



## Depletion sensitivity predicts unhealthy snack purchases<sup>☆</sup>



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### ABSTRACT

The aim of the present research is to examine the relation between depletion sensitivity – a novel construct referring to the speed or ease by which one's self-control resources are drained – and snack purchase behavior. In addition, interactions between depletion sensitivity and the goal to lose weight on snack purchase behavior were explored. Participants included in the study were instructed to report every snack they bought over the course of one week. The dependent variables were the number of healthy and unhealthy snacks purchased. The results of the present study demonstrate that depletion sensitivity predicts the amount of unhealthy (but not healthy) snacks bought. The more sensitive people are to depletion, the more unhealthy snacks they buy. Moreover, there was some tentative evidence that this relation is more pronounced for people with a weak as opposed to a strong goal to lose weight, suggesting that a strong goal to lose weight may function as a motivational buffer against self-control failures. All in all, these findings provide evidence for the external validity of depletion sensitivity and the relevance of this construct in the domain of eating behavior.

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Healthy eating starts with healthy food choices made at point-of-purchase settings, such as cafeterias, kiosks, and supermarkets. It has been estimated that individuals make over 200 of these food decisions per day (Wansink & Sobal, 2007). A critical factor determining whether people are able to make the healthy choice in these instances, is self-control. Self-control refers to the ability to alter thoughts, feelings, and actions in the service of attaining long-term goals (Baumeister, Vohs, & Tice, 2007). In terms of food choices, this can be conceived of as the ability to choose a healthy product that aligns with one's long-term health goals instead of a tasty, unhealthy product that – despite being appealing on the short-term – jeopardizes these long-term goals.

Building on the notion that each act of self-control consumes self-control from a limited resource (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000), we recently demonstrated that the ability to exert self-control may largely depend on the speed by which one's self-control resources

are drained: a phenomenon that we coined depletion sensitivity (Salmon, Adriaanse, De Vet, Fennis, & De Ridder, 2014). Specifically, we found that some people deplete their self-control resources at a faster rate than others, and that these individual differences in depletion sensitivity predict actual self-control exertion under low self-control conditions (Salmon, Adriaanse et al., 2014). To demonstrate this effect we used validated self-control tasks in a restricted lab setting. The aim of the present research is to investigate the external validity of the depletion sensitivity construct by observing how depletion sensitivity relates to real-life food purchase behavior in a community sample.

### 1. Depletion sensitivity

The construct of depletion sensitivity is based on the ego-depletion paradigm, which refers to the limited human capacity to exert self-control (Baumeister et al., 1998, 2007). After an initial act of self-control, such as inhibiting one's emotional expressions, people are said to be 'depleted', meaning that they lack the capacity (Baumeister et al., 1998; Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998) or motivation (Inzlicht & Schmeichel, 2012; Inzlicht, Schmeichel, & Macrae, 2014) to exert self-control on a second self-control task, such as resisting tempting

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chocolates and eating a healthy product instead. Whereas recently the mechanism underlying the ego-depletion effect, and the strength and robustness of the ego-depletion effect have been topic of debate (Carter, Kofler, Forster, & McCullough, 2015; Carter & McCullough, 2014; Hagger & Chatzisarantis, 2014; Kurzban, Duckworth, Kable, & Myers, 2013; Tuk, Zhang, & Sweldens, 2015), most research suggests that people are less likely to exert self-control after exerting self-control in an initial task (e.g. Duckworth & Kern, 2011; Hagger, Wood, Stiff, & Chatzisarantis, 2010; Inzlicht & Schmeichel, 2012). Notwithstanding the large number of studies that found evidence for the ego-depletion effect, we argue that people differ in their sensitivity to ego-depleting tasks and situations and that, consequently, some people will deplete their self-control resource at a faster rate than others (Salmon, Adriaanse et al., 2014). To illustrate, we propose that where one person may already deplete his resources and indulge in a delicious, but unhealthy, chocolate cake after studying for an hour, another person may still have sufficient self-control resources to resist that same chocolate cake after studying the entire morning.

The critical reader might wonder how depletion sensitivity can be distinguished from trait self-control, which has been found to relate to a variety of outcomes such as academic success, eating behavior, and overall well-being (De Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Tangney, Baumeister, & Boone, 2004). In the ego-depletion paradigm, the self-control resource is compared to the working of a muscle (Muraven & Baumeister, 2000). Although this metaphor has been criticized as it may not adequately reflect the nature of self-control (Inzlicht & Schmeichel, 2012; Inzlicht et al., 2014), it is helpful in illustrating the proposed difference between trait self-control and depletion sensitivity. In terms of this muscle metaphor of ego-depletion, one can compare trait self-control to the *power* of the muscle (Tangney et al., 2004). However, we argue that besides the power of the muscle, which determines the likelihood one will exert self-control in the first place, muscle *endurance*, or depletion sensitivity, determines how fast one's self-control resource gets depleted. So, whereas two individuals may have similar muscle power (e.g. equal levels of trait self-control), one individual may drain his muscle power at a faster rate compared to another (e.g. is more depletion sensitive).

Initial evidence for the relevance of depletion sensitivity was provided by showing that individual differences in depletion sensitivity predict the ability to exert self-control under conditions of ego-depletion in the lab (Salmon, Adriaanse et al., 2014). Compared to individuals low in depletion sensitivity, individuals sensitive to depletion performed worse on a self-control task (i.e., logical reasoning task) after they had already exerted self-control in a first task (i.e. cognitive task in which participants override learned responses, the 'E-erasing task', Baumeister et al., 1998). With the present study we aim to build on and extend our previous findings by demonstrating how depletion sensitivity affects the ability to exert self-control outside the lab, in the context of food choices.

Making food choices is frequently mentioned as a typical self-control dilemma (Baumeister, 2002; Bruyneel, Dewitte, Vohs, & Warlop, 2006; Faber & Vohs, 2004; Hofmann, Strack, & Deutsch, 2008; Salmon, Fennis, De Ridder, Adriaanse, & De Vet, 2014) and therefore makes an ideal context for further investigating the relevance of depletion sensitivity. We chose to focus on snacks as this is a food type that has previously been found to be predicted by self-control and that can be reliably categorized as healthy or unhealthy (e.g., Adriaanse, Kroese, Gillebaart, & De Ridder, 2014; Salmon, Fennis et al., 2014). We expect depletion sensitivity to predict snack purchase behavior in real-life settings where people encounter several depleting circumstances during the day. By

predicting self-control exertion in the field with a community sample, the present study aims to test the external validity of the depletion sensitivity construct.

## 2. The present study

In the present study, participants' goals to eat healthily and to lose weight will be included as additional predictors for exploratory reasons. That is, by including these predictors, we aim to provide an initial test of two additional, competing hypotheses; On the one hand it can be expected that depletion sensitivity is most likely to affect food choices for individuals with a strong long-term health or weight loss goal as the presence of such a goal is necessary for the experience of a self-control conflict. It makes sense to expect that the presence of a self-control conflict is required for self-control to become of relevance, and thus for depletion sensitivity to predict food purchases. On the other hand, there is also reason to expect that the presence of a strong health or weight loss goal may actually function as a buffer against the effects of depletion sensitivity, resulting in a stronger effect of depletion sensitivity for individuals with a weak long-term health or weight loss goal. This hypothesis is grounded in recent findings that suggest that ego-depletion may (partly) be explained by a lack of motivation (Inzlicht & Schmeichel, 2012; Inzlicht et al., 2014).

To reliably assess food purchase behavior, participants kept a food diary in which they were instructed to report every snack they bought. The number of healthy snack purchases and the number of unhealthy snack purchases were aggregated over one week, and analyzed as the two main outcome measures. It was expected that depletion sensitivity predicted the number of healthy and unhealthy snack purchases. Furthermore, in line with previous research that demonstrated effects of self-control on eating behavior (Adriaanse et al., 2014; Tangney et al., 2004; Wills, Isasi, Mendoza, & AINETTE, 2007), trait self-control was also expected to predict snack purchases. However, note that stronger effects of depletion sensitivity and trait self-control were expected for unhealthy rather than healthy snacks, as these represent a self-control dilemma between the immediate gratification of enjoying palatable foods and the long term benefits of eating healthily (Adriaanse et al., 2014; Dhar, 1997; Wang, Novemsky, Dhar, & Baumeister, 2010). Lastly, interaction effects of depletion sensitivity with the goal to eat healthily/to lose weight were explored.

## 3. Method

### 3.1. Participants and procedure

Participants were recruited via the website of the Netherlands Nutrition Center and could sign up for participation via email. After sign up, participants received a 7 day snack diary (Adriaanse, De Ridder, & De Wit, 2009) and a questionnaire via postal mail. One hundred eighty seven individuals signed up, and one hundred and eight individuals participated and returned their diaries by free postal mail. We excluded 12 participants who did not complete the entire study, as they did not fill out the questionnaire including the measures on depletion sensitivity or trait self-control (11.1%), so final analyses are based on a sample of 96 participants (7.3% men) with a mean age of 36.75 years ( $SD = 13.92$ ) and a mean BMI of 23.84 ( $SD = 5.11$ ). Of these participants, 8.3% completed lower education (primary school or lower general secondary education), 36.5% completed a middle level of education (intermediate vocational education or higher general secondary education), and 55.2% completed higher education (higher vocational education or university).

Participants were instructed to report every snack they bought

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