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A Short-term, Campus-based Dairy Campaign Designed to Increase Awareness of the Importance of Calcium Intake in College Students Demonstrates High Feasibility

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Abstract

Calcium intake is below recommended levels in many college students. The objective of this study was to test the feasibility of a short-term, theory-based campus dairy campaign designed to promote awareness of the importance of calcium intake in college students. Rooted in the social-ecological framework, a multi-component social marketing campaign was developed including social media, print materials, and booths at campus events. Post-campaign, students (*n*=3,037) completed an on-line survey to assess campaign awareness, awareness of the importance of consuming calcium, and impact of the campaign on dairy intake. Approximately one-third of respondents (*n*=995) were aware of the campaign, primarily through campus events. Fifty-one percent (*n*=507) agreed they were more aware of the importance of consuming dairy, and 45% (*n*=449) agreed they were consuming more dairy as a result of the campaign. A campaign designed to promote dairy calcium has potential to engage college students and positively impact awareness of the importance of calcium and dairy intake.

Keywords: dairy, calcium, college students, social marketing campaign

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Introduction

Milk and other dairy products account for the majority of the calcium consumed from food sources in the United States (Nicklas, O'Neil, & Fulgoni, 2009). Achieving an adequate intake of calcium during adolescence and young adulthood is essential for reaching peak bone mass and reducing the risk of osteoporotic fracture later in life (Rizzoli, Bianchi, Garabédian, McKay, & Moreno. 2010). Dietary calcium not only plays a critical role in the prevention of osteoporosis, but potentially other chronic illnesses, such as hypertension, obesity, and certain cancers, as well (Nicklas, 2003).

In the transition from adolescence to young adulthood, both dairy and calcium intake decrease (Larson et al., 2009; Nelson, Neumark-Sztainer, Hannan, & Story, 2009), with the average calcium intake in college students, particularly women, being below the recommended intake (1,300 mg/day for 14-18 year olds; 1,000 mg/day for adults 19 years and older) (Poddar et al., 2009; Burke, Reilly, Morrell, & Lofgren, 2009). Results from a previous pilot study conducted by our team mirror these data with male college students (n=50) reporting a calcium intake of 1,077 mg/d and females (n=75) reporting 866 mg/d (Rose et al., 2017). Worth noting, inadequate calcium intake in young adults may be due to lack of perceived susceptibility to osteoporosis (Edmonds, Turner, & Usdan 2012; Ford, Bass, Zhao, Bai, & Zhao, 2011). Such findings suggest a need for dietary interventions in college students designed to increase awareness of the health importance of dietary calcium early in life, and ultimately intake of calcium rich foods and beverages. This is particularly important considering that dietary patterns established during this critical life transition may have a detrimental impact on life-long dietary practices and health (Larson et al., 2009).

Social marketing is the application of marketing techniques to affect behavior for societal, rather than commercial, gain (Andreasen, 2002). These techniques have been applied to a variety of nutrition or nutrition-related interventions to attempt to alter eating behavior of targeted groups. A review of nutrition interventions using social marketing techniques found that 14 of the 16 interventions reviewed were effective in eliciting positive dietary changes (Carins & Rundle-Thiele, 2014). Specific to college students, a social marketing campaign designed to improve knowledge, attitudes, and behaviors concerning fruit intake was effective in increasing students' reported fruit consumption from 1.5 to 1.8 servings per day (Shive & Morris, 2006). In another study aimed at college students, a social marketing campaign effectively reduced the percentage of individuals engaged in talking negatively about their body fat (Garnett et al., 2014). While, to

date, there are no published findings in this area of scholarship relating specifically to dairy calcium, these findings suggest the potential of a social marketing campaign to improve college students' calcium intake from dairy foods.

According to Bowen et al. (2009), feasibility studies are a necessary "first step" in determining the appropriateness of an intervention for future testing. The objective of this study was to test feasibility of a four-week campus-based social marketing campaign focused on dairy and designed to promote awareness of the health importance of dairy calcium intake in college students. In the current study, feasibility was defined as acceptability (reaction), demand (use), implementation (fidelity), and limited effectiveness (effects on intermediate outcomes) of intervention (Bowen et al., 2009). To our knowledge, this is the first study of its kind.

Methods

Theoretical framework. The theoretical framework of the intervention was grounded in the Social-Ecological Model which posits that behavior is impacted by several levels of influence, including intrapersonal factors (individual knowledge, attitudes, and skills), interpersonal factors (formal and informal social networks and support), and community factors (social norms) (Gregson et al., 2001; McLeroy, Bibeau, Steckler, & Glanz, 1988). All levels of influence of the Social-Ecological Model were targeted in the current study; to this end, campaign health messages were designed to impact intrapersonal factors, while campaign social media outlets and campus events were designed to affect interpersonal factors, and campaign print media, social media, and campus events aimed at the community factors (Gregson et al., 2001; McLeroy et al., 1988).

Campaign messaging, design, and delivery. The campaign messaging, design, and delivery were developed in collaboration with graphic design and marketing experts, as well as with the input of a group of senior-level communications majors enrolled in an advanced marketing course. This collaborative team designed the campaign in such a way to assure personal relevance among the target audience of college students, which, according to the Elaboration Likelihood Model (ELM), is necessary for eliciting lasting attitudinal and behavior change in response to social marketing message exposure
(Wilson 2007). Specifically, the research and design team: (a) chose a message source that would appeal to the target audience (well-known student athletes); (b) designed messages that would be persuasive to college students (motivational quotes from campaign ambassadors); and (c) selected delivery outlets tailored to the target audience of college students (e.g., social media [which is highly relied on by the millennial generation]; heavily attended, wide-reaching campaign events).

Campaign ambassadors were recruited, and they included two male and three female student athletes, each representing a different sport. During the pre-campaign photo shoot, athletes were asked to respond to the following questions:

1. Why do you drink milk?
2. When do you drink milk?
3. What kind of milk do you drink?
4. What other calcium-rich foods do you eat?

Their responses were included in the campaign as messages intended to be both motivating and informative in nature. For example, "What keeps me moving on and off the court? Low fat chocolate milk every day!" In addition to student athlete testimonials, campaign messages included nutrition facts aligned with USDA MyPlate guidelines (consume three servings of low- or fat-free dairy products including milk, yogurt, cheese, and fortified soy milk) (choosemyplate.gov/food-groups/dairy.html). Finally, an accompanying campaign logo and tagline (Calcium Keeps You Moo-ving) and hashtag (#SpotTheCow) were developed and were included on all campaign materials.

The four-week campaign was launched at the beginning of the academic year upon students' return to campus and included multiple delivery outlets to assure that the campaign health messages were both pervasive–that is, "part of the rituals and environments that define daily life"–(Morris et al., 2011) and suitable for the target audience of college students (Budden, Anthony, Budden, & Jones, 2011; Spero & Stone, 2004). First, social media outlets were chosen based on their usage by the target population (young adults, 18 to 29 years old) according to the Pew Research Center (pewresearch.org) and included a regularly updated Facebook page and Twitter account, as well as an Instagram account. Prior to campaign launch, a schedule was created for timing of Facebook posts and Tweets based on best practices for engaging audiences via social media (Zarrella, 2013; Centers for Disease Control and Prevention, 2011). Facebook posts and tweets included nutrition facts about dairy and calcium, (e.g., "Drinking milk and eating dairy products … during the 20's, while we're still able to build bone density, is very important to our future health"), tips on how to include dairy and calcium into one's diet (e.g., "Easy ways to squeeze more dairy into your diet–add milk or yogurt to your oatmeal and smoothies"), testimonials and photos from the campaign student athletes (e.g., "Chocolate milk is my favorite drink. I drink it for its recovery benefits after a workout and because it tastes phenomenal!"), easy recipes (e.g., fruit smoothie with yogurt, salad dressing made with yogurt), and engagement prompts (e.g., "'Like' this post if you drank a glass of milk today"). Finally, a one-time Instagram contest was carried out in which students were invited to post a picture of how they included dairy in their daily diet.

In addition to the social media outlets, print media were also used to promote dairy. Print materials (posters and flyers) included photographs of the student athletes consuming dairy products as well as links and Quick Response or QR codes that students could use to access more

information about the benefits of dairy consumption. Posters and flyers were displayed in pre-determined highly trafficked campus buildings (e.g., student union, recreation centers, libraries) and in dormitories. Media also included campaign messages (campaign hashtag) written in chalk on sidewalks throughout campus. The chalk messages were placed in ten separate highly trafficked areas on campus (e.g., main library, union, recreation center) immediately after the two campus events (described below).

Finally, the campaign had a presence at two heavily attended and wide-reaching on-campus events (freshman orientation event and student involvement fair) with booths offering interactive games, informational pamphlets, and promotional give-aways (cups, pens, T-shirts and sunglasses with the campaign's name and/or logo, and free dairy samples). The campaign ambassadors (two male and three female well-known student athletes) made guest appearances at these events with two at each event.

Evaluation. The evaluation plan for the current study centered on testing feasibility as defined by Bowen et al. (2009), including the areas of acceptability (reaction by the target audience to the intervention), demand (documented use of selected intervention activities), implementation (extent to which the intervention was implemented as planned), and limited effectiveness testing (intended effects of intervention on intermediate variables). Approximately six weeks after the conclusion of the campaign, all university undergraduates (N=43,886) were invited via email to participate in an on-line survey assessing awareness of the campaign ("Have you heard of the #SpotTheCow Calcium Keeps You Moo-ving Campus Dairy Campaign?"). Students who indicated "Yes" (n=995) continued with the survey; those who indicated "No" (n=2,042) were thanked for their time.

Acceptability. Students who reported awareness of the campaign were asked to rank the top three components of the campaign they found to be most influential. They were also asked to select their favorite type(s) of Facebook posts (i.e., little-known nutrition facts about dairy and calcium, tips on how to include dairy and calcium into one's diet, testimonials and photos from the campaign student athletes, easy recipes, and engagement questions).

Demand. Attendance at campus events was estimated by the event organizers. Social media engagement data (e.g., number of followers and "Likes") were collected from each outlet's web site. The percentage of students who were aware of the campaign and "Liked" the campaign's Facebook page was determined by asking if students had "Liked" the campaign on the post-campaign survey. The mode(s) by which students learned of the campaign (e.g., promotional items, Facebook, posters) was also determined by an item on the post-campaign survey.

Implementation. The number and location of posters distributed and the number of promotional items distributed were recorded. The numbers of posts to Facebook, Twitter, and Instagram were

also collected from records at each social media outlet. To determine whether the intervention was implemented as intended (i.e., intervention fidelity), researchers completed a campaign specific fidelity tool during the four-week campaign, which included a checklist of the key campaign activities (number and location of posters distributed, number of promotional items distributed, and number of posts to social media outlets).

Limited effectiveness testing. Students were asked to report how the campaign affected their awareness of the health importance of dairy in their diets ("I am more aware of the importance of including dairy into my daily eating habits as a result of this campaign") and their consumption of dairy products ("I am more likely to include dairy into my daily eating habits as a result of this campaign"). Both questions were assessed on a five-point Likert scale from strongly agree to strongly disagree.

Demographic data were collected from survey respondents who reported awareness of the campaign. All survey respondents (regardless of their awareness of the campaign) who completed the survey could enter a drawing for a gift card. The percentage of students selecting each survey response choice was calculated in SPSS (Version 22.0).

The study was approved by the Institutional Review Board at The Ohio State University and students indicated their willingness to participate by completing the voluntary on-line survey.

Results

The post-campaign survey was completed by 3,037 students. This resulted in a 7% response rate (calculated as n=3,037 [number of those who responded to the invitation to complete the post campaign survey] / N=43,886 [number of undergraduates to whom the email invitation was sent] = 7%). Approximately one-third of respondents (n=995) indicated that they were aware of the campaign. Demographic information provided by those who indicated being aware of the campaign (n=937) is presented in Table 1. Most respondents self-identified as non-Hispanic White (78.6%), with the next largest group identifying as Asian (13.9%) (Table 1); those percentages were similar and higher than university statistics, respectively. Sixty-eight percent of respondents were female, which was slightly higher than university statistics, and most were between the ages of 19 and 22. Approximately 25% of respondents were from each class standing (freshman, sophomore, junior, senior).

Table 1. Demographic Characteristics of Respondents who Reported Awareness of the Campaign (n=937)

Alt-text: Table 1 presents demographic information of those who indicated being aware of the campaign (n=937). Most respondents self-identified as non-Hispanic White (78.6%), with the next largest group identifying as Asian (13.9%) (Table 1); those percentages were similar and

higher than university statistics, respectively. Sixty-eight percent of respondents were female, which was slightly higher than university statistics, and most were between the ages of 19 and 22. Approximately 25% of respondents were from each class standing (freshman, sophomore, junior, senior).

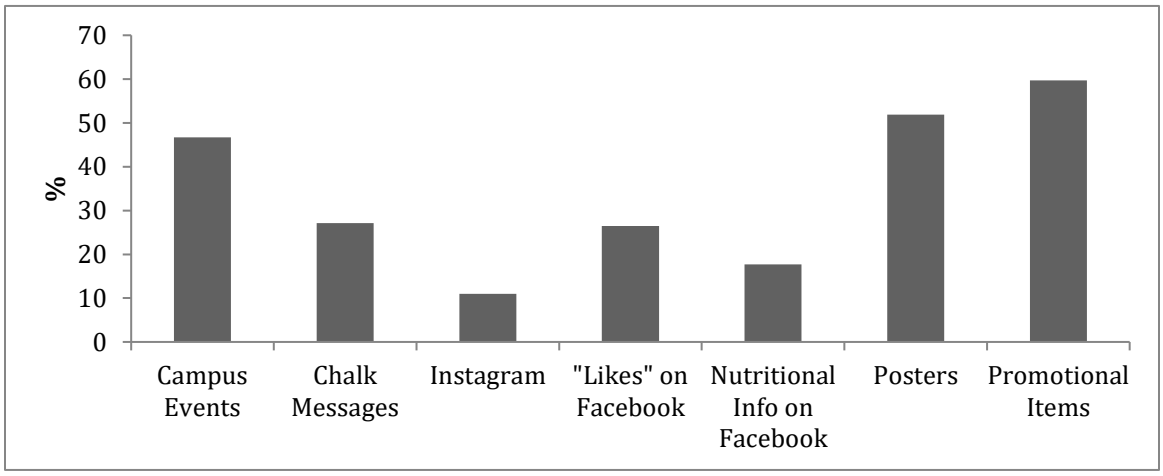
	n (%)
Race[a]	
African American	58 (6.4)
Asian	126 (13.9)
Hispanic	32 (3.5)
Native American	10 (1.1)
Non-Hispanic White	711 (78.6)
Other	9 (1.0)
Marital Status[b]	
Single	766 (81.8)
Exclusive Relationship	152 (16.2)
Married	15 (1.6)
Divorced	3 (0.3)
Gender	
Female	637 (68.0)
Male	300 (32.0)
Age	
18 and younger	172 (18.4)
19-20	431 (46.0)
21-22	260 (27.7)
23-25	46 (4.9)
25 and older	28 (3.0)
Class Standing	
Freshman	212 (22.6)
Sophomore	244 (26.0)
Junior	246 (26.3)
Senior	235 (25.1)
Resident of Ohio	
Yes	711 (75.9)
No	226 (24.1)

[a]Respondents could select more than one race
[b]One individual chose not to report marital status

Acceptability. Students rated the promotional items (59.7%, *n*=594) distributed at campus events as the most influential part of the campaign. Students also found the posters (51.9%, *n*=516) and campus events (46.7%, *n*=465) to be influential (Figure 1).

Figure 1. Most influential aspects of the campaign (*n*=995)

Alt-text: Figure 1 presents the most influential aspects of the campaign. Students rated the promotional items (59.7%, *n*=594) distributed at campus events as the most influential part of the campaign. Students also found the posters (51.9%, *n*=516) and campus events (46.7%, *n*=465) to be influential.



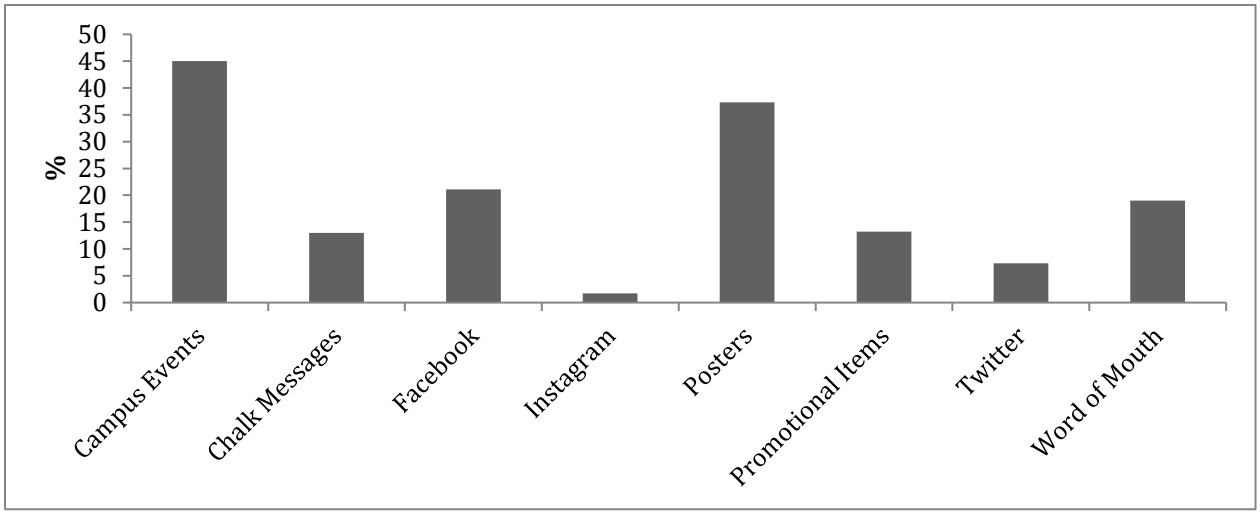
Of the Facebook post types, students preferred posts that contained dairy calcium nutrition facts, such as information on the amount of calcium and other nutrients in milk (11.4%, *n*=113), and tips on how to incorporate more dairy calcium into their diet, such as a recipe for a breakfast smoothie made from milk and Greek yogurt (11.4%, *n*=113).

Demand. The campaign had a presence at campus events with an estimated combined attendance of 30,000 students. Each Facebook post (*n*=56) was seen by a median of 363 people. Posts were Liked a total of 3,654 times, or a median of 20.5 Likes per post. Posts that included campus student-athlete celebrities were particularly popular, receiving as many as 11,100 views and 520 Likes. Eighty percent of traffic to the Facebook page was via a mobile device. The campaign Twitter account had 11 followers while the campaign's Instagram account had no followers and no contest entries.
Demand for the intervention was also assessed via the post-campaign survey. Of those who responded, 995 students (32.8%) were aware of the campaign.

Of the students who knew about the campaign, 25.5% reported that they "Liked" the campaign's Facebook page. The most frequently cited way students learned of the campaign was through campus events (45%) (Figure 2). Students also learned of the campaign via posters or flyers (37%), Facebook (21%), word of mouth (19%), or promotional items (13%). Few (<10%) students learned of the campaign through Twitter or Instagram.

Figure 2. Source of awareness about the campaign (*n*=995)

Alt-text: Figure 2 presents source of awareness about the campaign. The most frequently cited way students learned of the campaign was through campus events (45%). Students also learned of the campaign via posters or flyers (37%), Facebook (21%), word of mouth (19%), or promotional items (13%). Few (<10%) students learned of the campaign through Twitter or Instagram.



Implementation. Sixty posters for the campaign were placed around campus (dormitories, libraries, recreation centers, student union). Eight thousand pens, 6,500 cups, 4,000 pairs of sunglasses, and 250 T-shirts were handed out as promotional items at campus events. Two thousand campaign flyers were also distributed at these events. The campaign posted on Facebook 56 times over the four-week intervention period, while the campaign's Twitter account posted 75 tweets. There were eight posts made on the campaign's Instagram account. Results from the fidelity tool demonstrated intervention activities were achieved 100% of the time.

Limited effectiveness testing. Of the students who were aware of the campaign, 51% (*n*=507) agreed or strongly agreed that the campaign made them more aware of the importance of including dairy in their diets. In addition, 45% (*n*=449) of students who were aware of the campaign agreed or strongly agreed that they were more likely to consume dairy as part of their daily diet as a result of the campaign.

Discussion

The aim of this study was to determine the feasibility (acceptability, demand, implementation, and limited effectiveness) (Bowen et al., 2009) of a four-week campus dairy social marketing campaign in promoting awareness of the health importance of calcium in college students. Overall, results from this study demonstrate feasibility of the campaign. Acceptability of the campaign was evaluated by asking students who reported being aware of the campaign to rank

what they perceived to be the top three influential aspects of the campaign. Students reported favoring the promotional items given out at campus events most, followed by posters, and campus events. Campaign demand was assessed in multiple ways, including attendance at campaign events, engagement in social media (Facebook, Twitter, and Instagram), and campaign awareness. Attendance at the events was high, just under 70% (estimated 30,000 out of 43,886 [student body number] = 68%). This finding supports the evidence demonstrating the importance of campaign delivery outlets being tailored to the target audience for engagement of the population under investigation (i.e., offering events at heavily attended, wide-reaching events) (Wilson, 2007). The level of engagement in social media varied by outlet type (Facebook, Twitter, and Instagram). Participation in Facebook was greater than Twitter and Instagram, which had no followers and no contest entries. While in the current study social media outlets were selected based on current usage data among the young adult population (Pew Research Center, 2017), it is possible that students' usage of the various social media outlets at the institution in which the campaign was occurring (a Midwestern state) varies from the national sample. Future research should focus on better understanding the social media engagement patterns of students at this and other similar institutions. A third of surveyed students (*n*=995) reported awareness of the campaign, paralleling results from a social marketing campaign designed to increase physical activity in undergraduate college students (Scarapicchia, Sabiston, & Faulkner, 2015). Campaign implementation was assessed by recording the number and location of posters distributed and the number of promotional items distributed at events, as well as the numbers of posts to social media outlets. With the intended implementation goals being reached 100% of the time (for all implementation outcomes), the campaign demonstrated high fidelity.

Finally, limited effectiveness of the campaign was evaluated by asking students to report if they perceived that the campaign affected their awareness of the health importance of dairy and their consumption of dairy. Only between 45% and 51% of participants self-reported attitudinal and behavioral changes regarding dairy. The campaign messages were designed in such a way to promote the central processing pathway, which, according to the ELM, is the preferred pathway for lasting attitudinal and behavioral change. The stimulation of this pathway in response to message exposure depends in part on personal motivation, which is influenced by attitudes toward the message and the relevance of topic to the target audience (Wilson, 2007). Similarly, results from a recent review of the effectiveness of health messages of varying types suggest that message effectiveness is largely dependent on the priority population's interest in a particular health issue (Wansink & Pope, 2015). Future research should focus on identifying effective ways to increase the relevance of this nutrition topic to the students who did not respond to the message.

Interestingly, this concept of relevance aligns well with research in the behavioral sciences in which cues in an individual's environment "trigger" or elicit a specific response (Hanks, Just, &

Wansink 2012; Schwartz, Riis, Elbel, & Ariely, 2012). Often individuals have a desire to make proper dietary choices but it is common for this desire to become latent, or dormant. Behavioral triggers, such as the campaign described here, can be utilized to "ignite" the latent desire, leading the individual to make a more healthful decision. In the case where the specific campaign has no relevance to an individual, the campaign's presence–social media outlets, campus messaging, presence at campus events–can also have a positive effect on behavior through exposure (Boyland & Halford, 2013).

In summary, overall, results demonstrate the feasibility of this test social marketing campaign aimed and emphasize the importance of including the benchmark criteria of social marketing in the design of social marketing interventions (Andreasen, 2002) to achieve appeal with the target audience. In a recent review of social marketing nutrition interventions, those that included more benchmark criteria of social marketing (behavioral objective, audience segmentation, audience research, exchange, marketing mix, and competition; [Andreasen, 2002]) were found to be more successful compared to those that included fewer criteria (Carins & Rundle-Thiele, 2014). Importantly, the campaign under investigation in the current study included all but one of these essential elements. To this end, the campaign was designed with a clear behavioral objective (to improve awareness of the importance of dairy calcium intake), a clearly specified audience (college students), and was designed with input from college students in advanced marketing courses. In addition, booths at campaign events offered dairy product samples to demonstrate to students what they gain in exchange for including more dairy in their diets. Finally, the campaign employed a full marketing mix, moving beyond posters and flyers to include interactions with students via social media outlets, booths with interactive games at campus events, and campus student celebrities as campaign ambassadors. Future campaigns may be strengthened by addressing the final benchmark criterion of competition. Efforts could be directed at reducing the availability and appeal of sugar sweetened beverages that college students often choose instead of dairy milk.

Limitations

Several limitations of this study are worth noting. First, the response rate was low (7%) compared to other similar studies among college students (50% range) (DeJong et al., 2006). It will be critical for future efforts to identify strategies to boost the response rate, such as modifications to the incentive structure (e.g., adding a pre-incentive) (Patrick et al., 2013). Second, campaign evaluation used a convenience sample of respondents. Students who responded to the study survey invitation may have differed from the student population as a whole and we cannot infer the true percentage of the student body that was aware of the campaign. Next, the study relied on self-report changes in behavior as a result of the campaign. Future studies would be strengthened by assessing objective measures of changes in dairy consumption. In addition, the post-campaign survey screened out all respondents who had not

heard of the campaign. Therefore, we do not know how students who were unaware of the campaign perceive the importance of dairy calcium in their diets or how their dairy calcium intake had changed over the four-week campaign. Finally, the study was cross-sectional in design. Future studies should assess student attitudes and behaviors at later time points to determine if such campaigns have lasting impacts on students' attitudes and behaviors concerning dairy calcium.

Conclusions

The aim of the present study was to test feasibility and acceptability of a social marketing campaign focused on dairy calcium designed to increase college students' awareness of the importance of calcium intake. One-third of survey respondents were aware of the campaign, most commonly through the campus events. Approximately half of those aware of the campaign found that the campaign increased their awareness of the importance of including dairy in their diets. Our findings suggest that a campus and social media campaign have potential to increase awareness of the importance of dairy consumption among college students. Results from this study may be used by Extension professionals and practitioners in nutrition and dietetics working with the target population of young adult college students to guide development of best practices in future similarly designed social marketing campaigns.

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