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Self-perceived successful weight regulators are less affected by self-regulatory depletion in the domain of eating behavior

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ABSTRACT

Weight loss and maintenance goals are highly prevalent in many affluent societies, but many weight regulators are not successful in the long term. Research started to reveal psychological mechanisms that help successful weight regulators in being successful. In the present study, we tested the assumption that these mechanisms facilitate successful self-regulation particularly under conditions of self-regulatory depletion. Participants exerted or did not exert self-control in a first task before engaging in a taste test of a tempting but unhealthy food. Participants who had initially exerted self-control ate more than participants in the control condition. This effect was reduced in self-perceived successful weight regulators as compared to perceived unsuccessful self-regulators. A reduced susceptibility to self-regulatory depletion may be an important contributor to long-term weight regulation success in successful weight regulators.

1. Introduction

In today's affluent societies, finding calorie-rich palatable food posits no problem. In fact, while our ancient ancestors struggled to find enough food to survive and feed the group, for many people in many societies, not consuming too much calorie-rich food is the much stronger challenge than finding and procuring it.

As a consequence of the high accessibility of palatable but unhealthy food, many individuals diet to loose and maintain their desired weight (restrained eaters; Herman & Polivy, 1980). However, keeping a healthy diet turns out to be a difficult endeavor (Mann et al., 2007), and restrained eating is associated with a *higher* (instead of lower) body mass index (BMI). Thus, restrained eating represents rather a concern for dieting than dieting success per se. Measures of dietary restraint (Herman & Polivy, 1980; Van Strien, Frijters, Bergers, & Defares, 1986) are therefore generally unable to differentiate between successful and unsuccessful weight regulators (Meule, Papies, & Kübler, 2012; van Strien, 1999).

A promising approach to differentiate between successful and unsuccessful weight regulators was introduced by Fishbach, Friedman, and Kruglanski (2003). These researchers developed the Perceived Self-Regulatory Success in Dieting Scale to measure weight regulation success. Since then, researchers have scrutinized the scale's validity and found that it efficiently differentiates between successful and unsuccessful weight regulators. For example, self-perceived successful weight regulators are more successful insofar as they have lower BMIs than perceived unsuccessful weight regulators (Meule et al., 2012). Further research suggests that when confronted with an eating-related stimulus self-perceived successful weight regulators automatically activate concepts associated with dieting and weight management while unsuccessful weight regulators do not (Fishbach et al., 2003; Papies, Stroebe, & Aarts, 2008). Furthermore, successful weight regulators use more flexible control strategies (Meule, Westenhofer, & Kubler, 2011), are less impulsive (von Koningsbruggen, Stroebe, & Aarts, 2013), and show better food-specific inhibitory control and less food intake upon exposure to tempting food as compared to unsuccessful weight regulators (Houben, Nederkoorn, & Jansen, 2012). In concert, research suggests that the automatic activation of control strategies, the use of more flexible control strategies, and food-specific inhibitory mechanisms help successful weight regulators in translating their intentions concerning weight regulation into action (Papies et al., 2008; Stroebe, van Koningsbruggen, Papies, & Aarts, 2013).

We assumed that the mentioned mechanisms help successful weight regulators particularly in high-risk situations that make self-regulatory failure particularly likely (e.g., after consuming a preload of food, being under cognitive load; Herman & Polivy, 2011). One context that places high demands on self-regulation is the depletion of self-regulatory resources. The strength model of self-control (Baumeister, Vohs, & Tice, 2007) posits that the ability to self-control relies on a limited, domain-independent resource. According to the model, any

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exertion of self-control will temporarily reduce this resource, leading to a state of self-regulatory depletion that makes self-control failures in any subsequent attempt at self-control more likely. Applied to the present context, the model predicts (and research has found) that after exerting self-control in a domain unrelated to eating, self-control is weakened, leading to increased consumption when confronted with tempting, but unhealthy food (Kahan, Polivy, & Herman, 2003; Vohs & Heatherton, 2000). A large literature delivers support for this model (for a meta-analysis, see Hagger, Wood, Stiff, & Chatzisarantis, 2010) and makes apparent that a decreased susceptibility to self-regulatory depletion would greatly improve the odds for achieving self-regulatory goals (Friese & Wänke, 2014; Job, Dweck, & Walton, 2010).

In the present study, we hypothesized that in the eating behavior domain successful weight regulators would be less affected by self-regulatory depletion than unsuccessful weight regulators. Participants first completed a task in which they exerted or did not exert self-control. They then took part in a taste test of tempting, but unhealthy food. We expected more consumption after self-regulatory depletion, but this effect should be reduced for self-perceived successful weight regulators. Studies showing the relevance of perceived weight regulation success for actual food intake in experimental settings are rare (Meule et al., 2012), and no previous research has investigated the impact of perceived weight regulation success under conditions that usually impede self-control.

2. Methods

Seventy-two participants were randomly assigned to a resource depletion or a control condition. Five participants were excluded from the analysis (see supplemental material for details). The final sample included 67 female participants ($M_{age} = 24.93$ years, $SD_{age} = 7.60$). During recruitment, we asked participants to not eat and only drink water 2 h prior to the study. Shortly before the participants entered the laboratory, the experimenter baked some chocolate chip cookies in a small oven. When the participants entered the room, it was filled with the smell of freshly baked cookies, but neither the oven nor the cookies were visible. Up to two participants took part in the study simultaneously but were separated by partition walls.

After providing informed consent, participants completed the self-regulatory depletion task or the control task for 6 min. Only in the depletion condition, the task required attention control and motor inhibition (e-crossing task; Baumeister, Bratslavsky, Muraven, & Tice, 1998). They then worked on some filler tasks on the computer not relevant for present purposes before engaging in the taste test of the freshly baked cookies. Participants were asked to eat as much or as little as they liked during 7 min. Cookie consumption was the dependent variable. Finally, participants completed the Perceived Self-Regulatory Success in Dieting Scale (Meule et al., 2012) as a measure of perceived weight regulation success (PWRS), the Restraint Scale with the subscales concern for dieting and weight fluctuations (Herman & Polivy, 1980), demographics (including weight and height), hunger at the beginning of the study, and a manipulation check asking how exhausting participants experienced the resource depletion task.

Detailed information about the sample, the self-regulatory depletion manipulation, the taste test and the measures of perceived weight regulation success, dietary restraint, hunger, and the manipulation check can be found in the online supplemental materials.

3. Results

3.1. Preliminary analyses

Table 1 depicts descriptive and inferential statistics between the experimental conditions as well as correlations between the study variables. In line with previous research (Meule et al., 2012), PWRS was negatively correlated with BMI, $r = -.42$, $p < .001$, and concern for dieting, $r = -.25$, $p = .040$. Unexpectedly, participants in the resource depletion condition reported a higher concern for dieting than participants in the control condition, $t(65) = 3.11$, $p = .003$.

3.2. Main analyses

We regressed cookie consumption on the experimental condition, PWRS, and their interaction. Continuous variables were *z*-standardized before the analyses (Aiken & West, 1991). Experimental condition was effect-coded (−1: control condition, 1: resource depletion condition).

The overall model was highly significant, $F(3, 66) = 15.94$, $p < .001$, adjusted $R^2 = .41$. Both the main effect of the resource depletion manipulation ($\beta = .56$, $t(66) = 5.94$, $p < .001$) and the main effect of PWRS ($\beta = -.21$, $t(66) = -2.20$, $p = .032$) were significant, indicating that participants in the resource depletion condition ate more of the cookies than participants in the control condition, and participants with a high PWRS ate less than participants with a low PWRS. These main effects were qualified by the expected interaction between experimental condition and PWRS, $\beta = -.22$, $t(66) = -2.26$, $p = .028$ (see Fig. 1). Simple slope analyses revealed that for participants low in PWRS, the resource depletion manipulation led to more cookie consumption, $\beta = .78$, $t(66) = 5.75$, $p < .001$. This effect was also significant for participants high in PWRS, but the relationship was considerably weaker, $\beta = .35$, $t(66) = 2.57$, $p = .012$. Thus, as expected, participants high in PWRS were less affected by the resource depletion manipulation than participants low in PWRS.

The results remained almost unchanged when controlling for hunger, BMI, concern for dieting, and weight fluctuations (Table S1). Hence, the unexpected difference in concern for dieting between the experimental conditions cannot account for the main finding depicted in Fig. 1.

4. Discussion

The present research tested the idea that differences in eating behavior between successful and unsuccessful weight regulators become especially apparent “when the going gets tough,” that is, under conditions that make resistance to temptation particularly difficult such as self-regulatory depletion. As predicted, participants ate more of a freshly baked chocolate chip cookie after an initial exertion of self-control

Table 1
Means, standard deviations, inferential statistics and bivariate correlations of study variables.

	Resource depletion		Control					Correlations					
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*	1	2	3	4	5	6
1. Hunger	3.84	1.33	4.31	1.78	−1.50	.138	0.30	–					
2. Perceived weight regulation success	4.32	1.28	4.41	1.22	−0.28	.778	0.07	.12	–				
3. BMI	21.22	2.57	21.62	2.65	−0.63	.531	0.15	.03	−.42***	–			
4. Dietary restraint – concern for dieting subscale	1.28	0.51	0.92	0.42	3.11	.003	0.77	−.23†	−.25*	.27*	–		
5. Dietary restraint – weight fluctuations subscale	1.36	0.77	1.24	0.74	0.66	.512	0.16	−.14	−.31*	.43***	.35**	–	
6. Cookie consumption	62.38	25.46	34.03	12.05	5.61	<.001	1.42	−.05	−.27*	−.01	.09	−.06	–

Note. $N = 67$. †$p < .06$. *$p < .05$. **$p < .01$. ***$p < .001$.