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Can an Immersion in Wellness Camp Influence Youth Health Behaviors?

Abstract

Summer 4-H camps present an untapped opportunity for advancement of mission mandates. The project reported here immersed campers in healthy living experiential learning. The goal was to improve self-efficacy and health behaviors related to nutrition and physical activity. Data was collected from enrolled campers through multiple survey tools. A total of 74 campers completed baseline surveys during summer 2012; 6-month follow-up rate was 72%. Camp improved intervention campers' nutrition knowledge ($p<0.10$) and home food environment ($p<0.05$). Results suggest experiential learning/immersion opportunities in nutrition, culinary, and gardening may encourage positive health behaviors and influence the home food environment.

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Introduction

Summer camp is a strong tradition in many states' 4-H programs. Previous research suggests experiential learning activities at camp positively affect campers' life and leadership skills (Garton, Miltenberger, & Pruett, 2007). The camp setting also facilitates immersion experiences, which have been used successfully in educational programming relative to language and/or cultural acquisition (Center for Advanced Research on Language Acquisition, 2009). Immersion experiences may be an effective strategy to combat the obesity epidemic. They encompass all levels of the socio-ecological model, which has been adopted as the Cooperative Extension's National Framework for Health and Wellness (Extension Committee on Organization and Policy, 2014). Summer camp provides a unique opportunity to provide immersion experiences in the mission mandates, such as Healthy Living. Yet a limited amount of evaluation relative to summer camp learning opportunities exists.

Progressively, more youth are overweight or obese, mounting concern for the future health of Americans (Daniels et al., 2005; Ogden, Carroll, Kit, & Flegal, 2012; Schwimmer, Burwinkle, & Varni, 2003; Whitlock, Williams, Gold, Smith, & Shipman, 2005). Overweight adolescents are more likely to be overweight or obese in adulthood and are subsequently at greater risk for chronic diseases (Dietz, 1998a, 1998b; Magarey, Daniels, Boulton, & Cockington, 2003). One behavior linked to overweight and obesity (Magarey et al., 2003) and chronic disease (Bazzano, 2006; Daniels et al., 2005; Hung et al., 2004; Ness & Powles, 1997; Steinmetz & Potter, 1996) is inadequate fruit and vegetable (FV) consumption (Kimmons, Gillespie, Seymour, Serdula, & Blanck, 2009).

Inadequate FV consumption occurs regardless of age, ethnicity, and gender (Kimmons et al., 2009; Yeh et al., 2008). Less than 10% of the U.S. population meets daily FV recommendations, with the lowest levels of consumption among adolescents (Kimmons et al., 2009; Lorson, Melgar-Quinonez, & Taylor, 2009). Fruits and vegetables provide nutrients during growth periods (infancy, preschool, and puberty) in addition to maintenance metabolism, obligate losses and physical activity (Koletzko, et al., 1998). Further, decreased FV consumption has been linked to increased consumption of solid fats and added sugars, as well as portion sizes (Koletzko et al., 2004; Munoz, Krebs-Smith, Ballard-Barbash, & Cleveland, 1997; Nielsen, 2003).

Introducing a variety of FV early in life increases preferences for FV that may carry into adulthood (Birch, 1999; Domel, Baranowski, Hunter, Leonard, & Riley, 1993; Kristjansdottir et al., 2006; Larson, Laska, Story, & Neumark-Sztainer, 2012; Nicklas et al., 2001; Patrick & Nicklas, 2005; Wardle, 1995; Wolfe & Campbell, 1993). Fruit and vegetable preferences have been identified as the strongest predictor of consumption (Brug, Tak, te Velde, Bere, & de Bourdeaudhuij, 2008) and may be more influential than nutrition education or increased knowledge (Harvey-Berino et al., 1997). There is also evidence that children with greater knowledge (Reynolds, Hinton, Shewchuk, & Hickey, 1999; Wardle, 1995) and awareness of FV recommendations (Bere & Klepp, 2005; Sandeno, Wolf, Drake, & Reicks, 2000) have greater FV consumption. Cooking knowledge and skills (self-efficacy) may also improve eating behaviors (Condrasky, Griffin, Michaud, & Clark, 2010). Finally, a home-food environment that supports FV consumption is necessary to promote FV intake (Ball, Cohen, & Meyer, 2012; Neumark-Sztainer, Wall, Perry, & Story, 2003; Rabe, Ohri-Vachaspati, & Scheer, 2006). As parents provide access to more FV in the home, adolescents report eating more (Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005).

Culinary programs present an experiential learning opportunity to create sustainable healthy eating behaviors (Condrasky & Hegler, 2010). Previous research notes youth prefer hands-on activities (69%) and identified summer camp (44%) as an opportunity to learn about food safety (Diehl, Pracht, Forthun, & Simonne, 2010). The study reported here examines the impact of an Immersion in Wellness camp experience with experiential learning in gardening, culinary, skills, and nutrition on youth's self-efficacy, knowledge and FV preferences and intake, as well as home-food environment. Novel aspects to this project include: 1. Use of summer 4-H camp to immerse youth in healthy living programming; 2. Evaluation of behavior change (dietary intake); and, 3. Long-term follow up (5 month post-camp).

Methods

The Immersion in Wellness camp experience was conducted at a Midwest State 4-H Center during the summer of 2012. Two specific week-long camps at the 4-H Center were targeted for the study, Everything Camp and Counselors in Training Camp (CIT). Everything Camp facilitated recruitment of

9-14 year olds, while CIT Camp targeted16-18 year olds. Six camp weeks, which included both Everything and CIT Camps, were randomly assigned as either control (n=3 weeks) or intervention (n=3 weeks). Campers were aware of the project at the time of camp registration but did not know if they would receive control or intervention programming. Because the control and intervention were assigned by week, all campers received the same programming the week they attended camp whether they participated in the study or not. Intervention campers received immersion programming each morning of camp. Control campers received the traditional camp programming provided by the 4-H staff. Institutional Review Board approval was received for all data collection measures and interventions.

Data Collection

Campers and their parents were recruited through a pre-camp mailing, which explained the intent of the study and enrollment procedures, and/or a simple one-on-one discussion occurred with the researchers at camp registration. Eligible campers and their parents were asked to read and sign the informed consent and assent documents.

Data was collected from enrolled campers using previously established survey tools (Struempler & Raby, 2005 [fruit and vegetable knowledge survey, 16 items]; Domel et al., 1993 [fruit and vegetable preferences, 41 items]; Domel, Thompson, Hunter, Baranowski, & Leonard, 1996 [self-efficacy for fruit and vegetable intake, 7 items]; Catenacci & Wyatt, 2007 [home food environment survey, 17 items]; Harvard School of Public Health, 2005; Rockett et al., 1997 [youth/adolescent food frequency questionnaire, 151 items];). The fruit and vegetable knowledge survey was revised to reflect current dietary recommendations (i.e., MyPlate vs MyPyramid). Surveys were administered prior to the camp experience (at-home or on-site), collected at check-in and repeated at 6 months following the camp experience for both control and intervention groups. Intervention campers also completed surveys at the completion of the week-long immersion experience.

Intervention

Intervention campers received 2 to 3 hours of experiential learning in gardening, culinary, and nutrition each morning of the 5-day immersion camp experience. Campers were divided into three groups (n~10-15/group), which rotated between the garden, culinary, and nutrition lessons; each lesson was 30-40 minutes. The five-step experiential learning model served as the framework for each of the immersion activities (Gleason, 2012). Each experience included a hands-on learning activity followed by a discussion to reflect (share and process) and apply (generalize and apply) their observations to similar/different situations. For example, ice cream in a bag was used to teach/demonstrate appropriate portion sizes. Teams made ice cream, but only in an amount to serve each camper a ½ cup portion. The youth's reaction to the ½ cup portion size facilitated discussion about typical portion sizes of food consumed at home, at school, and in restaurants. Campers were able to generalize and apply the concept of "portion distortion" to other food choices.

Table 1 provides an overview of all experiential learning activities throughout the week-long camp experience. Gardening lessons were developed and taught by the local county Master Gardeners. The composting lesson was taught by staff from the National Laboratory for Agriculture and the

Environment. Culinary lessons were developed and taught by an undergraduate culinary intern. Nutrition lessons were developed by an undergraduate nutrition student class, modified by a graduate student in nutrition, and taught by graduate level nutrition students.

Table 1.
Intervention Week Experiential Learning Activities

	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
Garden	**Garden Planning** Measurements Location	**Soil** Texture Improve quality pH Fertilizer nutrients	**Seeds** Growing requirements Zone maps **Plants** Thinning Transplanting Harvesting	**Water Conservation** Wasteful watering Conservation practices **Garden Pest** Pest identification	**Composting** Benefits Materials Care Bugs/worms
Culinary	**Utensil Identification** Basic utensils Knife skills **Food Safety** Food borne illness	**Mise en Place** Organize workspace **Food Safety** Danger Zone	**Handling Raw Meat** Storage **Food Safety** Separate Safely Temperatures	**Seasonal/Recipe Modifications** Ingredient substitutions Economical **Food Safety** Hand Washing	**Yeast Dough** Leavening Gluten Kneading **Food Safety** Review
Nutrition	**MyPlate** Food groups Meals and snacks	**Fruits & Vegetables** Vitamins and minerals FV Recommendations	**Get Up & Go** PA Recommendations Pedometer Heart Rate	**Portion Distortion** Portion control Reading a label	**Hero vs. Villain Fats** Heart healthy fats Dining out

Intervention weeks also had lunch menus tailored to incorporate vegetables harvested from the garden and prepared during the culinary lessons (i.e. homemade salsa for tacos). Finally, youth in the intervention also received a take-home kit intended to influence the home environment. The take-home kit included: color-coded cutting boards, paring knife, vegetable scrub brush, Healthy and Homemade cookbook (ISU Extension publication), refrigerator and meat thermometers, pedometer, garden journal, and various nutrition and PA publications related to the experiential learning topics.

Data Analysis

Data were compared to the normal distribution to test for normality. Data were analyzed using frequencies, chi-square, independent and paired-samples t-test (for normally distributed data) Mann-

Whitney U test (for non-normally distributed data), and likelihood analysis estimates (Akaike, 1974). Population demographics (age and gender) by intervention were examined at baseline using independent samples t-test and chi-square analysis.

Higher FV self-efficacy, nutrition knowledge, and FV preferences were considered positive outcomes. FV self-efficacy, knowledge, preferences, and home-food environment scores were compared at baseline and at 6 months post by intervention using independent samples and paired samples t-tests. FV preferences were examined using four classifications: FV overall, fruit, vegetable, and vegetables grown in the camp garden (garden vegetables). The home-food environment survey captured the availability of food in the pantry and refrigerator in three categorizes—most preferred, neutral, and least preferred. The most preferred home-food environment was considered positive and included more food meeting the recommendations of the Dietary Guidelines for Americans (DGA), whereas least preferred home-food environment was considered negative and had fewer foods meeting the DGA recommendations. For statistical analyses, most preferred and least preferred were used to characterize the home-food environment and examine any subsequent change.

Change scores for survey responses from baseline to 6 months post-camp were calculated for FV self-efficacy, knowledge, preferences (overall, fruit, vegetable, garden vegetable), home-food environment (most desired pantry, most desired refrigerator, least desired pantry, least desired refrigerator), and FV consumption (fruit, fruit juice, vegetable, starchy vegetable, garden vegetables and individual garden vegetables). These scores were categorized as negative, no change, or positive change for Chi Square analyses.

Further exploratory data analysis excluded campers who did not respond to the follow-up questionnaire (n=18) and CIT campers (n=3). Data from 49 non-CIT subjects were tested for correlation factorially using Pearson's correlation coefficient, and significant collinearities were noted for multivariate analysis. Potential multivariate models were identified through factorial testing of several independent variables to one dependent variable. Models with independent variables showing significant collinearity were excluded unless collinear variables were clearly unrelated. Maximum likelihood estimates were compared using a small-sample-size corrected Akaike Information Criteria (AICc) (Akaike, 1974), and models with strong likelihood estimates were tested using a bootstrap method (Burnham & Anderson, 2002; Konishi & Kitagawa, 2008). AICc values were computed for each tested model and the best performing model was identified with each resampling. Models were judged to be equivalent if they were equally represented in the resampling. Random numbers were generated using the Mersenne Twister algorithm (Matsumoto & Nishimura, 1998).

Data was analyzed using the IBM Statistical Package for Social Sciences for Windows (IBM Statistical Package for Social Sciences for Windows, 2010). Likelihood analysis and bootstrap modeling were programmed and analyzed using MATLAB R2007A (MathWorks, Natick, MA.). The level of significance used for all statistical analysis was $p<0.05$, while a trend was $p<0.10$.

Results

A total of 74 campers (32 male, 42 female; 38 control, 36 intervention) completed baseline surveys during summer 2012 (Table 2). Due to the bimodal distribution of ages, a non-parametric test, Mann-Whitney, was used to examine the difference in age between the two groups and suggests a significant difference in age between intervention and control ($p<0.05$) at baseline. Gender was not significantly different between intervention and control campers at baseline. Six-month follow up response rate was 72% (n=53); however, sample size on specific survey results varies among analyses due to incomplete surveys.

Table 2.

Baseline Demographics by Control and Intervention

Gender	**Control**	**Intervention**	**Total**
Male	17	15	**32**
Female	21	21	**42**
Total	**38**	**36**	**74**
Age [a]	**Control**	**Intervention**	**Total**
9	1	10	**11**
10	5	11	**16**
11	3	9	**12**
12	10	3	**13**
13	12	0	**12**
14	2	0	**2**
15	0	0	**0**
16	0	2	**2**
17	2	1	**3**

a. Statistical difference ($p<0.05$) between control and intervention by Mann-Whitney Test

Baseline and 6-month post-camp mean survey scores for FV self-efficacy, nutrition knowledge, FV preferences, and home-food environment appear in Table 3. The control group had significantly higher nutrition knowledge at baseline, which persisted through 6 months post-camp ($p<0.05$). However, the intervention group tended to improve nutrition knowledge from baseline to 6 months post-camp ($p<0.10$), which was not observed in the control group. At 6 months post-camp, both control and intervention groups significantly improved their most preferred home environment ($p<0.05$; Table 3); however, a trend was noted between the control and intervention at 6 months post-camp ($p<0.10$; Table 3), suggesting the intervention group may have improved a bit more. A significant difference from baseline to 6 months post-camp was noted among control campers' self-efficacy, overall FV preferences, as well as most and least preferred home food environment ($p<0.05$, Table 3). These results indicate improved self-efficacy, FV preferences, and preferred home-food environment;

however, the least preferred home-food environment also increased. In contrast, a significant difference from baseline to 6 months post-camp was noted among the intervention group's most and least preferred home-food environment ($p<0.05$; Table 3), and a trend for overall FV preferences and fruit preferences was observed ($p<0.10$; Table 3). These results suggest greater availability of least and most preferred food in the home as well as a tendency towards greater fruit and FV preferences.

Table 3.

Baseline and 6-month Post Survey Scores by Control and Intervention

		Baseline		**-month Post-Camp**	
	Possible Score	**Control** μ ± (SEM) (n=30)	**Intervention** μ ± (SEM) (n=23)	**Control** μ ± (SEM) (n=30)	**Intervention** μ ± (SEM) (n=23)
FV Self-Efficacy	0-12	8.27 ± (0.59)	7.96 ± (0.68)	9.53 ± (0.46) e	8.91 ± (0.47)
Nutrition Knowledge	0-16	13.20 ± (0.48) b	11.57 ± (0.64)	13.97 ± (0.32) c	12.91 ± (0.37) f
FV Preferences (Overall)	0-108	86.07 ± (2.93)	87.35 ± (3.38)	89.63 ± (2.35) e	89.83 ± (3.07) f
Fruit	0-66	48.77 ± (1.82)	50.00 ± (1.87)	50.07 ± (1.49)	51.70 ± (1.78) f
Vegetable	0-42	28.23 ± (1.06)	27.91 ± (1.51)	29.57 ± (1.11)	28.22 ± (1.38)
Garden Vegetables	0-18	12.00 ± (0.62)	11.65 ± (0.74)	12.53 ± (0.66)	12.04 ± (0.72)
Home Food Environment					
Most Preferred	0-44	15.00 ± (0.88) a	16.04 ± (0.90)	23.76 ± (1.17) a, e	27.30 ± (1.32) d, e
Least Preferred	0-44	12.27 ± (1.14)	12.09 ± (0.94)	17.73 ± (1.30) e	20.43 ± (1.80) e

a. Sample Size = 29

b. Significant difference between control/intervention at baseline ($p<0.05$)

c. Significant difference between control/intervention at6-month post ($p<0.05$)

d. Trend between control/intervention at6-month post ($p<0.10$)

e. Significant difference from baseline to6-month post ($p<0.05$)

f. Trend from baseline to6-month post (p<0.10)

Chi square analysis of change score categories (negative or no change and positive change) revealed no significant difference between the control and intervention groups' change in self-efficacy, knowledge, and preferences (data not shown). However, positive change in the home-food environment, specifically the most preferred food pantry, was significantly greater in the intervention group (p<0.05; Table 4). Further examination of the preferred food pantry choices revealed the intervention group increased preferred food options for grains, FV, dairy, snacks, and condiments (data not shown).

Table 4.

Change in Home Food Environment and Garden Vegetable Intakes by Control and Intervention

	Control (n=30)		**Intervention (n=23)**		
	% ↓ or no Δ	**% ↑**	**% ↓ or no Δ**	**% ↑**	**χ^2 (p-value)**
Most Preferred Pantry	62.1a	37.9a	30.4	69.6	5.14 (**p=0.02**)*
Most Preferred Refrigerator	62.1 a	37.9a	54.5b	45.5b	0.29 (p=0.59)
Least Preferred Pantry	50.0	50.0	47.8	52.2	0.03 (p=0.88)
Least Preferred Refrigerator	65.5a	34.5a	56.5	43.5	0.44(p=0.51)
Garden Vegetable Intake	56.7	43.3	52.4c	47.6c	0.09 (p=0.76)
Tomato	73.3	26.7	68.2b	31.8b	0.16 (p=0.69)
Soybeans	83.3	16.7	86.4b	13.6b	0.09 (p=0.77)
Broccoli	83.3	16.7	81.8b	18.2b	0.02 (p=0.89)
Peas	80.0	20.0	77.3b	22.7b	0.06 (p=0.81)
Spinach	86.7	13.3	63.6b	36.4b	3.79 *(p=0.05)* +

Greens	83.3	16.7	63.6b	36.4b	2.63 (p=0.11)
Bell Peppers	86.7	13.3	63.6b	36.4b	3.79 *(p=0.05)* +
Sweet Potato	83.3	16.7	81.8b	18.2b	0.02 (p=0.89)
Zucchini	96.7	3.3	76.2c	23.8c	4.99 (**p=0.03**)*
Lettuce	80.0	20.0	59.1b	40.9b	2.70 (p=0.10)

a. Control based on 29 responses

b. Intervention based on 22 responses

c. Intervention based on 21 responses

* Significant ($p<0.05$)

+ Trend ($p<0.10$)

% ↓ or no Δ = percent negative or no change score

% ↑ = percent positive change score

Chi-square results suggest no significant difference between control and intervention groups' change in fruit, fruit juice, vegetable, or starchy vegetable intakes (data not shown). An examination of change scores for individual garden vegetable intakes suggests intervention campers tended to have greater positive change for consumption of spinach and bell peppers ($p<0.10$) and significantly greater change in consumption of zucchini ($p<0.05$; Table 4).

Multivariate likelihood analysis modeling results with bootstrapping can be viewed in Table 5. Results of likelihood analysis modeling suggest FV preferences and home-food environment influence change in self-efficacy; treatment (control/intervention), gender, age, self-efficacy, and least preferred home-environment influence change in preferences, and treatment, age, and least preferred home environment influence change in knowledge (Table 5). Conversely, intakes of the various groups of food appear to be gender specific (with the exception of starchy vegetables and fruit juice), age, change in preferred home environment, and change in intakes of other groups of food (Table 5).

Table 5.

Multivariate Likelihood Analysis Models Predict Change in Fruit/Vegetable Intake

Dependent Variable	Model	AICc	Δ AICc	Bootstrap Likelihood Percentage	Model
Δ FV Self-Efficacy	1	106.1	0.0	32.63	FV Preferences, ΔPreferred Home Refrigerator, ΔPreferred Home, ΔStarchy

					Vegetable Intake
	2	106.2	0.1	33.27	FV Preferences, ΔPreferred Home Refrigerator, ΔPreferred Home
	3	107.5	1.4	34.11	ΔPreferred Home Refrigerator, ΔPreferred Home
Δ Nutrition Knowledge	1	125.3	0.0	50.14	Treatment, Age, ΔLeast Preferred Home
	2	126.5	1.2	49.86	Treatment, Age, Preferred Home, ΔPreferred Home, ΔLeast Preferred Home
Δ FV Preferences	1	209.7	0.0	33.22	Treatment, Gender, Age, FV Self-Efficacy, Least Preferred home, ΔGarden Vegetable Intake
	2	211.0	1.3	33.58	Treatment, Gender, Age, FV Self-Efficacy, Least Preferred Home
	3	210.7	1.0	33.19	Treatment, Gender, Age, FV Self-Efficacy, Least Preferred Home, ΔVegetable Intake, ΔGarden Vegetable Intake
ΔFruit Intake	1	151.3	0.0	32.50	Gender, ΔFruit Juice Intake
	2	151.9	0.6	32.50	Gender, ΔFruit Juice Intake
	3	154.5	3.2	34.95	Gender
Δ Fruit Juice Intake	1	73.7	0.0	47.02	ΔPreferred Home, ΔFruit Intake, ΔStarchy Vegetable Intake
	2	75.4	1.7	52.98	ΔPreferred Home, ΔStarchy Vegetable Intake
Δ Vegetable Intake	1	172.0	0.0	33.61	Gender, Age, ΔFruit Juice Intake
	2	172.5	0.5	33.29	Gender, Age, ΔNutrition Knowledge, Δ Fruit Juice Intake
	3	172.9	0.9	33.10	Gender, Age, ΔNutrition Knowledge, ΔPreferred Home, ΔFruit Juice Intake
Δ Starchy Vegetable Intake	1	79.6	0.0	25.08	ΔFruit Juice Intake, ΔGarden Vegetable Intake
	2	80.1	0.5	24.74	Treatment, ΔFruit Juice Intake, ΔGarden Vegetable Intake
	3	81.1	1.5	24.51	Treatment, ΔPreferred Home, ΔFruit Juice Intake, ΔGarden Vegetable Intake
	4	80.6	1.0	25.66	ΔGarden Vegetable Intake
Δ Garden	1	139.7	0.0	33.11	Gender, ΔFV Preferences, ΔPreferred Home,

Vegetable Intake					ΔStarchy Vegetable Intake
	2	140.2	0.5	34.01	Gender, ΔStarchy Vegetable Intake
	3	141.2	1.5	32.88	Treatment, Gender, ΔFV Preferences, ΔPreferred Home, ΔLeast Preferred Home, ΔStarchy Vegetable Intake

Δ = change in
All results are significant at $p<0.05$
Lowest AICc is the best predicting model, other AICc values within two units are considered closely related/nearly equivalent
Δ AICc = AICc of the model – best model

Discussion

The study reported here examined the impact of an immersion in wellness camp experience on youth's FV knowledge, preferences, self-efficacy, and intake. Overall, results suggested greater improvement in knowledge and home food environment, specifically the food pantry, among the intervention campers between baseline and 6 months post-camp. In addition, intervention campers had greater intake of specific vegetables grown in the garden at 6 months post-camp.

Baseline scores revealed a large distribution of self-efficacy, knowledge, preferences, and the home-food environment scores among campers, likely related to the age range of the campers. Nutrition knowledge, FV self-efficacy, FV preferences, and the home-food environment improved in both control and intervention campers at 6-month post-camp. Improvements in the intervention group may be the result of the camp experience with gardening, culinary, and nutrition education lessons as well as the take-home kit. Yet control campers also improved at 6-month post-camp, which suggests other influential factors such as age/maturation, home, school and/or community factors. The significant difference in age by treatment (control campers being older) likely influenced some of these findings. For example, self-efficacy and knowledge increased significantly in both groups (control and intervention) from baseline to 6-month post-camp. The significant change in the control group may be related to the age/maturation of these campers, whereas the change in the intervention group may be attributed to the intervention.

Data collected 6-months post-camp suggested the intervention had marginal impact on camper knowledge, preference, and self-efficacy scores. However, the intervention group did appear to improve their home-food environment at 6 months by increasing the amount of "preferred" pantry options (grains, FV, dairy, snacks, and condiments). The intervention group also reported increased intakes of zucchini, spinach, and bell peppers, which had been included in the camp garden, culinary, and nutrition education lessons as well as camp meals. An association between dietary intakes and repeated exposure such as those incorporated into the camp experience has been previously documented (Heim, Stang, & Ireland, 2009; Morris, Neustadter, & Zidenberg-Cherr, 2001) .

Exploratory data analysis provides insights for future research. Self-efficacy, which has been shown to impact dietary intakes (Geller & Dzewaltowski, 2010), appeared to be influenced by food preferences and the home-food environment. Preference for a food item, as well as home-food environment, where the food item is available and accessible, supports an individual's self-efficacy to consume that food item. Interestingly, nutrition knowledge and FV preferences appeared to be influenced by age, treatment (control/intervention), and least preferred home environment. It was anticipated that change in knowledge would be impacted by age and intervention; however, least preferred home environment also appeared to influence change in knowledge. Some research suggests that knowledge is the first step to improving FV intake (Reynoldset al., 1999; Wardle, 1995). The data suggests differences in FV intake by gender, with the exception of starchy vegetables and fruit juice. This was not unexpected because gender differences relative to FV intake have been documented in the literature (Cartwright et al., 2003; Neumark-Sztainer, Story, Resnick, & Blum, 1996; Rasmussen et al., 2006; Reynolds, Baranowski, et al., 1999). Intake of food groups was also impacted by preferred home environment and change in intake of other food groups. Availability and accessibility of food as well as change in other food groups would likely alter the intake of another food group.

Limitations of the study include the small sample size for 6-month post-camp data analysis, which decreased the power of analyses. In addition, a significant difference was noted between control and intervention campers' age, which influenced data collected and interpretation. The researchers did examine the data omitting the CIT campers; however, a significant difference among the remaining campers' age persisted using Mann-Whitney test. Further, data represent a sample of Midwest youth with very limited demographic or socioeconomic information and may not be representative of other geographic regions. All data collected were based on self-report responses to surveys with inherent limitations. Finally, the home-food environment survey tool has not been validated for research purposes and has been used previously as a personal assessment tool. It should also be noted that a seasonal difference (summer vs. winter) could have influenced the home food environment responses. Seasonal differences would be most likely captured in the most preferred refrigerator, where fresh produce is most likely stored. Interestingly, 37.9% of control and 45.5% of intervention campers indicated improvement in most preferred refrigerator environment from pre- to6-month post-camp. This is noteworthy given pre-camp represented the months of June/July and the 6-month post-camp represented the months of January/February.

In conclusion, the summer camp experience provides a unique setting to: 1. Provide experiential learning opportunities; 2. Address the 4-H mission mandates (citizenship, healthy living, science); and 3. Immerse youth in the socio-ecological model for health promotion. Previous research suggests youth prefer experiential and summer camp opportunities to learn about food safety (Diehl, Pracht, Forthun, & Simonne, 2010). Experiential learning activities can be used to address more than one mission mandate. For example, the study used the ice cream in a bag activity to demonstrate portion control (healthy living), whereas Dillivan and Dillivan (2014) used the ice cream in bag activity to teach a physics concept (science). The camp experience facilitated "immersion" of youth at all levels of the socio-ecological model (individual, social, physical, and policy). Typically, 4-H programming occurs at the individual and social levels of the model. The camp setting integrated the physical and policy levels of the model through a health-promoting environment with abundant opportunities for physical activity and meals meeting the Dietary Guidelines for Americans. Education at the individual and social levels of the socio-ecological model alone will not improve lifestyles (Krebs-Smith, Reedy, & Bosire, 2010), but creating healthier nutrition and PA environments, particularly at the community and policy level may lead to behavior change (Story, Neurmark-Sztainer, & French, 2002).

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