Research report

Eating behavior, restraint status, and BMI of individuals high and low in perceived self-regulatory success

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A B S T R A C T

The Perceived Self-Regulatory Success (PSRS) scale was developed to assess self-reported success at dieting and has been used to differentiate between successful and unsuccessful dieters (Fishbach, Friedman, & Kruglanski, 2003). We re-analyzed data from seventeen studies in order to examine whether PSRS predicted in-lab eating behavior of restrained and unrestrained eaters. We also explored the relation between body mass index, restraint, current dieting, and responding on the PSRS scale. It was found that successful dieters do not necessarily eat less than do unsuccessful dieters when a tempting food is available. Additionally, individuals who considered themselves to be successful dieters were more likely to be unrestrained eaters and current non-dieters than restrained eaters and current dieters. However, regardless of restraint status, individuals high in PSRS had lower BMI than those low in PSRS. These findings suggest that those who score high on the PSRS scale may not be concerned with regulating eating and weight. However, the restrained eaters who do score high on the PSRS scale appear to be successful at controlling their weight, despite not eating less in the lab.

Introduction

Considering the high rate of overweight and obesity, it is not surprising that many people attempt to lose weight. Using data from the National Health Interview Survey, Kruger, Galuska, Serdula, and Jones (2004) reported that 24.3% of men and 37.6% of women in the U.S. are trying to lose weight. These weight-loss attempts often end in failure. Although many people experience early weight-loss success, dieters often regain the weight they had initially lost (Crawford, Jeffery, & French, 2000). However, some dieters are successful at maintaining weight-loss. In one study, thirteen to 20% of dieters were found to be successful at maintaining a weight-loss of 5 kg or more over five years (Wing & Phelan, 2005), while an earlier study found that up to 67% of weight-losers reported maintaining their weight-loss (Schachter, 1982).

In recent years, increasing attention has been paid to successful dieting. These research efforts have focused on teasing out the differences between successful and unsuccessful dieters. In an interview study, for example, Chambers and Swanson (2012) examined the behavioral and psychological factors associated with dieting success and failure. They found differences between successful and unsuccessful dieters in frequency of weighing, weight-loss strategies, and reactions to weight-loss setbacks. Therefore, it appears that successful and unsuccessful dieters differ in many ways. It is important to continue to study successful dieting and to determine factors associated with successful dieting that may influence eating behavior. Interest in successful dieting has made finding a way to measure dieting success increasingly important. The Perceived Self-Regulatory Success (PSRS) scale is a self-report measure of perceived dieting success (Fishbach, Friedman, & Kruglanski, 2003). The scale consists of three items, including “To what extent... (1) are you successful at watching your weight?... (2) are you successful in losing extra weight?... and (3) do you find it difficult to stay in shape? (reverse coded). Participants respond to the items using a 7-point Likert scale. Participants scoring one or more standard deviation above the mean are considered to be successful self-regulators and participants scoring one or more standard deviation below the mean are considered to be unsuccessful self-regulators. Several studies have used the PSRS scale to examine the role of perceived self-regulatory success in dieters’ behaviors and psychological processing. However, none of these studies has examined how PSRS is related to actual eating. Further, although the PSRS scale is purported to measure success at dieting, there is no measure of dieting attached to the scale. Previous research has used various measures to determine and define dieting status. Therefore, there is a lack of consistency in how dieting is determined when using the PSRS scale. This lack of consistency may lead to non-dieters being included in analyses of successful dieters in some studies.

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Perceived self-regulatory success in the literature

Fishbach et al. (2003) found that after exposure to a tempting food prime, individuals who valued dieting more than others did respond more quickly to diet-related words if they were high in PSRS (successful dieters), but not if they were low in PSRS (unsuccessful dieters). There was no difference in reaction time following a neutral prime. Similarly, restrained eaters (determined using the Restraint Scale; Polivy, Herman, & Howard, 1988) who were low in PSRS exhibited quicker reaction time when identifying high caloric foods than restrained eaters high in PSRS, demonstrating that unsuccessful restrained eaters have an attentional bias towards diet-breaking foods, while successful restrained eaters do not (Meule, Vogele, & Kubler, 2012).

Further, Van Koningsbruggen, Stroebe, and Aarts (2011) measured dieting status using the Concern for Dieting Subscale of the Restraint Scale, and studied successful and unsuccessful dieters’ size perception of palatable and diet food after exposure to a tempting food cue. Study 1 indicated that objects related to an individual’s goal are perceived as larger. In this case, dieters exposed to a food cue estimated the size of a chocolate muffin to be larger than did those dieters not exposed to a food cue. Study 2 examined how perceived self-regulatory success influenced size perception of a diet food (apple) after exposure to a diet food, tempting food, or a control prime. Successful dieters perceived the apple as bigger after exposure to the diet and food primes, as compared to those in the control condition. Unsuccessful dieters perceived the apple as bigger when exposed to the diet prime, but smaller when exposed to the food prime, than did those in the control prime condition. These findings suggest that successful dieters access the dieting goal when primed with dieting and when primed with eating.

Additional evidence suggests there are some individual difference variables associated with success in dieting. For example, Van Koningsbruggen, Stroebe, and Aarts (2013) recently found that trait impulsivity is negatively related to dieting success among restrained but not unrestrained eaters. Further, increased cardiac regulation is associated with increased PSRS in current dieters but not current non-dieters (Meule, Lutz, Vogele, & Kubler, 2012b). This finding suggests that cardiac control may be one physiological characteristic associated with successful self-regulation in dieting.

Further research has examined the role of perceived self-regulatory success in dieters’ behaviors. Rigid control of eating is related to low scores on the PSRS and food cravings, whereas scoring high on the PSRS scale is associated with flexible control (Meule, Lutz, Vogele, & Kubler, 2012a; Meule, Westenhofer, & Kubler, 2011). Further, Papis, Stroebe, and Aarts (2008) examined whether perceived self-regulatory success in dieting is associated with greater adherence to a dieting plan over the course of two weeks. Among unrestrained eaters, intention to avoid five palatable foods was related to lower frequency of eating the foods. Among restrained eaters, intention predicted diet adherence of successful restrained eaters, but not unsuccessful restrained eaters. Similarly, Van Koningsbruggen, Stroebe, Papis, and Aarts (2011) studied the effect of implementation intentions on eating behavior over a two-week period. Participants were restrained and unrestrained eaters (measured using the Restraint Scale-Concern for Dieting subscale) and were assigned to one of three conditions: a diet-implementation condition, in which they were to think about their diet whenever they encountered a tempting food; a no-eating implementation intention, in which they were to think about not eating the tempting food; or a control condition. There was a condition effect on restrained eaters who were low in PSRS only, in that those in the diet-implementation intention condition ate the target foods less frequently than did those in the other two conditions. It was concluded that diet-implementation intentions help restrained eaters low in PSRS to decrease consumption of tempting foods. The authors argued that restrained eaters high in PSRS may automatically activate the diet goal in the face of temptation, without the use of (or need for) implementation intentions.

Thus, the literature suggests that the perceived self-regulatory success scale is a valid measure of dieting success as indicated by cognitive measures of attention to diet words and perceived size of food items, although its ability to predict avoidance of tempting foods was less convincing (only unsuccessful dieters claimed to avoid temptations). No study has yet examined the eating behavior of successful and unsuccessful dieters in a controlled lab environment, or even measured intake outside the lab. In order to determine the role of perceived self-regulatory success in predicting actual eating behavior, the present report examined data from seventeen studies that measured eating behavior in a lab setting. It was hypothesized that successful self-regulators would eat less than unsuccessful self-regulators.

Further, the relation between restraint status and current dieting status, one’s score on the PSRS scale, and Body Mass Index (BMI) was explored. It is apparent in the literature that, although perceived self-regulatory success seems to predict various diet-type behaviors, there has been no consistent measure of dieting used in conjunction with the PSRS scale. Several studies (Meule, Papis, & Kubler, 2012; Meule, Vogele, et al., 2012; Meule et al., 2012a; Meule et al., 2012b; Papis et al., 2008; Van Koningsbruggen et al., 2011; Van Koningsbruggen et al., 2013; Van Koningsbruggen, Stroebe, Papis, et al., 2011) used the Restraint Scale (Polivy et al., 1988) or a subscale of the Restraint Scale. On the other hand, Fishbach et al. (2003) used an author-developed measure of diet valuing. Meule et al., 2011 used measures of rigid and flexible control of eating and Meule, Lutz, Vogele, and Kubler (2012) used a single item measure of current dieting (yes/no) to determine whether or not participants were dieters. Thus, it is unclear whether successful dieters were true dieters in all of the studies. In our studies, we used the Restraint Scale (Polivy et al., 1988), which measures chronic dieting, and also a one-item measure of current dieting to determine dieter status. Restrained eating and current dieting status should be related to successful dieting on the PSRS scale, so this will be assessed in the current data set.

Method

Overview

Data from seventeen studies in our lab that included the PSRS scale were re-analyzed. These studies examined the influence of various factors on participants’ eating behavior. Each study manipulated variables intended to increase or decrease eating in restrained eaters. See Table 1 for details on the studies. For the purpose of the present analyses, the studies’ manipulations were coded as “intended to increase eating”, “intended to decrease eating”, and “control.” These studies were all conducted in a lab setting and involved eating in the guise of a taste test. The taste test was always standardized to 10 min. Participants were told to taste and rate a food (cookies, chocolate candies, or chips, depending on the experiment); they were told that they could eat as much as they wanted.

Participants

Participants in all of the studies were undergraduate students. In all, data from 620 participants were included in the analyses: 253 were restrained eaters (231 females, 22 males) and 367 were unrestrained eaters (341 females, 26 males). Three-hundred and thirty-five of the participants were classified as high in perceived self-regulatory success (298 females, 37 males) and 286 were
classified as low in perceived self-regulatory success (275 females, 11 males).

Five-hundred and thirty-seven participants reported current dieting status (i.e., whether they were “currently on a diet”). One hundred and seventeen (113 females, 4 males) were current dieters and 420 (379 females, 41 males) were current non-dieters. Two-hundred and fifty-eight of these (247 females, 11 males) were low in perceived self-regulatory success and 279 (245 females, 34 males) were classified as high in perceived self-regulatory success.

Measures

Perceived Self-Regulatory Success (PSRS) scale

In all of the current studies, the PSRS scale (Fishbach et al., 2003) was administered as part of a packet of questionnaires completed by the participants at the end of the experiment (after the taste test and before debriefing). Previous studies examining successful dieting have also administered the PSRS scale at the end of the experiment (Van Koningsbruggen et al., 2011; Van Koningsbruggen, Stroebe, Papes, et al., 2011). The three items of the scale were mixed in with other filler items in order to disguise the purpose of the questionnaire. Internal consistency of the PSRS scale has been found to be \( \alpha > .70 \) and the scale is considered to be valid (Meule, Papes, et al., 2012).

Restrain Scale (RS)

Participants also filled out the Restraint Scale (Polivy & Herman, 1988). The RS is a 10-item scale that measures chronic dieting. Participants scoring 15 or higher on the RS are considered to be restrained eaters; participants scoring less than 15 are considered to be unrestrained eaters. Studies of the psychometric properties of the RS suggest that it may be more reliable (\( \alpha = .86 \)) and valid in normal weight than obese participants (van Strien, Herman, Engels, Larsen, & van Leeuwen, 2007).

Current dieting

In some studies, current dieting was measured using a one item question: “Are you currently dieting?” to which participants responded “Yes” or “No.” Current dieting is different from restraint because restraint is considered chronic dieting, whereas people who are currently dieting may not be chronic dieters (and chronic dieters may not be currently dieting).

BMI

Participants’ height and weight were measured in-lab using a balance beam scale. These measurements were used to calculate BMI.

Results

Eating behavior

Calories consumed was modeled as a function of experimental condition, perceived self-regulatory success, and dietary restraint status. A two-level multilevel model was used to take into account participants nested within experiments by estimating a random intercept for each experiment included in the merged data set using the variance components covariance structure and the Satterthwaite method of estimating degrees of freedom.

There was a marginally significant effect of PSRS on calories consumed, \( b = -60.12, SE = 32.69, t(603.22) = -1.84, p = .07 \). People who perceived themselves to be successful self-regulators ate marginally less than did those who perceived themselves to be unsuccessful self-regulators. The effects of experimental condition and restraint were not significant predictors of calories consumed and there were no significant interactions, \( b = -23.67, SE = 20.65, t(601.82) = -1.15, p = .25 \) and \( b = -35.29, SE = 34.59, t(600.16) = -1.02, p = .19 \), respectively.

An additional analysis was conducted using restrained eaters only to see if, as predicted (and as it is supposed to), the PSRS scale predicts intake among chronic dieters. Calories consumed was modeled as a function of experimental condition and PSRS. A two-level multilevel model was again used to take into account participants nested within experiments. There was no main effect of condition, \( b = -2.41, SE = 18.41, t(247.25) = -.13, p = .90 \), and no main effect of success, \( b = -49.95, SE = 37.98, t(244.52) = -1.32, p = .19 \). Thus, surprisingly, among restrained eaters, the caloric consumption of successful dieters did not significantly differ from the caloric consumption of unsuccessful dieters.

The same method was used to analyze the eating data of unrestrained eaters only. Calories consumed was modeled as a function of experimental condition and PSRS. There was a marginally significant main effect of PSRS on calories consumed by unrestrained eaters, \( b = -60.02, SE = 33.82, t(357.59) = -1.78, p = .08 \). Unrestrained eaters high in PSRS ate marginally less than did unrestrained eaters low in PSRS. The PSRS scale thus seems paradoxically to predict intake in unrestrained eaters better than it does in restrained eaters. Again, there was no main effect of experimental condition, \( b = -22.29, SE = 21.33, t(356.36) = -.105, p = .30 \).

To study this further, we also modeled calories consumed as a function of experimental condition, current dieting, and PSRS. Again, a two-level multilevel model was used. There were no significant effects of PSRS, current dieting or condition, \( b = 49.76, SE = 28.7, t(518.27) = -1.73, p = .08 \), \( b = 2.18, SE = 37.98, t(516.46) = .06, p = .95 \), and \( b = 9.19, SE = 17.02, t(519.78) = .540, p = .590 \), respectively. However, as above, successful self-regulators ate marginally less than unsuccessful self-regulators.

Additional analyses were conducted among current dieters only to determine if successful current dieters ate less than did unsuccessful current dieters. PSRS and condition did not significantly predict eating among current dieters, \( b = -12.5, SE = 33.2, t(107.4) = .38, p = .71 \) and \( b = -46.79, SE = 26.71, t(110.58) = -1.75, p = .08 \), respectively.

The same multilevel analysis was conducted among current non-dieters only. As in the case of restraint status, there was a marginal main effect of PSRS such that unsuccessful current non-dieters ate marginally more than did successful current non-dieters.
b = −48.67, SE = 28.81, t(407.54) = −1.69, p = 0.09. There was no effect of experimental condition, b = 10.63, SE = 17.10, t(408.58) = .62, p = .53.

Restraint/current dieting, PSRS, and BMI

As a secondary question, the researchers were interested in how restrained versus unrestrained eaters and current dieters versus current non-dieters responded on the PSRS scale. When using the PSRS scale, it is important to analyze only dieters, for whom questions of the scale (e.g. Are you successful at watching your weight?) are pertinent. In other words, it is important to consider whether the scale actually captures successful dieters, as opposed to people who simply are not dieting. Previous research has used various methods for determining who is a “dieter.” For example, Fishbach et al. (2003) analyzed data only from participants who scored high on an author-constructed Values Measure, which assessed how much participants valued dieting. In contrast, other studies (e.g. Papies et al., 2008) analyzed data from participants who were restrained eaters, as measured by the Restraint Scale. In our studies, we used the Restraint Scale, which measures chronic dieting, and a single extra item measured whether or not participants were currently dieting.

First, we used a logistic regression to determine if unrestrained or restrained eaters were more likely to be labeled successful dieters. Successful dieting was a binary outcome as the person was either a successful dieter or not, which violated the normality assumption required for traditional regression. Thus, a logistic regression with a logit link function was used to model successful dieter status as a function of restraint. This analysis revealed that restraint significantly predicted successful dieter status, but did so negatively, b = −1.12, SE = 0.17, p < .001, Odds Ratio = .33:1. This implies that every 1-unit increase in restraint predicted a .33 decrease in the likelihood that the person was a successful dieter. In other words, participants who perceived themselves to be successful dieters were more likely to be unrestrained eaters than restrained eaters (see Fig. 1).

Another logistic regression analysis was used to determine if current dieters or non-dieters were more likely to be labeled successful dieters by the PSRS scale. A logistic regression with a logit link function was used to model successful dieter status as a function of current dieting status. This analysis revealed that current dieting significantly predicted successful dieter status, b = −0.52, SE = 0.21, p = 0.01, Odds Ratio = 1.68:1. This indicates that non-dieters are 1.7 times more likely to be considered successful dieters than are current dieters.

We were also interested in whether PSRS predicted BMI among restrained and unrestrained eaters. Our findings support previous work that found a negative correlation between BMI and dieting success (Meule, Papies, et al., 2012; Meule, Voge, et al., 2012; Meule et al., 2012a,b). Overall, PSRS predicted BMI, F(1,496.35) = 28.72, p < .001. Successful self-regulators had lower BMI than unsuccessful self-regulators. This was also true when restrained eaters were examined alone; successful chronic dieters had lower BMI than unsuccessful chronic dieters, F(1,234.43) = 15.52, p < .001, see Fig. 2. Unsuccessful self-regulators also had lower BMI than unsuccessful self-regulators, F(1,235) = 6.17, p = .013. Among current dieters, however, success did not predict BMI. Only successful current non-dieters had lower BMI than unsuccessful current non-dieters, F(1,307.05) = 26.990, p < .001.

Discussion

The purposes of the current study were to determine if the PSRS scale predicted how much people would eat in a controlled lab setting and to examine how responding on the PSRS scale related to restraint, current dieting, and BMI. As expected, the PSRS scale did, indeed, predict eating behavior. People classified as successful self-regulators are marginally less than did those classified as unsuccessful self-regulators. However, when the sample was restricted to restrained eaters only (people highly and chronically concerned with dieting), or only current dieters, PSRS did not predict eating behavior.

Further, people perceived themselves to be successful dieters whether or not they were restrained eaters, and thus, concerned with dieting. In fact, unrestrained eaters and current non-dieters were more likely to rate themselves as successful self-regulators than were restrained eaters and current dieters. This finding suggests that people who consider themselves successful dieters may not necessarily be concerned with dieting and weight-loss. This finding also points to a problem with the PSRS scale. Specifically, the PSRS scale does not come with a consistent measure of dieting. Therefore, depending on the dieting measure used in conjunction with the PSRS scale, people who are classified as successful dieters may or may not be true dieters. Meule, Papies, et al. (2012) considered a modification to the PSRS scale in order to distinguish between people concerned with dieting and those for whom dieting is not an issue. These authors added a “not applicable” option to the scale and excluded data from participants who answered “not applicable” to any of the questions. However, few participants used the “not applicable” option. They concluded that most people are familiar with dieting and that the PSRS scale (with or without the modification) is an appropriate instrument for measuring dieting success. Including a consistent measure of dieting or

![Fig. 1. Likelihood that restrained and unrestrained eaters will be labeled high in PSRS. Unrestrained eaters are more likely to be high in PSRS than are restrained eaters.](Image)

![Fig. 2. BMI of restrained eaters high and low in PSRS. Individuals high in PSRS had lower BMI than those low in PSRS.](Image)
weight concern to the PSRS scale, may help to target participants who are true dieters. In any case, it appears to be important when using the PSRS scale to be sure that the people being measured are actually dieters, and not just naturally thin people for whom dieting is not necessary because they have no weight issues.

Consistent with previous research (Meule, Papiès, et al., 2012; Meule, Vogele, et al., 2012; Meule et al., 2012a,b), we found that individuals high in PSRS had lower BMI than those low in PSRS. Further, restrained eaters high in PSRS had lower BMI than restrained eaters low in PSRS. It seems that, although restrained eaters are less likely to be high in PSRS compared to unrestrained eaters, those restrained eaters who are high in PSRS do have lower BMI than those low in PSRS despite failing to eat less in a lab setting. This correlation between BMI and PSRS cannot be interpreted without further data.

The present research adds to the literature on successful dieting. Although previous research has demonstrated the PSRS scale’s ability to distinguish those who are successful dieters from those who are unsuccessful with respect to psychological processes related to eating and self-reported avoidance of target foods, no studies had used the PSRS scale to distinguish between the eating of successful and unsuccessful dieters in a controlled lab environment. The present research demonstrates that although “successful dieters” are able to more quickly access the dieting goal after being primed with tempting food words (Fishbach et al., 2003; Papiès et al., 2008), they may not necessarily eat less when a tempting food is offered to them for eating. It is possible that dieters high in PSRS are better able to resist temptation in real-world eating situations and that a controlled, in-lab taste test did not capture this ability to resist temptation. Dieters high in PSRS may also be more flexible in their diets. Thus, eating a fatty food during a taste test may not be a serious violation of the diet. Meule, Papiès, et al. (2012) found PSRS to be negatively associated with rigid dietary control and positively associated with flexibility in dieting. The counter-regulation literature has demonstrated that dieters who violate their diets go onto eat more fatty foods than those who do not violate their diets in a lab setting. Perhaps dieters high in PSRS are flexible in their diets and do not overeat in response to diet violation, while those who are low in PSRS are rigid in dieting and overeat after a diet violation. Thus, although dieters high and low in PSRS ate similar amounts of a fatty food during an in-lab eating opportunity, dieters high in PSRS may compensate by eating less at a later time, while dieters low in PSRS may counter-regulate throughout the rest of the day. There is no direct evidence for this; however, future research may investigate this possibility.

Further, those who scored high in perceived self-regulatory success were more likely to be unrestrained than restrained eaters, indicating that many successful self-regulators are not concerned about “regulating” at all. It is likely that these people simply have no problems controlling weight and eating. Despite the relatively low number of restrained eaters who were classified as “successful”, our data show that these few do, indeed, have lower BMI than unsuccessful restrained eaters (although that correlation could simply mean that dieters who start out thinner have less trouble dieting and feel more successful).

Conclusions

The present data indicate that dieters high in PSRS do not consume less in the lab than those low in PSRS. Further, caution should be exercised to ensure that successful dieters, as measured by the PSRS scale, are actually those concerned about weight and dieting rather than those who feel able to control their weights because it is not an issue for them at all. It appears to be a lot easier to see yourself as successful at controlling your eating/weight if you have no problem with controlling your weight or intake in the first place.

References


