

## Research and Professional Briefs

# A “Contract for Change” Increases Produce Consumption in Low-Income Women: A Pilot Study

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**ABSTRACT**

This study determined whether a “Contract for Change” goal-setting exercise enhanced the effectiveness of the Expanded Food and Nutrition Education/Food Stamp Nutrition Education programs to increase produce consumption in low-income (<130% of poverty) women after 4 weeks. Thirty-eight participants were randomized in this three-group parallel arm study: (a) control group participants received life-skills lessons, (b) the education group received the Expanded Food and Nutrition Education/Food Stamp Nutrition Education “Food Guide Pyramid” lessons, and (c) the contract group also received the “Food Guide Pyramid” series and completed a “Contract for Change.” It was hypothesized that the contract group would have the greatest increases in advancement toward dietary change and produce consumption. Compared with controls, the contract group significantly moved toward acceptance of vegetable consumption ( $P \leq .05$ ). Compared with the education group, the contract group significantly increased fruit consumption. Results suggest that nutrition professionals can effectively use goal-setting to assist low-income populations with dietary change.

*J Am Diet Assoc.* 2005;105:1793-1796.

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0002-8223/05/10511-0010\$30.00/0

doi: 10.1016/j.jada.2005.08.015

Fewer than 60% of American adults eat the recommended five to nine servings of produce each day (1), and adults in lower socioeconomic classes consume even less (2). US Department of Agriculture (USDA) research shows that low-income families spend a significant portion of their limited resources on fats, sweets, and alcohol rather than on more nutritious alternatives (3). This is concerning given that fruits and vegetables are important sources of vitamins, minerals, fiber, and phytochemicals (4-7), and that diet is a modifiable risk factor known to significantly affect chronic disease risk (8).

Dietary habits are formed as a result of several factors interacting to produce a behavior. Factors associated with increased produce consumption include self-efficacy, availability, and knowledge of the 5 A Day campaign (9-11). In low-income groups, barriers such as cost, limited access to fresh produce, and lack of knowledge about the importance of consuming a balanced diet must also be overcome (12,13). Due to the complexity of facilitating behavior change, there is a critical need to create more effective educational tools.

A “Contract for Change” is a tool derived from the Behavior Modification model (14-16). In creating a contract, each participant sets a personal goal and explicit methods by which to achieve it. The purpose of this pilot study was to determine the effectiveness of pairing personalized goal-setting exercises within community-based nutrition education programs to promote behavior change in a low-income population. It was hypothesized that, through an increased sense of self-efficacy, the contract group would: (a) advance within the stages of change model toward accepting dietary change, and (b) increase produce consumption to a greater extent than the other groups.

**METHODS**

This intervention targeted English-speaking, low-income women (<130% of federal poverty level) who were potential recipients of University of California Cooperative Extension Expanded Food and Nutrition Education (EFNEP)/Food Stamp Nutrition Education (FSNEP) programs in seven California counties: San Joaquin, Solano, Sonoma, Mendocino, Santa Clara, Butte, and Calaveras. Counties were chosen to provide representation from both rural and urban areas. Women were eligible for the study if they were between the ages of 20 and 45 years, spoke English, and could attend classes over 3 months. Exclusion criteria were chronic disease (diabetes, cardio-

**Table 1.** Stage of change for acceptance of vegetable consumption: Health Beliefs Questionnaire

Treatment	Precontemplation	Contemplation	Decision	Action	Maintenance
	←————— % <sup>a</sup> —————→				
<b>Control</b> (n=5)					
Baseline	20	20	40	20	0
Final <sup>b</sup>	<b>0</b>	<b>40</b>	<b>40</b>	<b>20</b>	<b>0</b>
<b>Education</b> (n=14)					
Baseline	8	23	39	30	0
Final	7	7	43	43	0
<b>Contract</b> (n=19)					
Baseline	6	28	50	16	0
Final <sup>b</sup>	<b>0</b>	<b>0</b>	<b>53</b>	<b>47</b>	<b>0</b>

<sup>a</sup>Data are presented as percentage of participants within each stage of change. Repeated-measures analysis of variance compared group changes (movement forward through one or more stages of change) from baseline to final between treatment groups.

<sup>b</sup>The superscripted letters and boldface numbers denote group changes that are significantly different from one another ( $P \leq .05$ ).

vascular disease, or cancer) or pregnancy. The University of California, Davis Institutional Review Board approved this protocol and all women signed informed consent.

After recruitment, women were randomly assigned to a treatment and asked to attend four 1-hour classes over 4 weeks. All three of the following treatments were completed within the spring to fall seasons. The control group received the *Gateway to a Better Life* series discussing money management (17). The education group received the Food Guide Pyramid series currently in use by California EFNEP/FSNEP (18). Topics discussed included healthful approaches to eating and in-depth discussions of the components of the USDA Food Guide Pyramid. The contract group also received the Food Guide Pyramid series; in addition, women completed a Contract for Change at the initial meeting and were reminded of their goals at subsequent classes.

The Contract for Change tool was adapted from previous work demonstrating the effectiveness of this approach (16,19) focusing on dietary goals appropriate for our target population and was tested in focus groups by our research unit to ensure clarity. Outcome measures were assessed three times, both pre- and post-intervention, and with a final assessment occurring 1 month after intervention completion to evaluate whether the anticipated dietary changes were maintained.

The study took place over 9 months. All of the classes were delivered by University of California Cooperative Extension paraprofessional staff trained to deliver consistent curriculum and were recorded for quality assurance.

Three validated assessment tools were used to collect dietary information from the participants. The Health Beliefs questionnaire appraised the study participants' readiness to make a dietary change, as based on Prochaska's stages of change model (20), and consisted of 14 questions evaluating the dietary practices of a woman and her family. The Food Behavior Checklist, a 16-item questionnaire currently used by the California State EFNEP/FSNEP, determined food-consumption patterns among the target population (21). Finally, the Fred Hutchinson Food Frequency Questionnaire used both the 5 A Day method (seven items including a summary ques-

tion for fruit and a summary question for vegetables) and the summation method (100+ items presented in a list format) (22) to estimate the number of fruits and vegetables consumed by the study population.

Data from the Health Beliefs Questionnaire and Food Behavior Checklist were expressed as categorical variables and data from the Fred Hutchinson Food Frequency Questionnaire were expressed as continuous variables. The possible covariates of age, race, income, residence (rural vs urban), and initial fruit and vegetable consumption were analyzed with analysis of covariance prior to statistical testing. The effects of dietary intervention on the stage of dietary change were determined using SPSS 10.0 for Windows (SPSS Inc, 2004, Chicago, IL) by repeated-measures analysis of variance. The effects of dietary intervention on fruit and vegetable intakes were determined by one-way analysis of variance comparing the change observed between two time points. The significance level was set at  $P \leq .05$ .

## RESULTS AND DISCUSSION

Three-hundred forty-five women were screened for this pilot study. From this cohort, 65 (19%) clients were enrolled, 38 (58%) completed surveys at the final time point, and 35 (54%) completed surveys at the follow-up time point. Due to dropouts, the treatment groups were greatly skewed. Five women (13%) completed the control lesson series, 14 (37%) completed the education lesson series, and 19 (50%) completed the contract lesson series. There were no significant differences between the three groups with respect to age, ethnicity, or residence.

Based on responses to the Health Beliefs Questionnaire, the contract group made significantly more advances (movement) in stages of change toward acceptance of vegetable consumption compared with the control group (Table 1). Movement through stages of change for the education group was not significantly different from the other two groups. Acceptance of fruit consumption was relatively high for all groups and no significant changes were observed.

Data from the Fred Hutchinson Food Frequency Questionnaire showed a significant increase in 5 A Day esti-

**Table 2.** Estimation of fruit consumption (serving/day) among low-income women based on data from the Fred Hutchinson Food Frequency Questionnaire and the Food Behavior Checklist<sup>a</sup>

Treatment	Baseline	Final	Follow-up	Change: Baseline to final	Change: Baseline to follow-up
←————— <i>mean ± SD<sup>b</sup></i> —————→					
<b>5 A Day Method: Food Frequency Questionnaire</b>					
Control	2.3±1.8	3.0±2.2	2.5±1.6	0.7±2.4	0.2±1.2
Education	3.8±2.5	2.6±1.4	1.8±1.6	-1.2±1.8 <sup>x</sup>	-2.0±2.6 <sup>x</sup>
Contract	1.0±1.6	3.0±2.1	2.9±2.1	2.0±1.8 <sup>y</sup>	1.9±1.4 <sup>y</sup>
<b>Summation Method: Food Frequency Questionnaire</b>					
Control	2.2±1.8	2.3±1.1	2.9±3.0	0.1±1.4	0.7±3.0
Education	5.3±2.5	3.1±1.9	3.4±2.0	-2.2±2.3	-1.9±3.2 <sup>x</sup>
Contract	2.8±1.6	3.5±3.0	6.5±4.2	0.7±2.4	3.7±3.1 <sup>y</sup>
<b>Food Behavior Checklist</b>					
Control	3±1.6	5.4±6.4	3.8±2.1	2.4±2.2	0.8±-0.2
Education	3±1.7	2.3±1.2	3.5±1.3	-0.7±2.4	0.5±2.9 <sup>x</sup>
Contract	1±0.7	3±1.5	2.4±1.4	2±1.7	1.4±1.6 <sup>y</sup>

<sup>a</sup>One-way analysis of variance compared change between treatment groups (baseline to final or follow-up) for each method of fruit intake estimation.

<sup>b</sup>SD=standard deviation.

<sup>x,y</sup>The superscripted letters denote means that are significantly different from one another ( $P \leq .05$ ).

mations of fruit consumption between the baseline and final time points for the contract group compared with the education group (Table 2). No other significant increases were observed between these two time points. Change at follow-up was observed between the contract and education groups for both 5 A Day and summation estimations of fruit consumption (Table 2). Estimations of  $\beta$ -cryptoxanthine and vitamin C intake significantly increased in the contract group, supporting these observations. The decrease in produce consumption observed in the education group may be explained by a better understanding of a serving size after completion of the lesson series (23). No significant differences were observed for either method of vegetable consumption estimation, although a trend toward increased vegetable consumption was observed in the contract group.

Finally, the Food Behavior Checklist showed significant differences between the education and contract groups at follow-up for self-estimated fruit consumption (Table 2). Due to a small group size, the control group was not significantly different from either group for any of the fruit and vegetable estimations. Reported levels of produce consumption were consistent with other investigations (24-26).

The results of this pilot study demonstrate that tailored goal-setting exercises, paired with nutrition education, can be an effective means for nutrition professionals to facilitate dietary change in a low-income population. The major limitation to this pilot study was the relatively small number of participants. We believe our recruitment challenges can be attributed to two factors: (a) we originally planned to assess biochemical markers of produce consumption, but due to this factor many potential subjects declined participation; and (b) due to a dearth of bilingual validated theory-based assessment materials, all women participating in the intervention had to be fluent English speakers.

## CONCLUSIONS

Readiness to change and actual behavior change for produce intake can be demonstrated after brief interventions. The results of this pilot study show that goal-setting exercises can be an easy and effective means to increase the success of existing community-based education programs in low-income women. To this end, the California State EFNEP/FSNEP program has adopted the "Contract for Change" as a tool for county educators. It is recommended that future studies consider the limitations discussed and include larger and more representative populations.

The authors acknowledge that funding for this study was provided by the USDA Economic Research Service UC Davis Small Grants Program and the FSNE.

## References

1. Johnston CS, Taylor CA, Hampl JS. More Americans are eating "5 A Day" but intakes of dark green and cruciferous vegetables remain low. *J Nutr.* 2000;130:3063-3067.
2. Foerster SB, Wu S, Gregson J, Hudes M, Fierro MP. *California Dietary Practices Survey: Overall Trends in Healthy Eating Among Adults.* Sacramento, CA: Cancer Prevention and Nutrition Section, California Department of Health Services Public Health Institute; 1999.
3. Wilde PE, McNamara PE, Ranney CK. *The Effect on Dietary Quality of Participation in the Food Stamp and WIC Programs.* Washington, DC: Food and Rural Economics Division, Economic Research Service, US Department of Agriculture; 2000:1-12.
4. Hyson D. *The Health Benefits of Fruits and Vegetables: A Scientific Overview for Health Professionals.* Wilmington, DE: National Cancer Institute; 2002:1-20.

5. Hertog MG, Kromhout D, Aravanis C, Blackburn H, Buzina R, Fidanza F, Giampaoli S, Jansen A, Menotti A, Nedeljkovic S, Pekkarinen M, Simic BS, Toshima H, Feskens EJ, Hollman PC, Katan MB. Flavonoid intake and long-term risk of coronary heart disease and cancer in the Seven Countries Study. *Arch Intern Med.* 1995;155:381-386.
6. Hirvonen T, Pietinen P, Virtanen M, Ovaskainen ML, Hakkinen S, Albanes D, Virtamo J. Intake of flavonols and flavones and risk of coronary heart disease in male smokers. *Epidemiology.* 2001;12:62-67.
7. Hirvonen T, Virtamo J, Korhonen P, Albanes D, Pietinen P. Intake of flavonoids, carotenoids, vitamins C and E, and risk of stroke in male smokers. *Stroke.* 2000;31:2301-2306.
8. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA.* 2004;291:1238-1245.
9. Van Duyn MA, Kristal AR, Dodd K, Campbell MK, Subar AF, Stables G, Nebeling L, Glanz K. Association of awareness, intrapersonal and interpersonal factors, and stage of dietary change with fruit and vegetable consumption: A national survey. *Am J Health Promot.* 2001;16:69-78.
10. Satia JA, Kristal AR, Patterson RE, Neuhauser ML, Trudeau E. Psychosocial factors and dietary habits associated with vegetable consumption. *Nutrition.* 2002;18:247-254.
11. Trudeau E, Kristal AR, Li S, Patterson RE. Demographic and psychosocial predictors of fruit and vegetable intakes differ: Implications for dietary interventions. *J Am Diet Assoc.* 1998;98:1412-1417.
12. Dixon LB, Winkleby MA, Radimer KL. Dietary intakes and serum nutrients differ between adults from food-insufficient and food-sufficient families: Third National Health and Nutrition Examination Survey, 1988-1994. *J Nutr.* 2001;131:1232-1246.
13. Krebs-Smith S, Kantor LS. Choose a variety of fruits and vegetables daily: Understanding Complexities. *J Nutr.* 2001;131(suppl 2S-1):S487-S501.
14. Prochaska JJ, Zabinski MF, Calfas KJ, Sallis JF, Patrick K. Interactive communication technology for behavior change in clinical settings. *Am J Prev Med.* 2000;19:127-131.
15. Cullen KW, Baranowski T, Smith SP. Using goal setting as a strategy for dietary behavior change. *J Am Diet Assoc.* 2001;101:562-566.
16. Calfas KJ, Sallis JF, Zabinski MF, Wilfley DE, Rupp J, Prochaska JJ, Thompson S, Pratt M, Patrick K. Preliminary evaluation of a multicomponent program for nutrition and physical activity change in primary care: PACE+ for Adults. *Prev Med.* 2002;34:153-161.
17. *Gateway to a Better Life.* Riverside, CA: University of California Cooperative Extension; 1998.
18. *Expanded Food and Nutrition Education Program Core Curriculum.* Davis, CA: University of California Cooperative Extension; 2002.
19. Rosal MC, Ebeling CB, Lofgren I, Ockene JK, Ockene IS, Hebert JR. Facilitating dietary change: The patient-centered counseling model. *J Am Diet Assoc.* 2001;101:332-338.
20. Murphy SP, Bunch SJ, Kaiser LL, Townsend MS, Joy AB, Allen LH, Peerson J. *Validation of a Brief Checklist to Evaluate Nutrition Education Interventions.* Davis, CA: US Department of Agriculture/Food and Consumer Services; 1998:1-17.
21. Murphy SP, Kaiser LL, Townsend MS, Allen LH. Evaluation of validity items for a food behavior checklist. *J Am Diet Assoc.* 2001;101:751-756, 761.
22. Kristal AR, Vizenor NC, Patterson RE, Neuhauser ML, Shattuck AL, McLerran D. Precision and bias of food frequency-based measures of fruit and vegetable intakes. *Cancer Epidemiol Biomarkers Prev.* 2000;9:939-944.
23. Bensley L, Van Eenwyk J, Bruemmer BA. Measuring fruit and vegetable consumption: Providing serving size information doubles estimated percent eating five per day. *J Am Diet Assoc.* 2003;103:1530-1532.
24. Havas S, Anliker J, Greenberg D, Block G, Block T, Blik C, Langenberg P, DiClemente C. Final results of the Maryland WIC Food for Life Program. *Prev Med.* 2003;37:406-416.
25. McClelland JW, Demark-Wahnefried W, Mustian RD, Cowan AT, Campbell MK. Fruit and vegetable consumption of rural African Americans: Baseline survey results of the Black Churches United for Better Health 5 A Day Project. *Nutr Cancer.* 1998;30:148-157.
26. Thompson B, Demark-Wahnefried W, Taylor G, McClelland JW, Stables G, Havas S, Feng Z, Topor M, Heimendinger J, Reynolds KD, Cohen N. Baseline fruit and vegetable intake among adults in seven 5 A Day study centers located in diverse geographic areas. *J Am Diet Assoc.* 1999;99:1241-1248.