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Fit Into College II: Physical Activity and Nutrition Behavior Effectiveness and Programming Recommendations

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***Purpose*:** To determine whether residency (living on campus versus off campus) was related to the effects of Fit into College on students' health behaviors, and to understand interns' perceptions of their roles in mentoring their trainees. ***Design*:** Pre-experimental, one-group, pretest-posttest design and a posttest focus group interview. ***Setting*:** University-offered health and internship courses. ***Subjects*:** Twenty-four students (trainees) participated in the intervention, nine of whom lived on campus. Five student-interns served as their mentors. ***Intervention*:** Fit into College was a 14-week intervention in which trainees teamed up with an intern to improve and/or maintain healthy nutrition and physical activity behaviors. ***Measures*:** Trainees' nutrition and physical activity behaviors and perceptions were quantitatively assessed through surveys at preintervention and postintervention. Interns' mentoring perceptions were qualitatively assessed through a focus group interview after the intervention. ***Analysis*:** Two-factor repeated measure ANOVAs and qualitative theme identification. ***Results*:** Regardless of their residency location, the trainees' perceptions of the health benefits of eating fruits and vegetables improved during the intervention. However, for trainees living on campus, the intervention was not effective in increasing the number of fruits and vegetables consumed or the planning for food preparation. The interns perceived that they did not have adequate access to healthy foods, the knowledge or skills to prepare healthy foods, or the competency to teach food preparation strategies to their trainees. For trainees living on campus, the intervention was more effective in decreasing perceived exercise barriers than trainees living off campus. ***Conclusion*:** Future iterations of Fit into College may focus on 1) improving college students' planning and preparation of healthy foods, 2) segmenting trainees into more homogeneous groups for the interns to tailor their areas of expertise (campus vs. off-campus and/or freshman vs. upperclass students), and 3) collaborating with university-partners to improve environmental conditions to promote physical activity and healthy nutrition.

***Keywords*:** college students, physical activity, nutrition, residence halls

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The overweight and obesity rates among Americans have escalated from 12.0% in 1991–36.0% in 2004 and are estimated to continue to rise (Mokdad et al., 1999; Ogden, Carroll, Curtin et al., 2006). Sedentary lifestyles and poor dietary habits are key predictors of this national epidemic (Odgen et al., 2006). Research results repeatedly tout the efficacy of physical activity and nutrition interventions in attenuating the overweight and obesity crisis (Dietz & Robinson, 2005; Odgen et al., 2006; Stevens et al., 2007; Troiano, 2000; United States Department of Health and Human Services, 1996) and have been deemed as leading health indicators for improving our nation's health (Healthy People 2020, 2011).

Among the college student population, the overweight and obesity trends have similarly increased from 20.5% in 1995–32.4% in 2011 (American College Health Association, 2011). This increase is reflected in the dietary and physical activity habits of college students. Only 6.2% of college students (6.5% female and 5.4% male) consumed the recommended five or more fruits and vegetables per day (American College Health Association, 2010), and approximately one-fifth of students (19.2%; 21.4% male and 17.9% female) met the public health recommendation of engaging in 30 minutes or more of moderate intensity physical activity 5 or more days per week (American College Health Association, 2010; Haskell et al., 2007). Colleges provide a unique setting in which students have the opportunity to both live and learn on campus, thus underscoring the significance that health promotion programs and policies can have in enhancing and supporting students' health.

Background

Ecological models of health behavior posit that an individual's health behaviors are influenced by his or her surroundings (Broffenbrenner, 1979; Glanz, Rimer, & Viswanath, 2008; McLeroy, Bibeau, Steckler, & Glanz, 1988; Sallis & Owen, 2002). Since college students may spend the majority of their time within the campus' social and physical environments and are subject to eating campus-served foods and engaging in campus-housed physical activity, it behooves health researchers to address the individual, social, and environmental factors that positively or negatively influence students' health behaviors. Interventions that support students' ability to "fit into college" can mitigate the growing overweight and obesity epidemic by fostering healthy lifestyles.

Fit into College is a healthy behavior promotion intervention in which undergraduate students, otherwise known as "trainees," team up with a senior-level "intern" to improve and/or maintain their nutrition and physical activity behaviors, thus maximizing the trainees' likelihood to "fit into college" (Topp et al., 2011). Interns mentor their trainees (usually two trainees per intern) weekly to discuss nutrition and fitness principles and motivational strategies (individual-level support); provide coaching and counseling from the trainees' previous week and goal-setting for the upcoming week (social-level support); and exercise with the trainees in campus fitness facilities and dine in the campus restaurants (environmental-level support). See Table 1 for a description of the weekly cognitive and behavioral objectives to improve trainees' health.

Based on the Transtheoretical Model (TTM), the *Fit into College* intervention was designed to address the cognitive and behavioral aspects of health behavior

Table 1 ***Fit into College II*** **Weekly Objectives**

Week	Weekly session title	Cognitive objectives for the week	Behavioral objectives for the week with intern
1	Physical Activity (PA), Fitness Nutritional Intake Analysis	• Assess the participant's beliefs, attitudes and knowledge concerning PA, fitness and nutritional intake	• Complete baseline assessment of physical activity, physical fitness and nutritional intake
		• Establish a rapport with participant to understand their values and personal goals	• Review test PA, fitness and nutritional intake results and compare with established norms
		• Educate the participant on the components of PA, fitness, and nutritional intake analysis	• Discuss with the participant their personal values and goals
2	Introduction /What is My Fitness Level	• Raise the participant's awareness of their fitness level compared with normal levels for their age and gender based upon their initial fitness testing	• Introduce the TTM of health behavior change
		• Develop a sense of a realistic level of PA, fitness, and nutritional intake	• Discuss components of specific, measureable, attainable, realistic, and time-sensitive (SMART) goals
		• Attempt to link the behavior associated with achieving these goals with the participant's personal values	• Develop short term (2–4 weeks) and long term goals (14 weeks and beyond) for PA, fitness and nutritional intake
3 & 4	Exercise and You	• Increase the perceived physical, emotional, social benefits of exercise	• Tour the university gym facilities and inform the participant of other exercise opportunities on campus (e.g., yoga, intramurals, clubs etc.)
		• Decrease barriers to going to the university gym including embarrassment or unfamiliarity with the equipment	• Develop a personalized exercise prescription consistent with the participant's goals including cardiovascular, resistance, flexibility and event or goal specific training
		• Increase social support involved with going to the university gym	• Develop an exercise log based upon the exercise prescription
		• Increase knowledge of components of an exercise program	• Set short terms goals for adherence
			• Complete at least one session of their exercise prescription with their Fitness Intern per week for the remainder of the semester

(continued)

Table 1 ***(continued)***

Week	Weekly session title	Cognitive objectives for the week	Behavioral objectives for the week with intern
3 & 4	Exercise and You		• List the participant's perceived benefits and barriers to engaging in the proposed exercise prescription
5 & 6	Nutrition and You	• Increase the perceived physical, emotional, social benefits of consuming a nutritionally sound diet	• Discuss the benefits of consuming a nutritionally sound diet
		• Decrease barriers and enhance benefits of consuming a nutritionally sound diet	• Discuss the barriers to consuming a nutritionally sound diet and approaches to overcoming these barriers
		• Increase knowledge of the components of a nutritionally sound diet	• Develop a short term goal to improving the participant's nutritional intake over the next 2 weeks and discuss the benefits and barriers to achieving this goal
			• Share a meal at one of the on-campus dining facilities and discuss the nutritional content of the foods
7	Fieldtrip to the Grocery	• Increase self-efficacy and knowledge in using a full service grocery store: location of the store, how the store is arranged (e.g., fruits, vegetables and high fiber snacks) and identify various methods of transportation to and from the grocery store	• Review a grocery store coupon circular and plan a single day of "shelf stable" food which includes >2 serving of milk, 5–6 servings of fruit/vegetables at a cost less than $15
		• Understand how to read and use a grocery coupon circular	• Obtain transportation to a convenient local grocery store
		• Increase self-efficacy in planning a nutritionally sound diet on a limited budget	• Meet and tour the local grocery store and identify the location of various foods identified in the single day food plan
			• Identify a high fiber snack they would actually eat
			• Identify one new fruit/vegetable/dairy/high fiber snack they have never eaten but would consider eating

(continued)

Table 1 ***(continued)***

Week	Weekly session title	Cognitive objectives for the week	Behavioral objectives for the week with intern
7	Fieldtrip to the Grocery		• Discuss the benefits and barriers to shopping at the local grocery store and review the benefits and barriers to consuming a nutritionally sound diet
8	Maintaining Motivation	• Identify benefits and barriers to maintaining a lifestyle of regular exercise and consuming a nutritionally sound diet (e.g., time commitment, convenience, sleep, psychiatric symptoms such as stress, concentration and study skills, health, etc)	• Discuss progress toward previously stated short term (2–4 weeks) and long term goals (14 weeks and beyond) for PA, fitness and nutritional intake
		• Identify techniques to maintaining progress toward goals by linking behavior with personal values (e.g., social support, documentation, self-efficacy etc.)	• Acknowledge and support attempts at behavior change and progress toward short and long-term goals
			• Discuss barriers to goals, rewrite goals if necessary, and develop contingency plans to minimize barriers to goals
			• Develop a contingency plan to maintain regular exercise (e.g., rain, unexpected closing, travel) and consuming a nutritionally sound diet (e.g., weekends, visiting home, holidays, etc.)
			• Identify 3 contingency approaches to maintain regular exercise and consuming a nutritionally sound diet (e.g., social support, contracting, setting goals publicly)
9	Convenience/Vending Machine and Basic Pantry Dinning	• Increase awareness and change attitudes and beliefs of the nutritional content (calories, fat and sugar) foods available in the campus convenience/ vending machines	• List foods and the nutritional value of these foods the participant frequently buys from convenience/vending machines
		• Increase self-efficacy to consume nutritionally sound meal/snack purchased from convenience/ vending machines on campus	• Discuss the benefits and barriers to consuming foods from convenience/vending machines

(continued)

Table 1 ***(continued)***

Week	Weekly session title	Cognitive objectives for the week	Behavioral objectives for the week with intern
9	Convenience/Vending Machine and Basic Pantry Dinning		• Develop a plan to consume nutritionally sound foods that are available from convenience/vending machines
			• Meet for a nutritionally sound meal/snack purchased from convenience/vending machines on campus
10	Residence Hall Exercise Plan	• Increase knowledge about approaches to exercise that can be conducted while in the dorm	• Discuss components of the participant's exercise prescription and modifications to the prescription such that exercises can be performed in the residence hall to achieve the PA and fitness goals
		• Increase self-efficacy to perform exercise in the residence hall	• Develop an alternative exercise prescription that can be performed in the residence hall
		• Discuss the benefits and barriers to performing exercise in the residence hall	• Meet in the common area of the dorm and complete a single bout of the alternative exercise prescription
		• Improve the attitude toward engaging in exercise in the residence hall	• Discuss the benefits and barriers to completing the alternative exercise prescription in the residence hall
11	Residence Hall Chef	• Increase knowledge about approaches to cooking a nutritionally sound diet in participant's residence hall	• Identify resources available to the participant that would facilitate preparing a nutritionally sound diet in participant's residence hall
		• Increase self-efficacy to prepare a nutritionally sound diet in participant's residence hall	• Plan a nutritionally sound diet menu for a single day which could be prepared in the participant's residence hall
		• Discuss the benefits and barriers to preparing a nutritionally sound diet in participant's residence hall	• In the common area of the residence hall prepare and consume a single meal that is nutritionally sound

(continued)

Table 1 ***(continued)***

Week	Weekly session title	Cognitive objectives for the week	Behavioral objectives for the week with intern
11	Residence Hall Chef	• Improve the attitude toward preparing a nutritionally sound diet in participant's residence hall	• Discuss the benefits and barriers to preparing a nutritionally sound diet in participant's residence hall and approaches to enhance the perceived benefits and minimize the barriers
12	The Effects of Fitness and Diet	• Increase the relationships between PA, fitness, sound nutritional intake and personal components the participant values or their personal life goals	• Discuss participant's values or their personal life goals • Have the participant provide examples of individuals who exemplify their values or personal life goals • Have the participant discuss the relationships between their values or personal life goals and PA, fitness, sound nutritional intake • Have the participant discuss the impact they believe PA, fitness, sound nutritional intake may have had on individuals who exemplify their values or personal life goals
13	PA, Fitness, Nutritional Intake Analysis	• Reassess the participant's beliefs, attitudes and knowledge concerning PA, fitness and nutritional intake • Increase knowledge about the relationships between their behavior and changes in PA, fitness and nutritional intake	• Complete reassessment of physical activity, physical fitness and nutritional intake • Compare baseline and reassessment tests of PA, fitness and nutritional intake results and compare with established norms
14	Fit for Life	• Assess changes in the participant's beliefs, attitudes and knowledge concerning PA, fitness and nutritional intake • Increase participant's self-efficacy to maintain a lifestyle including physical activity, physical fitness and consuming a nutritionally sound diet	• Assess if short-term and long-term goals for PA, fitness and nutritional intake were achieved • Discuss with the participant reasons why or why not these goals were or were not achieved • Discuss the participants' progress along the TTM continuum of behavior change for PA and nutritional intake • Develop written plan for maintaining healthy diet and exercise behaviors for the future

change (Prochaska & Velicer, 1997; Topp et al., 2011). The TTM has been widely used in various health behaviors promotion studies, such as smoking cessation, physical activity and healthy eating (Marshall & Biddle, 2001; Prochaska & Velicer, 1997). Preliminary findings from the *Fit into College I* 10-week intervention showed successes in improving campus-residing, freshmen college students' health behaviors and outcomes (Topp et al., 2011). For the current study, 14-week *Fit into College II,* participant recruitment was broadened to include any undergraduate student living on or off campus. Considering the differences in students' access to healthy foods and physical activity opportunities that residency may present, it is important to explore the influence of residency on intervention results. For example, students who live off campus may or may not have convenient or affordable access to healthy foods or exercise facilities. And, although students who live on campus may have access to readily available foods and exercise facilities, barriers may be present within the college environment that influence students' access to healthy options. Therefore, the purposes of this current study were 1) to determine whether residency (living on campus versus off campus) was related to the effects of *Fit into College II* on students' health behaviors, and 2) to understand interns' perceptions of their roles in mentoring their trainees. Results from this study may provide information for future obesity prevention intervention designs among college students.

Methods

Sample

Before participant recruitment, the University Institutional Review Board approved two separate study protocol—one protocol outlining the data collection procedures involving the trainees enrolled in the *Fit into College II* intervention and the second protocol involving the interns enrolled in their senior-level internship course. Trainees were recruited from one healthy lifestyles class in which the intervention was conducted, and interns were recruited from one senior-level internship course. Trainees' and interns' instructors were not present during recruitment or data collection and were not notified as to which students participated in the study (as to not influence their course grade). Participants were explained the nature of the study and voluntarily signed the informed consent.

The average age of the trainees who participated in the study [n = 26; 15 females (57.7%), 11 males (42.3%)] was 20.2 years (range 18–25) with 7 of the 14 freshmen and 1 of the 12 upperclassmen living on campus. The mean age of the interns (n = 5; 2 females, 3 males) was 24.2 years (range 21–33), and all were full-time, health and sport sciences major students, and lived off campus.

Data Collection Procedures

This study used trainees' pre- and postintervention quantitative data and interns' postintervention qualitative data. The quantitative data were obtained at baseline and following the 14-week intervention from the trainees. The interns participated in a semistructured, open-ended format, focus group interview session (Patton, 2002). The session was digitally recorded to ensure reliability and transferability for transcription and content analysis.

Outcome Measures

For trainees, moderate intensity physical activity, vigorous intensity physical activity, walking and sedentary behavior were measured using the International Physical Activity Questionnaire (Craig et al., 2003), and exercise pros and cons were measured using the Exercise Decisional Balance Scale (Nigg, Rossi, Norman, & Benisovich, 1998). Exercise Decisional Balance is a two-factor, 10-item Likert-type scale using a five-point scale (1 = extremely important to 5 = not important). The coefficient of Cronbach's alpha has been reported to be 0.83 and 0.71 for benefits and barriers respectively (Paxton et al., 2008). Calculation of the Cronbach's alpha of the scale in this study yielded an alpha of 0.87 and 0.82 for benefits and barriers respectively.

Previous day numbers of fruits and vegetables were measured through a twenty-four hour intake record, and perceived health benefits, convenience, preparation, planning, and barriers of consuming fruits and vegetables were measured using the Fruit and Vegetables Decisional Balance Scale (Henry, Reimer, Smith, & Reicks, 2006). Fruits and Vegetables Decisional Balance is a five factor (health benefits-pros, general barriers-cons, convenience issues-cons, planning issues-pros, and preparation issues-pros) measurement using a five-point scale (1 = not important at all to 5 = extremely important). It has been reported to have a good internal reliability with Cronbach's alpha coefficient ranging from 0.61–0.81 (Henry, Reimer, Smith, & Reicks, 2006). In this current study, the coefficients of Cronbach's alpha were 0.76 for health benefits–pros, 0.51 for general barriers–cons, 0.51 for convenience issues–cons, 0.54 for planning issues–pros, and 0.72 for preparation issues–pros.

Data Analysis

A series of two-way repeated measure ANOVAs were developed to determine the main effect and interaction effect of the intervention and residency on trainees' health behaviors. The 12 physical activity and nutrition variables (moderate physical activity, vigorous physical activity, walking, sedentary behavior, previous day number of fruits and vegetables consumed, perceived health benefits, convenience, preparation, planning, and barriers of consuming fruits and vegetables, exercise pros, and exercise cons) served as dependent variables. In each repeated measure ANOVA, there was one between-subject variable (residency: living on campus vs. off campus), one within-subject variable (intervention: preintervention vs. postintervention), and one interaction variable (residency * intervention). A significance value of $\alpha = .05$ was set for analyses in this study. The focus group interview recording was transcribed verbatim, and themes were identified within the data using inductive coding methods (Patton, 2002).

Results

Trainees' Quantitative Results

The results of the repeated measure ANOVA revealed significant interaction effects of the intervention and residency on previous day number of fruits and vegetables ($F = 5.02$, $p < 0.05$), perceived fruit and vegetable planning ($F = 7.63$, $p < .01$) and

exercise barriers ($F = 11.49$, $p < .01$); therefore, the within-subject main effects of the intervention were interpreted based on residency. The significant interaction results indicated that the effects of intervention on trainees' previous day number of fruits and vegetables, perceived fruit and vegetable planning and exercise barriers depended on the residency of the trainees. An inspection of group means revealed that previous day number of fruits and vegetables decreased from preintervention ($M = 3.50$) to postintervention ($M = 1.14$) for trainees who lived on campus. Further, there was a decreasing trend on their perceived fruit and vegetable planning after intervention though not statistically significant ($M = 16.38$ vs. $M = 14.00$). The exercise barriers for trainees living on campus decreased significantly from 22.75 to 19.50 ($p < .01$) while the exercise barriers for trainees living off campus did not decrease significantly. After the intervention, trainees living on campus perceived fewer exercise barriers compared with trainees living off campus ($M = 19.50$ vs. $M = 23.39$, $p < .05$).

There were no significant interaction effects on other outcome variables, thus the main effects can be freely interpreted. Significant main effects were detected in two intervention variables: sedentary behaviors ($F = 6.764$, $p < .05$) and perceived fruits and vegetables' health benefits ($F = 32.00$, $p < .01$). After the intervention, trainees were more sedentary ($M = 184.79$ vs. $M = 326.86$) and the trainees' perceived health benefits increased from preintervention ($M = 31.57$) to postintervention ($M = 66.31$).

Interns' Qualitative Results

Planning, Preparing, and Accessing Healthy Foods. The interns conveyed that the trainees would have preferred more guidance on planning and preparing healthy meals in their residence hall rooms where they had access to a kitchen. However, one intern indicated that she "didn't want to cook because [she] worked late and had to study afterwards." Another intern indicated that "it takes so much time and energy really, if you think about it—to prepare [healthy foods]." Furthermore, all interns felt compelled to eat the university food since they were required to purchase a mandatory meal plan, regardless of campus residence or not. The interns ". . . tried to go over what was better choices [at a campus] buffet . . . . We went to [campus fast-food restaurant] . . . and talked about the options they have."

Home Exercising. Some trainees were intimidated to exercise in the campus fitness center despite their interns showing them how to use the equipment and exercising with them. The interns acknowledged their trainees' hesitation and were able to share home exercise programs with their trainees. One intern recalled "I print off like exercises that you get from like *Self Magazine* . . . those little workouts and things . . . . We would do those together and that was fun so they had something to do at home."

Targeting Students. One intern, who was also an intern the previous year, indicated that the intervention had expanded too quickly. According to him, "taking seniors and juniors made a big difference" in a negative way. Another intern agreed stating "Yeah, mine [trainees] were all upper class. Two were seniors and they had all had nutrition and they had gone through a lot of the classes so I was just

trying to get them to incorporate it into their life. They knew a lot of the things I was telling them." She further indicated that "They had heard it all. They just didn't care to do it."

Discussion

Regardless of their residency location, the trainees' perceived health benefits of eating fruits and vegetables improved during the intervention. However, for trainees living on campus, the intervention was not effective in increasing the number of fruits and vegetables consumed and fruits and vegetables planning. An interesting theme emerged from the interns' focus group session and warrants additional discussion. The interns perceived that they did not have adequate access to healthy foods nor did they have the knowledge or skills to prepare healthy foods. Further, they felt they were not competent in teaching food preparation strategies to their trainees. Thus, interns' lack of knowledge and skills on food preparation may result in the ineffectiveness of the intervention in increasing trainees' fruits and vegetables consumption.

For trainees living on campus, the intervention seemed to be more effective on decreasing perceived exercise barriers than trainees living off campus. This may be due to the convenient access to exercise facilities for trainees living on campus. Interestingly, the interns indicated that some trainees still preferred to exercise in their residence hall rooms, even though university provided them with exercise facilities.

After the intervention, the trainees, regardless of residency, were more sedentary and showed no significant increase on moderate, vigorous activity and walking. Since this intervention occurred in the fall semester (August through December), the increase in sedentary behaviors may be attributed to students' increase in studying time for final exams, or the onset of colder weather thus decreasing students' engagement in outdoor physical activities. Further, some trainees were intimidated to exercise in the campus fitness center despite their interns showing them how to use the equipment and exercising with them.

In this study, students' access to healthy foods and exercise facilities were environmental factors that hinged upon institutional policies. According to ecological theories of health behavior (McLeroy et al., 1988), these institutional, community, or public policies can influence student's health behaviors. Therefore, policies should be targeted intervention areas in which faculty and students can identify and implement healthy alternatives on and off campus.

Lastly, regarding the interns' perceptions of their roles in mentoring their trainees, the interns expressed their desire to offer *Fit into College* to freshman only, as it was offered the first year of the intervention. They thought that targeting a specific group would help achieve the overall goal of "fitting into college." Since social support was qualitatively identified as a key component for the interns to effectively mentor their trainees, the interns felt that including freshmen-only would help build a more homogenous group.

The findings of this study however, may not be generalizable to other groups of college students since this study consisted of a small, self-selected sample of students enrolled in a university-offered health course. In addition, social desirability

may have limited their responses during the interviews. Further studies should include a larger, randomly selected sample and a comparison group.

Conclusions and Recommendations

As universities strive to improve environmental conditions that facilitate healthy behaviors, the results of this study clearly underscore the importance of fostering students' knowledge, attitudes, and skills as well as cultivating social support. A university-wide ecological approach to health promotion (Sallis & Owen, 2002), that focuses on individual, social, and environmental factors, can be an effective strategy for attenuating the overweight and obesity epidemic among students. Future iterations of *Fit into College* may focus on 1) improving college students' planning and preparation of healthy foods, 2) segmenting trainees into more homogeneous groups for the interns to tailor their areas of expertise (campus vs. off-campus and/or freshman vs. upperclass students), and 3) collaborating with university-partners to improve environmental conditions to promote physical activity and healthy nutrition.

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