HEALTH

Physical Activity, Nutrition, and Self-Perception Changes Related to a University "Lifetime Fitness for Health" Curriculum

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Abstract

Undergraduate college students are at a crucial point in the development of significant health behaviors, most notably related to physical activity and dietary intake. The purpose of this study was to qualitatively determine whether participation in a Lifetime Fitness for Health (LFH) curriculum in college had short-term and long-term benefits with regard to physical activity behaviors, nutrition behaviors, and self-concept. The study took place at a university in the Pacific Northwest region of the United States and included 20 undergraduate students (15 female, five male;

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primarily freshman and sophomores). Semistructured focus groups were conducted 10 weeks (n = 11) and 1 year (n = 9) after students completed a LFH course. Six 60- to 90-min focus group interviews occurred. Interviews were transcribed verbatim and analyzed by two researchers who worked independently to organize participant responses, ultimately achieving agreement into major thematic categories. The four themes identified were (a) awareness and knowledge of general fitness and nutrition principles, (b) short-term (10-week) benefits in overall physical activity levels and nutrition behaviors, (c) long-term (1-year) benefits in physical activity levels and nutrition behaviors, and (d) benefits to self-perceptions. LFH courses create awareness through providing factual information and practical strategies for health behavior changes at a transitional time to adulthood.

The trend toward physical inactivity that characterizes a significant portion of the United States population is evident among college students. For example, only 43.6% of the 34,208 college students surveyed by the American College Health Association (ACHA, 2009) met the adult physical activity recommendations of the American College of Sports Medicine and American Heart Association (Haskell et al., 2007). One study found that physical activity levels declined 62.5% during the transition from high school to college (Cullen et al., 1999). However, during the postcollege years, physical activity habits remain remarkably stable. That is, from their senior year in college, 84.7% of regular exercisers continued their regiment postgraduation and 81.3% of nonexercisers were no more active, and possibly less so, postgraduation (Sparling & Snow, 2002). These dynamics have led public health researchers to suggest that college-level physical education[1] curricula represent the last opportunity to shape physical activity habits (Sparling, 2003); however, research on this topic is lacking (Ferrara, 2009; Keating, Jianmin, Piñero, & Bridges, 2005; Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008; Wengreen & Moncur, 2009).

Research has also documented the poor eating patterns of college students, including the overconsumption of fast food and

1 Physical education is used here as a generic term to represent the overarching and historical academic unit most often associated with delivering such curricula to college and university students (Corbin & Cardinal, 2008; Sargent, 1900); though, we acknowledged that diverse academic and nonacademic units may have an interest in promoting students' healthy, active lifestyles (e.g., housing and dining services, recreational sports, student health services).

foods high in fats and sugars (Nelson et al., 2008). Furthermore, in the ACHA (2009) survey, only 5.9% of those sampled reported consuming the recommended five or more servings of fruits and vegetables per day. In another study, 67% reported consuming less than the recommended amount of fiber per day (Huang et al., 2003), and another study found 76% reported eating the same food day after day (Haberman & Luffey, 1998). Such eating patterns, either alone or coupled with a lack of physical activity, may contribute to the greatest increases in overweight and obesity levels for people aged 18 to 29 (Mokdad et al., 1999).

Physical activity and nutritional behaviors are also inextricably linked to self-perceptions. What people do by way of health behaviors can influence how they feel about themselves, and conversely, self-views can impact the likelihood of a person initiating and sustaining health behaviors. For example, the adapted exercise and self-esteem model (Fox, 1998) depicts physical activity as being directly associated with exercise efficacy, and empirical evidence supports this (Ng, Cuddihy, & Fung, 2003). Ng et al. (2003) found that university students required to participate in physical activity classes had enhanced exercise efficacy and motives to participate in leisure activities. The work of Butler, Black, Blue, and Gretebeck (2004) supported and built upon that of Ng et al. Specifically, Butler et al. found stable efficacy scores for women from the point of college entrance to 5 months later with regard to their ability to make time for exercise and resist a worsening of their dietary practices. However, they highlighted a nonsignificant downward trend on both scales over the course of the study.

To address many of the concerns related to college students' physical activity and nutrition behaviors, college curricula that facilitate the development of positive health practices on a large-scale basis are needed (Kupchella, 2009; Sparling, 2003). One curricular innovation of the past 50 years delivered primarily through the basic instruction programs of physical education departments has been the advent of Lifetime Fitness for Health (LFH)-type courses (Corbin & Cardinal, 2008; Kulinna, Warfield, Jonaitis, Dean, & Corbin, 2009). LFH courses are designed to inform students about the importance of health behaviors and provide implementation strategies to integrate these behaviors into students' lifestyles. Although such coursework appears to be increasing on college campuses (Kulinna et al., 2009), a general trend also exists toward reducing the emphasis on college-level physical education requirements. For example,

the percentage of institutions requiring physical education courses for graduation has decreased from 97% in the 1920s–1930s to less than 40% in 2009–2010 (Cardinal, Sorensen, & Cardinal, 2012). When such courses are removed, the potential impact is tangible; for instance, one university observed that within 3 years of dropping their requirement, negative trends in students' exercise and nutrition patterns occurred (Ansuini, 2001). An important step in reversing such trends is the evaluation of existing courses and the impact they have on students, both at the time the course is taken and in the years that follow.

Quantitative studies evaluating the efficacy of LFH courses have mostly assessed their short-term effects (e.g., testing prior to and immediately following the course) on students' knowledge, attitudes, and/or behaviors (Corbin & Cardinal, 2008). These studies have shown positive improvements in attitude and modest improvements in physical activity behavior and/or fitness (Cardinal & Spaziani, 2007; DeVoe et al., 1998; Quinn & Wilson, 1987; Sallis et al., 1999). Longitudinal studies of the effects of LFH courses have shown mixed results (Adams & Brynteson, 1992, 1995; Brynteson & Adams, 1993; Calfas et al., 2000; Pearman et al., 1997; Saelens et al., 2000; Slava, Laurie, & Corbin, 1984). A key element for the longer term success of these classes seems to be that behavior change skills such as those derived from the transtheoretical model of behavior change must be taught to and learned by the students enrolled in the courses (Cardinal, Cardinal, & Burger, 2005); this has been shown in short-term evaluation studies too (Cardinal, Jacques, & Levy, 2002).

Limited qualitative research is available on this topic. One exception is the work of Jenkins, Jenkins, Collums, and Werhonig (2006) who were interested in determining the facets of a LFH course that could lead to positive and negative student perceptions. Interviews with a subset of the sample (n = 20) were conducted to further probe written responses from the entire sample of undergraduate students (N = 157). The authors reported that physical fitness testing, wellness assignments, instructional techniques, and meeting people were perceived as positive aspects of the course experience. Negative perceptions were associated with the class meeting time, classroom management, and lack of cohesion among the group. Another exception is the work of Higgins, Lauzon, Yew, Bratseth, and Morley (2009) who interviewed study participants (n = 7) 1 month to 5 years postcourse. The interviews were interpreted in

conjunction with 1-min papers gathered from students (n = 150) on the final day of class. They found that students expressed the value of the course in three broad areas: "being," or coming to understand the importance of a balanced physical, psychological, and spiritual wellness; "belonging," or learning to recognize the impact of the individual on the community and the significance of group support to create change; and "becoming," or acquiring skills to address challenges.

This study's purpose was to build upon the extant literature by employing a qualitative research approach aimed at recording the experience of undergraduate college students with regard to short- and long-term health behaviors affected by their participation in a LFH course. Although the ultimate goal of the course was to have students adopt and sustain health behaviors, self-views offer a possible mechanism for altering behaviors and can certainly be impacted by and have an impact on behavioral choices; thus, changes in student self-perceptions related to physical activity and nutritional behaviors were also investigated.

Method

Setting

This study was approved by the Institutional Review Board of the university where the data collection occurred, with research funding awarded by a regional health organization's foundation. Potential participants were recruited after they completed a required general education LFH course at a state university in the Pacific Northwest region of the United States. The 10-week course, which consisted of 100 min each of lecture and lab per week, focused on physical activity and nutrition education and the link these have to self-concept. Students completed both the lecture and the lab to fulfill the general education requirement, although concurrent enrollment was not required. The lecture portion of the class discussed topics such as basic nutrition, reading food labels, physical fitness components (i.e., muscle strength and endurance, cardiorespiratory endurance, flexibility, and body composition), back health, and hypokinetic diseases. The lecture enrollment ranged from 300 to 400 students per class.

The lab component was conducted either once or twice a week and enrolled between 25 and 50 students per lab section. Students had the option of completing a general lab in which the curriculum

allowed for a wide variety of activities (e.g., group fitness, weight training, games/sports) or a topic-specific lab where they participated in one area of fitness (e.g., cardio conditioning, yoga) to complete all the lab topic requirements. Lab requirements consisted of goal setting, behavior change techniques and self-reflection, personal nutrition journaling, dietary analysis, and exercise assessments in each component of fitness. Students also participated in physical activities such as running, yoga, relaxation, weight training, and group sports during the laboratory component. Throughout these lab activities, students were asked to reflect upon and write about what they had learned about themselves by participating in the activity. In some cases, these self-reflection writings formed the basis of further class discussion. Table 1 depicts the conceptual content of the lecture and lab for LFH students with regard to health behaviors, class activities, and the theoretical premise of the curriculum.

Appropriateness and completeness of the interview guide were determined through two pilot focus groups with 10 students who were not included in the final sample. Recruitment for the present study was limited to students who took the LFH course during the winter term to eliminate potential seasonal effects. After the LFH course, the course instructors sent recruitment e-mails to the students who had successfully completed the LFH course the previous year and the previous term. A total of six classes were contacted.

Participants

A total of 20 undergraduate students participated in the focus groups with each group ranging from two to five participants to facilitate effective discussions and appropriate engagement of group members (Kreuger, 1994; Patton, 2001). Three of the focus groups (n = 11; Female = 9, Male = 2) were conducted with students who had completed the LFH course the previous term (Y0), and the remaining focus groups consisted of students (n = 9; Female = 6, Male = 3) who had completed the course 1 year prior (Y1). Seventeen of the 20 participants were Caucasian, two were Latina/Latino, and one was Hawaiian. Fourteen of the 20 participants took the course during their first year at the university.

Table 1

Lifetime Fitness for Health Overview

Health behavior domain	Content	Activities	Theoretical background
Overall wellness/ Mental health	Introduction/ Increase awareness	Self-evaluation of health behaviors, introducing behavioral change stages	Transtheoretical model Self-concept
Physical fitness/ activity	Aerobic fitness Muscular fitness Flexibility	Fitness assessments, practicing actual physical activity skills designed to enhance each fitness components	Transtheoretical model Self-efficacy theory
Healthy eating	Body composition and energy balance	Self-assessments	Transtheoretical model
	Healthy food consumption	Nutrition scavenger hunt/reading food labels	Transtheoretical model Self-efficacy theory Social ecological model
Implementing health behaviors	Physical activity and diet	Journaling	Transtheoretical model Self-efficacy theory
	Goal setting	Appropriate goal-setting strategies and techniques	
	Stress management	Relaxation techniques	
	Social support	Building positive social relationships	

Design

All focus groups followed a semistructured format with follow-up questions to provide clarification (see Appendix A for interview questions). Participants used a pseudonym during the discussion to ensure anonymity, and at the end of the focus group, they were compensated for their time with a $15 gift card to the university bookstore. Each focus group was digitally recorded and ranged from 60 to 90 min in length. The interviews were later transcribed verbatim by a professional transcriptionist and analyzed by two members of the research team.

Researchers followed Patton's (2001) evaluative criteria for achieving credibility (i.e., clear delineation of purpose, reflexivity, and data triangulation). Triangulation occurred by two researchers analyzing the data through coding the transcripts independently to organize participant responses. Upon completing the coding, the researchers compared and reached an agreement on the major thematic categories (Berg, 2009). To further verify the findings, a third researcher reviewed and confirmed the four identified themes.

Results

Theme 1: Awareness and Knowledge of General Fitness and Nutrition

The study found considerable examples of attention to integral course concepts such as frequency and intensity of physical activity for health benefits, weight and body composition, posture, and appropriate food choices. Awareness of health benefits from physical activity and nutrition were described as follows: "My first two terms were lacking in these areas and I needed to focus more on it" (Debbie, Y1); "I realized I need to reprioritize exercise" (Nicole, Y0); "It made me look at exercise and eating in a different way, and not just to look good" (Vanessa, Y1); and "I became more conscious of what I was doing and not doing with regard to exercise" (Sara, Y0). These examples were stated to be awareness as a result of the LFH class content, and the knowledge acquired assisted them in a greater understanding to potentially change their behaviors. These students also increased their awareness of appropriate food choices. They commented, "I realized how your consumption is important and you are what you eat" (Claire, Y0); "I focus more on what goes into my mouth instead of shoving anything in because I'm hungry" (Jennifer, Y1); and "I noticed the changes in what I ate

(making better food choices) and how that made me feel" (Bill, Y0). More important, 80% of participants recognized and spoke of the interaction between multiple concepts of the course, an idea that was continually reinforced throughout the lectures. For example, Claire (Y0) recalled, "After taking the class I'm much more aware of when you're not working out you need to be really careful about what you eat if you don't want to impact yourself in a negative way." As such, Claire recognized how reduction in physical activity also needs to be placed in the context of energy balance, nutritional choices, and even self-concept, that is, how a person might feel about herself or himself when not being active or making sound nutritional choices.

In addition to acquiring personal knowledge, the students often shared their new understanding of exercise and nutrition with people who were not enrolled in the class such as friends, parents, or partners. Sam (Y1) stated, "I've actually told other people I know that…instead of sitting around home, go out and run or walk or just go do something and when you come back you feel a lot better." Jennifer (Y1) explained, "Your mindset kind of changes how you hang out with others instead of watching a movie, you go for a walk." Prompted by class discussions and online assignments, students also identified being more attentive of their own family habits and histories with regard to disease and risk factors. Mary (Y1) discussed, "I would learn stuff from class and discuss it with my parents and we would have a more educated discussion about it."

This theme also increased individual self-awareness. Students shared, "It actually made me realize—oh wow, I'm not eating very healthy" (Dan, Y1) and "It definitely made me more aware of my activity level and that I need to be more active" (Claire, Y0). The participants were evidently enlightened by what they learned about themselves. Typically, they recognized a need for improvement in their current health practices, but on occasion they were pleasantly surprised to learn they were getting the recommended nutrients in their diet or performed well on fitness tests. Therefore, it was apparent that students in the course learned useful facts, shared their newfound knowledge with others outside of the class, and took a closer look at themselves, as well as their families, in terms of health indicators and behaviors.

Theme 2: Short-Term Benefits in Physical Activity Levels and Nutrition Behaviors

This theme reflected changes that lasted for the duration of the 10-week course. The spectrum of responses ranged from people starting a fitness routine to people modifying existing routines. Melinda (Y0) stated, "I started bike riding over to the grocery store. I'm incorporating those little things that improve your health," and Nicole (Y0) commented,

> I lived four blocks off campus and would drive to class and I would get winded going up the stairs but, with this class, I realized that physical activity will have benefits no matter what the level is. I'm proud to say I have not driven to class yet this term!

Eight of the participants continued to employ behavior change strategies they learned in class such as writing down workout goals and posting them on the refrigerator at home as a constant reminder (Nicole, Y0; Bill, Y0; Mark,Y1), engaging friends to go to the gym as a form of social support (Debbie, Y1; Jane,Y0; Sara,Y0; Mandy, Y1), or scheduling a specific time for exercise (Sara, Y0; Debbie, Y1; Dan, Y1). In addition, participants reflected on how helpful other physical activity courses were in maintaining their physical activity levels. These classes are not a part of the LFH curricula, but are recommended to students as a way to schedule physical activity and exercise into their daily lives at the university.

With regard to nutritional behaviors, 10 participants spoke of adopting certain lifestyle changes they learned from the LFH course such as cooking healthy meals at home on occasion, buying from a grocery store instead of always relying on the food served in a campus dormitory, and making a list of what to purchase before shopping. This was exemplified by Bill's (Y0) behavior prior to the course, which was "…to go to the store and just pile whatever I saw into my cart." The participants were also generally attentive to what they were eating or how they were improving their food choices (e.g., choosing fruits and vegetables over other options, choosing whole wheat over white bread, eating healthier), although they were not focusing on specific dietary recommendations such as the number of servings of fruits or vegetables they consumed daily, nutrient-dense foods, and fiber or saturated fat intake. Moreover, 11 participants spoke to the importance of the personal nutrition

journaling and the dietary analysis lab assignment; specifically, they recalled how it encouraged them to further consider the concepts of energy balance, weight management, and healthful food choices.

Theme 3: Long-Term Changes in Physical Activity and Nutrition Behaviors

Eighteen participants expressed eating "a little bit healthier" as a result of material learned in the course. One specific example of a sustained behavior change noted by two participants was the substitution of nonsugary drinks for sugary drinks. However, although most of the participants seemed capable of recalling specific aspects or even entire lectures from the course, they were not able to conjure up concrete examples during the focus group interviews. Notably, however, the awareness and obtained knowledge discussed in the first theme (i.e., awareness and knowledge of general fitness and nutrition) did not seem to dissipate readily. Claire noted (Y0), "If you can't make the change or decide you don't want to, [the class] is still knowledge...whether you make changes or not." From Claire's perspective, the tools and foundation for making healthy lifestyle changes are available to students from the point of the class onward.

All nine participants who were 1 year removed from the educational experience of the class also endorsed the course regardless of whether they enjoyed it. They thought it was good that the LFH course was required of all students on campus. The sentiment was expressed that being exposed to the course at the start of college allowed students to establish good habits while in college that might help counter the inherent challenges associated with maintaining a healthy lifestyle upon graduating. The participants felt that a key to the material being so ingrained was the interactive nature of the course: "They show me how to apply it and then I can take all that and apply it to different aspects of my life" (Dan, Y1). In sum, the participants could not readily identify specific behavioral changes that they could attribute to the course they had completed a year earlier, yet they defended the experience with testimonies such as "I think it definitely has helped me make changes in my life" (Vanessa, Y1), and Sam (Y1) stated,

> Learning how to live healthy might not have anything to do with what you're going to do as a career, but there's other

aspects of life [other] than just career. This is how to live your life and it's just as important if not more.

Theme 4: Benefits in Self-Perceptions

In general, the participants had difficulty articulating the extent to which changes in how they viewed themselves could be singularly attributed to the course. Madison (Y0) astutely observed,

> I'm not sure exactly what the class changed and what coming to college changed because it was in my second term and I really hadn't figured out who I was at college yet. I think it helped me to form...my image of myself in a better way."

The difficulty of addressing the notion of self might stem from multiple factors, including the possibility that the course did not play a prominent role in altering self-views and the likelihood that students are unaccustomed to reflecting on how they see themselves. What is interesting is that although the students throughout the LFH course engaged in class exercises where they monitored themselves in terms of health indicators and behaviors, they were not asked to rate or reflect on how they saw themselves. Such a requirement could have encouraged them to consider their self-views and how those views were associated with their lifestyle choices.

A key benefit of the course was evident in terms of the confidence the participants gained from the course content. For example, participants mentioned how helpful it was to tour the recreation facility on campus as part of a laboratory experience so they did not have to avoid the facility for fear of not knowing how to use the equipment and appearing foolish. Debbie (Y1) stated, "I was not super confident about figuring out the [recreation center name], because there's a lot of opportunities there, but you have to be able to figure out how to use them." Other participants shared that they derived confidence from their successes at ordering healthier food (e.g., "[I am] more confident in how I eat"), making wiser choices (e.g., "I just feel better about myself, cause I'm making better choices"), and implementing a workout plan independent of the structure previously provided by an athletic team (e.g., "I can do it on my own"). In addition, students recognized that confidence to cope with challenges in life could come from the act of engaging in physical activity. This was exemplified by Jennifer (Y1): "...You get

kind of revitalized by going to the gym and say, golly, I can tackle anything and I have the power. It just gives you that confidence... I can tackle whatever else that comes."

A final area of self-perceptions that resonated with the participants pertained to perceptions of competence or adequacy in specific areas of physical achievement. Five participants voiced their own insufficiency with regard to endurance and strength. Representative comments included the following: "I am not as healthy as I could be because I don't have as much strength as I could have... I don't have as much endurance as I could have cause I don't work out so much" (Erin, Y1) and "I thought I was stronger than I really was" (Debbie Y1). Participants referenced concepts from the course such as "use it or lose it" when discussing strength and also mentioned their lack of competence toward physical activity when they did not regularly participate.

Discussion

This investigation explored students' knowledge of and behaviors regarding physical activity, nutrition, and self-perceptions in a university-required LFH course. Students gained substantial knowledge and confidence in the areas of physical activity and nutrition behaviors for health, which is reflective of Higgins et al.'s (2009) research in which they found students reflected the three Bs (i.e., being, belonging, and becoming) toward behavior change. Students indicated they benefited from the educational experience, gained tools to improve their health behaviors, and recommended the course be required of all students despite varying perceptions of positive and negative experiences.

Heightened awareness was a primary benefit of participating in the course. The participants shared that they increased their awareness of physical activity and nutritional principles, as well as the interplay between physical activity and nutrition. This finding supports the value of adopting a multidisciplinary approach to the educational experience as opposed to focusing on physical activity or nutritional concepts in isolation. The importance of such multidisciplinary programs has previously been advanced. For example, Nemet et al. (2005) advocated for multidisciplinary programs following the short-term and longer term beneficial effects of a combined dietary–behavioral–physical activity intervention in overcoming obesity with children and adolescents.

From a pedagogical perspective, it might be interesting to include experiential learning experiences in the LFH course that address behavior change strategies such as behavior change contracts with peers, enrollment in concurrent activity classes, or a community project in which students participate and teach the local community about physical activity and nutrition concepts they have learned in the LFH class. These suggestions are consistent with Haas and Gregory (2000) who found experiential learning was valuable with medical students who identified health-related behavior change goals for themselves, assumed different roles in small group sessions (e.g., patient, doctor, manager, observer), and then evaluated their goal attainment.

A final area of awareness that resulted from the LFH course pertained to self-awareness. As a function of their involvement in the course, participants tracked their existing behaviors and found areas in need of improvement with regard to their physical activity and nutritional patterns. Receiving information about one's current health status and associated risks is consistent with consciousness raising (Prochaska & Marcus, 1994). Within the transtheoretical model such a strategy can be a vehicle for progressing individuals to the next stage of behavior change. A case in point is the study by Kim, Kim, and Chae (2010) who found that adults with metabolic syndrome in the regular exercise stages of the transtheoretical model were more likely to use consciousness raising compared to those in the nonregular exercise stages. Thus, it would seem LFH courses provide empirically supported strategies for facilitating the adoption and maintenance of positive health behavior change.

Perceived physical activity behaviors were the most significant areas of change noted most likely because multiple aspects of physical activity were the main topics in the course. Physical assessments and fitness plan development were also significant portions of the laboratory experiences. With regard to nutrition, the students recalled broad nutrition concepts rather than specific dietary guidelines. This finding speaks to a need for the existing curriculum to shift toward a more applied focus in order to better teach and model behavioral and problem-solving approaches for improving dietary intake.

Long-term changes in physical activity or nutritional behaviors were less frequently reported. This could be due to a number of factors that accompany the passage of time. Several lifestyle factors may act as barriers for exercise and proper nutrition such

as living off campus, being more individually responsible for one's dietary behaviors, and having more demands on one's time with employment (and thus less time for exercise). Participants may also have improved in activity and dietary behaviors immediately after the course, similar to the students who had just completed the course, but had no substantial change over the subsequent year, thus decreasing their awareness of the changes they made a year earlier.

There was support that participants acquired an understanding of how health behaviors can positively impact global self-perceptions. After attending the LFH course, students made a connection between engaging in health behaviors and developing positive self-views. More readily, however, students acquired confidence that stemmed from specific events such as learning how to navigate their way around the recreation facility on campus. This finding was consistent with the skill development hypothesis (Marsh, 1986) whereby the acquisition of skills or mastery experiences will enhance self-perceptions. Coupling skill-based physical activity classes with the lecture–laboratory format of the LFH course could allow for a practical connection between awareness and behavior.

Limitations

Highly interested students could have volunteered to share their experiences in changing health behaviors or to endorse their enjoyed educational experience. Also, the retrospective nature of the study design challenges the participants to accurately recall their experiences over an extended period of time; however, it also has inherent advantages in documenting the enduring effects of the educational experience.

Conclusion

We take heart in the participant sentiment suggesting that even if health behavior changes are not made immediately during or after the course, students certainly gained knowledge of what they "needed to do" and "how to do it" so that they could live healthier lives. Students gained the knowledge to be physically active, to eat well, and to understand that their mental health can also benefit from these health behaviors; this is an important starting point for college students. Furthermore, in this sample, students also became more physically active, more aware of the nutritional choices they were making in their day-to-day lives, and gained a deeper understanding

of the relationship between these behaviors and their psychological health.

References

Adams, T. M., II, & Brynteson, P. (1992). A comparison of attitudes and exercise habits of alumni from colleges with varying degrees of physical activity programs. *Research Quarterly for Exercise and Sport, 63*, 148–152.

Adams, T. M., II, & Brynteson, P. (1995). The effects of two types of required physical education programs on attitudes and exercise habits of college alumni. *The Physical Educator, 52*, 203–211.

American College Health Association. (2009). *American College Health Association National College Health Assessment II: Reference group executive summary fall 2009*. Linthicum, MD: Author.

Ansuini, C. G. (2001). The impact of terminating a wellness/activity requirement on campus trends in health and wellness [Abstract]. *American Journal of Health Promotion, 15*, 455.

Berg, B. L. (2009). *Qualitative research methods for the social sciences* (7th ed.). Boston, MA: Allyn and Bacon.

Brynteson, P., & Adams, T. M., II. (1993). The effects of conceptually based physical education programs on attitudes and exercise habits of college alumni after 2 to 11 years of follow-up. *Research Quarterly for Exercise and Sport, 64*, 208–212.

Butler, S. M., Black, D. R., Blue, C. L., & Gretebeck, R. J. (2004). Change in diet, physical activity, and body weight in female college freshman. *American Journal of Health Behavior, 28*(1), 24–32.

Calfas, K. J., Sallis, J. F., Nichols, J. F., Sarkin, J., Johnson, M. F., Caparosa, S., . . . Alcaraz, J. E. (2000). Project GRAD: Two-year outcomes of a randomized controlled physical activity intervention among young adults. *American Journal of Preventive Medicine, 18*, 28–37.

Cardinal, B. J., Cardinal, M. K., & Burger, M. E. (2005). Lifetime fitness for health course assessment: Implications for curriculum improvement. *Journal of Physical Education, Recreation and Dance, 76*(8), 48–52.

Cardinal, B. J., Jacques, K. M., & Levy, S. S. (2002). Evaluation of a university course aimed at promoting exercise behavior. *Journal of Sports Medicine and Physical Fitness, 42*(1), 113–119.

Cardinal, B. J., Sorensen, S. D., & Cardinal, M. K. (2012). Historical perspective and current status of the physical education graduation requirement at American 4-year colleges and universities. *Research Quarterly for Exercise and Sport*, *83*, 503–512.

Cardinal, B. J., & Spaziani, M. D. (2007). Effects of classroom and virtual "lifetime fitness for health" instruction on college students' exercise behavior. *The Physical Educator, 64*(4), 205–213.

Corbin, C. B., & Cardinal, B. J. (2008). Conceptual physical education: The anatomy of an innovation. *Quest, 60*(4), 467–487.

Cullen, K. W., Koehly, L. M., Anderson, C., Baranowski, T., Prokhorov, A., Basen-Engquist, K., . . . Hergenroeder, A. (1999). Gender differences in chronic disease risk behaviors through the transition out of high school. *American Journal of Preventive Medicine, 17*, 1–7.

DeVoe, D., Kennedy, C., Ransdell, L., Pirson, B., DeYoung, W., & Casey, K. (1998). Impact of health, fitness, and physical activity courses on the attitudes and behaviors of college students. *Journal of Gender, Culture, and Health, 3*, 243–255.

Ferrara, C. M. (2009). The college experience: Physical activity, nutrition and implications for intervention and future research. *Journal of Exercise Physiology Online, 12*(1), 23–35.

Fox, K. R. (1998). Advances in the measurement of the physical self. In J. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 295–310). Morgantown, WV: Information Technology.

Haas, L. J., & Gregory, M. C. (2000). Teaching behavior change skills to first-year medical students: A small group experiential approach. *Education for Health, 13*, 337–345.

Haberman, S., & Luffey, D. (1998). Weighing in college students' diet and exercise behaviors. *Journal of American College Health, 46*(4), 189.

Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., . . . Bauman, A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Medicine & Science in Sports & Exercise, 39*(8), 1423–1434.

Higgins, J. W., Lauzon, L. L., Yew, A., Bratseth, C., & Morley, V. (2009). University students' wellness: What difference can a course make? *College Student Journal, 43*(3), 766–777.

Huang, T. T. K., Harris, K. J., Lee, R. E., Nazir, N., Born, W., & Kaur, H. (2003). Assessing overweight, obesity, diet, and physical activity in college students. *Journal of American College Health, 52*(2), 83–86.

Jenkins, J. M., Jenkins, P., Collums, A., & Werhonig, G. (2006). Student perceptions of a conceptual physical education activity course. *The Physical Educator, 63*(4), 210–221.

Keating, X. D., Jianmin, G., Piñero, J. C., & Bridges, D. M. (2005). A meta-analysis of college students' physical activity behaviors. *Journal of American College Health, 54*(2), 116–125.

Kim, C.-J., Kim, B.-T., & Chae, S.-M. (2010). Application of the transtheoretical model: Exercise behavior in Korean adults with metabolic syndrome. *Journal of Cardiovascular Nursing, 25*, 323–331.

Kreuger, R. A. (1994). *Focus groups: A practical guide for applied research*. Thousand Oaks, CA: Sage.

Kulinna, P. H., Warfield, W. W., Jonaitis, S., Dean, M., & Corbin, C. (2009). The progression and characteristics of conceptually based fitness/wellness courses at American universities and colleges. *Journal of American College Health, 58*(2), 127–131.

Kupchella, C. E. (2009). Colleges and universities should give more broad-based attention to health and wellness—At all levels. *Journal of American College Health, 58*(2), 185–186.

Marsh, H. W. (1986). Global self-esteem: Its relation to specific facets of self-concepts and their importance. *Journal of Personality and Social Psychology, 51*, 1224–1236.

Mokdad, A. H., Serdula, S. K., Dietz, W. H., Bowman, B. A., Marks, J. S., & Koplan, J. P. (1999). The spread of obesity epidemic in the United States, 1991–1998. *Journal of the American Medical Association, 282,* 1519–1522.

Nelson, M. C., Story, M., Larson, N. I., Neumark-Sztainer, D., & Lytle, L. A. (2008). Emerging adulthood and college-aged youth: An overlooked age for weight-related behavior change. *Obesity, 16*, 2205–2211.

Nemet, D., Barkan, S., Epstein, Y., Friedland, O., Kowen, G., & Eliakim, A. (2005). Short- and long-term beneficial effects of a combined dietary–behavioral–physical activity intervention for the treatment of childhood obesity. *Pediatrics, 115*, e443–e449.

Ng, J. K., Cuddihy, T., & Fung, L. (2003). Does a required physical education program change leisure exercise behaviours in Hong Kong university students? The role of the environment explored. *Journal of Exercise Science and Fitness, 1*(2), 104–115.

Patton, M. Q. (2001). *Qualitative research and evaluation methods* (2nd ed.). Thousand Oaks, CA: Sage.

Pearman, S. N., Valois, R. F., Sargent, R. G., Saunders, R. P., Drane, J. W., & Macera, C. A. (1997). The impact of a required college health and physical education course on the health status of alumni. *Journal of American College Health, 46*, 77–85.

Prochaska, J. O., & Marcus, B. H. (1994). The transtheoretical model: Application to exercise. In R. K. Dishman (Ed.), *Advances in exercise adherence* (pp. 161–180). Champaign, IL: Human Kinetics.

Quinn, T. J., & Wilson, B. R. A. (1987). Physiological and performance effects of a 10-week voluntary lecture/exercise class sequence. *Fitness in Business, 1*(5), 175–178.

Saelens, B. E., Gehrman, C. A., Sallis, J. F., Calfas, K. J., Sarkin, J. A., & Caparosa, S. (2000). Use of self-management strategies in a 2-year cognitive-behavioral intervention to promote physical activity. *Behavioral Therapy, 31*, 365–379.

Sallis, J. F., Calfas, K. J., Nichols, J. F., Sarkin, J. A., Johnson, M. F., Caparosa, S., . . . Alcaraz, J. E. (1999). Evaluation of a university course to promote physical activity: Project GRAD. *Research Quarterly for Exercise and Sport, 70*(1), 1–10.

Sargent, D. A. (1900). The place for physical training in the school and college curriculum. *American Physical Education Review, 5*, 1–17.

Slava, S., Laurie, D. R., & Corbin, C. B. (1984). Long-term effects of a conceptual physical education program. *Research Quarterly for Exercise and Sport, 55*, 161–168.

Sparling, P. B. (2003). College physical education: An unrecognized agent of change in combating inactivity-related diseases. *Perspectives in Biology and Medicine, 46*, 579–587.

Sparling, P. B., & Snow, T. K. (2002). Physical activity patterns in recent college alumni. *Research Quarterly for Exercise and Sport, 73*, 200–205.

Wengreen, H., & Moncur, C. (2009). Change in diet, physical activity, and body weight among young-adults during the transition from high school to college. *Nutrition Journal, 8*, 32. doi:10.1186/1475-2891-8-32

Appendix A
Interview Questions

1. How were you impacted by the course?
   a. Were there any "memorable moments" in the lecture or labs that will help you remember the classes and increase the chances you will continue to maintain the health behaviors you have changed or increase the chances that you will adopt new wellness behaviors in the future?
2. Can you remember any behaviors that you changed during the time you took the class?
   a. Why do you think this behavior change occurred? In what way did the class facilitate or not facilitate this change?
   b. Have you been able to maintain that behavior change until now? If so, do you attribute this to anything you learned in the classes?
3. Were there any wellness behaviors that you didn't change immediately, but changed at a later date?
   a. Do you think this behavior change was a result of taking the classes, or due to something else? Explain
4. What were other influences beyond your behavior change?
5. Did you experience any positive or negative changes in how you thought about yourself?
   a. When did these changes occur and how long did they last?
6. Did you notice a difference in any self-perceptions such as your perceived physical appearance, strength, conditioning, or competence in sport and exercise?
7. Did any changes in self-views relate to how you view yourself outside of physical activity (e.g., did you feel differently about yourself with regard to social relationships, school work, or other areas of your life?).
8. How do you feel changes in your self-perceptions relate, if at all, to changes in your behavior? That is, did changes in your behavior occur before changes in your self-view, vice versa, or neither?