Appetite 58 (2012) 695–698

Contents lists available at SciVerse ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Short communication

# Predictors of weight loss success. Exercise vs. dietary self-efficacy and treatment attendance ☆

Shannon Byrne [a], Danielle Barry [a,b,*], Nancy M. Petry [a]

[a] Calhoun Cardiology Center, University of Connecticut Health Center, 263 Farmington Avenue (MC3944), Farmington, CT 06030-3944, USA
[b] Edith Nourse Rogers Memorial Veterans Affairs Hospital, 200 Springs Road (116B), Bedford, MA 01730, USA

ARTICLE INFO

*Article history:*
Received 29 June 2011
Received in revised form 27 October 2011
Accepted 2 January 2012
Available online 10 January 2012

*Keywords:*
Weight loss
Self-efficacy
Diet
Exercise
Treatment attendance

ABSTRACT

Pre-treatment diet and exercise self-efficacies can predict weight loss success. Changes in diet self-efficacy across treatment appear to be even stronger predictors than baseline levels, but research on changes in exercise self-efficacy is lacking. Using data from a pilot study evaluating tangible reinforcement for weight loss ($N = 30$), we examined the impact of changes in diet and exercise self-efficacy on outcomes. Multiple regression analyses indicated that treatment attendance and changes in exercise self-efficacy during treatment were the strongest predictors of weight loss. Developing weight loss programs that foster the development of exercise self-efficacy may enhance participants' success.

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## Introduction

Recent statistics indicate that a third of Americans are obese and approximately another third are overweight (Flegal, Carroll, Ogden, & Curtin, 2010). Excess body weight increases risk for medical and psychiatric conditions, including type 2 diabetes, cardiovascular disease, osteoarthritis, some cancers, and mood, anxiety, and personality disorders (Barry, Pietrzak, & Petry, 2008; Flegal, Graubard, Williamson, & Gail, 2005; Nguyen, Nguyen, Wooldridge, Slone, & Lane, 2010; Petry, Barry, Pietrzak, & Wagner, 2008). Losing weight, even as little as 5% of body weight, leads to significant reductions in health risks (Institute of Medicine, 1995; National Heart, Lung, & Blood Institute (NHLBI), 1998; Powell, Calvin, & Calvin, 2007). Although weight loss programs based on reducing dietary intake and increasing physical activity can be effective in promoting weight loss, results are usually modest, and attrition from weight loss programs is high (e.g., Honas, Early, Frederickson, & O'Brien, 2003). Identifying patient characteristics and behaviors associated with successful weight loss could inform the development of more effective interventions to address the growing obesity crisis (Fontaine & Cheskin, 1997).

The concept of self-efficacy is fundamental to behavior change interventions based on social cognitive theory. Self-efficacy refers to individuals' beliefs regarding their ability and competence to make the behavior changes required to achieve goals such as weight loss (Strecher, DeVellis, Becker, & Rosenstock, 1986). Individuals start pursuing goals with varying levels of self-efficacy, and higher self-efficacy is generally associated with greater effort and commitment to adopting healthy behaviors (Schwarzer, 1992). In turn, successful pursuit of goals can enhance self-efficacy (Batsis et al., 2009; McAuley & Blissmer, 2000; Strecher et al., 1986), increasing the likelihood behavior change will be maintained. Behaviors required for successful weight loss include reduction of caloric intake and increase in caloric expenditure, although the relationship between self-efficacy for these behaviors and successful weight loss is unclear.

Regarding pre-treatment diet self-efficacy, Prochaska, Norcross, Fowler, Follick, and Abrams (1992) found that pre-treatment scores on a measure of diet self-efficacy, the Weight Efficacy Lifestyle Questionnaire (WEL; Clark, Abrams, Niaura, Eaton, & Rossi, 1991), predicted weight loss among participants in a worksite weight loss program, but accounted for a very small proportion of the variance. Conversely, in a study of African American women receiving weight loss treatment from primary care physicians, pre-treatment WEL scores were actually associated with less weight loss, suggesting that self-efficacy beliefs can sometimes be inaccurate and arise from underestimating the difficulty of losing weight

☆ *Acknowledgements:* This study was funded by a grant to the second author from the Ethel Donaghue Center for Translating Research Into Practice and Policy. Preparation of this report was supported in part by NIH Grants R21-HL092382, P30-DA023918, and T32-AA07290. We thank Elizabeth Appel, M.D., Myra Rosenstein, M.D., and Amy Novotny for their invaluable assistance with this study.

* Corresponding author.
*E-mail address:* danielle.barry@va.gov (D. Barry).

0195-6663/$ - see front matter Published by Elsevier Ltd.
doi:10.1016/j.appet.2012.01.005

(Martin, Dutton, & Brantley, 2004). Fontaine and Cheskin (1997) found no association between pre-treatment WEL scores and either weight loss or program attendance in a sample of outpatients treated at a hospital based weight management program.

Some literature suggests that change in self-efficacy may be a more significant predictor of weight loss success than baseline self-efficacy. For example, while Martin et al. (2004) found that greater pre-treatment diet self-efficacy predicted less weight loss, they also observed that larger improvements in self-efficacy during treatment were associated with greater weight loss. Several other studies have also found that increases in diet self-efficacy scores from pre- to post-treatment are associated with greater weight loss (e.g., Bas & Donmez, 2009; Warziski, Sereika, Styn, Music, & Burke, 2008).

Exercise is another crucial component of successful weight loss programs. In one study, Linde, Rothman, Baldwin, and Jeffery (2006) examined both the WEL and an exercise self-efficacy scale adapted from the WEL as predictors of weight loss at various stages in treatment. They found pre-treatment scores on both the WEL and the exercise self-efficacy scale were associated with behaviors required for weight loss and with weight loss during treatment. However, they did not assess whether changes in exercise self-efficacy from pre- to post-treatment predicted greater weight loss.

Poor attendance and attrition from treatment are among the biggest barriers to the success of behavioral weight loss interventions (Gardner, et al., 2007; Honas, Early, Frederickson, & O'Brien, 2003; Teixeira, et al., 2004), and better session attendance is associated with greater weight loss during treatment and better maintenance of weight loss after treatment (Chao et al., 2000). The ability to persevere in treatment may be related to self-efficacy. For example, Bernier and Avard (1986) found that participants who completed treatment had higher pre-treatment self-efficacy than those who dropped out prematurely.

The goal of the current study was to evaluate the effects of pre-treatment self-efficacy for diet and exercise, as well as changes in self-efficacy occurring during treatment, on weight loss success. Finding an effect of baseline self-efficacy could improve understanding of individual differences in the likelihood of experiencing success in a behavioral weight loss intervention, while strong effects of changes in self-efficacy would argue for including techniques for improving self-efficacy in behavioral weight loss programs. Given the mixed findings regarding associations between dietary self-efficacy and weight loss and the relative paucity of studies examining associations between exercise self-efficacy and weight loss, examining the contribution of both forms of self-efficacy should shed light on their relative importance to weight loss success. Because practicing the behavior changes recommended by behavioral weight loss programs could contribute to both weight loss and to changes in self-efficacy, treatment attendance and changes in caloric intake and physical activity level were included in the analysis.

## Method

### Participants

Thirty adult primary care patients (25 women and 5 men) participated in the study, which was designed to compare a standard cognitive behavioral weight loss intervention (*Diabetes Prevention Program*, Wing & Gillis, 1996) to the same intervention with the addition of tangible reinforcements for weight loss and completion of activities that promote weight loss. All participants were referred by primary care physicians at an outpatient internal medicine clinic affiliated with the University of Connecticut Health Center. They were between 18 and 55 years old, had a body mass index (BMI) between 25.0 and 39.9, and had resting blood pressure between 90 and 140 systolic and between 60 and 90 diastolic. All participants were able to speak and read English at the 6th grade level and expressed willingness to be randomly assigned to a treatment group. Potential participants were excluded if they had any serious acute or chronic medical problems that would impact their ability to adhere to dietary and exercise regimens, if they were pregnant or breast feeding, if they had a current, uncontrolled psychiatric condition or serious psychiatric symptoms, if they met criteria for dependence on a substance other than nicotine, if they were planning to quit smoking in the next 3 months, if they had a history of any eating disorder, if they reported losing more than 10% of their heaviest body weight in the last 6 months, or if they had participated in a formal weight loss program in the last 3 months. The University's Institutional Review Board approved the study, and all participants signed written informed consent.

### Procedures

After providing informed consent, participants met with a research assistant at the medical clinic to complete a 1–2 h baseline evaluation to determine study eligibility, current level of physical activity, current dietary intake, and self-efficacy for regulating diet and exercise. Following the interview, eligible participants received a pedometer and a set of food diaries and were instructed to wear the pedometer and complete the food diaries on one weekday and one weekend day prior to their first appointment with a counselor.

### Measures

Weights were obtained using a digital scale that was calibrated monthly to ensure accurate measurements. Physical activity was evaluated using the average number of steps recorded on the pedometer over the two assigned days and the Paffenbarger Physical Activity Questionnaire (PAQ; Paffenbarger, Wing, & Hyde, 1978), which computes calories burned per week based on self-reported physical activity. Food diary reports were entered into the My Pyramid Tracker Program (USDA Center for Nutrition Policy and Promotion, 2005) to obtain average daily calories consumed.

The WEL and the Self-Efficacy for Exercise Scale (SEE; McAuley, 1992; Resnick & Jenkins, 2000) were used to assess self-efficacy for regulating diet and exercise, respectively. The WEL assesses self-efficacy related to avoiding overeating when faced with situations such as availability of food, negative emotions, physical discomfort, positive activities related to eating and social pressure to eat. Scores range from 0 to 180, with higher scores indicating greater self-efficacy. The SEE evaluates perceived confidence in one's ability to exercise when faced with a variety of barriers including fatigue, time constraints, physical or emotional discomfort, lack of social support, or competing activities. Scores range from 0 to 1800, with higher scores indicating greater self-efficacy. Both instruments have demonstrated reliability and validity (Resnick & Jenkins, 2000; Rossi, Rossi, Velicer, & Prochaska, 1995).

Participants met with the research assistant for a post-treatment evaluation using the same measures at the end of the 12-week intervention. A week prior to the post-treatment evaluation, participants were reminded to wear the pedometer and complete food diaries on at least one weekday and one weekend day and to bring the pedometer and food diaries to the post-treatment evaluation.