Research Brief

The Effect of Goal Setting on Fruit and Vegetable Consumption and Physical Activity Level in a Web-Based Intervention

Stephanie O'Donnell, MS, RD, LDN; Geoffrey W. Greene, PhD, RD, LDN; Bryan Blissmer, PhD

ABSTRACT

Objective: To explore the relationship between goal setting and fruit and vegetable (FV) consumption and physical activity (PA) in an intervention for college students.

Methods: Secondary data analysis of intervention group participants from a 10-week online intervention with complete weekly data (n = 724). Outcomes (cups of FV per day and minutes of PA per week) and goals for both behaviors were reported online each week. Weekly differences between goals and behaviors were calculated, as well as the proportion meeting individual goals and meeting recommendations for behaviors.

Results: There were significant ($P < .05$) effects of goal setting on both behaviors and of goal group (tertile of meeting weekly goals) on behavior, as well as meeting recommendations for both behaviors. There was an increase in FV consumption ($P < .001$) but no change in PA over time.

Conclusions and Implications: Goal setting as part of a Web-based intervention for college students was effective, but results differed for FV and PA. Goal setting for maintaining behavior may need to differ from goal setting for changing behavior.

Key Words: goal setting, fruit, vegetables, physical activity, college student (*J Nutr Educ Behav*. 2014;46:570-575.)

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INTRODUCTION

Most Americans do not meet recommendations for fruit and vegetable (FV) consumption and physical activity (PA). Inadequate performance of these health-related behaviors is a major contributor to chronic disease prevalence and premature mortality.[1-6] Only 5.8% of college students report consuming ≥ 5 servings of FV/d, although 5 servings is below current recommendations of 5–9 cups of FV/d[2,7]; only 21.5% report meeting recommendations for moderate-intensity PA on ≥ 5 d/wk.[7] Some interventions have been effective in increasing FV[8] and PA,[9] but results have been mixed.

A goal is the object or aim of an action or a desired level of performance proficiency, usually within a specified time frame.[10,11] Goal setting has been found to be effective in increasing task performance.[10-12] Locke and Latham[10] postulated that goals affect performance by 3 mechanisms: (1) a directive function (direct attention and effort toward goal-relevant activities and away from goal-irrelevant activities), (2) an energizing function (high goals lead to greater effort than low goals), (3) persistence (goals can prolong effort depending on difficulty level).[13] Goals also indirectly affect performance by leading to arousal, discovery, and/or the use of task-relevant information.[14] Setting a specific, difficult goal leads to higher performance than an ambiguous "do your best" goal.[10] Falling under this umbrella are SMART goals, which are specific to a behavior, measurable, attainable, realistic, and time bound.[15] Another way to improve goal achievement is to use implementation intentions. Implementation intentions specify when, where, and how, so that when a situation arises, people will know how to respond so that they can achieve goals.[16]

Whereas there is a clear definition of what a goal is, there is variability in how goals are set. They can be self-set, assigned, set participatively, or even guided.[10,17] Because of this variability in guidelines for goal-setting procedure, studies define goal setting in different ways. This could be 1 reason why some studies find goal setting to be an effective intervention,[18-20] whereas others do not.[21,22] Similarly, there have been conflicting results on the effect of goal setting on FV and PA,[18-22] and few of these studies focus on young adults.[17,22]

Greene and colleagues[23] recently completed an online intervention (Project WebHealth) that was effective in increasing FV and reducing decline in PA in college students. Although goal setting was a component of the intervention, the effect of goal setting

Department of Nutrition and Food Sciences, University of Rhode Island, Kingston, RI
Address for correspondence: Geoffrey W. Greene, PhD, RD, LDN, Department of Nutrition and Food Sciences, 112 Ranger Hall, University of Rhode Island, Kingston, RI 02881; Phone: (401) 874-4028; Fax: (401) 874-5974; E-mail: gwg@uri.edu

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on behavior was not assessed. The purpose of the current study was to explore the relationship between goal setting and FV as well as PA. Hypotheses were that FV and PA would increase over time with the use of weekly goal setting, and that by the end of the intervention, subjects who met or exceeded the majority of their goals would consume more FV and perform more PA than those who were not as effective goal achievers.

METHODS

Design and Participants

This study was a secondary analysis of data from Project WebHealth, which used an experimental design with random assignment to online intervention or non-treatment control groups[23] at 8 participating institutions (University of Maine, Michigan State University, Pennsylvania State University, University of Rhode Island, South Dakota State University, Syracuse University, Tuskegee University, and University of Wisconsin–Madison). The institutional review board at all participating institutions approved Project WebHealth and the Institutional Review Board at the University of Rhode Island approved the current study. Data collection for Project WebHealth started in September, 2007 and continued through the 3-month intervention period. Inclusion criteria for Project WebHealth were that participants be full-time students enrolled in 1 of the participating institutions, age 18–24 years, and with a body mass index ≥ 18.5; exclusion criteria were being pregnant or breastfeeding, being a nutrition or exercise science major, and having adverse health conditions that limit participation in a nutrition and exercise promotion program. The current study was restricted to the experimental group (n = 830) of Project WebHealth and was further restricted to subjects who completed all 10 online lessons with complete data for online weekly goals and behaviors (n = 724). Subjects responding "not sure" to minutes of physical activity for any week were excluded from PA analyses; thus, the analytic sample for PA analyses was 665.

The intervention for Project WebHealth has been described elsewhere.[23] Briefly, the program included 10 online lessons with facts, interactive questions, and personal feedback. Subjects were given access to 1 new lesson per week over the 10 weeks of the intervention, and each lesson took approximately 15 minutes to complete. The first lesson provided information about recommended targets as well as how to set a SMART goal.[15] The last lesson also included information about FV and PA recommendations. Four lessons focused on eating healthfully, 2 lessons on enjoyable physical activity, and 2 on size acceptance and non-dieting principles.[24]

At the end of each lesson, subjects reported average cups FV per day and minutes of PA per week and set a goal for each behavior for the following week. Weekly goals, reported behavior, and recommended targets for behaviors (5 cups FV/d and 150 min PA/wk) were graphed on each subject's profile page, and thus were available each time the subject logged on to the program. The final lesson asked participants to set goals for the following semester (these goals are not reported in this study). The self-report and goal-setting screens within each lesson included a dropdown menu with the following FV choices/d: < 0.5 cup, 0.5 cup, 1 cup, 1.5 cups, 2 cups, 2.5 cups, 3 cups, 3.5 cups, 4 cups, 4.5 cups, or ≥ 5 cups; and PA choices: 0, 1, 2, 3, 4, 5, 6, or 7 days of exercise with 10, 20, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, or ≥ 180 minutes (on average) per day. In addition, there was an option for "don't know/not sure." Goal and behavior were used to determine personal goal achievement (met or exceed goal). The researchers calculated a personal goal achievement score by summing weekly goal achievement (range, 0–9 goals achieved); subjects were divided into tertile groups by number of goals achieved (FV group 0 ≤ 3 goals, group 2 = 4–5 goals, group 3, ≥ 6 goals; PA group 0 ≤ 2 goals, group 2 = 3–4 goals, group 3 ≥ 5 goals). Behavior was compared with targets to assess target goal achievement (met or exceeded target).

Analyses

The sample was described using mean ± SD for continuous variables and proportions for categorical variables. The authors assessed primary outcomes by repeated-measures ANOVA (change in FV and PA) or ANCOVA (effect of goal attainment group on FV and PA week 10, with week 1 value as covariate) with Tukey *post hoc* comparisons between groups and effect size estimates (η^2).[25] Similar repeated-measures ANOVAs were used to assess change in secondary outcomes of change in goal for FV and PA and change in proportion meeting target for FV and PA. Difference between the goal for the next week and the behavior reported the following week were assessed using paired *t* tests (with Bonferroni adjustment); the authors examined relationships among variables using Pearson's bivariate correlations (with Bonferroni adjustment). Chi-square analysis assessed the association between personal goal achievement group and whether subjects were meeting recommendations at week 10. Finally, chi-square analysis assessed the association between those meeting recommendations at week 10 for FV and those meeting recommendations at week 10 for PA. Statistical significance for all analyses was set at $P < .05$, with Bonferroni adjustment as specified above (SPSS, version 20.0, IBM, Inc, Summers, NY, 2012).

RESULTS

The mean age of study participants (n = 724) was 19.2 ± 1.1 years, the reported body mass index was 23.7 ± 3.8 kg/m^2, and the sample was predominantly female (64%), white (79%), a freshman or sophomore (70%), and living on campus (72%).

Table 1 shows the relationship between reported FV intake (cups per day) from week 2 to week 10 and the goal set for the following week recorded from week 1 to week 9, as well as the relationship between behavior and goal, proportion meeting target, and proportion attaining personal goals. Fruit and vegetable intake increased significantly over time ($F = 75$; $P < .001$), with a moderate to large effect size[25] ($\eta^2 = .09$). There was also a significant effect of time on goal ($F = 32$; $P < .001$), with a small to moderate effect size ($\eta^2 = .04$). Goals were highest at week 1, decreased to lowest at week 2, and then increased consistently. There were significant ($P < .006$, Bonferroni adjustment) differences between goal and behavior each week; the difference