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Salient beliefs among Canadian adults regarding milk and cheese consumption: a qualitative study based on the theory of planned behaviour

Marie-Josée Lacroix, Sophie Desroches, Mylène Turcotte, Geneviève Painchaud Guérard, Paul Paquin, François Couture and Veronique Provencher* 

Abstract

Background: In spite of multiple efforts by public health authorities to promote consumption of milk and alternatives in the Canadian adult population, consumption of these healthy foods is still suboptimal. This study aimed to explore salient beliefs underlying the consumption of fluid milk and cheese among adults.

Methods: The qualitative descriptive research design was based on the Theory of Planned Behaviour framework, using 20 focus groups. A total of 161 men and women (19 to 50 years old) from Quebec City, Montreal and Toronto (Canada) were recruited to participate in focus groups. A hybrid approach (deductive and inductive) to qualitative methods of thematic analysis was used during coding of focus group transcripts to draw out participant's salient beliefs regarding milk and cheese consumption.

Results: For both milk and cheese, most groups cited advantages or disadvantages with regards to health effects, nutritional value, taste, socio-affective aspects and practicality. Family and friends, health professionals and advisors, and communications domain (e.g. advertisements, TV programs, well-known personalities) were cited as major influences affecting consumption. Price reduction, product improvements, supply increase and variation, favourable food/drink combinations and access were among the most commonly cited facilitators for milk and cheese consumption. Major barriers included high price, reduced confidence in the product (reasons/contexts that reduce perceived safety of the product), health status, problems linked to supply (varieties/formats which are not available), and habits and cultural values. Gender and level of milk and cheese consumption differences were observed between groups: men referred more often to industry and politics as factors influencing their milk consumption, while women expressed more animal and environmental concerns. Differences were also noted between high and low consumer's groups in relation to the themes of taste, pleasure and emotions for milk and cheese consumption. Lastly, low consumers expressed more distrust and disgust relating to milk consumption than high consumers.

Conclusions: The majority of beliefs observed are consistent with earlier studies on milk or dairy product consumption. Consumers' concerns about origins of milk, however, have never been reported. These findings will help optimize approaches for promoting consumption of these foods among different segments of Canadian adults.

Keywords: Milk, Cheese, Adult, Salient belief, Theory of Planned Behavior, Qualitative study, Focus groups

* Correspondence: veronique.provencher@fsaa.ulaval.ca
Institute of Nutrition and Functional Foods (INAF), Pavillon des Services, Laval University, 2440 Hochelaga Blvd., Quebec City G1V 0A6, QC, Canada

Background

While the majority of Canadian adults believe they are knowledgeable about nutrition (82 %) and that they have good eating habits (77 %) [1], few follow dietary guidelines, especially regarding milk and its alternatives (e.g. yogurt, cheese, fortified soy beverages). For example, data from the last Canadian Community Health Survey (2004) [2] showed that just one-third of the adult population met the Canada Food Guide recommended minimum daily servings for the “milk and alternatives” food group (named “milk products” food group in the 1992 version), i.e. two servings per day for 19-50-year-olds. Similar findings have been observed in the United States [3] and elsewhere [4]. The evidence is clear that this food group contains important nutrients (i.e. protein, vitamin D, calcium, etc.), and significantly contributes to total daily nutrient intakes [5]. However, enhancing the population’s eating habits remains an important public health challenge and identifying factors that promote the consumption of healthy foods (such as milk and alternatives) constitutes a first step.

Social cognitive theories have been widely used to improve our understanding of health-related behaviours [6]. A number of studies have used social cognitive theories to qualitatively explore [7–11] or quantitatively assess [12–16] determinants of consumption of milk or dairy products among women, the elderly, or the adult general population. Among these theory-based approaches, the Theory of Planned Behaviour (TPB) is among the most commonly used for identifying the psychosocial determinants of eating behaviours and their related salient beliefs [17]. The TPB suggests there are three primary determinants for the intention to adopt a behaviour: attitude, subjective norms and perceived behavioural control. Each of these primary constructs is in turn a function of underlying beliefs. Attitude is defined by behavioural beliefs (i.e., perceived advantages or disadvantages of the behaviour), subjective norms by normative beliefs (i.e., social pressures to adopt the behaviour), and perceived behavioural control by control beliefs (i.e., perceived ease or difficulty of adopting the behaviour). One meta-analytic review [18] showed the effectiveness of the TPB in predicting behaviour, as its constructs accounted for 27 and 39% of variances in behaviour and intention to adopt the behaviour, respectively. However, the relative importance of each construct may vary for different populations and health-related behaviours. Few studies have used a social cognitive theory that proved effective in predicting milk or dairy product consumption [12, 15] or in exploring determinants of dairy consumption in adults [7, 8]. Two qualitative studies explored, respectively, the beliefs of the general adult population about functional dairy products (i.e. products fortified with calcium, plant sterol or omega-3, for

example), and the beliefs of older women about traditional (non-fortified, or natural) dairy products. Two quantitative studies assessed the importance of social cognitive theory constructs in the consumption of traditional dairy products among older adults and women, respectively. None reported on the salient beliefs of the general population regarding the determinants of their intention to consume traditional dairy products, and none reported specifically on beliefs among men.

In a behaviour change intervention, an educational message could be ineffective in changing a behaviour if underlying motives of the behaviour are different from the motives addressed in the educational message [6]. The first step in designing a TPB-based behaviour change intervention is to determine the target population’s specific beliefs [19]. This step is essential in order to design interventions that will target the population’s motives underlying the target behaviour instead of addressing health professional’s beliefs about the behaviour. To increase the effectiveness of the process, Ajzen and Fishbein suggest specifying the definition of the target behaviour [20]. Among the most commonly consumed foods from the milk and alternatives food group, two dairy products that are generally not perceived as equally healthy by consumers were selected to explore beliefs underlying milk and alternatives consumption: milk because it is a beverage low in fat, and cheese because it is a food high in fat and sodium. Since the consumption of milk and alternatives remains an important public health challenge, the goal of this study was to explore salient beliefs underlying the consumption of specific dairy products (i.e., milk and cheese) among men and women from different population segments. In particular, the study aimed to identify commonly held beliefs linked to attitudes (behavioural beliefs), subjective norms (normative beliefs) and perceived behavioural control (control beliefs) underlying the consumption of milk and cheese.

Methods

Study design and data collection

Using a qualitative descriptive research design based on the TPB framework, data were collected in two-hour focus groups conducted between April and June 2012. All groups were audio- and video-taped, and led by a moderator team (moderator and assistant) using a standard semi-structured interview guide pilot-tested prior to the study (Table 1) [21]. The pilot study focus groups data were not included in the results in the present manuscript. For the two behaviours under study (consumption of milk and cheese), the focus groups sought to determine the salient beliefs of participants underlying their attitude (defined as behavioural beliefs, or perceived advantages and disadvantages), subjective norms (defined as normative beliefs, or the approval or

Table 1 Standardized semi-structured interview guide based on the TPB

Introduction questions	
Behaviours	Cow's milk and cheese consumption
Attitude	<i>In your view, what are the advantages/disadvantages of consuming fluid milk/cheese?</i>
Subjective norm	<i>In your circle/environment, tell us who are the people (or group) that are important to you and that could influence your food habits.</i> <i>Among these people, who would approve/disapprove of your decision to consume fluid milk/cheese?</i>
Perceived behavioural control	<i>In your view, what would enable/prevent you from consuming fluid milk/cheese?</i>
Ending questions	

disapproval of individuals or groups of significant others) and perceived behavioural control (defined as control beliefs, or perceived barriers or facilitators). Before the TPB-related questions, the interview guide included an open-ended question on general perceptions of dairy products. Before taking part in the focus group, participants had to complete an online socio-demographic questionnaire as well as a validated web-based food-frequency questionnaire [22] which assessed overall consumption of milk, cheese and yogurt based on consumption over the past month.

Sampling and participants

Men and women (aged 19 to 50) were recruited using ads in local newspapers, email invitations sent to a Laval University mailing list, cold calling a random selection of numbers in the city phone book, website advertisements, and face-to-face recruitment in workplaces. Vegans and people with chronic health problems (food allergies, dyslipidemia, endocrine disorders not including stable thyroid disease, or lactose intolerance) or a history of eating disorders were excluded from the study, as the food choices of these people are or have been restricted for other reasons.

Recruitment process

Since the purpose of this study was to capture a diversity of beliefs, participants recruited were separated using a stratified purposeful sampling procedure [23] based on two main population segmentation criteria: sex (men and women) and milk products (i.e., milk, cheese and yogurt) consumption (high, i.e. \geq two servings per day, or low, i.e. $<$ two servings per day), and were separated into homogenous groups by sex and level of consumption. Quebec City focus groups composed of French speakers ($n = 8$ focus groups) were conducted by the moderator team (MT, MJL) at the Institute of Nutrition

and Functional Foods (INAF) in a room specially designed for the purpose. In order to explore perceptions in other Canadian cities and among English speakers, 12 additional groups were conducted in Montreal ($n = 4$ among French speakers and $n = 4$ among English speakers) and Toronto ($n = 4$ among English speakers) by a specialized firm. This firm was tasked with recruiting all participants and conducting English-only focus groups in similar rooms to those in Quebec City. The INAF moderator team (MT, MJL) accompanied an English-speaking moderator, who received the interview guide and information on the project objectives in advance. For each of four categories of individuals (men with high milk product consumption, men with low consumption, women with high consumption and women with low consumption), three focus groups were conducted in French and two in English (for a total of $n = 12$ French groups and $n = 8$ English groups). All participants signed a consent form (approved by the Laval University Research Ethics Committee; #2012-014/21-02-2012) at the start of the focus group, and received \$75 in compensation at the end of the session.

Data analysis

Descriptive data analysis of participant characteristics was calculated from percentages for categorical data as well as means \pm standard deviation. All discussions were transcribed for analysis following the method proposed by Bazeley [24]. A hybrid approach to qualitative methods of thematic analysis (as described by Fereday and Muir-Cochrane [25]) was used for this study. This approach incorporated both Boyatzis' data-driven inductive approach [26] and the deductive a priori template of codes approach outlined by Crabtree and Miller [27]. During the analysis, a copy of the original recordings and field notes was kept available for the purposes of confirmation or traceability [23].

Data coding

Transcripts were coded line by line by pairs of analysts (MT, MJL, SMD) assisted by computer software (NVivo 9.0, QSR International Pty. Ltd., Doncaster, Victoria, Australia, 2010) during and after data collection (iterative process), using a bilingual template of codes based on the research question and the TPB model (deductive coding) [27]. This template was composed of two product categories (MILK and CHEESE). Under each product category were three categories corresponding to the three TPB constructs, and under each of these categories were subcategories representing the salient beliefs associated with each construct (see the header of Table 3). Double coding was performed for the first three focus groups ($n = 2$ in French and $n = 1$ in English; inter-coder agreements were $> 92\%$) and analysts held weekly

meetings over the duration of the remaining 17 focus groups to enhance consistency and credibility of coding. Emerging themes from the data were identified and classified under the three TPB constructs (inductive coding) [26]. Following the principles of thematic analysis, similar textual units or response items were grouped into the same subcategories within each construct.

Belief categorization

The same analysts then performed classification in order to identify general themes; for each TPB construct, subcategories were reviewed, renamed, split or merged, and aggregated into a more inclusive category to form a common idea. For example, the “health benefits” category was created from responses such as “good for the bones”, “it is filling”, or “it is healthier than soft drinks”, etc. [28]. All research team members (with expertise in nutrition and agri-food) met in October 2012 after 15 of the 20 focus group transcripts were coded ($n = 7$ in French and $n = 8$ in English), to discuss all categories and agree on which terminology would most closely reflect the perceptions of participants. The meeting also allowed analysts to step back from the data, review findings to date, and decide how to complete the analysis [24].

Data validation

In November 2012, two additional validation focus groups were conducted in Quebec City [23]. Observations from these confirmed the plausibility of the results (i.e. TPB framework belief categories for milk and cheese) and data saturation. A fourth analyst (GPG) then revised the content of the subcategories to provide a third opinion on classification.

Comparison of beliefs according to different populations

Although some authors suggest to document the amount of consensus and interest that topics generate [29, 30], procedures of the present study didn't take into account these issues during focus groups (e.g., the moderation team didn't take notes systematically on nonverbal behavior). Under these circumstances, the focus was made on the individual (i.e., textual unit) and the group (i.e., focus group) as units of analysis. Advanced functions of the NVivo software (e.g. matrix coding queries) were used to draw out similarities and differences between groups of men and women and between groups of high and low consumers, from which the frequency of topics discussed were compared. The number of focus groups and textual units for a category related to milk consumption were compared between groups of men and women. The number of focus group means that one or several participant in the focus group addressed the issue or expressed the belief; thus, if the same belief was mentioned by several

participants in the same group, it was considered a single belief. The number of textual unit means that one participant addressed the issue or clearly stated that he/she approved the issue addressed by another participant; thus, this refers to any mention by any participant in any focus group of men or women. The same process of comparison was then applied to belief categories related to cheese consumption, and repeated for groups of high and low consumers. For presentation of results, differences of at least two focus groups between men and women (or high and low consumers) were retained, or differences of twice the number of textual units or more.

Data presentation

In the Results section, main belief categories (i.e. those cited by at least one participant in more than five of the 20 focus groups) for the three TPB constructs are presented. A few examples of underlying themes (identified with quotation marks) and/or translated quotes are provided to reveal the nuances of participants' perceptions, and to demonstrate the credibility and trustworthiness of the analytical process. The participant's study registration number (MILK#), sex (M for male; F for female), level of milk, cheese and yogurt consumption (H for high consumer; L for low consumer) and focus group attended (FG#) are indicated for each quote. Additional tables with samples of translated quotes for each product category are available (see Additional file 1: Tables S1 to S6).

Results

Baseline characteristics of participants

A total of 161 participants attended one of 20 focus groups in Quebec City, Montreal or Toronto (Table 2) with an average of eight participants per group. For the two selected population segmentation criteria, half the groups were men only ($n = 10$) and half were women only ($n = 10$). Ten groups consisted of low consumers of milk, cheese and yogurt (< two servings per day), while 10 consisted of high consumers (\geq two servings per day), evenly split between the male and female groups. The average age of participants was 32.8 ± 9.3 years, and they consumed a mean of 1.8 ± 1.2 servings of milk, cheese and yogurt per day. Participants classified in groups of high consumers consumed a mean of 2.8 ± 0.7 servings, while the groups of low consumers consumed a mean of 0.7 ± 0.3 servings of milk, cheese and yogurt per day.

Identifying salient belief categories underlying fluid milk consumption

All themes relating to milk and cheese consumption raised by participants in the 20 focus groups are summarized in Table 3 according to the three constructs of the Theory of Planned Behaviour.

Table 2 Characteristics of participants ($n = 161$) from the 20 focus groups

Language		French		English	Total	
City		Quebec	Montreal	Toronto		
Demographic variables, n (%) ^a						
Focus groups		8 (40)	4 (20)	4 (20)	4 (20)	20 (100)
Participants		72 (45)	27 (17)	24 (15)	38 (24)	161 (100)
Sex	Male	32 (20)	16 (10)	15 (9)	17 (11)	80 (50)
	Female	40 (25)	11 (7)	9 (6)	21 (13)	81 (50)
Age	19-29 years old	34 (21)	12 (7)	5 (3)	17 (11)	68 (42)
	30-50 years old	38 (24)	15 (9)	18 (11)	21 (13)	92 (57)
	Not available	-	-	1 (1)	-	1 (1)
	Mean age \pm SD, years old	32.7 \pm 9.6	32.3 \pm 10.4	34.9 \pm 8.6	32.0 \pm 8.6	32.8 \pm 9.3
Ethno-cultural origin	Caucasian	70 (43)	22 (14)	15 (9)	16 (10)	123 (76)
	African/Afro-American	1 (1)	4 (2)	2 (1)	5 (3)	12 (7)
	Asian	1 (1)	-	2 (1)	9 (6)	12 (7)
	Hispanic	-	1 (1)	-	4 (2)	5 (3)
	Other	-	-	3 (2)	4 (2)	7 (4)
	Not available	-	-	2 (1)	-	2 (1)
Education level	\leq High school diploma	13 (8)	7 (4)	7 (4)	6 (4)	33 (20)
	\geq College diploma	59 (37)	20 (12)	15 (9)	32 (20)	126 (78)
	Not available	-	-	2 (1)	-	2 (1)
Consumption status	< Two servings per day	34 (21)	12 (7)	10 (6)	20 (12)	76 (47)
	\geq Two servings per day	37 (23)	15 (9)	12 (7)	18 (11)	82 (51)
	Not available	1 (1)	-	2 (1)	-	3 (2)
Mean number \pm SD, servings per day	All participants	1.8 \pm 1.2	1.9 \pm 1.1	1.9 \pm 1.2	1.8 \pm 1.2	1.8 \pm 1.2
	High consumers	2.9 \pm 0.6	2.8 \pm 0.6	2.7 \pm 0.8	2.7 \pm 0.9	2.8 \pm 0.7
	Low consumers	0.7 \pm 0.3	0.8 \pm 0.2	0.8 \pm 0.3	0.8 \pm 0.3	0.7 \pm 0.3

^aAll percentages are calculated for total participants ($n = 161$) (except for focus group data), and rounded to the nearest unit

Behavioural beliefs: main categories

When asked about the advantages of consuming milk, health benefits were identified as a major issue in all groups. Nutritional advantages also emerged in all groups, with participants referring to micronutrient content, protein and fluid intake, and most groups cited the enjoyable taste of milk as well (e.g. “good with specific foods”, “good taste”, “good with coffee”). Socio-affective advantages (defined as beliefs related to beneficial emotions felt during and after drinking milk or linked to positive social aspects of drinking milk) were reported in almost half of the groups (e.g. that it’s comforting, or brings back childhood memories), as one participant said (originally in French): *It’s good for the morale.* (MILK035, F, H, FG1). The practicality of milk was noted as well, e.g. it can be easily added to other meals, it can be frozen, and it is a multi-purpose food. Participants from a few groups described milk as a staple food, as illustrated in the following quote (originally in French): *If there’s no*

milk at home, it’s a crisis! (laughs) (MILK430, F, H, FG7). Lastly, some groups described milk as a natural product. On the other hand, the most frequently cited disadvantages of milk consumption also concerned health outcomes: undesirable health effects (e.g. gastro-intestinal problems, unnecessary for adult development, causes mucus or worsens it). The unpleasantness of the taste of milk in general or of milk in specific forms was also a major perceived disadvantage among participants from several groups, as expressed by one participant (originally in French): *I don’t like the taste of milk either. I like the taste of dairy products but not milk.* (MILK461, F, H, FG11). Nutritional disadvantages were also identified by several groups, who mentioned especially fat, cholesterol and calories. Participants in various groups discussed milk rather as a processed product containing undesirable substances, citing hormones and antibiotics given to cows and added to their milk, the addition of chemicals, excessive processing, etc. Affective values were also

Table 3 Beliefs regarding milk and cheese consumption, according to Theory of planned behaviour constructs^a

Behavioural beliefs (Attitudes)		Normative beliefs (Subjective norm)		Control belief (Perceived behavioural control)	
Advantages	Disadvantages	People/groups approving	People/groups disapproving	Facilitators	Barriers
Health benefits	Undesirable health effects	Family and friends	Family and friends	Reducing the price	High price
Nutritional advantages	Nutritional disadvantages	Health professionals and advisors	Health professionals and advisors	Potential improvements to the product	Health status as a barrier
Enjoyable tastes	Unpleasant organoleptic properties	Agri-food or restaurant industries	Communications domain	Varied and increased supply	Reducing confidence in the product
Practicality	Processed product that contains undesirable substances	Communications domain	Persons or groups who promote a diet	Current and better access	Problems linked to the supply
Socio-affective advantages	Impracticality	Socio-political agents	Agri-food or restaurant industries	Increased confidence in the product	Habits and cultural values as barriers
Socio-cultural advantages ^c	Questions about source ^b	Persons linked to education	Socio-political agents ^c	Favourable social influences	Social influences as barriers
Natural product	Disadvantageous affective value ^c		Persons linked to education	Favourable food/drink combinations	Food/drink combinations as barriers ^b
Staple food			Foreigners ^b	Better packaging or formats	Unpleasant odours ^c
Advantages relating to socio-economic impacts ^c				Cooking information and tips	Limited accessibility
				Favourable cultural habits and values	Impractical formats or packaging ^b
				Health status or body weight as a facilitator	Lack of equipment ^b
					Physical environment as a barrier ^b
					Lack of cooking information or tips ^c

^aIn descending order of reported frequency

^bBelief category that emerged only for milk consumption

^cBelief category that emerged only for cheese consumption

mentioned as disadvantages, with participants raising questions about its origin. In the words of one participant (original language): *But it's just the fact that it's like liquid coming out of an animal, it's just... Like the goat too ... It's like, that's supposed to be for their children ... not for humans. It's just awkward drinking it, an animal's milk.* (MILK546, F, L, FG14). At last, half of the groups mentioned the impracticality of milk as a disadvantage (e.g. its short shelf-life, the need to keep it cool for transportation).

Normative beliefs: main categories

Of the people whom participants considered to be important and to have an impact on their dietary habits, family and friends seemed to have the greatest influence on their milk consumption. Participants in all groups mentioned at least one person close to them who would approve of their milk consumption. Health professionals and advisors (e.g. doctors, physical trainers, dietitians) were cited as well by several groups as potentially approving of their milk consumption. A similar number of groups discussed how the communications domain

(such as the media and internet) encouraged them to drink milk, as said by one participant (original language): *I think the media would be a big factor. All the advertising showing people drinking milk and how happy they are.* (MILK506, M, L, FG12). Persons or groups in the agri-food or restaurant industries (e.g. dairy farmers, grocers, the *Union des producteurs agricoles*, restaurants and food service managers) were also cited by many groups as approving. Lastly, participants in some groups perceived socio-political agents such as the government and people in the education milieu such as teachers as likely to approve of their consumption of fluid milk. On the other hand, several groups also named one or more people in their family and friends when we asked who would disapprove. Diverse groups also noted public disapproval of milk consumption, especially among celebrities, TV shows, media and internet. More than half the groups noted the likely disapproval of persons or groups who promote particular diets (e.g. vegans, animal rights activists, vegetarians, “milk detractors”, paleo diet advocates). Finally, participants in various groups perceived health professionals and

advisors (e.g. doctors, physical trainers, dietitians, naturopaths) as disapproving as well.

Control beliefs: main categories

When asked about facilitating factors of milk consumption, potential improvements to the product were frequently identified. In particular, participants noted that improving taste, improving shelf-life and “new tastes and colours of milk” would make milk consumption easier. More than half the groups also mentioned favourable food/drink combinations (e.g. eating it with sweet foods, eating it in a dish, or making an alcoholic drink with it) as facilitating factors. Various groups noted that varied and increased supply (e.g. the availability of organic milk, other flavours of milk, and different fat contents) could help promote milk consumption. Participants from various groups also perceived current access to milk or better access to milk as facilitating factors, such as having milk vending machines and free milk distribution in schools. Moreover, participants in half of the groups listed facilitating factors of milk consumption that would increase their confidence in the product, such as positive study results regarding health, Canadian quality control regulations for milk, or knowing that farms respect animal welfare. One participant said (originally in French): *I'm trying to find out if any serious documented research or resources have found tangible benefits to drinking milk.* (MILK400, M, L, FG4). Several groups also raised the issue of price; some participants noted that reducing the price would encourage them to drink milk. Social influences were identified as well by participants as having a favourable impact on their milk consumption. These included having children, “having people close to us who drink milk”, and milk drinking being “more socially acceptable”. One participant said (original language): *Maybe if it's more accepted, I mean all the time that I go in restaurant I don't see a lot of people drinking a glass of milk, so if it's more socially accepted maybe I would...* (MILK442, M, H, FG9). Lastly, various groups identified favourable cultural habits and values as facilitating factors. On the other hand, reduced confidence in the product was one of the barriers most frequently reported by participants. Animal welfare concerns, negative study results, and “bad news in the media” were among the most frequently cited concerns, as seen in the following quote (originally in French): *Diseases... there's already mad cow disease, but a known epidemic that hit cows on farms, that would make me stop drinking milk while it was happening.* (MILK416, M, H, FG5). Moreover, several groups identified health status as a barrier (e.g. potential lactose intolerance, respiratory problems or mucus, possible allergies). In the words of one participant (originally in French): *My mother always told me not to drink milk if I was sick.*

(MILK054, F, H, FG2). Its high price was also frequently cited as a barrier to milk consumption. More than half the groups saw social influences as barriers that made it harder to drink milk, especially in public. They noted a “disapproval of adults drinking milk in public” and that “it is a drink suggested for and associated with children.” Half the groups also cited problems linked to supply as a barrier, noting that milk can be replaced by soy beverages and that “there are too many other drinks for adults (coffee, tea, wine, etc.)”, and half the groups mentioned habits and cultural values as barriers to milk consumption. Food combinations were sometimes considered as negatively influencing milk consumption, since various groups saw food/drink combinations as barriers, noting that “milk needs something else to go with it” or “milk doesn't go with certain dishes” (e.g. hamburger, steak, fruit salad or fish). At last, some groups referred to impractical formats or packaging as barriers to milk consumption, mentioning that it is difficult to transport, cartons that cannot be resealed, and milk bags that cannot be reclosed.

Differing beliefs between men and women

Differences in beliefs were observed between groups of men and women particularly in relation to the industry, politics, animal and environmental concerns related to milk consumption (Table 4). Overall, male groups referred more often to the food industry and politics. More groups of men than women identified media and advertisements as having an impact on their dietary habits, persons or groups in the agri-food or restaurant industries (e.g. dairy producers, groceries) as approving milk consumption, and other types of drink companies (e.g. Pepsi Co, Coca-Cola) as disapproving of milk consumption. Only groups of men reported that Canadian quality control regulations for milk are reassuring and that bad news in the media (e.g. mad cow disease) could be a barrier. On the other hand, more groups of women expressed concerns about animal welfare and the environment, which were also reasons for their reduced confidence in milk consumption. The discomfort to drink another mammal's milk was raised by more groups of women. Finally, only female groups expressed that they tend to buy organic milk when they can, or that when organic milk was available, it would motivate them to consume milk.

Differing beliefs between high and low consumers

Some differences were noted between high and low consumer groups in relation to taste, pleasure and emotions related to milk consumption (Table 5, first column). High consumers associated milk consumption with beneficial emotions more often, indicated that milk is comforting and more often describing milk as an

Table 4 Detailed differences of focus groups (FG) and textual units (TU) in the categories and subcategories of milk consumption based on the Theory of planned behaviour (TPB) and identified between groups of men and women^a

Dairy product	TPB categories ^b	TPB subcategories of beliefs ^c	Men	Women
Milk	Questions about source	Discomfort related to drinking another mammal's milk	2 FG	7 FG
			2 TU	12 TU
	Persons/groups in the agri-food or restaurant industries approving		8 FG	5 FG
			22 TU	6 TU
	Communications domain approving	Media and advertisements	7 FG	2 FG
			9 TU	3 TU
	Persons/groups in the agri-food or restaurant industries disapproving	Other types of drink companies	3 FG	0 FG
			5 TU	0 TU
	Increased confidence in the product	Canadian quality control regulations for milk are reassuring	3 FG	0 FG
			4 TU	0 TU
	Varied and increased supply ^d	Having organic milk	0 FG	4 FG
			0 TU	4 TU
			5 FG	0 FG
			10 TU	0 TU
Reducing confidence in the product	Bad news in the media	2 FG	6 FG	
		7 TU	7 TU	
	Animal welfare concerns	0 FG	3 FG	
		0 TU	3 TU	

^a1 FG means that one or several participant in the FG addressed the issue or expressed the belief; differences of at least two FG were retained for presentation - 1 TU refers to any mention by any participant in any FG of men or women; differences of twice the number of TU or more were retained for presentation

^bAll the TPB categories that emerge from this study are identified in Table 3

^cOnly TPB subcategories presenting a noteworthy difference in the number of FG or TU are indicated here

^dVaried and increased supply refers to all beliefs reported by participants that refer to a variety or a flavour of milk already available (e.g. having organic milk) or that could become available in the current supply

indispensable food. On the other hand, low consumers more frequently reported that milk only tastes good if cold and that favourable food/drink combinations help them to drink milk (e.g. in cereal, in coffee). Groups of low consumers were also more likely to identify bad taste as a disadvantage of drinking milk.

Differences were also observed in relation to doubts and distrust about milk consumption (Table 6). Groups of low consumers discussed gastro-intestinal problems and mucus related to milk consumption and expressed doubts about calcium absorption more often than high consumers. More specifically, these participants believed that calcium from milk would not be well absorbed as heard or read in some media and advertisements; they said "it is just marketing" to make people drink more milk. Low consumers also expressed uneasiness towards drinking another mammal's milk, disgust with the nature of milk (as a body fluid) and perceived it to be adapted to calves' needs, not humans'. Milk without additives, antibiotics, hormones or white blood cells were mentioned as facilitators for milk consumption more often by low consumers than high consumers. Finally, more groups of low consumers also talked about animal welfare concerns and negative study results as barriers to their milk consumption.

Identifying salient belief categories underlying cheese consumption

Behavioural beliefs: main categories

All groups cited enjoyable taste as an advantage in consuming cheese. One participant said (originally in French): *Cheese has an incredible flavour that you don't find in other products.* (MILK409, M, H, FG5). Most groups also discussed the health benefits of cheese consumption, noting for example that it was filling, and a healthy snack. When asked about advantages to consuming cheese, several groups mentioned nutritional advantages, such as the micronutrient, protein and fat content of cheese. Most groups noted practicality as an advantage of cheese as well, describing it as a multi-purpose food, ready to eat, and less perishable than milk. As one participant noted (originally in French): *Cheese is versatile, because if you have two or three kinds in the fridge you can do whatever you want. You can serve it for breakfast, lunch, dinner or dessert. It goes with everything.* (MILK093, F, H, FG2). Socio-cultural advantages were also perceived by half the groups, as noted by one participant (originally in French): *I think the history of cheese is the history of the whole world. It's culture. Every cheese has a history and a geography.*

Table 5 Detailed differences of focus groups (FG) and textual units (TU) in the categories and subcategories of milk and cheese consumption based on the Theory of planned behaviour (TPB) and identified between high and low consumers' groups in relation to the themes of taste, pleasure and emotions^a

Dairy product	TPB categories ^b	TPB subcategories of beliefs ^c	High consumers	Low consumers
Milk	Enjoyable tastes	Only tastes good if cold	0 FG	3 FG
			0 TU	3 TU
	Socio-affective advantages	It's comforting	6 FG	3 FG
			14 TU	7 TU
			5 FG	1 FG
			7 TU	1 TU
	Staple food	Indispensable food	3 FG	1 FG
			6 TU	1 TU
	Unpleasant organoleptic properties	Bad taste	3 FG	7 FG
			4 TU	15 TU
Favourable food/drink combinations		5 FG	7 FG	
		10 TU	19 TU	
Cheese	Enjoyable tastes	Provides pleasure	7 FG	4 FG
			12 TU	6 TU
		Taste goes well with several foods	2 FG	4 FG
			4 TU	6 TU
	Increases the flavour of a food	2 FG	5 FG	
		2 TU	9 TU	
	Socio-cultural advantages	Special, elite food, once in a while or special occasions	3 FG	0 FG
			5 TU	0 TU
	Unpleasant organoleptic properties		5 FG	9 FG
			15 TU	24 TU
Disadvantageous affective value ^d	Difficult to stop eating it	3 FG	2 FG	
		7 TU	2 TU	
Increased confidence in the product	Direct contact with cheese maker and going to cheese stores	5 FG	1 FG	
		7 TU	1 TU	
Unpleasant odours		2 FG	6 FG	
		4 TU	7 TU	

^a1 FG means that one or several participant in the FG addressed the issue or expressed the belief; differences of at least two FG were retained for presentation - 1 TU refers to any mention by any participant in any FG of men or women; differences of twice the number of TU or more were retained for presentation

^bAll the TPB categories that emerge from this study are identified in Table 3

^cOnly TPB subcategories presenting a noteworthy difference in the number of FG or TU are indicated here

^dDisadvantageous affective value refers to all beliefs reported by participants associated with negative emotions felt during or after eating cheese (e.g. difficult to stop eating it)

You can give a theme to the cheeses you bring to the table and explore it through the years, because every cheese has a unique link to the major themes of a country and how it developed. (MILK115, M, H, FG3). Certain groups cited advantages relating to the socio-economic impacts of cheese consumption in that it supports the local economy. At the same time, the most frequently cited disadvantages of cheese consumption were also nutritional. Among other things, participants talked negatively about the high fat, salt, cholesterol and calorie content of cheese. Many groups also cited undesirable health effects, saying cheese consumption was

fattening or caused high cholesterol, etc. Various groups also mentioned unpleasant organoleptic properties (e.g. "bad smell", "repellent texture") associated with some cheeses, and some groups mentioned its affective value as a disadvantage to cheese consumption. They argued it "is difficult to stop eating it", "provokes nightmares", and makes them "feel guilty after eating it", as one participant said (originally in French): *I feel guilty for eating that much fat so quickly*. (MILK169, F, L, FG17). Lastly, a few groups cited disadvantages to do with practicality, such as it "only keeps for a short time" and "it has to be cut or grated".

Table 6 Detailed differences of focus groups (FG) and textual units (TU) in the categories and subcategories of milk consumption based on the Theory of planned behaviour (TPB) and identified between high and low consumers' groups in relation to the themes of doubts and distrust^a

Dairy product	TPB categories ^b	TPB subcategories of beliefs ^c	High consumers	Low consumers
Milk	Undesirable health effects	Gives gastro-intestinal problems	3 FG	8 FG
			7 TU	13 TU
		Causes mucus or worsens it	3 FG	6 FG
	5 TU		8 TU	
	Nutritional disadvantages	Doubts about usefulness or absorption of calcium ^d	0 FG	2 FG
			0 TU	2 TU
	Questions about source	Discomfort to drink another mammal's milk	3 FG	6 FG
			3 TU	10 TU
		Disgust associated with nature of milk (body fluid)	0 FG	3 FG
			0 TU	5 TU
		Adapted to needs of calves, not of humans	1 FG	3 FG
	2 TU	6 TU		
	Potential improvements to the products	Having milk with no additives, antibiotics, hormones or white blood cells	1 FG	2 FG
			1 TU	7 TU
	Reducing confidence in the product		7 FG	9 FG
20 TU			31 TU	
Animal welfare concerns		3 FG	5 FG	
		5 TU	8 TU	
Negative study results		0 FG	2 FG	
		0 TU	3 TU	

^a1 FG means that one or several participant in the FG addressed the issue or expressed the belief; differences of at least two FG were retained for presentation - 1 TU refers to any mention by any participant in any FG of men or women; differences of twice the number of TU or more were retained for presentation

^bAll the TPB categories that emerge from this study are identified in Table 3

^cOnly TPB subcategories presenting a noteworthy difference in the number of FG or TU are indicated here

^dDoubts about usefulness or absorption of calcium refers to all beliefs reported by participants that question the efficiency of calcium absorption and the usefulness of calcium from milk

Normative beliefs: main categories

Participants seemed to view their family and friends as the people with the greatest influence on their cheese consumption. A majority of groups cited at least one person in their family and friends whom they felt would approve of their decision to eat cheese. Moreover, various groups felt that persons or groups in the agri-food or restaurant industries (e.g. dairy farmers, grocers, restaurants) would approve of their consumption. A certain number of groups cited at least one health professional and advisors they thought would approve of cheese consumption (e.g. dietitians, doctors, physical trainers, dentists). More than half the groups identified elements in the communications domain as likely to approve (i.e. media, advertising, well-known personalities, TV programs, etc.). On the other hand, participants in many groups also said that one or more members of their family and friends would disapprove of their decision to eat cheese. When asked about who would disapprove of their decision to consume cheese, one participant said (original language): *My mother. She tries to find ways for*

me to lose weight all the time. (MILK452, F, L, FG10). A similar number of groups also felt that some health professionals and advisors would disapprove of cheese consumption. Many groups perceived influences linked to the communications domain such as celebrities, popular books, magazines and websites as likely to disapprove of cheese consumption. Finally, persons or groups who promote a diet or have dietary, religious or ethical beliefs were identified by various groups as disapproving.

Control beliefs: main categories

Participants were unanimous in mentioning price with regard to cheese consumption: all groups mentioned price reduction as a facilitator. Varied and increased supply was also viewed as a facilitating factor by most groups. More than half the groups mentioned cooking information and tips as facilitators, e.g. having more recipes, cheese tastings, and more information about cheese varieties. A similar number of groups discussed improvements that would encourage them to eat cheese (e.g. improving the smell, reducing the fat, or producing cheese

that is a functional food). Furthermore, participants from different groups noted that current and better access could facilitate their consumption. Better packaging or formats (e.g. airtight packaging, or small sample-style packaging) were also identified by half the groups as facilitators. Various groups noted that increased confidence in the product (e.g. positive study results, direct contact with cheese makers, knowledge about processing stages, etc.) would also facilitate consumption. On this topic, one participant noted (originally in French): *A cheese factory opened in my neighborhood. I wasn't all that keen, because it was expensive. But you go in and get talking to someone who knows about these things and explains them to you, and you're more inclined to give it a try next time you're at that aisle in the grocery store. You just never know...* (MILK069, F, H, FG2). At last, some groups saw social influences (e.g., special occasions, family gatherings, or "people close to us who eat cheese") as facilitating cheese consumption as well. When asked about barriers of consuming cheese, participants were unanimous in mentioning high price. A majority of groups said health status could also be a barrier to cheese consumption (e.g. cholesterol problems, weight gain, lactose intolerance, etc.). Half the groups cited lack of confidence in the product, noting concerns about safety after a crisis, fear of raw milk cheese, etc. Various groups identified problems linked to cheese supply as an impediment to consumption, noting the unavailability of desired size format in the supermarket, poor availability of local or raw milk cheeses, too many varieties available and not enough information, etc. Many groups also noted that habits and cultural values were a barrier (e.g., "not in their eating habits"), as well as the unpleasant smell. Lastly, a few groups saw social influences as barriers (e.g. religious concerns, fear of opinions among entourage, or "family and friends don't eat it"). One participant said he didn't want people to see him eating cheese because he felt that he should lose weight and would feel people were judging him. (MILK469, M, H, FG9).

Differing beliefs between high and low consumers

As for milk consumption, some differences were noted between high and low consumer groups, particularly in relation to taste, pleasure and emotions to consume cheese (Table 5, second column). Groups of high consumers expressed the pleasure of consuming cheese more frequently as an advantage. They described cheese positively as a special or elite food that is eaten once in a while or on special occasions. They were also more likely to think it is difficult to stop eating cheese than groups of low consumers, and they discussed more often how direct contact with cheese makers and going to cheese stores would help them eat cheese. At the same time,

more groups of low consumers reported that cheese goes well with several foods, and increases the flavour of a food. They were also more groups of low consumers who identified unpleasant organoleptic properties as disadvantages and unpleasant odours as barriers to consuming cheese.

Discussion

To our knowledge, this study is the first in Canada to use an effective social cognitive theory (Theory of Planned Behaviour) to qualitatively explore determinants of different levels of milk and cheese consumption (high consumption vs. low consumption) among a population sample comprising both women and men. This study is also marked out by the specificity of the behaviours under study (milk and cheese vs. dairy products in general) and number of focus groups (more than in previous studies). Thus, with the help of the TPB, our study was able to identify a great number and diversity of salient beliefs relating to attitudes, subjective norms and perceived behavioural control underlying milk and cheese consumption among Canadian adults.

With regard to the most predominant beliefs in our study (identified by 15 or more focus groups), the majority of themes supported the findings of previous studies [7, 8]. Indeed, health issues (health effects and nutritional value) were identified as major advantages or disadvantages perceived by participants to consuming milk and dairy products. Like Nolan-Clark et al. [8], we noted the persistence of beliefs such as the increased mucus and the use of hormones and antibiotics given to cows or added to their milk, concerns shared by several participants from groups of low consumers in spite of the fact that the Canadian government does not allow dairy farmers to use artificial hormones to increase milk production [31] or to distribute milk from cows treated with antibiotics [32]. Taste, processing and the practicality of the products have also been noted in other studies [7, 8] as important factors affecting milk and dairy consumption. Regarding subjective norms, an earlier study [8] also found that family and friends (particularly family) and health professionals (especially general practitioners and dietitians) were important influences on dairy product consumption. Finally, some predominant control beliefs (facilitators and barriers) identified in the present study are consistent with the literature, specifically concerning the issue of price [7], health status [8] and confidence in the product (e.g. desire to seek independent scientific research about health benefits of consuming milk and cheese [8], and the questionable treatment of cows [7]). Overall, the findings of the present study show that the perceptions of Canadian adults regarding milk and cheese consumption are similar to those

of older American women [7] and middle-aged Australian adults [8].

However, when looking at themes that were less predominant in our study, some novel findings emerge. As far as we know, this is the first study to report concerns about the origins of milk in relation to its consumption. The second set of analyses performed according to the level of milk and cheese consumption of participants revealed these concerns from groups of low consumers and women. The act of drinking an organic liquid produced by another mammal caused discomfort for these participants and real disgust for a few of them. This phenomenon has been observed by Rozin and Fallon who, following several experiments relating to disgust, formulated four types of food rejection based on three motivations: sensory-affective (defined by the belief that the food in question has negative sensory properties); anticipation of harm following ingestion (bodily or social harm); and ideational factors relating to knowledge of the food's origins or nature [33]. These three motives probably underlie some of the reported reasons for milk rejection in this study, namely its unpleasant taste, lack of social acceptability, its perceived undesirable health effects, and disgust or discomfort about its origins. This rejection could also deepen distrust of milk, which participants showed to be a major barrier to consumption by raising doubts and questions about this biological liquid. In addition to the distrust and doubts raised by low consumers, comparing beliefs between groups of high and low consumers demonstrated that high consumers' beliefs about milk and cheese consumption are often related to emotions. Milk represented positive emotions and comfort, whereas cheese was associated with pleasure, social gatherings, and special occasions. Conversely, low consumers were less likely to appreciate the taste of milk and cheese, or if they did, it was in specific circumstances or in association with other foods and drinks.

The second set of analyses of the present study according to gender revealed that groups of men and women expressed different concerns in relation to milk and cheese consumption. Gender differences highlighted that men referred more often to the food industry and politics as factors influencing their milk consumption, while women had more animal and environmental concerns, which is in line with the current body of literature [34, 35]. Given that educational message should be targeted to a specific population to be effective in producing behaviour change [36], these results show that future interventions aiming to optimize milk and alternatives consumption among adults should use sex-specific messages.

Aside from gender and level of consumption differences, the use of theory-based belief categories in our

study enabled us to make some interesting connections. The TPB-based interview guide allowed us to identify people or groups with a strong influence on participants' milk and cheese consumption (i.e., normative beliefs), including family and friends, health professionals and advisors (e.g., doctors, physical trainers, dietitians/nutritionists) and influences in the communications domain (e.g., advertisements, internet, celebrities, TV shows). In parallel, we noted the persistence of several beliefs in relation to milk and cheese consumption which run counter to evidence found in the nutrition science literature (e.g., milk as mucus producing) [37–39] but that were propagated for years by some health professionals [40]. Perhaps in reaction to loss of confidence in agri-food industry and almost unlimited access to unregulated information sources, some participants in our study seem to feel that the verification of food sources and its quality are their own personal responsibility. Understandably, they turn to the media for help. Yet the quality of health and nutrition related messages in the media are perceived as contradictory and confusing by many consumers [41–43]. Our observations also support Marquis et al. [44] who argue that sources of nutrition information most often consulted are not necessarily the most credible. Thus it is not surprising to observe reduced confidence in the product among the principal barriers to milk and cheese consumption in the present study.

In addition, participants in our study further demonstrated their concerns about their food choices by mentioning that advocates of specific diets (e.g., vegans, vegetarians, animals rights activists, paleo diet advocates) would likely disapprove of their milk and cheese consumption. These influences may reflect the increasing popularity, over the last few decades, of diet trends (e.g., fat-free diet, low-carb diet, gluten-free diet, locally grown food). These food movements, combined with a vast amount of information about food available on the web and an increasing number of Internet users seeking nutrition information and new recipes [45–47] are likely to have an increasing hold over milk and cheese consumption. These influences warrant further investigation.

In closing, the persistence of beliefs about undesirable substances in milk in the present study highlights the need for evidence-based nutrition and food education for Canadian adults, and to find creative and media-savvy ways to counter public misinformation and confusion. It also suggests the relevance of including not only doctors, dietitians and physical trainers, but also family members and friends in interventions to promote the consumption of milk and cheese (i.e. two main foods of the milk and alternatives food group), given their influence on the consumption of these foods. This approach is supported by the 2013 Tracking Nutrition Trends published by the Canadian Foundation for Dietetic

Research [1]. Our findings also highlight the need to develop intervention strategies that include food concerns (questions about discomfort associated with the origins of milk, or diet trends, for example) or media influences (e.g., celebrities, TV shows, diet advocates) that are increasingly part of the social environment. This is in line with Bronfenbrenner's theoretical perspective on the ecological environment [48]. Findings of the present study show that for the development of relevant new interventions, it is time to change our views and explore the social-affective and environmental influences on milk and cheese consumption in more depth, in addition to the cognitive aspects that have already been explored.

The methodology of this study has strengths and limitations. Several procedures were used during data collection and analysis to ensure the credibility and trustworthiness of the results [21], such as pilot-testing the interview questions, moderator teams, taking field notes during and after each focus group, line-by-line coding with software support, double-coding for the first three focus groups, validation focus groups to confirm plausibility and data saturation, and revision of category content by a fourth analyst (GPG). However, transcripts were not revised before coding due to time constraints, so a few errors were still in the transcripts and sometimes have slowed the coding process. Moreover, our findings do not represent the views of consumers from all Canadian provinces and territories and cannot be generalized to the Canadian population. Statistical representativity was not the purpose of this qualitative study, as it was the first step proposed by the TPB authors in preparation for a broader quantitative survey based on the beliefs identified. Nonetheless, our findings can be applied to individuals with similar characteristics (i.e., white, college-educated adults between 19 and 50 years old for the most part) and in a similar context as our sample participants (residents of Quebec City, Montreal and Toronto between April and November, 2012). In addition, baseline characteristics clearly show the heterogeneity of our participant sample, which is consistent with the 2006 Census data [49]. In spite of moderators' experience in focus groups interviews, there were still possibilities of participation bias (i.e. people may have participated because they were more interested in nutrition and health than non participants) and social desirability of responses in terms of being affected by other focus group members or by the moderators. Additionally, misclassification of participants in groups of high consumers who consumed less than two servings per day of milk and cheese, but more than two servings per day of milk, cheese and yogurt may have occurred. Finally, the moderator for the English focus groups was not the same person as for the French focus groups. Findings from the French and English groups may thus

have been influenced by the moderator's style, even though a standard protocol was used.

Conclusions

This is the first TPB-based study to explore the determinants of traditional milk and cheese consumption in a sample of men and women aged 19 to 50, and thus makes a significant contribution to the literature in providing a more complete picture of their decision-making process regarding consumption of these two foods. Although most of the predominating beliefs underlying milk and cheese consumption among our participants were consistent with earlier work on dairy products, our study contains some findings about social influences on people's consumption of milk and cheese, and about consumers' concerns related to the origins of milk, that have not been reported in previous studies. These original findings highlight that there is still more to understand about beliefs underlying the consumption of milk and alternatives by Canadians [2]. For example, given that the belief relating to questions about origins emerges only with regards to milk consumption, would it be more effective to separately target milk and cheese consumption in future interventions? Or would it be more effective to separately target the audience by sex (men vs. women) and level of consumption (high vs. low consumers)? These issues will be addressed in planning our next steps. Understanding these beliefs better is important for the milk and dairy sector, the Canadian regulatory system, the scientific community, and for the health of Canadians and other nations. Based on the findings of our theory-based study about people's specific beliefs regarding consumption of milk and cheese, a quantitative instrument could be developed, such as the kind proposed by Fishbein and Ajzen [19], to identify prevalent beliefs for a larger national survey investigated on a statistically representative sample. This quantitative instrument will be the second step in designing a TPB-based behavioural change intervention (in preparation for a future social marketing campaign, for example) that will contribute to improving the health of Canadians and others.

Additional file

Additional file 1: Tables S1 to S6. Sample quote, number of focus groups and textual units addressing the theme are indicated for each belief category underlying milk and cheese consumption, according to the three TPB constructs (attitudes, subjective norms and perceived behavioral control). (DOCX 43 kb)

Abbreviations

INAF, Institute of Nutrition and Functional Foods; TPB, Theory of Planned Behaviour

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Availability of data and material

The unidentified data generated during and/or analysed during the current study are not publicly available in order to not compromised individual privacy, but are available from corresponding author on reasonable request.

Authors' contributions

VP, SD and PP conceived and designed the study, and contributed to obtaining funding. FC trained MT in moderation of focus groups. MT and MJL carried out recruitment, focus group interviews, transcript codification and analysis. GPG reviewed transcript codification, analysis and performed beliefs comparison according to sex and level of consumption. All authors contributed to the interpretation of the analysis. MJL wrote the manuscript and all the other authors critically reviewed it before approving. All authors read and approved the final manuscript.

Competing interests

VP, SD and PP were investigators on a grant from the Dairy Research Cluster (Dairy Farmers of Canada, Agriculture and Agri-Food Canada, and the Canadian Dairy Commission), which made the present study possible. However, none of their honoraria were provided by this grant and the funding body was not involved in the collection, analysis, interpretation or presentation of data. Over the past five years, VP has received honoraria and travel expense reimbursement for participating in two symposia organized by Dairy Farmers of Canada. SD has received honoraria for participating in a symposium organized by Dairy Farmers of Canada. PP has received honoraria and contract research from dairy industries for various projects. MJL has received honoraria from Dairy Farmers of Canada for kiosk animation in grocery stores on the benefits of consuming the recommended number of servings of milk and alternatives. MT, GPG and FC have no financial conflicts of interest.

Consent for publication

All participants signed a consent form at the start of the focus group, and any of them could decline to participate at any moment.

Ethics approval and consent to participate

This study was reviewed and approved by the Laval University Research Ethics Committee (reference number: #2012-014/21-02-2012).

Endnotes

Not applicable.

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