairy products, and they consume only 1.9 servings of dairy products per day. This falls well short of the Dietary Guidelines for Americans’ recommended three servings of dairy products a day for adolescents. Dairy consumption continues to decline with increasing age. As dairy can be a food to help combat weight gain...
and obesity,\textsuperscript{11-16} this is a concern for younger populations such as children and adolescents who are developing eating habits that will carry into adulthood and whose body composition during childhood are associated with adult adiposity and body mass.\textsuperscript{17

With respect to dairy consumption, previous research has identified several barriers and facilitators to intake.\textsuperscript{18-25} Studies have identified demographic factors that are associated with low dairy intake including ethnicity, low socioeconomic status, increased body weight, and older age.\textsuperscript{22,23,25} Both qualitative and quantitative studies among children and adolescents have reported other factors that influence dairy intake.\textsuperscript{18-25} Weight-related behaviors or concerns change dairy consumption differently in males and females, as boys want to impress girls and be strong, while girls are more concerned about dairy being a fattening food. Family environment and parental influence can affect dairy consumption both positively or negatively as parents or family dynamics may encourage or discourage dairy product consumption. Making dairy products part of a routine for children and incorporating dairy into meal patterns can encourage dairy consumption. Finally, taste preferences, lactose intolerance, and soft drink intake have been identified as factors influencing dairy intake, all of which vary based on gender.\textsuperscript{18-25}

Due to the various facilitators and barriers that may affect dairy intake, results have not been consistent between studies in children and adolescents. Within these factors, gender differences are frequently apparent as boys and girls like to receive information in different ways.\textsuperscript{21} Moreover, there has been limited exploration of the differences between individuals across different levels of dairy product consumption, such as those who meet and those who fail to meet intake requirements. It is expected that those meeting dairy requirements and those not meeting dairy requirements would have different facilitators and barriers affecting their intake. It is therefore predicted that children will have specific factors affecting their dairy intake that will differ depending on both gender and consumption levels.

As such, the present study sought to investigate the barriers and facilitators to dairy product consumption in Grade 7 children as stratified by gender and level of habitual dairy product intake, with the goal of identifying factors that are both common and unique to each group. Grade 7 was chosen due to their age range falling within the specified children/preadolescents and their ability to communicate and participate in verbal focus group research. These findings may be relevant as they could be used to guide the development of interventions tailored specifically to different populations, genders, or intake levels of dairy.

**Methods**

**Study Sample**

To be eligible, students had to be enrolled in a Grade 7 class in Guelph, Ontario. Of the 199 eligible students aged 10 to 12 years, 67% consented to participate (n = 134; 61 males, 73 females). Students were enrolled in eight Grade 7 classes in five elementary schools in Guelph, Ontario. The median household income of participating schools was within the middle three quintiles of the provincial range. Racial/ethnic breakdown of the participants was not determined. Lack of participation was mainly due to failure to return signed consent forms or absenteeism on either study day.

**Procedures**

Students were invited to participate in the study through invitation letters distributed by the classroom teacher. Both parent and children were required to give informed consent. All students participated in the activities, regardless of consent; however, data were only analyzed for consenting participants. Nonrecorded focus groups were conducted with nonconsenting students in order to allow for inclusion of all students in the activity and limit any feelings of exclusion. This study was approved by the Research Ethics Board at the University of Guelph and by the Upper Grand District School Board.

Prior to conducting the focus groups, a researcher visited the classrooms and facilitated completion of the Youth Adolescent Questionnaire (YAQ), a valid and reliable food frequency questionnaire developed at Harvard University.\textsuperscript{26} In order to determine the approximate daily intake of dairy products, the dairy section of the YAQ as well as other dairy foods and dairy alternatives found throughout the YAQ were used to calculate the average daily intake of dairy foods in servings/day.\textsuperscript{19} Students were then divided into groups based on gender and dairy consumption, resulting in the following five groups: females do not meet dairy requirements (n = 6), females meet dairy requirements (n = 7), males do not meet dairy requirements (n = 6), males meet dairy requirements (n = 8), and a mixed gender group for the nonconsenting students and students who were absent for the first visit and therefore had no YAQ data. A minimum of two students in each group was needed to keep gender separate in consenting groups. If this condition was not met, the gender division was collapsed (n = 3); however, researchers were able to separate the male and female students in the transcript analysis.

Approximately one week following intake analysis and division of students into groups based on intake and gender, focus groups were conducted in the classroom.
Factors affecting dairy intake in males and females were associated with the themes of attitudes and knowledge, perceived control and self-efficacy, environment and reinforcement, and social norms and observational learning, with considerable overlap between these categories. All barriers and facilitators were categorized into these themes, which consisted of more than 75 subcategories, in an attempt to not miss any information stated by participants.

The factors influencing dairy intake in females and males as categorized into attitudes/knowledge, perceived control/self-efficacy, environment/reinforcement, and social norms/observations are illustrated in Figures 1 and 2, respectively. These figures illustrate all of the factors that were identified in the thematic transcript analysis. Following analysis of the frequency of responses, predominant factors influencing dairy product consumption in groups with different levels of intake for each gender were identified, and are illustrated in Figure 3 for females and Figure 4 for males. The lateral portions of these diagrams represent factors that were unique to groups with different levels of dairy intake, with shared factors represented in the middle circle.

A majority of the factors influencing dairy intake were similar between both females and males, although some gender differences were noted. Sports was a predominant facilitator for dairy product consumption in males only. Also, eating out was a facilitator for all males as they more specifically referenced asking for milk or getting to choose dairy products at restaurants. Females were less likely to discuss availability of dairy products outside of the home and more frequently mentioned not having access to dairy products. Variety of...
dairy products available was identified as a facilitator in females, while it was both a facilitator and barrier in males. Males stated not liking or not willing to try different varieties of dairy products, such as different types of cheese; however, both genders stated liking choice and variety of dairy products such as types of milk, yogurt, or ice cream or the versatility of dairy products. Specifically, one female participant said they “like how you can just eat it with anything and like every time you try it, like a dairy product, even though it’s like the same ingredients, it always tastes different.” Females talked mostly about the lack of convenience of dairy products, while male students noted that dairy products could be convenient or not convenient. For instance, with regard to transporting or bringing dairy products to school, males felt it was “too much work.” But if dairy products were provided by the school, such as the Elementary School Milk Program, some male students said dairy products would be more convenient in this case.

Both males and females across consumption groups noted similar facilitators affecting dairy product intake. Knowledge of the benefits of dairy products and positive health outcomes were strong facilitators in both males and females meet requirements groups, although all consumption groups showed knowledge of the individual components of dairy products and their influence on health. The students’ daily routine and habits that instilled dairy product consumption, such as cereal and milk at every breakfast, also helped facilitate dairy product consumption. Not surprisingly, taste was a major factor that influenced dairy product consumption in both genders. Also, barriers to dairy product intake that were similar
between genders and consumption groups included skipping meals that would have normally contained a dairy product or alternative and misconceptions regarding the perceived negative health effects of dairy products. Related to level of habitual intake, home availability between consumption groups appeared to be reduced in those not meeting dairy requirements. However, in our analysis we were unable to make a clear distinction between availability of dairy products (eg, available or not available) and the location in which dairy products are available (eg, at home, at school, or special occasions). Finally, both peers and parents were important social environment factors that could act as a facilitator or barrier in both genders, depending on the situation.

To further clarify the above factors, Tables 1 and 2 present participant quotations that illustrate each predominant factor influencing dairy product consumption in females and males, respectively.

**Discussion**

This study assessed the barriers and facilitators to dairy product consumption in Grade 7 children as stratified by gender and level of habitual dairy product intake, with the goal of identifying factors that were both common and unique to each group. A majority of the factors influencing dairy intake were similar between both females and males, although some gender differences were noted. Similarly, we observed overlap in the barriers and facilitators that influenced both genders across different levels of habitual intake. This information may be used in the development of interventions tailored specifically to different populations.
Figure 3. Comparison of similarities and differences in females between consumption groups of the predominant facilitators and barriers to dairy consumption in Grade 7 youth. Differences are shown on the right and left regions of each circle while the similarities are indicated by the overlap.

Figure 4. Comparison of similarities and differences in males between consumption groups of the predominant facilitators and barriers to dairy consumption in Grade 7 youth. Differences are shown on the right and left regions of each circle while the similarities are indicated by the overlap.
| Table 1. Selection of Quotations Accompanying Each Predominant Factor Influencing Dairy Product Consumption in Females. |  |
|---|---|
| **Factor** | **Quotation** |
| **Females who meet dairy requirements** |  |
| Availability—Outside home | Researcher: “And, um, where do you consume dairy products?” Participant: “It’s like I mostly drink it at home and eat at home, but I do a large amount at like school.” |
| Positive outcomes—Associated benefits | “I like drinking milk because I know it’s going to . . . [help my] bones.” |
| Habits | “Well, I drink milk every morning and night [and] before school starts and before [I go] to sleep.” |
| Hunger/thirst | “[I drink milk because] I’m awake and hungry.” |
| **Females who do not meet dairy requirements** |  |
| Sources of information—Media | Researcher: “But speaking of all of the good things and bad things in dairy products, where did [you] we all hear that?” Participant: “Dr. Oz.” |
| Sources of information—Labels | Researcher: “So thinking about some of the unhealthy things . . . that might not be good for you in dairy products, so where did [you] hear that?” Participant: “Because we read the label.” |
| Peer influence | Facilitator: “When I’m with one of my friends, I have this big giant glass of milk sometimes, but I drink way more milk than I usually do.” |
| Barrier: | Researcher: “Do you ever think about having dairy products when you’re with friends? Like, do you choose cheese and crackers, if that’s your favorite? Or are chips and something like that easier, or popcorn or something?” Participant: “No, normally we eat fries.” |
| Skipping meals | Participant: “Sometimes if I get up later then I have to have something quickly for breakfast.” Researcher: “Yeah. So what would be quicker than the cereal and milk, what would you choose?” Participant: “My mom makes some toast.” |
| Parental influence | “My dad, he wants me to drink and eat more [dairy products] but my mom doesn’t because she doesn’t like it.” |
| Availability—Not available (at home) | Researcher: “If you open up your fridge would you find dairy products in your household?” Participant: “No” |
| **All female groups** |  |
| Dietary components—Associated benefits | “It makes your bones strong.” |
| Dietary components—Associated harm | “Umm, as much as I like dairy products they also have a lot of sugar for the flavor.” |
| Taste | Facilitator: “For me it’s—it’s like because I like eating it and it’s yummy and it tastes really good.” Barrier: “I just really don’t like the taste of milk.” |
| Parental influence | “Yeah, every time I go home from school my dad would tell me like did you drink milk?” |
| Personal knowledge—Dairy alternatives | Researcher: “So when I say dairy products, what [comes to mind]?” Participant 1: “Um, soy milk.” Researcher: “Soy milk, yeah. Any other alternatives [you] know of?” Participant 2: “Almond milk.” Participant 3: “Goat milk.” |
| Food pairing | “I only like milk in my cereal because I don’t like the taste of it like by itself.” |
| Convenience | Researcher: “Do you think you would take dairy products and a snack on the go or is there other things that are easier and more convenient?” Participant: “I think other things are more convenient because I’m [not] having dairy products in wrappers so you tend not to take them and you take more crackers and that kind of thing ‘cause they’re more portable.” |
| Misconceptions | “Like if you eat too much of it, then you’re gonna get fatter.” |
Table 2. Selection of Quotations Accompanying Each Predominant Factor Influencing Dairy Product Consumption in Males.

| Factor                                           | Quotation                                                                                                                                 |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| **Males who meet dairy requirements**             |                                                                                                                                          |
| Positive outcomes—Associated benefits            | “Um, it’s good for your bones and then it helps out with your muscles.”                                                                   |
| Sports                                           | Researcher: “What’s one of the main reasons you drink dairy products?”                                                                     |
|                                                  | Participant: “Probably performance for sports.”                                                                                           |
| Habits                                           | “It’s probably because, like, I have [milk], like, mostly every day and I’m, like, used to it.”                                           |
| Taste                                            | “My parents encourage me and I like the taste of [milk].”                                                                                   |
| Texture                                          | Researcher: “Is there . . . any reason why you like [dairy] foods? You mentioned cheese, why do you like cheese so much?”                  |
|                                                  | Male 1: “I’m not sure. The texture.”                                                                                                       |
|                                                  | Male 2: “The texture.”                                                                                                                    |
|                                                  | Male 3: “I like the taste and the texture, yeah.”                                                                                          |
| Source of information—Labels                      | Researcher: “What do you look for the on the label of a dairy product?”                                                                    |
|                                                  | Participant: “Nutritional facts.”                                                                                                          |
|                                                  | Researcher: “Nutritional facts. Like what type of facts?”                                                                                 |
|                                                  | Participant: “The fat, like the sugar, sodium.”                                                                                           |
| Source of information—Media                       | “I watched a short documentary about the history of cheese and other dairy products on TV once.”                                          |
| Source of information—Family                      | “I heard it—like my parents kind of tell me . . .”                                                                                         |
| Parental influence                                | Facilitator: “They say why aren’t you drinking any milk, like any—if I forget they always remind me ‘Did you drink your milk yet?’”       |
|                                                  | Barrier: “Except my dad kind of like—he doesn’t want me drinking a whole bunch [of milk] ’cause like it’s not good you if you have a whole bunch of it. And also it’s wasting.” |
| **Males who do not meet dairy requirements**      |                                                                                                                                          |
| Skipping meals                                    | “Breakfast on the weekdays I always end up skipping.”                                                                                      |
| Lack of familiarity                               | “Like most cheese that I’ve like never had like if I tasted them I probably wouldn’t like it.”                                            |
| Cost                                              | “It’s—it’s like—it’s a bit too much. It’s like 50 cents per milk per day per week.”                                                        |
| Temperature                                       | “So like I can’t drink cold things so I—so I warm [chocolate milk] up for like I don’t know, 10-13 seconds and I stir it.”                |
| Eating out                                        | Researcher: “So if you are ever out at restaurants, do you order milk?”                                                                     |
|                                                  | Participant: “I usually order pop.”                                                                                                       |
| Availability—At home                              | Researcher: “Okay. And how about yourself, when you open your fridge at home what do you normally see?”                                   |
|                                                  | Participant 1: “Ah, yeah. Like lots of bags of milk. I drink a lot of milk. Uh, maybe some cheese strings, like big bricks of cheese, uh, mozzarella sticks, and cream cheese and some yogurt.” |
|                                                  | Participant 2: “Two percent milk, yogurt, cheese, butter.”                                                                                 |
| Hunger/thirst                                     | “And I like milk cause it quenches thirst, like it beats it up.”                                                                             |
| Personal knowledge—Dairy alternatives             | “I like almond milk, I’ll drink but it’s not my favorite. So, yeah, like rice milk is okay, like I’ve kind of like gotten used to it-ish, like when I have to drink it, when we don’t have milk, so, regular milk in my house.” |
| Convenience                                       | Facilitator: “Um, cheese on my sandwiches or like, cause we have milk day [at school] so like we get milk.”                               |
|                                                  | Barrier: “I never bring dairy products [to school].”                                                                                        |
| Peer influence                                    | Facilitator: “I went to this house, he offered me chocolate milk, I said yes.”                                                            |
|                                                  | Barrier: “Yeah, I usually—if I go over to a friend’s house like to drink I’d usually have water, I wouldn’t have like milk or anything.”     |

(continued)
Many similarities exist between the predominant facilitators affecting dairy product intake in both males and females and across consumption groups, including knowledge, routine habits, peers, and taste, which is consistent with previous research in children and adolescents.\textsuperscript{18-25} Higher nutritional knowledge has been associated with consumption of an overall healthier diet,\textsuperscript{28} and a lack of knowledge about the association between dairy/calcium and health has also been found to be a barrier to calcium intake.\textsuperscript{29} Habits, or routines, have also been found to affect dairy intake in children in previous research,\textsuperscript{25,30} which is important as it has shown that food and beverage choices are taught in childhood and further developed in adolescence, they persist into adulthood.\textsuperscript{7} In addition to knowledge and habits, taste was also a strong facilitator for dairy product consumption in all females and for males meeting requirements. Having a taste preference for dairy products has been noted as one of the greatest influences to dairy product consumption,\textsuperscript{22} and studies have frequently noted food preferences or taste as a factor influencing food choices.\textsuperscript{22,25,30,31}

Males and females also showed similarities in the predominant barriers to dairy product intake. Skipping meals, especially breakfast, was an important barrier in both genders not meeting dairy requirements. Eating breakfast, particularly cereal at breakfast, has been shown to facilitate milk consumption.\textsuperscript{32} Often, when meals were skipped that would typically have contained a dairy product, students reported grabbing a convenient snack or more transportable meal, such as toast, instead; however, these snacks or meals often did not contain the dairy products or alternatives that would have been consumed regularly. Furthermore, when asked whether the students would make up for this lost dairy serving from breakfast at another point during the day, many reported they would not. Another common barrier influencing dairy intake in both males and females was misconceptions. These misconceptions were typically regarding negative health outcomes that students associated with dairy product consumption. Research has shown that children and adolescents negatively associate the fat in dairy products with obesity, body fat, and body composition,\textsuperscript{25,29,33,34} and this was also seen in the current study. In contrast to this false belief, recent systematic reviews have shown no association between dairy and increased body weight or body fat.\textsuperscript{11,35} Research has actually shown that dairy products and alternatives have a positive influence on adiposity, body mass index, waist circumference, and lean body

### Table 2. (continued)

| Factor                        | Quotation                                                                 |
|-------------------------------|--------------------------------------------------------------------------|
| All male groups               |                                                                           |
| Misconceptions                | Male 1: “Uh, if you have, like, too much vitamins in [dairy products].”  |
|                               | Male 2: “Like, eating too much yogurt can be bad for you because it can make |
|                               | you sick, I guess.”                                                      |
|                               | Male 3: “I think . . . well, I do know if you drink too much milk, um, you can get, |
|                               | like . . . it can really make you sick because it . . . I think . . . like, it’s kind of . . . poison you because . . . I don’t know. If you take too much dairy, um, it could really affect your health, not just because of the fat but because of other stuff. I’m not exactly sure what it is.” |
| Dietary components—Associated | Participant: “Well, I like natural milk, just like that. Um, I think in, in some, like, dairy brands they add too much sugar in there.” |
| harm                          | Researcher: “Okay. And, how, how could the sugar be bad for you if you were to, to-? Like, why would too much sugar be a bad thing for you.” |
| Eating out                     | Participant: “Because my parents tell me if you take- like, have too much sugar, um, you could end up getting, like, diabetes and it will affect you for the rest of your life.” |
| Variety                       | “When we’re at a restaurant we would order milk.”                        |
| Dietary components—Associated | “Cause I like to—cause you—you can use milk for cereal and drink it . . . |
| benefits                      | It’s used for baking quite a lot, so . . .”                              |
| Availability—Outside of home  | “[Dairy products] hold a lot of protein and stuff. Or not protein. Like minerals and stuff that are healthy. Help fight off diseases.” |
| Preferences                   | “At school you get the chocolate milk.”                                   |
| Facilitator—Favorites         | “I like chocolate milk. Chocolate milk is my favorite.”                  |
| Barrier—Least Favorites        | Researcher: “Why don’t you like yogurt!”                                 |
|                               | Participant: “It’s pretty sweet cause it has a lot of sugar.”             |
mass in children and adolescents who reach dairy recommendations, mainly due to the nutritional components within dairy products as well as the replacement of sugar-sweetened beverages and other high-calorie foods with dairy products. The findings regarding misconceptions in children are critical as they suggest that interventions that target these gaps in knowledge, specifically with regard to the potential harm and benefits associated with dairy product consumption, might effectively improve dairy consumption in children.

In both genders, peers had a strong influence, acting as both a barrier and facilitator to dairy product intake. In previous research, peers’ personal food choices and encouragement, or lack thereof, have been reported to have a significant impact on the food choices children and adolescents make. Previous research has also noted the importance of peers’ attitudes or choices and its effect on adolescent dietary intake. Therefore, the observation of both positive and negative influences on dairy intake behavior in this study is not surprising.

Similar to peers, parental influence was observed to act as both a barrier and a facilitator to dairy product intake. Parents were found to be an important facilitator in the “meets requirements” group of both genders, although males meeting requirements also noted that parents could be a barrier to consumption. In contrast, males not meeting requirements did not discuss parents as influencing dairy intake, while females not meeting requirements noted parents as both a barrier and a facilitator (see Tables 1 and 2). Regardless of these between-group differences, parents in general were clearly noted as an important influence, which is not surprising, as social cognitive theory notes the importance of the environment, including having appropriate role models and expectations, to shape behavior. Previous research in children also supports the important impact parents can have on their food choices and specifically the influence that maternal milk consumption can have on their daughters. These results, along with other research, suggest that parents may continue to play a role in determining their child’s consumption of dairy foods during adolescence.

Previous interventions have addressed some of these factors, including parents’ knowledge of dairy products, misconceptions regarding dairy foods and their associated health benefits, taste, habits or routines, parental and peer influence, availability of dairy products, skipping meals, and the convenience of dairy products. Some gender differences were noted such as sports being a predominant facilitator in choosing to consume dairy in males only and eating out as a facilitator or barrier to dairy product consumption depending on gender. These results suggest several potential targets for interventions that aim to increase dairy consumption, such as increasing knowledge regarding the benefits of dairy consumption, clarifying misconceptions surrounding dairy product consumption and weight gain, making time for breakfast, serving milk or dairy with meals, exposing children to a variety of foods, making dairy tasteful, and suggesting strategies to consume more dairy in the context of peer pressure and eating out. Addressing these barriers and facilitators as part of intervention development, with tailoring to the needs of the target population, is recommended in order to increase effectiveness.

Following this, we did note that in comparison to the previously published national averages, more of our population appeared to meet the recommended dairy requirements. This may be due to reasons such as the close proximity to rural farm land and the strong agricultural influence on the city, both of which can increase milk consumption. Racial or ethnic breakdown was not measured in this study, so the specific demographics of the subjects are unknown. In general, Guelph is a relatively fast growing, rural-influenced, prosperous city in southern Ontario. Recent census data of the city of Guelph found that 84.3% of the total population was white, so it can be assumed that the ethnic breakdown of subjects was relatively homogeneous. Focus groups also have limitations as facilitators may have poor control over what is said, participants may not be expressing their own individual view in an attempt to impress their peers or facilitators, and participants may be uncomfortable discussing personal or sensitive topics, such as body image. To mitigate this limitation, researchers were formally trained, and facilitators of the focus groups remained with the same group across each school (e.g., males who do not meet requirements or females who meet requirements). Overall, however, these limitations are not likely to have had an appreciable impact on the reliability of results, which is supported by the consistency of the present research findings to previously published studies.

**Conclusion**

Overall, we found that specific factors considered important by males and females across different levels of habitual intake include personal knowledge about dairy products, misconceptions regarding dairy foods and their associated health benefits, taste, habits or routines, parental and peer influence, availability of dairy products, skipping meals, and the convenience of dairy products.
Acknowledgments

The authors gratefully acknowledge the adolescents from the schools who provided insight regarding factors affecting dairy intake. The authors also acknowledge the Upper Grand District School Board, the principals, and the teachers for allowing the researchers into their schools.

Authors’ Note

Dairy Farmers of Ontario and Ontario Ministry of Agriculture, Food and Rural Affairs, the funding agencies, had no role in the design, analysis, or writing of this article. This study was approved for ethics by the Research Ethics Board at the University of Guelph.

Author Contributions

Development of focus group scripts was completed by MP, GN, MR. Authors MR, JB, KC, DF, VK, DM all contributed to conducting and recording of focus group sessions. Data analysis was completed by MR, JB, KC. Author MR was responsible for writing of the manuscript with final approval and edits from GN and MP.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Dairy Farmers of Ontario and the Ontario Ministry of Agriculture and Rural Affairs. Megan Racey is supported by a Highly Qualified Personnel award from the Ontario Ministry of Agriculture and Rural Affairs. The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. Moore LL, Bradlee ML, Gao D, Singer MR. Effects of average childhood dairy intake on adolescent bone health. J Pediatr. 2008;153:667-673.
2. Lu L, Xun P, Wan Y, He K, Cai W. Log-term association between dairy consumption and risk of childhood obesity: a systematic review and meta-analysis of prospective cohort studies. Eur J Clin Nutr. 2016;70:414-423.
3. Kris-Etherton PM, Grieger JA, Hilpert KF, West SG. Milk products, dietary patterns and blood pressure management. J Am Coll Nutr. 2009;28:103S-119S.
4. German JB, Gibson RA, Krauss RM, et al. A reappraisal of the impact of dairy foods and milk fat on cardiovascular disease risk. Eur J Nutr. 2009;48:191-203.
5. Thomas K, Morris P, Stevenson E. Improved endurance capacity following chocolate milk consumption compared with 2 commercially available sport drinks. Appl Physiol Nutr Metab. 2009;34:78-82.
6. Gilson SF, Saunders MJ, Moran CW, Moore RW, Womack C, Todd MK. Effects of chocolate milk consumption on markers of muscle recovery following soccer training: a randomized cross-over study. J Int Soc Sports Nutr. 2010;7:19.
7. Karp JR, Johnston JD, Tecklenburg S, Mickleborough TD, Fly AD, Stager JM. Chocolate milk as a post-exercise recovery aid. J Int Soc Sports Nutr. 2006;16:78-91.
8. Health Canada. Maintaining healthy habits. http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/maintain-adopt/index-eng.php. Accessed July 30, 2015.
9. Statistics Canada. Findings from the Canadian Community Health Survey. http://www.statcan.gc.ca/pub/82-620-m/2006002/4053669-eng.htm#milk. Accessed July 30, 2015.
10. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. J Nutr. 2010;140:1832-1838.
11. Dror DK. Dairy consumption and pre-school, school-age and adolescent obesity in developed countries: a systematic review and meta-analysis. Obes Rev. 2014;15:516-527.
12. Kelishadi R, Zemel MB, Hashemipour M, Hosseini M, Mohammadifar N, Pourasa P. Can a dairy-rich diet be effective in long-term weight control of young children? J Am Coll Nutr. 2009;28:601-610.
13. Albala C, Ebbeling CB, Cifuentes M, Lera L, Bustos N, Ludwig DS. Effects of replacing the habitual consumption of sugar-sweetened beverages with milk in Chilean children. Am J Clin Nutr. 2008;88:605-611.
14. Bigornia SJ, LaValley MP, Moore LL, et al. Dairy intakes at age 10 years do not adversely affect risk of excess adiposity at 13 years. J Nutr. 2014;144:1081-1090.
15. Scharf RJ, Demmer RT, DeBoer MD. Longitudinal evaluation of milk type consumed and weight status in preschoolers. Arch Dis Child. 2013;98:335-340.
16. Zheng M, Rangan A, Olsen NJ, et al. Substituting sugar-sweetened beverages with water or milk is inversely associated with body fatness development from childhood to adolescence. Nutrition. 2014;31:38-44.
17. Freedman DS, Kettel LH, Serdula MA, Dietz WH, Srinivasan SR, Berenson GS. The relation of childhood BMI to adult adiposity: the Bogalusa heart study. Pediatrics. 2005;115:22-27.
18. Grove T, Douglass J, Heimbach J, DiRienzo D, Miller G. Evaluation of maternal consumption of dairy products and its influence upon daughters’ diets. FASEB J. 1999;13:A549.
19. Hanson N, Neumark-Sztainer D, Eisenberg M, Story M, Wall M. Associations between parental report of the home food environment and adolescent intakes of fruits, vegetables and dairy foods. Public Health Nutr. 2005;8:77-85.
20. Johnson R, Panely C, Wang M. Associations between the milk mother’s drink and the milk consumed by their school-aged children. Fam Econ Nutr Rev. 2001;13:27-36.
21. Jung, M. Strategies to increase consumption of milk products. C J Diet Pract Res. 2013;74:105.
22. Larson NI, Story M, Wall M, Neumark-Sztainer D. Calcium and dairy intakes of adolescents are associated with their home environment, taste preferences, personal health beliefs, and meal patterns. J Am Diet Assoc. 2006;106:1816-1824.
23. Neumark-Sztainer D, Story M, Dixon LB, Resnick MD, Blum RW. Correlates of inadequate consumption of
dairy products among adolescents. *J Nutr Educ Behav*. 1997;29:12-20.

24. Nowak M. The weight-conscious adolescent: body image, food intake, and weight-related behavior. *J Adolesc Health*. 1998;23:389-398.

25. Novotny R, Han J, Biernacke I. Motivators and barriers to consuming calcium-rich foods among Asian adolescents in Hawaii. *J Nutr Educ Behav*. 1999;31:99-104.

26. Rockett HR, Breitenbach M, Frazier AL, et al. Validation of a youth/adolescent food frequency questionnaire. *Prev Med*. 1997;26:808-816.

27. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3:77-101.

28. Dickson-Spillmann M, Siegrist M. Consumers’ knowledge of healthy diets and its correlation with dietary behaviour. *J Hum Nutr Diet*. 2011;1:54-60.

29. James DC. Factors influencing food choices, dietary intake, and nutrition-related attitudes among African Americans: application of a culturally sensitive model. *Ethn Health*. 2004;9:349-367.

30. Neumark-Sztainer D, Story M, Perry C, Casey MA. Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. *J Am Diet Assoc*. 1999;99:929-934.

31. Lee S, Reicks M. Environmental and behavioral factors are associated with the calcium intake of low-income adolescent girls. *J Am Diet Assoc*. 2003;103:1526-1529.

32. Albertson AM, Thompson D, Franko DL. Consumption of breakfast cereal is associated with positive health outcomes: evidence from the National Heart, Lung, and Blood Institute Growth and Health Study. *J Nutr Res*. 2008;28:744-752.

33. Auld G, Boushey CJ, Bock MA, et al. Perspectives on intake of calcium-rich foods among Asian, Hispanic and white preadolescent and adolescent females. *J Nutr Educ Behav*. 2002;34:242-251.

34. Henry C, Whiting SJ, Phillips T, Finch SL, Zello GA, Vatanparast H. Impact of the removal of chocolate milk from school milk programs for children in Saskatoon, Canada. *Appl Physiol Nutr Metab*. 2015;40:242-250.

35. Arbargouei AS, Janghorbani M, Salehi-Marzijarani M, Esmaillzadeh A. Effect of dairy consumption on weight and body composition in adults: a systematic review and meta-analysis of randomized controlled clinical trials. *Int J Obes*. 2012;36:1485-1493.

36. Watson LC, Kwon J, Nichols D, Rew M. Evaluation of the nutrition knowledge, attitudes, and food consumption behaviors of high school students before and after completion of a nutrition course. *Fam Consum Sci Res J*. 2009;37:523-534.

37. Bronner YI, Hawkins AS, Holt ML, et al. Models for nutrition education to increase consumption of calcium and dairy products among African Americans. *J Nutr*. 2006;136:1103-1106.

38. Bandura A. Human agency in social cognitive theory. *Am Psychol*. 1989;44:1175-1184.

39. Perry CL, Baranowski T, Parcel GS. How individuals, environments and health behavior interact: social learning theory. In: Glanz K, Rimer BK, Viswanath K, eds. *Health Behavior and Health Education: Theory, Research, and Practice*. San Francisco, CA: Jossey-Bass; 1990:161-186.

40. Fisher JO, Mitchell DC, Smiciklas-Wright H, Birch LL. Maternal milk consumption predicts the tradeoff between milk and soft drinks to young girls’ diets. *J Nutr*. 2001;131:246-250.

41. DeBar LL, Dickerson J, Clarke G, Stevens VJ, Ritenbaugh C, Aickin M. Using a website to build community and enhance outcomes in a group, multi-component intervention promoting healthy diet and exercise in adolescents. *J Pediatr Psychol*. 2009;34:539-550.

42. Gates M, Hanning RM, Gates A, Isogai A, Tsuji LJS, Metatawbin J. A pilot comprehensive school nutrition program improves knowledge and intentions for intake of milk and milk alternatives among youth in a remote First Nation. *J Nutr Educ Behav*. 2013;45:455-459.

43. O’Connell KM. *Impact of the HEROS (Healthy Eating to Reduce Obesity Through Schools) Study on Healthy Food Choices and Obesity Among Middle School Students in Guilford County (North Carolina) Schools* [dissertation]. Greensboro: University of North Carolina at Greensboro; 2005.

44. Yamaoka K, Watanabe M, Hida E, Tango T. Impact of group-based dietary education on the dietary habits of female adolescents: a cluster randomized trial. *Public Health Nutr*. 2011;14:702-708.

45. Singhal N, Misra A, Shah P, Gulati S. Effects of controlled school-based multi-component model of nutrition and lifestyle interventions on behavior modification, anthropometry and metabolic risk profile of urban Asian Indian adolescents in North India. *Eur J Clin Nutr*. 2010;64:364-373.

46. Muth ND, Chatterjee A, Williams D, Cross A, Flower K. Making an IMPACT: effect of a school-based pilot intervention. *N C Med J*. 2008;69:432-440.

47. Naghashpour M, Shakerinejad G, Lourizadeh MR, Hajinajaf S, Jarvandi F. Nutrition education based on health belief model improves dietary calcium intake among female students of junior high schools. *J Health Popul Nutr*. 2014;32:420-429.

48. Wordell D, Daratha K, Mandal B, Bindler R, Butkus SN. Changes in a middle school food environment affect food behavior and food choices. *J Acad Nutr Diet*. 2012;112:137-141.

49. Marquez O, Racey M, Preyde M, Hendrie GA, Newton G. Interventions to increase dairy consumption in adolescents: a systematic review. *Infant Child Adolesc Nutr*. 2015;7:242-254.

50. Minaker L, McCrager L, Lambraki I, et al. School region socio-economic status and geographic locale is associated with food behaviour of Ontario and Alberta adolescents. *Can J Public Health*. 2006;97:357-361.

51. Statistics Canada. 2013. Guelph, CY, Ontario (Code 3523008). *National Household Survey (NHS) Profile*. *2011 National Household Survey* (Statistics Canada Catalogue No. 99-004-XWE). http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E. Released September 11, 2013. Accessed September 24, 2015.

52. Basch CE. Focus group interview: An underutilized research technique for improving theory and practice in health education. *Health Educ Q*. 1987;14:411-448.