Personality and Individual Differences 90 (2016) 137–142

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Self-report and behavioural approaches to the measurement of self-control: Are we assessing the same construct?

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ARTICLE INFO

Article history:
Received 25 May 2015
Received in revised form 26 October 2015
Accepted 29 October 2015
Available online 8 November 2015

Keywords:
Measurement of self-control
Trait self-control
Executive function
Inhibition
Self-regulation
Physical activity

ABSTRACT

The capacity for self-control has been consistently linked to successful execution of health behaviour. However, a lack of consensus remains in the conceptualisation and measurement of the construct. Notably, self-report measures relate to behavioural measures of self-control only weakly or not at all. The aim of the current research was to examine the relationship between self-report and behavioural measures of self-control to determine whether these differentially relate to health behaviour. Participants ($N = 146$) completed questionnaire and behavioural measures of self-control, and reported their physical activity. A direct effect of self-reported self-control on physical activity was observed, qualified by an interaction between self-reported self-control and behavioural measures, whereby greater self-reported self-control was associated with greater engagement in physical activity among those who performed poorly on the stop-signal task and those who performed well on the Stroop task. These results appear to indicate that the combination of trait self-control and behavioural factors leads to facilitative or debilitative effects on behaviour. Self-report and behavioural measures of self-control do not appear to assess the same elements of self-control and should not be used interchangeably. It is suggested that these measurement modes reflect a difference between trait self-control and specific self-control processes.

1. Introduction

Self-control refers to the ability to regulate cognition and behaviour in order to achieve long term goals (Baumeister, Vohs, & Tice, 2007). Individual differences in self-control have been shown to be important for the regulation of health behaviours including alcohol consumption, eating behaviour, and physical activity (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Hagger, Wood, Stiff, & Chatzisarantis, 2010). However, conceptualisation and measurement of self-control varies greatly (Duckworth & Kern, 2011). Therefore, there is a need to examine the association between different measures of self-control, and how individual differences in these measures relate to health behaviour, in order to determine whether these measures are capturing the same construct, and if not, how they may differentially relate to health behaviour.

Common theoretical models of self-control take a dual process approach in which the roles of conscious and non-conscious processes are highlighted (Hofmann, Friese, & Strack, 2009; Strack & Deutsch, 2004). For example, Hofmann et al. (2009) suggest that self-control involves both explicit pursuit of long terms goals and implicit associative processes that promote resistance to temptation. While traditional dual process approaches suggest a conflict between these processes (Strack & Deutsch, 2004), current theorising suggests that these may act in tandem and that explicit and implicit processes operate in all stages of self-control (Fishbach & Shen, 2014). Given the complex and multi-faceted nature of self-control, it is unsurprising that there exist multiple means to assess self-control, and that these measures may not necessarily capture the same construct. In the current study the role of both explicit and implicit self-control is considered in an attempt to demonstrate that these processes are distinct.

Self-control is commonly conceptualised as a relatively broad and stable capacity assessed using self-report measures including the Tangney Self-Control Scale (Tangney, Baumeister, & Boone, 2004), and the Self-Regulation Questionnaire (Brown, Miller, & Lawendowski, 1999). Personality facets such as the self-discipline facet of the conscientiousness domain, specified within the Revised NEO Personality Inventory (Costa & McCrae, 1995), have also been used (Hoyle, 2006). A meta-analysis revealed that trait self-control and behavioural outcomes, including health behaviours, share a small-to-medium positive association (de Ridder et al., 2012); however, this relationship varied greatly according to the self-control scale used. This finding demonstrates discrepancies in the relationship between self-control and behaviour even when conceptually and methodologically similar measures of self-control are used, and highlights the need to determine relations among such measures and health behaviour.

Self-control has also been conceptualised as a set of higher order neurocognitive processes that aids in overriding unwanted impulses (Hofmann, Schmeichel, & Baddeley, 2012; Miyake et al., 2000).

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http://dx.doi.org/10.1016/j.paid.2015.10.051
0191-8869/

Measures of self-control operationalised in this way include behavioural tasks such as the stop-signal task, which assesses response inhibition (Verbruggen & Logan, 2008), the Stroop task, which measures attention control (MacLeod & MacDonald, 2000), and the Iowa gambling task used to measure decision making (Bechara, Damasio, Damasio, & Anderson, 1994). While performance on these tasks has been shown to relate to heath behaviour (Allom, Mullan, & Hagger, in press), these measures may be subject to within-person differences in state self-control as often these tasks do not demonstrate good test–retest reliability (Wostmann, Aicherta, Costaa, Rubiab, & Mollera, 2013). As self-control capacity is hypothesised to be a finite resource that may fluctuate in strength depending upon environmental and task demands (i.e., ego-depletion), individuals may perform differently on behavioural measures of self-control over time (Baumeister et al., 2007; Hagger, Wood, Stiff, & Chatzisarantis, 2009).

Given the different conceptualisations and operationalisations of self-control, it should not be surprising that these measures do not correlate highly, or indeed at all. A meta-analysis of 236 studies revealed that self-report measures tended to have moderate convergent validity while behavioural measures demonstrated low convergent validity (Duckworth & Kern, 2011). Further, the relationship between self-report and behavioural measures was small ($r = .10$). Similarly, Cyders and Coskunpinar (2011) conducted a meta-analysis of 27 studies comparing self-report and behavioural measures of impulsivity and failed to demonstrate a significant relationship between the two ($r = 0.097$), further demonstrating that self-report and behavioural measures of the same construct often do not relate. However, Sharma, Markon, and Clark (2014) suggested that this is not necessarily problematic when these measures are used to predict a third variable, namely; health behaviour. Given that self-report and behavioural measures do not share common method variance any consistent relationship between these measures and behaviour is likely due to unique variance in each type of measure.

Further, given that the two measurement methods represent different elements of self-control, an interaction between self-report and behavioural measures of self-control may exist, and account for additional variance in health behaviour (Sharma et al., 2014). Sharma et al. (2014) base this assumption on their own observations and that of Baskin-Sommers et al. (2012), in which the tendency to exert self-control was facilitated among externalising individuals when attentional resources were also supported. Previous research has also indicated that people high in trait self-control are more capable of overriding their impulses, while poor self-control has been linked to impulse control disorders, and excessive food and alcohol consumption (Marteau & Hall, 2013; Tangney et al., 2004). As the behavioural tasks described previously tap processes such as response inhibition and attention control, which all require impulse control, it may be the case that these processes will moderate the relationship between trait self-control and health behaviour such that trait self-control facilitates the execution of health behaviour according to level of specific self-control processes.

The primary purpose of this study was to assess the pattern of relationships between self-report and behavioural measures of self-control, and the health-related behaviour of physical activity. Self-control plays a key role in physical activity as individuals need to defy the impulse to rest as soon as fatigue or tiredness sets in and resist the temptation to engage in more attractive sedentary alternatives that are less effortful and physically demanding (Hagger et al., 2010). It was hypothesised that low self-reported self-control would result in lower levels of physical activity overall (Tangney et al., 2004). Secondly, it was hypothesised that behavioural measures will not relate to self-report measures. Thirdly, it was hypothesised that particular processes captured by behavioural measures would directly relate to physical activity (Padilla, Perez, Andres, & Parmentier, 2013). Finally, an interaction between self-report and behavioural outcomes is hypothesised such that trait self-control may be differentially important for the execution of physical activity depending upon the level of particular self-control processes.

2. Method

2.1. Participants and procedure

The sample consisted of 146 undergraduates from the University of Nottingham, United Kingdom (*M* age = 23.43, *SD* = 6.26, range 18–52) who received US$5 for participation and were recruited using flyers circulated on the noticeboards of clubs and societies and student information noticeboards in academic schools, email lists of students supplied by the academic departments of the University, and an online research participation scheme involving all students from the University's Department of Psychology who participate in studies for course credit. After providing informed consent, participants completed three self-report measures of self-control, a self-report measure of physical activity, and computerised versions of the stop-signal, Stroop and Iowa gambling tasks. To ensure maximum quality of data, participants completed measures in a sound-proof experimental cubicle while the researcher waited outside. One participant was excluded due to a colour vision deficiency. The study took 30 min, and participants were debriefed.

2.2. Measures

2.2.1. Self-reported self-control

Participants completed the brief 13-item Tangney Self-Control Scale (Tangney et al., 2004), the 63-item Self-Regulation Questionnaire (Brown et al., 1999), and the 10-item self-discipline facet of the conscientiousness domain of the Revised NEO Personality Inventory (Costa & McCrae, 1995), with higher scores on each indicative of better self-control. The Tangney Self-Control Scale included items such as: "I am good at resisting temptation", and demonstrated good reliability, $\alpha = .84$. Responses were made on five-point Likert scales ranging from 1 (not at all like me) to 5 (very much like me). The Self-Regulation Questionnaire included items such as: "I have a lot of will power", and demonstrated good reliability, $\alpha = .89$. Responses were made on five-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). The self-discipline facet included items such as: "I start tasks right away", and demonstrated good reliability, $\alpha = .83$, with responses made on five-point Likert scales ranging from 1 (inaccurate) to 5 (very accurate).

2.2.2. Behavioural tasks

The stop-signal task comprised of 'go' and 'stop' trials. During the 'go' trials, participants discriminate between square and circle images presented in the centre of a computer screen for 1000 ms by pressing a left-hand key for square and a right-hand key for circle. On 'stop' trials (25%), participants were instructed to inhibit this response if they heard a tone, which was initially presented 250 ms after visual stimuli and then varied by 50 ms, increasing after successful inhibition of response or decreasing after unsuccessful inhibition. The task consisted of 32 practise trials and three experimental blocks of 64 trials with a 10-s interval between each block. The stop-signal reaction time (SSRT) was used to measure response inhibition with longer SSRT times indicating lower response inhibition and therefore poorer self-control (Verbruggen & Logan, 2008).

The Stroop task required participants to name the ink colour of words (i.e., "red", "blue") by pressing a key corresponding to that colour. Both congruent (matched ink colour and name of colour) and incongruent (mismatched ink colour and name of colour) stimuli were presented. The task consisted of 12 practise trials and 48 experimental trials. Attention control was assessed using the Stroop interference score, where the difference in reaction time between congruent and incongruent trials is calculated, and a lower interference score indicated greater self-control (MacLeod & MacDonald, 2000).

In the Iowa gambling task (Bechara et al., 1994) participants received a 'virtual' sum of $2000 and were invited to maximise their profit