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Targeted Messages Increase Dairy Consumption in Adults: A Randomized Controlled Trial

Abstract

Background: Dairy consumption amongst North Americans aged 30-50 has been declining. Targeted messages have been identified as a cost efficient method through which to increase health-enhancing behavior, such as dairy intake. **Purpose:** To assess the utility of targeted, framed, efficacy-enhancing messages on calcium consumption from dairy in adults aged 30-50 in a randomized controlled trial. **Method:** Seven hundred and thirty two individuals (463 women, 269 men; $M_{\text{age}} = 40.57$ years) were randomly assigned to one of five message conditions; 1) gain-framed (GF), 2) loss-framed (LF), 3) self-regulatory efficacy enhancing (SRE), 4) GF plus SRE (GF+SRE), or 5) LF plus SRE (LF+SRE). Conditions were separate for men and women. Each condition received an emailed message on four consecutive days. Calcium intake from dairy, self-regulatory efficacy, outcome expectations and outcome value were measured at baseline, 1- and 4-weeks following the intervention. **Results:** Calcium intake from dairy significantly increased from baseline to week 1 post-intervention in all conditions ($p < .001$). A significant message condition x time interaction ($p = .04$) revealed that increases seen in the LF+SRE condition were maintained at week 4. All social cognitive constructs increased following the intervention ($ps < .01$). Self-regulatory efficacy ($\beta = .28, p < .01$) and outcome expectations ($\beta = .19, p < .01$) were significant predictors of subsequent calcium intake (week 4) from dairy. **Conclusion:** Taken together, it appears as though ensuring message content is targeted to the specific population's beliefs and motives is of importance when developing behavioral change intervention material.

Key Words: Calcium consumption, behavior change, targeting, framing, efficacy-enhancing

Targeted Messages Increase Dairy Consumption in Adults: A Randomized Controlled Trial

Adequate dairy consumption is associated with improved bone health [1], weight management [2] and reduced risk of chronic diseases including cardiovascular disease [3], hypertension [4] and type 2 diabetes [5]. Despite these numerous health benefits, there has been a continual decline in dairy consumption amongst North Americans [6]. In Canada, 72% of women and 65% of men aged 31-50 years fail to consume the recommended number of dairy servings per day (< 2 servings/day; [7]). In the US, 44% of men and 70% of women aged 31-50 years fail to consume the recommended dietary intake of calcium (1000mg/day), even with the use of calcium supplementation [8].

Despite this overall low dairy intake across North America, a recent systematic review [9] identified only 18 behavioral interventions aimed at increasing dairy consumption in adults. Of these, 11 interventions aimed to increase consumption as part of *generic* osteoporosis prevention programs, with limited success. These interventions varied in theoretical framework used (with the majority being atheoretical), and behavior change techniques utilized (see Table 2 in [9]). In contrast, interventions utilizing highly tailored material based on individualized feedback from a DXA bone scan yielded impressive increases in consumption rates [10, 11]. These findings suggest that intervention success may be in part due to informational relevance. Specifically, interventions that provide generic osteoporosis prevention information may not be meaningful to a wide range of the population, while a DXA scan can provide individuals with personalized, salient and meaningful feedback. DXA scans are, however, costly, time consuming, labour intensive, and only reveal “threatening” results for individuals who are osteopenic or osteoporotic at the time of scanning. Individuals with below clinical osteoporosis thresholds, but who could still benefit from calcium-enhancing interventions, fail to receive

attention. What is needed is a cost-effective, persuasive intervention that can reach large segments of the population who are currently under-consuming the recommended amounts of dairy. Health promotion messages have been highlighted as a cost-effective manner through which to influence behavior with high potential reach [12]. In order to maximize the effectiveness of such messages, however, it is important that the content be *targeted* to the population of interest [13].

Targeted messages incorporate content that is salient to a subset of the population rather than specific to an individual. Social cognitive theory (SCT; [14]) provides a framework that can guide the development of targeted messages. Targeted messages work to influence intentions and subsequent behavioral outcomes through SCT constructs [15, 16]. In the context of dairy intake, perceived outcomes associated with dairy consumption, and subsequent dairy consumption, vary greatly between different subsets of the population [17-19]. As such, health messages aimed at increasing dairy consumption may be more effective if they highlight the particular outcomes salient to the targeted population of interest.

For example, older women consume dairy products primarily to prevent osteoporosis and improve bone health [17], while university-aged women consume dairy primarily for reasons related to taste, cost, convenience and weight control [19]. Not surprisingly, men and women aged 30-50 years have distinct beliefs regarding dairy as compared to both older and younger female populations [18]. Specifically, Jung and colleagues [18] reported that dairy consumption for adults between the ages of 30-50 years was largely influenced by a) understanding the health benefits of dairy, b) the opportunity to act as a healthy eating role model for their children, and c) beliefs regarding potential hormone and/or antibiotic contamination of milk products. Furthermore, there were distinct gender differences in the reported motives and perceived

benefits of dairy consumption. Women were concerned with the nutrient content and overall health benefits of dairy products, while men were motivated by fitness outcomes and protein content. Taken together, these findings underscore the need for messages that highlight the specific interests and motives of the targeted audience.

In addition to targeting messages to the targeted population, the persuasiveness of the message content can also be influenced by a) the way the information is framed, and b) the amount of efficacious encouragement the message provides. Prospect theory proposes that individuals respond differently to factually equivalent information depending on whether the message is framed in terms of benefits (gain-framed) or costs (loss-framed; [20]) of the promoted behavior. Gain-framed messages are theorized to be more influential for inducing changes to health promoting behavior as compared to loss-framed messages [21]. However, the current literature examining message framing effects on dietary behavior is equivocal [22]. Some research suggests that gain-framed messages are not superior to loss-framed messages [23], while others suggest an advantage of gain-framed messages at increasing calcium consumption if moderated by motivational orientation [24]. It remains unclear whether framing a message is critical for changing dietary behavior.

Inclusion of strategies that bolster the reader's self-regulatory efficacy might also increase the effectiveness of health promotion messages. Self-regulatory efficacy, an individual's confidence to engage in skills required to manage a behavior change such as goal-setting, scheduling, and overcoming barriers, has been shown to act as a potent predictor of adherence to health behaviors, including diet [25, 26]. Messages that bolster confidence to self-regulate dairy consumption are posited to increase the persuasiveness of public health messages promoting dairy products.

In an attempt to create persuasive messages for increasing calcium consumption in young women, Jung and colleagues [27] modified existing osteoporosis prevention materials to be targeted, gain-framed, and efficacy-enhancing and compared these modified messages to loss-framed, standard care osteoporosis prevention materials. Compared to young women who received generic osteoporosis information over 14 weeks, women in the experimental condition showed a significantly greater increase in calcium intake both post-intervention and at 12-month follow-up. While these findings highlight the utility of gain-framed, targeted, efficacy-enhancing messages, the researchers were unable to conclude whether the effectiveness of these messages was due solely to the way the messages were framed, the efficacy-enhancing content within the messages, or a combination of the two.

The present trial sought to tease apart the relative impact of message framing and efficacy-enhancing content on dairy consumption levels amongst adults 30-50 years of age. To address this objective, gain-framed, loss-framed, self-regulatory efficacy-enhancing, and either gain- or loss-framed information *plus* self-regulatory efficacy-enhancing message content on dairy consumption was evaluated. In this manner, any potential additive effects of message framing plus the inclusion of efficacy-enhancing content could also be evaluated. This 5-armed trial permitted examination of three specific hypotheses. First, those who receive self-regulatory efficacy-enhancing information will consume more dairy than those who receive messages without such information. Second, those who receive gain-framed messages will consume more dairy as compared to those who receive loss-framed messages. Third, those who receive gain-framed messages that include self-regulatory efficacy-enhancing information will consume the most dairy in comparison to the other four conditions.

Method

Message Development

Separate messages were developed for men versus women in each of the five conditions given differences in outcome values and potential self-regulatory strategies reported by Jung and colleagues [18]. A total of 40 messages were created: Eight messages for each of the five conditions (four messages specific to men and four messages specific to women). Specifically, gain-framed (GF) and loss-framed (LF) messages were targeted towards women by emphasizing the overall nutrient content of dairy and its related health benefits. GF and LF messages were targeted towards men by emphasizing the benefits of dairy in regards to fitness and the protein content of these products. Common components in GF and LF messages for both men and women were emphases on the purity of Canadian milk (e.g., “And that it is a pure, hormone-free source of energy”), and the importance of consuming milk and milk products as a role modeling behavior for one’s children (e.g., “Whether you know it or not, you are a role model for not only your family, but also your friends”). With respect to self-regulatory strategies, the self-regulatory efficacy (SRE) enhancing messages in this study were targeted towards women by bolstering their confidence to meal plan and include dairy within staple recipes. SRE messages were targeted towards the men in this study by bolstering their confidence to make daily dairy consumption a “habit”. Common components in SRE enhancing messages for both men and women was bolstering their confidence to ‘go back to basics’ when considering grocery purchases, with dairy products being considered an essential food group (see Appendix A and B for sample messages).

Messages in the GF condition emphasized valued and salient benefits associated with consuming adequate dairy specific for each gender, while messages in the LF condition emphasized gender-specific, valued and salient benefits that could be lost if one did not consume

adequate dairy. Messages in the SRE condition aimed to bolster self-efficacy for engaging in the desired behavior regularly despite barriers through the provision of verbal persuasion and realistic strategies that could be easily incorporated into everyday life. In the GF plus SRE and the LF plus SRE conditions, participants read a GF/LF message in addition to an SRE message. To ensure message length was consistent across all five groups, unrelated message content was incorporated into the GF, LF and SRE messages.

Messages were developed around these key concepts in collaboration with a message framing expert (A.L-C.) and a technical writer. All messages were matched for length to ensure that time required to read the message was not a confounding variable between conditions. These 40 different messages were pilot tested in 4 confirmatory in-depth interviews with 19 adults (47% female, $M_{\text{age}} = 38.21$, $SD = 6.40$; see Jung et al., 2015) to ensure saliency and readability.

Participants

The estimated required sample size was calculated based on the degree of change expected in milligrams of calcium from dairy. Based on a previous SCT-based intervention aimed at increasing calcium intake [27], a medium effect size was anticipated. Thirty-nine participants per condition would be required using an $\alpha = 0.05$ and $\beta = 0.2$. A drop out rate of 20% was budgeted based on previous longitudinal online interventions [27], resulting in the calculation that 47 participants per condition would provide sufficient power to detect changes in milligrams of calcium from dairy.

A total of 2516 individuals from across Canada completed an online eligibility survey in response to a social mass media recruitment advertisement posted in each province of the country, during the recruitment period between August and September 2012. Individuals were considered eligible if they: A) were between 30 and 50 years of age, b) consumed less than 2

servings of milk or milk products per day, c) had no health or religious reasons to avoid milk and milk products, d) had regular access to the internet, and e) could speak and read English. Of the 1162 individuals that met the eligibility criteria, 732 (463 women, 269 men) completed the baseline survey, which was available online between October 18th – 21st 2012. Of these, 72.13% (528) completed the final follow-up survey at week 4 (November 22nd – 29th 2012). The mean age of participants was 40.57 years (± 6.49), with the majority reporting their ethnicity as Caucasian (79%). Fifty four percent of the participants reported being a parent and 46% reported being married. Over half of the sample worked full time, with 44% reporting a household income of between \$25,000-\$75,000 per annum.

Procedures

The protocol was approved by the University XXXXXX Research Ethics Board. All participants were recruited online from social media online forums from each province across Canada (recruitment conducted by XXX & XXXX). Interested individuals were invited to click on the advertisement and were immediately directed to the institution's hosted online survey tool. At this time, individuals read information about the study, answered eligibility criteria questions, and were asked to provide an email address. Within 48 hours, eligible participants were sent a link to the consent form and baseline survey. Upon completion of the baseline survey, participants were stratified by gender, and then randomly assigned to one of five message conditions using a random number generator by XXX & XXX.: 1) gain-framed (GF), 2) loss-framed (LF), 3) self-regulatory efficacy enhancing (SRE), 4) GF plus SRE (GF+SRE), or 5) LF plus SRE (LF+SRE).

All participants started the intervention on the same day. Participants were sent four messages via email on four consecutive days (i.e., one message per day; sent by XXX & XXX).

Intervention delivery and total time required (a few minutes over less than one week) was kept purposefully short to test the feasibility and persuasiveness of a brief message intervention that may be similar to a public health campaign (e.g., total time it may take to read a pamphlet, or skim through workplace health e-memos). The order in which messages were sent was randomized within each condition to control for order effects. Emails were sent to arrive between the hours of 11pm – 3am local time for each participant, and were sent with a subject title pertinent to the message content for the day (e.g., *Dairy: Get your 16 essential nutrients*). The messages were presented in the body of the email. A hyperlink to a survey pertaining to the message just read was provided at the bottom of each message email. If the survey was not completed that day, participants were sent the same message and survey link the following day. If the survey was still not completed on the subsequent day, it was assumed that the participant did not read that particular message, and was then sent the next message. Participants' dairy consumption was measured at baseline and week-1 and -4 post-intervention via online surveys. Participants were provided with \$5 Amazon gift cards for each survey completed.

Measures

Demographic Questionnaire. A baseline questionnaire assessed demographic characteristics including: Ethnicity, marital status, parental status, household income and number of individuals living in the home.

Manipulation Check. Following each intervention email message, participants were asked four questions. First, participants were asked if they read the message with response options of yes or no. Second, participants were asked what the main theme of the message was, with four response options available. Responses were coded as correct or incorrect. Third, participants were asked to rate how much they cared about the message, with responses scored

on an 8-point scale from 0 (*did not care at all*) to 7 (*cared a lot*). Finally, participants were asked how useful they found the message, with responses scored on an 8-point scale from 0 (*not at all useful*) to 7 (*extremely useful*).

Dairy consumption. Changes in self-reported consumption of calcium from dairy were assessed using a modified version of the “Calcium Calculator™” developed by the British Columbia Dairy Foundation [28]. The original tool assesses consumption of calcium from a comprehensive list of 30 commonly consumed dairy and non dairy foods that are available in Canada, and has been found to be a valid assessment of dietary calcium intake [29]. For the purposes of this study, individuals were asked to indicate the number of portions they ate of the 10 dairy products included in the list. A portion size was explained for each product. This modified, 10-item tool was used to determine total milligrams of calcium from dairy consumed by participants on the previous day at baseline, week 1 and week 4 post-intervention.

Self-Regulatory Efficacy. Participants’ confidence in their ability to plan, monitor and overcome barriers to adequate consumption of dairy was assessed using an 18-item measure. Each question included the stem, “How confident are you that you can...”. Example items include, “come up with solutions to overcome time constraints when attempting to consume adequate dairy next week?”, and “plan ahead to ensure that you eat at least 2 servings of dairy each day next week?” Responses were scored on a scale of 0% (*not at all*) to 100% (*extremely confident*) with response options in 10% increments. The specificity of the time frame (i.e., next week) and actions queried in the 18 items aligns with recommendations made by Bandura [30] and McAuley and Mihalko [31] for measuring self-efficacy. This measure demonstrated good internal consistency in the current study ($\alpha \geq .96$).

Outcome Expectations. The perceived likelihood of positive (16 items) and negative (5 items) outcomes occurring as a result of consuming milk and milk products was assessed using a 21-item measure. Participants were asked, “how LIKELY it is that each outcome in the list below will occur in the next week as a result of consuming adequate dairy?”. Participants were provided with a list of outcomes including; “Increased stamina throughout the day”, “Adequate recovery from exercise/physical activity”, “Oral health (e.g., gums, teeth)”, “Bloating”, and “weight gain”. Sixteen items emphasized positive outcomes, while 5 items identified negative outcomes. The items were developed by drawing on the results of previous qualitative work examining perceived outcome expectations in regards to dairy consumption in adults aged 30-50 years of age [18]. Responses were scored on a 9-point scale from 1 (*very unlikely*) to 9 (*very likely*). The items demonstrated good internal consistency in the current study ($\alpha \geq .95$).

Outcome Value. According to SCT, only outcome expectations that are valued influence motivation to engage in the desired behavior. The value participants placed on each of the 21 outcomes assessed in the Outcome Expectations measure were assessed using a corresponding 21-item measure. Participants were asked, “How much do you VALUE each outcome in the list below if it were to occur in the next week...”. These items were scored on a 9-point scale with a range of 1 (*little value to me*) to 9 (*high value to me*). The outcome value items demonstrated adequate internal consistency ($\alpha \geq .96$).

Analytic Approach

Data were analyzed using SPSS Statistics (v21, 2012). A series of GLM analyses of variances (ANOVA), independent t-tests and chi-squared tests were used to examine demographic characteristics associated with study dropout at week 4 post-intervention (IV = study adherence) and baseline measures of the study variables between the 5 message conditions

(IV = condition). A series of ANOVAs and chi-squared analyses were used to assess the message manipulation check items. Changes in consumption of milligrams of calcium from dairy were analyzed using one-way repeated measures ANOVA, with gender included in the model as an independent variable. There were no significant differences in baseline demographics, milligrams of calcium from dairy, or psychosocial variables between men and women. Changes in social cognitive variables following the intervention were examined using a repeated measures multivariate ANOVA in order to examine all SCT constructs simultaneously. The constructs of outcome expectation and outcome value were analyzed independently as the multiplicative combination (i.e., the product) of these constructs has been reported to be potentially statistically unsound [32]. Effect sizes were calculated using partial eta squared. Effects sizes for further contrasts were computed using Pearson's correlation coefficient or Cohen's *d*. In order to examine the potential influence of SCT variables on calcium consumption from dairy, multiple regression analysis was conducted.

Results

Study Attrition

Seven hundred and thirty two eligible individuals completed the baseline survey and were subsequently randomized to a message condition ($N_{GF} = 149$, $N_{LF} = 147$, $N_{SRE} = 155$, $N_{GF+SRE} = 143$, $N_{LF+SRE} = 138$). Of these 732, 204 (27.87%) participants failed to complete the 4-week post intervention survey. There were no significant differences in demographic characteristics (age, gender, ethnicity, education, race, income, marital status) or baseline milligrams of calcium from dairy between those who dropped out of the study compared to those that adhered (p 's > .05). Comparable attrition rates were observed across all five message conditions ($N_{GF} = 42$, $N_{LF} = 43$, $N_{SRE} = 48$, $N_{GF+SRE} = 37$, $N_{LF+SRE} = 34$), $\chi^2(4) = 1.89$, $p = .76$.

Participant Demographics and Randomization Effectiveness

The demographic characteristics of participants at baseline are reported in Table 1. There were no significant differences in demographic characteristics between the 5 message conditions ($ps > .05$). In addition, there were no differences in milligrams of calcium consumed from dairy or social cognitive outcomes between the 5 message conditions ($ps > .05$) at baseline.

Manipulation check

A total of 70.8% participants reported reading all four messages. Participants who did not read some or all of the messages, but completed follow-up measures were included in the analyses per protocol. There was no significant difference in the number of messages read by participants in the different message conditions, $F(4, 725) = .37, p = .83, \eta_p^2 = .002$. Across all four messages, 77.6% of participants correctly identified the main theme of the message they were sent.

Effect of Message Interventions on Calcium Intake

A 5 (Condition) x 2 (Gender) x 3 (Time) repeated measures ANOVA on milligrams of calcium consumed from dairy was conducted. Assumption testing revealed that calcium consumption from dairy at all time points did not display homogeneity of variance, therefore this variable was log transformed at all time points [33]. Mauchly's test indicated that the assumption of sphericity has been violated ($\chi^2(2) = 19.17, p < .001$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.96$). There was a significant main effect of time, $F(1.93, 945.71) = 14.40, p < .001, \eta_p^2 = .03$, such that dairy intake increased over time. Simple contrasts revealed a significant increase in milligrams of calcium consumed from dairy from baseline to week 1 post-intervention, $F(1, 491) = 34.31, p < .001, r = 0.26, 95\%$ CIs [0.18, 0.34]. The difference from baseline ($322.87 \pm 284.24\text{mg}$) to week 4 (460.12

±415.36mg) did not reach statistical significance, $F(1, 491) = 3.26, p = .07, r = .08$, 95% CIs [-0.01, 0.12]. There was no main effect of message condition, $F(4, 491) = .881, p = .48, \eta_p^2 = .01$, or gender, $F(4, 491) = .042, p = .84, \eta_p^2 < .001$. There was a significant Message x Time interaction, $F(7.7, 945.71) = 2.04, p = .04, \eta_p^2 = .02$, indicating that calcium consumed from dairy following the intervention differed between the message conditions. To further examine this interaction, five repeated measures ANOVA were conducted to examine changes in calcium intake from dairy across each of the five conditions. There was a significant main effect of time in three of the five conditions: GF, $F(2, 206) = 7.12, p < .01, \eta_p^2 = .07$, GF+SRE, $F(2, 196) = 3.87, p = .02, \eta_p^2 = .04$, and LF+SRE $F(1.73, 167.80) = 9.05, p < .01, \eta_p^2 = .09$: but not for LF, $p = .30, \eta_p^2 = .01$, or SRE, $p = .21, \eta_p^2 = .02$, conditions alone. Follow-up bonferroni corrected pairwise comparisons revealed a significant difference between calcium consumed from dairy at baseline and week 1 follow-up in the GF ($p < .01$), GF+SRE ($p = .03$), and LF+SRE conditions ($p = .03$). The only condition where the significant increase was sustained to week 4 was in the LF+SRE condition ($p < .01$).

The time x gender interaction is noteworthy, $F(1.93, 945.71) = 2.92, p = .06, \eta_p^2 = .01$ (see Table 2). Two exploratory post hoc ANOVA were conducted to examine this interaction. There was a significant main effect of time for men, $F(1.91, 342.26) = 9.39, p < .001, \eta_p^2 = .05$ and for women, $F(1.92, 617.31) = 8.20, p < .001, \eta_p^2 = .03$. Bonferroni pairwise comparisons revealed a significant increase in calcium consumed from dairy for men from baseline to week 1 ($p < .001, d = .36$) and from baseline to week 4 ($p = .03, d = .22$). The increase seen at week 1 was maintained at week 4 ($p = .42, d = .12$). For women, calcium consumption from dairy increased from baseline to week 1 ($p = .001, d = .24$), however, this increase was not maintained

at week 4 ($p = 1.0$, $d = .03$). There was no significant message condition x gender interaction ($p = .86$, $\eta_p^2 = .002$) or message condition x time x gender interaction ($p = .71$, $\eta_p^2 = .007$) effects.

Effect of the Message Interventions on SCT Variables

A 5 (Condition) x 2 (Gender) x 3 (Time) repeated measures MANOVA was conducted to examine the effect of the interventions on all social cognitive variables collectively. The overall omnibus test was significant, $F(8, 470) = 44.34$, $p < .001$, $\eta_p^2 = .43$. Main effects for time were found for self-regulatory efficacy, $F(1.81, 864.03) = 50.51$, $p < .001$, $\eta_p^2 = .10$, outcome value, $F(1.76, 840.72) = 5.96$, $p < .01$, $\eta_p^2 = .01$, and outcome expectations, $F(1.91, 909.73) = 158.92$, $p < .001$, $\eta_p^2 = .25$, such that scores on these variables increased across all conditions. There were no main effects for message condition, $F(16, 1448) = 1.40$, $p = .13$, $\eta_p^2 = .01$. ~~However, the results for outcome expectations between conditions is noteworthy, $F(4, 477) = 2.18$, $p = .07$, $\eta_p^2 = .02$. As post hoc exploratory analyses, we examined differences in outcome expectations between message conditions. There was a significant difference between a) GF and SRE, b) LF and SRE, and c) GF+SRE and SRE, such that participants in the SRE condition reported significantly lower outcome expectations than those in the above three message conditions where outcome expectations were targeted ($ps < .05$).~~ There was a significant main effect of gender on outcome value, $F(4, 474) = 3.63$, $p < .01$, $\eta_p^2 = .03$. Specifically, men valued outcomes associated with dairy consumption to a lesser extent than women. There were no significant Condition x Gender, Condition x Time, or Condition x Gender x Time interactions for any SCT variables ($ps > .05$).

Impact of SCT Constructs on Calcium intake

In order to examine the impact of post-intervention measures of social cognitive variables on subsequent calcium intake from dairy, a forced entry multiple regression analyses was

conducted. Self-regulatory efficacy, outcome expectations, and outcome value at week 1 post-intervention were entered into the model simultaneously. Together, these constructs explained 15% of the variance in calcium intake at week 4 post-intervention, $F(3, 489) = 29.85, p < .001$, $R^2_{adj} = .15$. However, only self-regulatory efficacy ($\beta = .28, p < .01$) and outcome expectations ($\beta = .19, p < .01$) were significant predictors of subsequent calcium intake from dairy (see Table 3).

Discussion

The purpose of this randomized controlled trial was to test the effects of framed, targeted, and efficacy-enhancing messages on calcium intake from dairy products in adults aged 30-50 years of age who were consuming less than the daily recommended intake of dietary calcium. This study built on previous research examining gain-framed, efficacy-enhancing messages on calcium consumption in young adults [27] by including a combination of five different message conditions designed to tease apart the relative effects of framing and efficacy-enhancing message content on adults' dairy consumption levels.

One week after receiving four emailed messages, sent on four consecutive days, there was a significant increase in calcium intake from dairy across three of the five conditions. Participants receiving gain-framed, gain-framed plus self-regulatory efficacy enhancing, or loss-framed plus self-regulatory efficacy enhancing messages increased their consumption of calcium from dairy one week following receipt of the email messages, but only those receiving the loss-framed plus self-regulatory efficacy enhancing messages maintained this significant increase from baseline to week 4 post-intervention. It should be noted, however, that the loss-framed messages in this intervention highlighted losses to potential benefits that could be gained from engaging in the behaviour of consuming adequate dairy, as opposed to losses only. The average

increase in the loss-framed plus self-regulatory efficacy condition was 201.16mg of calcium from dairy which equates to approximately one additional serving of dairy.

These findings are in contrast to Rothman and Salovey's proposed framework [21], which ~~Specifically, in regards to dairy consumption, Rothman and Salovey's [21] framework~~ would suggest that gain-framed messages would be more persuasive than loss-framed messages given the preventive nature of the behavior. Consistent with other intervention studies within a variety of domains, the present findings do not support this message-framing hypothesis [23, 34, 35]. Notably, a meta-analysis examining obesity-related behaviors (specifically exercise and healthy eating practices; [36]) revealed no meaningful difference in the persuasiveness of gain- versus loss-framed messages for encouraging healthy eating practices. Within the nutrition literature, van Assema and colleagues [37] found no differential effects of message framing on individuals' attitudes or intentions to consume a low fat diet or consume more fruits and vegetables. Similarly, Gerend and Shepherd [24] reported minimal differences between the persuasiveness of gain- and loss-framed messages in promoting dairy consumption among young adults. Together, these results suggest that message framing may have little influence on changing dietary practices.

One possible explanation for these repeated null findings in relation to the effectiveness of gain- vs. loss-framed messages could be due to underlying contextual and dispositional moderators that influence message perception but have not been accounted for [22]. ~~These include emotional states [38], motivational orientation [39], perceived autonomy [40], and regulatory focus [41] to name a few.~~ While understanding and acknowledging key moderators is important, tailoring messages based on specific beliefs and personality traits may not present a feasible community-wide health promotion strategy ~~and, as shown by the current research, may~~

~~not be necessary to promote healthy dietary behavior. In regards to the development of messages designed to promote healthy eating practices, such as increasing dairy consumption, O'Keefe and Jensen [36] caution against focusing on message framing tactics due to a lack of advantage of one variation over the other.~~

Interestingly, in their 2011 paper, Jung and colleagues [27] report a follow-up study in which they tried to tease apart the effects of the framing versus the targeting that they had incorporated into their calcium-enhancing messages. This study revealed no effect of framing and led the authors to conclude that targeting may have been the more potent factor within their messages. In the current study, a common element of all five message conditions was the incorporation of targeted content. By incorporating information regarding perceived benefits and barriers to dairy consumption and strategies to ensure regular dairy consumption that were relevant to each gender and within the sampled age group, all the messages were specifically targeted to the population of interest. Together, these findings suggest that making the information targeted may be the crucial ingredient at eliciting dietary change, not the way in which messages are framed.

While it is now widely accepted within health promotion campaigns that 'one size does not fit all', many interventionists have chosen to develop individually tailored intervention material ~~rather than developing targeted informational materials for a larger population subset~~ [42]. For example, both Estok and colleagues [10] and Sedlak and colleagues [11] provided participants with individualized, tailored feedback from DXA scans and reported considerable success in increasing dairy intake. To date, there has been limited research directly comparing the effectiveness of tailored vs. targeted interventions within health promotion campaigns. ~~The major caveat with tailoring message content to the individual is the cost required, relative to~~

~~creating targeted messages.~~ Individualized material is time consuming to create, expensive and places high demands on personnel. Alternatively, as the results of this study suggest, targeting to a *subset* of a population provides a middle-ground that represents a cost efficient, effective means through which to engage community-wide initiatives in order to disseminate health promotion messages.

In addition to increases in calcium intake, self-regulatory efficacy, outcome expectations and outcome value increased in all message conditions following this intervention. ~~In line with social cognitive theory [14], outcome expectations following the intervention were considerably higher amongst the conditions that emphasized the potential benefits of consuming dairy products (GF; LF; GF+SRE) as compared to the condition that solely highlighted self-regulatory strategies (SRE).~~ Interestingly, self-regulatory efficacy beliefs increased across all five conditions even though efficacy-enhancing content was not explicitly provided in the gain (GF)- or loss-framed (LF) conditions. Perhaps the content of the GF and LF messages was sufficiently influential enough to prompt individuals to consume dairy products, thus resulting in a successful mastery experience that bolstered their self-efficacy beliefs. This explanation aligns with Bandura's [14] theorizing that successful mastery experiences are the most potent source of self-efficacy beliefs and could explain the similar increases in self-regulatory efficacy beliefs seen across all conditions. In line with this, post-intervention self-regulatory efficacy was found to be the most potent predictor of calcium intake from dairy at the 4-week follow-up. These findings suggest that, by providing a message that prompts an individual to initially engage in the behavior, successful mastery experiences may be obtained, thus bolstering self-regulatory efficacy beliefs to further engage in the behavior. This current research provides similar evidence in regards to promoting calcium consumption through dairy intake within this population.

Interestingly, although the time by gender interaction for calcium consumption did not reach statistical significance ($p = .06$), the mean calcium intake values suggest that men reported greater increases in calcium consumption from dairy following the intervention as compared to women, while at the same time valuing the outcomes associated with dairy consumption significantly less than women. This is the first study to our knowledge to assess differences between men and women in regards to psychological constructs and dairy consumption. The current findings suggest that, for men, there may be less value attached to behavioral outcomes. Rather, primarily knowing ‘how’ to perform the behavior seems sufficient to drive engagement in that behavior for men. It is also possible that messages created for the men were more compelling as compared to message content created for women. Future research is warranted to further examine these gender differences in regards to dietary behavior decision making.

A limitation of the current study is the absence of a no-message control condition. This a priori decision not to include a control condition was driven by the research questions and specific hypotheses derived from past research. ~~Namely, the focus of this study was to examine whether differences existed between framed messages, framed vs. self-regulatory efficacy enhancing messages, or whether there were additive effects of framed plus self-regulatory efficacy enhancing messages.~~ Further, increasing the trial to 6 arms with multiple repeated time points would have required a sample size that was not feasible in the present study. ~~Future work should ensure the inclusion of a control condition in which participants are provided with general nutrition messages not specific to calcium intake.~~ Another limitation was that behavior was only assessed for four weeks post-intervention. It is not known whether changes to diet would be maintained for longer periods of time after this intervention.

Despite these limitations, a strength of the current study was the diversity of participants. Utilizing an online intervention and surveying design enabled recruitment of individuals from a variety of locations and backgrounds across Canada. This sample heterogeneity allows for generalizability of the findings across a broader segment of the Canadian population. Furthermore, it suggests that future public health campaigns can be targeted to simple population demographics such as gender and age groups. By working in collaboration with individuals from the specific subset of the population with which the intervention is intended for, materials can be created that maximize the personal relevance of the message content. The intent-to-treat analysis for this study can be considered another strength of this study. By including participants who failed to read some or any of the messages but completed follow-up measures in our analyses, a conservative and pragmatic evaluation of all treatment conditions was made.

In summary, this study provides evidence that providing population-specific information message content, and incorporating salient ‘how-to’ strategies, are effective for promoting calcium intake from dairy products in adults aged 30-50. Developing targeted, efficacy-enhancing material may be more important for changing behavior than the way in which the information is framed. Given the high rates of calcium under-consumption within Canada and the US, these findings have implications for future public health campaigns. Future research should examine the long-term impact of these messages on dairy consumption rates.

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Table 1. Demographic characteristics of the sample at baseline.

Variable	Total (n = 732)	GF (n = 149)	LF (n = 147)	SRE (n = 155)	GF + SRE (n = 143)	LF + SRE (n = 138)
Age (y), mean (SD)	40.57 (6.49)	41.34 (6.74)	39.76 (6.14)	40.74 (6.58)	40.08 (6.69)	40.91 (6.22)
Gender (% women)	63.3	62.4	62.6	65.2	62.9	63.0
Education (%)						
≤ High school	17.6	16.2	14.9	18.6	16.8	22.5
Apprenticeship or trade certificate	7.2	6.8	8.2	3.9	9.1	8.7
College or diploma	31.2	32.9	34.0	34.2	23.8	31.2
Bachelor degree	27.7	26.8	23.8	27.7	32.9	27.5
Post-grad	16.0	17.4	19.0	15.5	17.5	10.8
Ethnicity (% white)	79.4	81.1	75.7	81.5	78.3	80.1
Household income (%)						
< \$49,999	36.3	37.6	38.1	34.9	37.8	33.3
\$50 – 74,999	20.8	18.1	22.4	20.6	19.6	23.2
\$75 – 99,999	17.1	18.1	15.0	15.5	18.2	18.8
\$100,000 +	25.8	26.1	24.5	29.0	24.5	24.6
Children (% ≥ 1 child in house)	53.6	52.3	56.5	51.6	46.2	61.6
Marital status (% married)	46.3	48.3	49.0	42.6	46.2	45.7

Table 2. Descriptive statistics for calcium intake from dairy between the 5 conditions, Gain-Framed (GF), Loss-Framed (LF), Self-Regulatory Efficacy (SRE), GF+SRE, and LF+SRE (unadjusted)

Variable	Men			Women		
	Baseline	Week 1	Week 4	Baseline	Week 1	Week 4
GF	317.35 (37.32)	547.18 (63.34)	521.25 (73.94)	356.69 (37.63)	517.06 (41.00)	448.48 (50.47)
LF	347.18 (40.87)	468.61 (59.29)	470.83 (65.37)	344.34 (31.05)	522.11 (49.03)	388.05 (48.96)
SRE	306.16 (34.26)	538.79 (70.80)	560.28 (83.41)	306.04 (26.85)	407.75 (41.25)	419.33 (53.81)
GF+SRE	338.44 (34.82)	575.30 (68.17)	477.72 (57.77)	306.19 (23.36)	465.39 (35.30)	463.16 (45.17)
LF+SRE	263.74 (38.43)	515.63 (68.82)	555.90 (75.78)	315.52 (27.42)	457.81 (39.08)	425.66 (45.44)

Table 3. Multiple regression analyses examining the predictive utility of SCT variables post intervention on calcium intake from dairy at Week 4.

	B	SE B	β
Constant	2.40	.58	
Self-regulatory efficacy	0.03	0.01	.28*
Outcome expectations	0.27	0.08	.19*
Outcome value	-0.10	0.08	-.06

Note: $adjR^2 = .15$ ($p < .001$). * $p \leq .001$

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	3, 4, 5
	2b	Specific objectives or hypotheses	6, 7
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	9
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	N/A
Participants	4a	Eligibility criteria for participants	8, 9
	4b	Settings and locations where the data were collected	9
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	9, 10
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	11, 12
	6b	Any changes to trial outcomes after the trial commenced, with reasons	N/A
Sample size	7a	How sample size was determined	8
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	9
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	9
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	9
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	9
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those	N/A

		assessing outcomes) and how	
Statistical methods	11b	If relevant, description of the similarity of interventions	7, 8
	12a	Statistical methods used to compare groups for primary and secondary outcomes	12, 13
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	12, 13
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	13, 30
	13b	For each group, losses and exclusions after randomisation, together with reasons	13, 30
Recruitment	14a	Dates defining the periods of recruitment and follow-up	8, 9
	14b	Why the trial ended or was stopped	N/A
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	28
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	14 - 17
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	14 - 17
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	14 - 17
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	14 - 17
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	N/A
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	21
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	21, 22
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	17 - 22
Other information			
Registration	23	Registration number and name of trial registry	1, 8
Protocol	24	Where the full trial protocol can be accessed, if available	1, 8
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	22

*We strongly recommend reading this statement in conjunction with the CONSORT 2010 Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.

Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest

Ethical Approval: All procedures performed were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

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Electronic Supplementary Material 1. Screenshots of advertisements used for recruiting participants

1. Text online advertisement

a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

Are you between 30 and 50 years of age? Do you consume less than 2 servings of dairy per day (e.g., milk, cheese, yogurt)? If so you may be eligible to take part in an online research study.

You will be compensated for your time. If you want to learn more about the study, or are interested in taking part please click on the link below and complete the brief eligibility survey.

<https://survey.edudata.ca/es/cz11Mg/YzMyOA/>

2. Poster advertisement

Do you consume less than 2 servings of dairy per day?

\$20 Compensation

If so and you you may be eligible to take part in an online research study
(UBC research study: "Milk Messages")

WHO? Individuals between 30-50yrs of age who consume 2 or less servings of dairy per day and have no health reasons for avoiding dairy

WHAT? Online Study requiring approximately 60-minutes of your time over 1-month

HOW? Click on the link:
<https://survey.edudata.ca/es/czl1Mg/YzMyOA/>

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

This research is being conducted by
Dr. Mary Jung, UBC at Okanagan

Electronic Supplementary Material 2. Example intervention messages sent via email

Gain-Framed email message for women

Get your 16 essential nutrients. Grab some milk or yogurt to ensure you reap the health benefits

Send message

Helvetica 12 B I U

To:

Cc:

Subject: Get your 16 essential nutrients. Grab some milk or yogurt to ensure you reap the health benefits

Milk's loaded with 16 essential nutrients

When planning healthy meals and snacks, make sure you get 2 servings of dairy products a day. Milk is delicious and nutritious! Consuming enough milk, yogurt or cheese gives you 16 essential nutrients your body needs for optimal health.

It contains folate and magnesium too!

You already know that milk contains calcium, which helps you to maintain strong bones, an important element in avoiding osteoporosis. But did you know milk contains many other vitamins and minerals that are vital for best health? Drinking milk provides you with vitamins A, B and D, as well as the minerals folate, magnesium and selenium. Folate aids in red blood cell formation and may protect you against heart disease and stroke. It is an essential nutrient during pregnancy because it contributes to the early development of the **fetus**. Magnesium can help prevent premenstrual symptoms such as bloating and fatigue, and selenium has antioxidant effects, so it boosts the immune system.

Ladies: We all need protein after exercise

Planning a workout today? Consuming milk products provides the perfect power refreshment after exercising. Milk is a natural source of protein, which helps your body to recover and recharge after a workout. We often hear that men benefit from protein to help build muscle; women do too!

Best news: Low-fat has the same nutrition punch

Concerned about fat and calories? Milk and milk products are often available in low fat and non-fat options, so when you eat them you get the same nutrients without the risk of gaining weight. In fact, scientific studies show that a diet rich in milk products helps you maintain a healthy weight and possibly even lose weight. More good news: there is evidence that you get an even greater dose of calcium per serving when you consume low and non-fat milk products, compared to whole fat options.

Milk and cheese were with us through the ages

Milk and cheese are part of our culinary history. Drinking milk has been traced as far back as the agricultural revolution, around 10,000 BC, when people began to keep animals for their meat and milk. The ancient Egyptians drank milk, but it was generally reserved for royalty, priests and the very wealthy. By the 5th century AD, cows and sheep in Europe were prized for their milk. In the early 1600s, European dairy cows were brought to this continent; as Canadians, we were making cheese long before we had our own flag or railroad!

Self-Regulatory email message for women

Back to basics. Overwhelmed by nutrition information? Dairy products are always a quick, easy, natural choice.

Times New... 15 B I U

To:

Cc:

Subject: Back to basics. Overwhelmed by nutrition information? Dairy products are always a quick, easy, natural choice.

Tips on how to easily get more dairy in your diet

Wondering how to incorporate more dairy into your day? It's simple! Here are some quick and easy ways you can get your two servings a day:

- Try melting cheddar or mozzarella cheese on bagels, perogies, nachos or quesadillas
- Grab a yogurt drink on the go
- Take a break and sip on a nice, warm latte
- Spread some chèvre on toast!
- Snack on tzatziki with pita chips or veggies!
- Make soups with skim milk
- Make your own yogurt parfait by pouring fresh fruit, raisins and raisons, and crunchy granola over a cup of Greek yogurt

Shop the perimeter

Don't have time to read nutrition labels? There's a lot of choice out there and it's tempting to buy foods that may not be good for you. Try shopping in the aisles around the perimeter of your grocery store so you naturally load up on the essentials, such as milk and milk products. Foods and beverages found in the outer aisles are usually less processed, with less packaging. You may find perimeter shopping helps you stick with the healthy choices in Canada's Food Guide. It also helps you keep your children away from the temptations found in the middle aisles of the store!

Basic foods are healthiest

Feeling overwhelmed by nutritional information? Confused by opposing health messages? Go back to basics: Buy products in their pure, natural form, such as milk, yogurt, and locally-made cheese. Dairy products are a source of 16 essential vitamins and minerals, so they are a healthy choice for you and your family. Rest assured, Canadian milk and milk products are always a trustworthy "go to" option.

Milk and cheese through the ages

Did you know? Milk and cheese are part of our culinary history. Drinking milk has been traced as far back as the agricultural revolution, around 10,000 BC, when people began to keep animals for their meat and milk. The ancient Egyptians drank milk, but it was generally reserved for royalty, priests and the very wealthy. By the 5th century AD, cows and sheep in Europe were prized for their milk. In the early 1600s, European dairy cows were brought to this continent; as Canadians, we were making cheese long before we had our own flag or railroad!

Cows Today

Loss-Framed email message for men

Milk. Drink it or lose out. Don't miss out on nutrients, free from fat

A

To:

Cc:

Subject: Milk. Drink it or lose out. Don't miss out on nutrients, free from fat

If you're not getting dairy, you're missing out on essential nutrients

Health and good nutrition aren't as easy to achieve without dairy products. You might not feel as strong and robust. If you aren't consuming 2 servings of milk, yogurt or cheese per day, you're missing out on an ideal way to get 16 essential nutrients your body doesn't make on its own. And don't forget -- you can enjoy dairy products without added fat.

Dairy contains zinc, calcium and selenium - are you missing out?

Milk and milk products contain many vitamins and minerals that are vital for good health, so you shouldn't miss out. Besides losing the benefits of vitamins A, B and D, skipping milk may leave you short in minerals zinc, calcium and selenium. Being depleted in zinc could result in weak tissue formation and a higher risk for poor prostate health. A lack of calcium could weaken bones and teeth, as well as having a negative effect on your heart and nerves. Selenium deficiency means being low in antioxidants that improve male fertility and body purification, while reducing cancer rates. If you're not getting enough dairy, your body might not be functioning at your best.

Guy's: Don't neglect to fuel your body

Don't lose the chance to keep your body in prime condition. If you're not consuming milk products, you're not getting the perfect power refresher after exercising. Since milk is a natural source of protein -- which helps your body to recover and recharge after a workout -- you shouldn't bypass it. Here's what you might be missing if you don't consume dairy after exercise?

1) Failure to rehydrate: after you exercise it's a good time to replace lost fluids and milk does a better job of having your body hang onto fluid than water and even better than Powerade™ (<http://www.ncbi.nlm.nih.gov/pubmed/17459189>)

2) Failure to repair: exercise creates stress in your muscle that often requires being repaired. Protein contains the building blocks (called amino acids) that are required to rebuild your muscle protein and milk has what is referred to as the highest quality protein available. That's because milk contains amino acids that our body absolutely has to have and more of them than other protein sources. So if you're not consuming dairy post-workout, you're missing out on this high quality protein. The amount of protein in 500ml of skim milk (about 18g) is a good amount of protein to consume to promote an optimal recovery of muscle protein after a hard workout (<http://www.ncbi.nlm.nih.gov/pubmed/19056590>). In a separate study comparing skim milk to a soy-protein beverage, milk came out on top for producing more rapid gain in muscle (<http://www.ncbi.nlm.nih.gov/pubmed/17413102>). Milk and milk products are a source of intact protein (1 cup low fat Greek-style yogurt = 23 grams of high quality protein in 160 calories, 2 cups of skim milk = 18 grams of high quality protein in 172 calories). So unless you're looking for the excess calories you'll find in commercial shakes and powders that contain upwards of 50 grams of isolated protein, you may be wasting your money.

Avoiding milk may backfire as a weight loss strategy

Milk and milk products are often available in low fat and non-fat options, so don't miss out! According to scientific studies, you may be more susceptible to weight gain if you don't open yourself up to dairy's delights. No dairy, no benefits!

Milk and cheese were with us through the ages

Electronic Supplementary Material 2. Example intervention messages sent via email

Gain-Framed + Self-Regulatory email message for men

Go back to basics. Get nutrients without the fat. Milk. Drink it. Dairy products are always a quick, easy, natural choice.

Times New... 14 B I U

To:

Cc:

Subject: Go back to basics. Get nutrients without the fat. Milk. Drink it. Dairy products are always a quick, easy, natural choice.

Tips on how to easily get more dairy in your diet

It's easy to get the nutrients you need. You can do it! Follow Canada's Food Guide, which includes 2 servings of milk and milk products a day. Here are some simple ways you can incorporate dairy into your diet:

- At the lunch counter, ask for cheese in your sandwich
- Grab a yogurt drink or chocolate milk after a workout
- Order a latte or a café au lait instead of coffee
- Throw some cottage cheese on your salad
- Have a glass of milk with dinner
- Eat frozen yogurt for dessert
- Bring single serving yogurt or cottage cheese containers to work with you – a healthy snack that will keep you energized throughout the day

Basic foods are healthiest

Feeling overwhelmed by nutritional information? Confused by opposing health messages? Go back to basics: Buy products in their pure, natural form, such as milk, yogurt, and locally-made cheese. Rest assured, Canadian milk and milk products are always a trustworthy "go to" option.

Shop the perimeter

Don't like grocery shopping? Not sure what's healthy? There's a lot of choice out there and it's tempting to buy foods that may not be good for you. Try shopping in the aisles around the perimeter of your grocery store so you naturally load up on the essentials, such as milk and milk products. Foods and beverages found in the outer aisles are usually less processed, with less packaging.

Milk's loaded with nutrients

Health and nutrition are important to you. You want to feel strong and healthy. Consuming 2 servings of milk, yogurt or cheese per day is an ideal way to get 16 essential nutrients your body doesn't make on its own. And don't forget - you can enjoy dairy products without added fat.

Dairy contains zinc, calcium and selenium!

Milk and milk products contain many vitamins and minerals that are vital for good health. Besides vitamins A, B and D, milk provides you with the minerals zinc, calcium and selenium. Zinc is an important nutrient for tissue formation and is also beneficial for good prostate health. Calcium is essential for the maintenance of healthy bones and teeth, as well as a healthy heart and nerves. Selenium contains antioxidants that improve male fertility, and has

Loss-Framed + Self-Regulatory email message for women

Don't miss out on 16 essential nutrients. It's easy! Grab some milk, cheese or yogurt. Dairy products are always a quick, easy, natural choice.

Times New... 14 B I U

To:

Cc:

Subject: Don't miss out on 16 essential nutrients. It's easy! Grab some milk, cheese or yogurt. Dairy products are always a quick, easy, natural choice.

Tips on how to stop avoiding dairy

You are missing out if you don't incorporate more dairy into your day. It's simple! There are many delicious ways to get your two servings a day:

- Try melting cheddar or mozzarella cheese on bagels, perogies, nachos or quesadillas
- Grab a yogurt drink on the go
- Take a break and sip on a nice, warm latte
- Spread some chèvre on toast!
- Snack on tzatziki with pita chips or veggies!
- Make soups with skim milk
- Make your own yogurt parfait by pouring fresh fruit, raisins and raisins, and crunchy granola over a cup of Greek yogurt

Shop the perimeter

Don't have time to read nutrition labels? There's a lot of choice out there and it's tempting to buy foods that may not be good for you. If you don't concentrate your shopping in the aisles around the perimeter of your grocery store, you may be missing an opportunity to load up on the essentials, such as milk and milk products. Foods and beverages found in the outer aisles are usually less processed, with less packaging. You may find perimeter shopping helps you stick with the healthy choices in Canada's Food Guide. It also helps you keep your children away from the temptations found in the middle aisles of the store!

Basic foods are healthiest

Feeling overwhelmed by nutritional information? Confused by opposing health messages? Go back to basics: If you don't buy products in their pure, natural form, such as milk, Greek yogurt, and locally-made cheese, your body won't get vitamins A, B and D, as well as minerals folate, magnesium and selenium. Canadian milk and milk products are always a trustworthy "go to" option and are a healthy choice for you and your family.

You'll miss milk's 16 essential nutrients

When planning healthy meals and snacks, don't deny yourself 2 servings of dairy products a day. Without consuming enough milk, yogurt or cheese, you're missing out on delicious and nutritious products, plus your not getting 16 essential nutrients your body needs for optimal health.

You'll forsake this source of folate and magnesium

Targeted Messages Increase Dairy Consumption in Adults: A Randomized Controlled Trial

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