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"Are you in full possession of your capacity?". A mechanistic self-control approach at trait and state levels to predict different health behaviors☆

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ABSTRACT

This study investigated the role of self-control in health behaviors at both trait and state levels. We examined if trait and state self-control independently predict health behaviors, as well as the mechanisms of these relationships (desire, conflict, and resistance). This question was investigated on unhealthy and healthy behaviors, in the domain of physical activity, diet, and smoking. 325 participants completed a questionnaire assessing trait and state self-control, as well as desire, conflict, resistance, and health behaviors. Path analyses revealed that trait self-control indirectly predicted unhealthy behaviors through reduced desire, conflict, and resistance, and directly predicted healthy behaviors. These relationships remained significant when controlling for state self-control, suggesting that people's general tendency to prioritize distal goals over proximal motives uniquely predicts behaviors. Results also showed that adding state self-control to the model doubled the explained variance in healthy behaviors, highlighting the importance of considering self-control capacity at both trait and state levels.

1. Introduction

Despite accumulating evidence that behaviors play a central role in health, most people have difficulties to adopt a healthy lifestyle (e.g., Ford, Zhao, Tsai, & Li, 2011). Understanding the determinants of behavior change has thus become a hot topic in psychology, notably within socio-cognitive models (e.g., theory of planned behavior, Ajzen, 1991). Although these models have been successful in identifying key determinants of behavioral intention (e.g., self-efficacy, attitudes), intentions do not systematically translate into behavior change, a phenomenon known as the "intention-behavior gap". Self-control, which reflects the ability of the self to exert control over the self (Muraven & Baumeister, 2000), represents a promising concept to address this limitation (e.g., Sniehotta, Presseau, & Araújo-Soares, 2014). Indeed, individual differences in self-control have consistently been shown to predict health behaviors. For example, people with high self-control trait report less use of tobacco and less eating disorders than people with low self-control trait (for a review see de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012).

However, the mechanisms through which self-control affects behaviors remain unclear. Traditionally, self-control is conceived as the ability to inhibit desires or habits (e.g., Hagger, Wood, Stiff, & Chatzisarantis, 2010). The more people are able to resist desires that conflict with their long-term goals, the more likely self-control success is to occur (e.g., Kotabe & Hofmann, 2015). Yet, recent research shows instead that high trait self-control is associated with reduced desire for problematic behaviors, reduced conflict between desires and long-term goals, and less resistance to conflict (e.g., Hofmann, Adriaanse, Vohs, & Baumeister, 2014; Hofmann, Baumeister, Förster, & Vohs, 2012; Luehring-Jones, Tahaney, & Palfai, 2018). This is in line with a broader conceptualization of self-control as a general process by which people prioritize distal goals over proximal motives (Fujita, 2011). Here, effortful inhibition is one mechanism by which people control their behaviors, but more "proactive" strategies exist, such as avoiding temptations or developing healthy habits.

The goal of this study was to extend this line of research by investigating self-control at the dispositional and state levels. We examined if trait and state self-control independently predict health behaviors, as well as the mechanisms of these relationships (desire, conflict, and resistance). This questioning lies on evidence that

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although individual differences in self-control exist, this ability may also vary on a daily-life basis (e.g., Buyukcan-Tetik, Finkenauer, and Bleidorn (2018) and Hofmann, Vohs, and Baumeister (2012)). This suggests that people's available resources at a particular point in time may differ from the resources they have most of the time. If this is the case, are self-regulation behaviors affected by both trait and state self-control, and to what extent? On the one hand, we can consider based on the strength model of self-control (e.g., Muraven & Baumeister, 2000) that behaviors are primarily determined by current self-control resources. On the other hand, a recent study on well-being showed that both trait and state self-control contributed to this outcome, and that trait self-control was more predictive than state self-control (Buyukcan-Tetik, Finkenauer, & Bleidorn, 2018). This suggests that these two aspects of self-control should both be considered.

We examined the role of trait and state self-control on different types of health behaviors (unhealthy and healthy). Most research assumes that self-control effects on unhealthy behavior (e.g., eating junk food) and healthy behaviors (e.g., eating healthy) rely on the same processes, but empirical evidence of this assumption is lacking (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). Yet, such evidence is necessary because these two types of behaviors differ in an important way. Indeed, unhealthy behaviors may be attractive in the short term and need therefore to be inhibited; healthy behaviors may instead be unattractive in the short term and need therefore to be actively initiated (e.g., de Boer, van Hooft, & Bakker, 2011). The literature on approach and avoidance motivation suggests the relevance of distinguishing these two types of behaviors (e.g., achievement goals theory, Elliot, 2005; regulatory focus theory, Higgins, 1998). For example, the regulatory focus theory considers that people may pursue different types of goals: they are promotion-oriented when they pursue desirable outcomes (e.g., gains), and prevention-oriented when they strive to avoid undesirable outcomes (e.g., losses). Importantly, these goals lead to different emotions, cognitions and behaviors (Higgins, 1998). This suggests that self-control mechanisms could differ according to the nature of the behavior.

In sum, the current study investigated the mechanisms through which both trait and state self-control predict unhealthy and healthy behaviors, from a broad self- theoretical perspective. This questioning was examined in the domains of diet (eating balanced food and avoiding eating unbalanced food), physical activity (being physically active and avoiding being sedentary), and smoking (avoiding smoking). We hypothesized that trait and state self-control would predict behaviors independently from one another (e.g., Buyukcan-Tetik, Finkenauer, & Bleidorn, 2018). We also hypothesized that the self-control – unhealthy behaviors relationships would be mediated by decreased desire for these behaviors, reduced conflict between desires and long-term goals, and less resistance to conflict (e.g., Hofmann, Baumeister, Förster, & Vohs, 2012; Luehring-Jones, Tahaney, & Palfai, 2018). Fig. 1 summarizes our hypotheses.

2. Material and methods

2.1. Participants and procedure

College students from five French universities were contacted through mailing lists to participate in an online study examining the relationships between their personal beliefs and health behaviors. They were further informed that their participation was anonymous and that their responses would be kept confidential. Sample size was determined before any data analysis, following Boomsma's (1985) recommendation to include a minimum of 200 participants when conducting structural equation modeling (we did not continue to collect data after data analysis). After having confirmed their consent to participate in this study, a sample of 422 voluntary individuals completed the online questionnaire (hosted on SurveyMonkey). The study was conducted in accordance with APA ethical principles in the conduct of research with human participants.

Seventy-nine participants were not considered in further analyses because they completed only the first page of the questionnaire (less than 15% of the items). In addition, data beyond three standard deviations from the mean of the variables of interest were removed, resulting in exclusion of eighteen more participants. The final sample was composed of 325 participants (188 women; M_{age} = 20.90, SD_{age} = 4.62). All measures, manipulations, and exclusions in the studies are disclosed.

2.2. Measures

2.2.1. Trait self-control capacity

The Brief Self-Control Scale (BSCS) (Tangney, Baumeister, & Boone, 2004) is a largely used scale to assess trait self-control. The BSCS is composed of 13 items (e.g., “I am good at resisting temptations”, “I have a hard time breaking bad habits”). Participants responded on a seven-item Likert scale ranging from 1 (*Completely disagree*) to 7 (*Completely agree*). The scale presented good reliability in the present study (α = 0.77).

2.2.2. State self-control capacity

State self-control was indexed by subjective vitality. This operationalization was chosen because subjective vitality corresponds closely to the definition of self-control capacity as one's perception of the mental resources or energy available to the self (Clarkson, Otto, Hassey, & Hirt, 2016). Indeed, subjective vitality is defined as the energy available to the self (Ryan & Deci, 2008). This construct may not be reduced to energy because other energy-related constructs such as anger, anxiety, or arousal, are unrelated or negatively related to it (Ryan & Frederick, 1997). Instead, subjective vitality represents energy that one can harness or regulate for purposive actions (Ryan & Deci, 2008), and is therefore similar to the definition of self-control capacity.

In support to this idea, past research within the ego depletion literature has shown that exerting self-control can reduce subjective vitality (e.g., Hagger, Wood, Stiff, & Chatzisarantis, 2010; Muraven, Gagné, & Rosman, 2008; Rouse, Ntoumanis, & Duda, 2013). For instance, Muraven, Gagné, and Rosman (2008) observed that decreased self-control performance after a depleting task was mediated by decreased subjective vitality. This suggests that subjective vitality and behavioral assessments of ego depletion tap into the same resources, with subjective vitality having the advantage of being a highly accessible, phenomenologically based variable (Ryan & Deci, 2008).

More particularly, participants completed the Subjective Vitality Scale (Ryan & Frederick, 1997). This scale began with the stem: “Indicate to what extent each of the following sentence reflects the general feelings you had during the past two days”. It was composed of five items (e.g. “I felt alive and vital”) and responses ranged on a seven-item Likert scale from 1 (*Completely disagree*) to 7 (*Completely agree*). The scale presented good reliability (α = 0.70). Past research showed that this measure may fluctuate over time (e.g., Emile, d'Arripe-Longueville, Cheval, Amato, & Chalabaev, 2014; Smolders, de Kort, & van den Berg, 2013). For example, Smolders, de Kort, and van den Berg (2013) observed that more than 65% of the variance in feelings of vitality occurred within individuals, at the level of time of day. This suggests that this measure may be appropriate to capture state of self-control capacity.

2.2.3. Self-control mechanisms

Desire, desire-intention conflict, and resistance were assessed with the items used in (Hofmann, Vohs, & Baumeister, 2012). Items were preceded by the stem: “Among the following behaviors, what are those you have desired doing and to what extent, during the past two days?”. The stem was followed by five items focusing on the three unhealthy