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VOLUME 38(5) www.ajpm-online.net MAY 2010

| | | | |
|--------------------------|--|---|---|
| Research Articles | 543 | Effects of a College Course About Food and Society on Students' Eating Behaviors EB Hekler, CD Gardner, TN Robinson | |
| 465 | Evaluating the Food Environment: Application of the Healthy Eating Index-2005 J Ready, SM Krebs-Smith, C Boire | 548 | The U.S.-Mexico Border: A Time-Trend Analysis of Border-Crossing Injuries A Kelada, LL Hill, S Lindsay, D Slymen, D Fortage, R Coimbra |
| 472 | Healthfulness of the U.S. Food Supply: Little Improvement Despite Decades of Dietary Guidance SM Krebs-Smith, J Ready, C Boire | 551 | Adolescent Suicide and Health Risk Behaviors: Rhode Island's 2007 Youth Risk Behavior Survey Y Jang, DK Perry, JE Hesser |
| 478 | Microbial Quality of Food Available to Populations of Differing Socioeconomic Status ME Koro, S Anandan, JJ Quintan | Review and Special Articles | |
| 482 | Behavioral Counseling and Varenicline Treatment for Smoking Cessation GE Swan, JB McClure, LM Jack, SM Zbikowski, HS Javitz, SL Caltz, M Deprey, J Richards, TA McAfee | 556 | Future Health Applications of Genomics: Priorities for Communication, Behavioral, and Social Sciences Research CM McBride, D Bowen, LC Brody, CM Condit, RT Croyle, W Gwinn, MJ Khoury, LM Kozlity, BR Kort, TM Marteau, K McLeroy, K Patrick, TW Valente |
| 491 | Sports Participation and Problem Alcohol Use: A Multi-Wave National Sample of Adolescents D Mays, L DePadilla, NJ Thompson, H Kushner, M Windle | Current Issues | |
| 499 | The Relative Importance of Patient-Reported Barriers to Colorectal Cancer Screening RM Jones, SH Woolf, TD Cunningham, RE Johnson, AH Krist, SF Rothreich, SW Vernon | 566 | Being Sorry Is Not Enough: The Sorry State of the Evidence Base for Improving the Health of Indigenous Populations CL Paul, R Sanson-Fisher, J Stewart, AE Anderson |
| 508 | Patient-Reported Barriers to Colorectal Cancer Screening: A Mixed-Methods Analysis RM Jones, KJ Devers, AJ Kuzel, SH Woolf | Editorials and Commentary | |
| 517 | Hospitalizations for Poisoning by Prescription Opioids, Sedatives, and Tranquilizers JH Cohen, SM Davis, PM Furber, RD Skora, RD Tilston, RM Basasie | 569 | Folic Acid-Preventable Spina Bifida: A Good Start but Much to Be Done SP Dalfey, Jr. |
| 525 | Geographic Disparity, Area Poverty, and Human Papillomavirus Vaccination SL Pruitt, M Schoedman | 571 | Look Upstream to Prevent Border Injuries BS Levy |
| Brief Reports | | Departments | |
| 534 | Folic Acid Intake Among U.S. Women Aged 15-44 Years, National Health and Nutrition Examination Survey, 2003-2006 SC Tinker, ME Cogswell, O Devins, RJ Berry | 573 | Point-of-Decision Prompts to Increase Stair Use FF Eves |

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Effects of a College Course About Food and Society on Students' Eating Behaviors

Eric B. Hekler, PhD, Christopher D. Gardner, PhD, Thomas N. Robinson, MD, MPH

Background: Health education programs for promoting a healthful diet have shown limited success in clinical trials.

Purpose: This paper aims to examine whether an innovative educational course focused on societal-level issues related to food and food production (Food and Society) would promote healthful eating among college students.

Methods: A quasi-experimental non-RCT was conducted to compare changes in eating behaviors among students taking the Food and Society course ($n=28$) versus students taking health-related human biology courses about obesity, health psychology, and community health assessment ($n=72$). All participants were undergraduates. A Food Frequency Questionnaire was administered at the beginning and end of the four courses taught from January through March 2009. Students in the Food and Society course read selected portions of popular books and essays (e.g., Michael Pollan's *Omnivore's Dilemma*) and watched documentaries (e.g., Aaron Woolf's *King Corn*) highlighting environmental, ethical, social justice, cultural, political, and agricultural issues related to food and food production, and discussed these major themes during class sessions. In addition, students were required to (1) write an Op-Ed article and (2) create a brief YouTube video focused on themes discussed in the course.

Results: The students who took the Food and Society course reported significantly improving their healthful eating ($F[2, 97]=5.72, p=0.02$), with greatest improvements in increased vegetable ($F[2, 97]=10.96, p=0.001$) and decreased high-fat dairy ($F[2, 97]=5.39, p=0.02$) intakes relative to the comparison group.

Conclusions: The results suggest that it may be possible to change dietary behaviors in college students by focusing on social, ethical, cultural, and environmental issues related to food and food production.

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Introduction

Improving dietary behaviors for disease prevention is challenging.¹ Many medical/public health interventions emphasize health-related outcomes as motivators for behavior change (e.g., weight loss) but

focus less on rewarding aspects of the behavior changes themselves (i.e., the process of behavior change).^{2,3} Interventions may work better if they address process motivation.²

If **process motivation** is emphasized, interventions may not need to focus on health. These are called **stealth interventions** because the primary focus is promoting behavior change via a motivating process for the participant (e.g., dance classes for adolescent girls)⁴ that, as a side effect, influences a health outcome that the clinician/policymaker deems important (e.g., physical activity).^{2,5} Effective TV-viewing reduction and physical activity interventions for children and families used this stealth intervention model.^{4,6}

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Social/ideological movements are other potentially powerful process motivators.^{2,3} Some existing and emerging social/ideological movements share behavioral goals with healthful living, including environmental sustainability, animal rights, social justice, labor rights, cultural movements, and agricultural reform (subsequently referred to as food-related social issues).^{2,3} For example, engagement in environmental sustainability might encourage eating more fresh vegetables and fruits and less processed foods, meat, and dairy. Therefore, it was hypothesized that a course about food-related social issues would function as a stealth intervention to motivate college students to consume more vegetables and fruits and less high-fat meat, high-fat dairy, processed foods, and sweets.

Methods

This study used a quasi-experimental, nonrandomized control group design. Data were collected at the beginning and end of four college courses (January through March 2009). The experimental course “Food and Society: Exploring Eating Behaviors in a Social, Environmental and Policy Context” (Food and Society), taught by the authors, focused on food-related social issues, but did not focus on health issues, and thus was designed as a stealth intervention. Students read selected portions of popular books,^{7–14} and watched documentaries,^{15–17} and then discussed major themes in class. Assignments included writing and submitting an Op-Ed article (a newspaper opinion article) and creating a YouTube video in small groups, advocating for behavior change related to a course theme. To promote engagement, students were encouraged to find food-related social issue organizations and events and to share their experiences.

Three comparison courses—“Health Psychology,” “Community Assessment/Health,” and “Obesity: Clinical/Societal Implications”—were selected because they also were upper-level Human Biology courses, were delivered the same quarter, and were taught by experienced health promotion researchers and focused on a health message.

Dietary intake was assessed with items adapted from the Harvard Food Frequency Questionnaire (FFQ)¹⁸ and scored as servings per week within food categories (vegetables, fruits, high-fat dairy, high-fat meats, processed foods, and sweets). Students also rated the importance to them of six values: eating a healthful diet, staying physically fit, environmental sustainability, animal rights, social justice, and ethics and morality (Table 1) using items demonstrated to have satisfactory reliability and validity among college students (unpublished data). The protocol was approved by the Stanford University Panel on Human Subjects in Medical Research.

Statistical Analyses

All analyses were conducted in 2009. There were no differences among the three comparison courses on any eating variables from the FFQ, so their data were aggregated. Within-group pre-post changes were tested with paired sample *t*-tests. Differences between the Food and Society course and comparison

courses were assessed using ANCOVA, with changes in outcome behaviors/values as the dependent variable; group assignment (Food and Society or Comparison) as the independent variable; and baseline value of the dependent variable as a covariate. An intent-to-treat analysis was used (baseline values carried forward when post-test data were missing). To reduce the potential influence of outliers, Winsorization was used (replacing values greater than the 95th percentile with the 95th percentile value).¹⁹

To test the overall impact of the Food and Society course, a healthful diet score was calculated using baseline median splits for each food category. At each time point, intakes at or above the baseline median for vegetable and fruit consumption, and those at or below the baseline median for high-fat meat, high-fat dairy, processed foods, and sweets were given a +1 on the healthful diet score (possible range=0–6), following an established method.²⁰

Results

Table 1 summarizes all results. There were more psychology majors in the comparison courses than in the Food and Society course ($p=0.004$), but there were no other significant differences between the two groups on any other demographic, value, or outcome variables at baseline. Food and Society students reported significant, within-group improvements in vegetable ($p=0.03$) and high-fat dairy ($p=0.006$) consumption and near-significant improvements in sweets ($p=0.08$) and high-fat meat ($p=0.06$) consumption. The comparison group reported no improvements (p 's >0.14) and a decrease in vegetable consumption ($p=0.03$).

The Food and Society course significantly improved overall healthful eating relative to the comparison group ($F[2, 97]=5.72, p=0.02$). Vegetable consumption increased ($F[2, 97]=10.96, p=0.001$) and high-fat dairy consumption decreased ($F[2, 97]=5.39, p=0.02$) in the Food and Society course relative to the comparison group. The Food and Society course also significantly increased students' beliefs in the importance of the environment ($F[2, 97]=10.64, p=0.002$); animal rights ($F[2, 97]=9.92, p=0.002$); and healthful diet ($F[2, 97]=8.08, p=0.005$) relative to the comparison group.

Discussion

A course focused on food-related social issues improved healthful eating compared to courses focused on health issues. The Food and Society course also increased the strength of students' beliefs regarding the importance of the environment, animal rights, and eating healthful food. This increase was greater than that for the comparison students, suggesting a potential mechanism for making dietary improvements.

Table 1. Demographics, values, and outcome variable statistics, % unless otherwise indicated

| Variables | Comparison courses (n=72) | | Food and society course (n=28) | |
|---|---------------------------|-------------|--------------------------------|-------------|
| | Pre | Post | Pre | Post |
| Demographics | | | | |
| Female | 80.6 | | 82.1 | |
| Race/ethnicity | | | | |
| White | 45.8 | | 46.4 | |
| Asian/Asian-American | 12.5 | | 35.7 | |
| African-American/black | 11.1 | | 7.1 | |
| Other race/ethnicity | 15.3 | | 3.6 | |
| Multiracial | 15.3 | | 7.1 | |
| Grade level | | | | |
| Sophomore | 13.9 | | 7.1 | |
| Junior | 38.9 | | 39.3 | |
| Senior | 44.4 | | 46.4 | |
| Other | 2.8 | | 7.1 | |
| Major^a | | | | |
| Human biology | 56.9 | | 82.1 | |
| Psychology | 33.3 | | 0.0 | |
| Other | 8.3 | | 17.9 | |
| Lost to follow-up | | 13.9 | | 10.3 |
| Overweight (BMI>25)^b | 4.2 | | 0.0 | |
| Values variables (M±SD)^c | | | | |
| Importance of environmental sustainability ^d | 1.8±0.8 | 1.7±0.9 | 2.0±0.9 | 2.3±1.1** |
| Importance of animal rights ^d | 1.3±0.9 | 1.2±0.9 | 1.5±1.0 | 1.8±1.1** |
| Importance of eating a healthful diet ^d | 2.6±0.9 | 2.5±0.9 | 2.7±0.9 | 3.0±0.9** |
| Importance of staying physically fit | 2.7±1.2 | 2.6±1.0 | 2.9±1.1 | 3.0±1.0 |
| Importance of social justice | 2.9±1.1 | 2.8±1.1 | 2.8±1.0 | 2.8±1.0 |
| Importance of ethics and morality | 3.2±1.1 | 3.1±1.1 | 3.0±1.1 | 3.0±1.0 |
| Servings per week of dietary intake variables^e (M±SD) | | | | |
| Healthful diet score ^d | 3.1±1.6 | 3.3±1.6 | 3.3±1.5 | 4.0±1.6** |
| Vegetables ^d | 27.9±19.3 | 25.5±17.4** | 27.9±14.1 | 32.1±17.5** |
| High-fat dairy ^d | 8.7±6.2 | 8.3±5.8 | 8.5±6.5 | 6.3±4.8*** |
| High-fat meat | 4.2±3.7 | 3.8±3.5 | 4.0±4.1 | 3.1±4.4* |
| Sweets | 7.7±5.6 | 7.7±5.6 | 8.6±5.0 | 7.1±4.6* |
| Fruits | 13.0±9.2 | 13.4±9.5 | 14.6±7.6 | 16.1±8.6 |
| Processed foods | 4.9±4.3 | 4.8±4.2 | 5.0±4.2 | 3.6±2.3 |

^aThere were significantly more psychology majors in the comparison courses relative to the Food and Society course ($p=0.004$). There were no other differences between groups at baseline on any of the demographic; values (all p 's>0.23); or servings per week intake (all p 's>0.40) variables. Baseline group differences in demographic variables were tested with chi-square analyses.

^bBased on self-reported heights and weights. One participant in the control group and two participants in the intervention group did not report weight at baseline.

^cThese survey items were phrased as *Compared to other things in your life, [issue] is: Not at all important compared to other things in your life (coded=0); Less important (1); About as important (2); More important (3); Just about the most important (4); The very most important (5).*

^dANCOVA predicting changes in each variable controlling for baseline values indicated significant differences between courses for these variables.

^eHigh-fat dairy includes whole milk, ice cream, cream cheese, other cheese, margarine, and butter. High-fat meat includes bacon, hot dogs, hamburgers, processed meats (e.g., sausage, salami, and bologna), beef, pork, or lamb in a sandwich or as a main dish. Sweets include chocolate, candy without chocolate, pie or cakes, and cookies. Processed foods include fast food, soda, french fries, and processed snack food.

Pre to Post within-group changes were tested with paired-sample t-tests * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

These findings suggest that food-related social issues may be more motivating for the *process* of dietary behavior change than health-related issues (see Robinson^{2,3}). If this is true, the demonstrated short-term improvements in eating resulting from this stealth approach may more readily translate into long-term behavior change. This possibility requires further empirical testing.

The implications of the present study are also notable because young adults are at high risk for weight gain and associated cardiovascular disease risks.^{21,22} New approaches are needed for this age group, and a college course is relatively easy to disseminate.

There were several limitations to this pilot study. Students were not randomly assigned into courses. Students predisposed to making healthful dietary changes may have been more likely to enroll in a course entitled “Food and Society,” and there were more psychology majors in the comparison courses, creating a potential threat to internal validity.²³ Therefore, differences observed between groups may be unrelated to course effectiveness. Although this possibility cannot be ruled out, there were no significant differences between courses at baseline regarding any of the measured dietary behaviors or values (Table 1). Further, using health-related courses is a particularly rigorous comparison condition because they likely attract students predisposed to behavior change, and may prompt dietary behavior change themselves.

All participants were undergraduates at an upper-tier academic institution. It is not known if this intervention would be as effective among a less-educated group. Nonetheless, food justice, labor rights, and other related movements exist in urban and low-income areas,^{2,3} supporting the potential generalizability of the approach. Finally, although engagement in food-related social issues was encouraged, the experimental course focused primarily on increasing knowledge and awareness. However, anecdotal evidence during and after the course suggested that a number of students did become more engaged in food-related social issues.

Conclusion and Future Directions

These results suggest a potentially innovative behavior change approach. The results are consistent with the stealth intervention model, suggesting that intervention effectiveness can be improved by focusing on *process* motivations rather than *outcomes*, and they do not need to explicitly address health topics.^{2,3} Future studies in other samples should examine similar interventions, mechanisms whereby social issues influence behavior

change and their potential ability to maintain behavior change.

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