



Applied nutritional investigation

The liberating effect of weight loss supplements on dietary control: A field experiment



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ABSTRACT

Objectives: Taking weight-loss supplements may create illusion of protection against weight gain and thereby loosen subsequent dietary self-control. The current study examined whether taking weight-loss supplement would increase food intake and further tested whether positive attitudes toward supplements would increase susceptibility to overeating.

Methods: Participants were randomly assigned to take either a known placebo or a purported weight loss supplement (actually, the same placebo). After supplement provision, participants' actual food consumption at a reward buffet lunch was recorded.

Results: Compared with controls, participants receiving a purported weight loss supplement ate more food at the reward buffet. Perceived progress toward the goal of weight reduction mediated the connection between use of weight loss supplements and subsequent food consumption. Participants with more positive attitudes toward weight loss supplements were more susceptible to the liberating effect of taking weight loss supplements on food intake.

Conclusion: Using weight loss supplements may produce unintended consequences on dietary self-regulation. The public should pay more attention to the notion of psychological liberation when using weight loss supplements.

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Introduction

Achieving and maintaining weight loss requires significant lifestyle and behavioral modification [1]. Thus, use of non-prescription weight loss supplements is an appealing alternative or adjunct for many people trying to manage their weight [2,3]. For example, a survey conducted in 2005–2006 with a representative sample of 3500 U.S. adults found that 33.9% of those adults trying to lose weight reported using a dietary supplement for weight loss at some point [4]. Ironically, however, the obese population has increased at the same time as the use of weight loss supplements has become widespread [5]. The present study provides experimental evidence that weight loss supplements may be associated with loosened dietary control in a real dining situation.

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In general, dietary choices are usually driven by multiple underlying goals. For instance, people may wish to fully enjoy culinary pleasure while maintaining a regime of weight reduction. According to the perspective articulated in the literature on progress toward multiple goals [6], actions used to infer progress toward one goal can liberate individuals and thereby “increase their likelihood of pursuing incongruent actions (p. 370).” Previous research has shown that making a healthy choice can generate liberation from subsequent health regulation [7,8]. For example, one study [6] demonstrated that dieters who perceived greater progress toward their ideal weight were more likely to choose a tasty but fattening chocolate bar over a healthy snack. In a similar vein, taking weight loss supplements may suggest that progress has been made and that the focal goal is nearly achieved. As a result, individuals may be more likely to pursue alternative goals.

Arguing from the notion of the liberating effect [6,9], we contend that engaging in actions such as taking weight loss supplements, which can signal that sufficient progress toward weight reduction has already been achieved, may generate psychological liberation from subsequent dietary control. It

recently has been demonstrated that the liberating effect of the use of weight loss supplements in a laboratory experiment found that participants receiving a purported supplement ate more in a taste task and preferred larger quantities of sugar in their reward drinks than did controls [10]. The researchers reasoned that taking weight loss supplements may have led participants to believe that they were making progress toward their weight loss goal, which increased the competing desire to pursue culinary pleasure. However, previous studies [6,8,10] demonstrating the liberating effect were conducted in laboratory settings. To expand the generalizability of findings about psychological liberation, this research examined the liberating effect of taking weight loss supplements on dieting behavior in the context of a buffet-style reward meal. Moreover, the present study examined the moderating role of an attitudinal factor to test the boundary of the liberating effect. That is, we predicted that those users with more positive attitudes toward weight loss supplements would experience more liberation and would take greater advantage of supplement use by using it as evidence of their perceived progress toward weight reduction. We predicted that, if taking weight loss supplements decreased dietary self-regulation, then such use would have an especially strong effect on users with more positive attitudes toward supplements.

Materials and methods

We conducted a field experiment to examine whether the use of weight loss supplements induced a stronger perception that progress toward weight reduction had been achieved and thereby decrease the self-regulation involved in dieting behaviors. To bridge the gap between the laboratory and the real world, the dependent variable was assessed in a natural environment (i.e., a buffet-style meal) to test our predictions. Consumption of a buffet-type meal was examined because previous research has shown that buffets are closely related to excessive energy intake and weight gain (see [11] for a related review). Additionally, this research investigated the moderating role of attitudes toward weight loss supplements under the assumption that positive attitudes toward weight loss supplements would more likely lead to poor dietary self-control.

Participants

Women were recruited from a larger community using a subject pool drawn from a dietary health study in Tainan City (the second largest city in southern Taiwan) that was administered through the Southern Taiwan University. The current experiment focused on young adult women because a cross-sectional population-based telephone survey of health behaviors from September 2002 to December 2002 (N = 9403) showed that women ages 18 to 34 y were most likely to use supplements compared with other age and gender groups [4]. The study sample consisted of 70 participants (mean 28.16 y, SD = 5.69) who intended to lose weight. Twelve candidate participants who did not meet the study criteria (i.e., no history of allergies to dietary supplements, no current psychopathology, no behavior that would prevent them from consuming dietary supplements, and having an intention to lose weight) were excluded. This study was approved by the ethical board of the National Sun Yat-sen University.

Procedure

During recruitment, participants were asked to rate their attitudes toward weight loss supplements. Attitudinal items were embedded in a faux questionnaire. This study drew from previous work [12] to assess participants' attitudes toward weight loss supplements. Participants responded to "What do you generally think about weight-loss supplements?" using a scale ranging from 1 (*very unsafe/very bad/very unfavorable/very negative/very unhealthy/very invaluable/very unnecessary*) to 7 (*very safe/very good/very favorable/very positive/very healthy/very valuable/very necessary*). Scores on these items showed internal consistency ($\alpha = 0.89$). The mean of the seven items was computed to construct an index measuring attitudes toward supplements. A high score indicated a positive attitude toward weight loss supplements. Participants were told not to take any dietary supplements on the day of study participation and to ensure that they could enjoy a reward buffet at a student restaurant.

Upon arrival, participants were asked to help a faculty member in the Biology Department with a functional food test to be used in a randomized, placebo-controlled study. This department name was used to avoid participants guessing the study purpose if they knew the author affiliations. After providing written

Table 1

Participant demographics and descriptive statistics for the measures

	Weight loss supplement*		Control		P-value
	n	%	n	%	
Dairy supplement users	20	57.1	18	51.4	0.73
Overweight (BMI ≥ 25 kg/m ²)	17	48.5	18	51.4	0.81
		Mean (SD)		Mean (SD)	
Age (y)		27.06 (4.12)		29.26 (6.81)	0.11
Time since last meal (h)		1.90 (1.11)		1.84 (1.37)	0.85
BMI (kg/m ²)		24.76 (3.32)		24.86 (3.33)	0.91
Perceived goal progress (1–7)		4.72 (0.97) [†]		3.49 (1.07)	<0.01
Attitudes toward weight loss supplements (1–7)		4.17 (1.34)		4.05 (1.07)	0.69
Number of food items eaten		9.77 (1.99) [†]		8.37 (1.29)	<0.01
Number of less healthy items eaten		5.71 (0.89) [†]		3.74 (0.95)	<0.01
Number of healthy items eaten		4.06 (1.11) [†]		4.63 (0.84)	0.02

BMI, body mass index

* Each condition (weight loss supplement vs. control) involved 35 participants.

[†] Means are significantly different from those of the control conditions at $P < 0.05$ according to the independent samples *t* test (two-tailed).

consent, participants were randomly assigned to the weight loss supplement or the control group. Participants in the supplement group were told that the "test pill will help you to attain weight loss," whereas those in the control group were told that the "test pill is a placebo that will be used in a future study." Unbeknownst to participants, all received placebo pills. They then rated the perceived attributes of the pill they had just taken (e.g., size, shape, color, texture, and flavor) on a questionnaire that included an item measuring perceived progress toward their goal [10]. The process of rating was a means of disguising the real purpose and gaining increased involvement from the participants. Participants were also asked to use a seven-point scale (1 = *least likely*, 7 = *most likely*) to indicate the extent to which they felt they were making progress toward the goal of weight reduction [6,10]. Additionally, number of daily weight loss supplements taken, body mass index (BMI), and time since last meal were recorded (Table 1).

After taking pills, each participant was led to a student restaurant for a lunch buffet. The experiment occurred during six weekends, and each session involved 10 to 12 participants. The food on this buffet, which remained consistent over the course of the experiment, consisted of six healthy items (e.g., fruit, salad with Japanese dressing, vegetable pizza, steamed bean curd, steamed fish, and sugar-free green tea) and six less healthy items (e.g., chocolate cookies, French fries, fried chicken, cheeseburgers, soda, and custard). Healthy and less healthy items were identified by two dietitians blinded to the purposes of the experiment. Interrater reliability was perfect (percentage of agreement = 1.00). Each participant's spontaneous food consumption was recorded by a yoked observer who followed and pretended to be a customer. The yoked observer simply walked by the assigned participant whenever she took food items and recorded the food items eaten. After participants finished eating, they were asked to return the guest comment card to the laboratory. During a probing session, none of the participants guessed the study purpose, and none had noticed that they were being observed during the meal. Each participant was then debriefed, thanked, and dismissed.

Results

The number of food items eaten was not associated with participant BMI (mean 24.81; SD = 3.30; $r = 0.06$; $P > 0.61$); number of daily supplements taken (mean 0.69; SD = 0.60; $r = 0.11$; $P > 0.34$); or age ($r = -0.03$; $P > 0.82$). The data on food items eaten was submitted to a 2 (manipulation: weight loss versus placebo) \times 2 (food items: healthy versus less healthy) mixed-factorial analysis of covariance, treating the time since last meal as a covariate. Importantly, a main effect of supplement manipulation revealed that, on average, participants presumably taking weight loss supplements ate a greater number of food items than did control subjects [$F(1, 67) = 12.07$; $P < 0.001$; partial $\eta^2 = 0.15$] (Table 1). This finding suggests that individuals may be susceptible to the risk for excessive food intake after

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