

Stop and Start Control: A Distinction within Self-control

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Abstract: A theoretical distinction within self-control, between stop control and start control, was investigated in two studies. Study 1 consisted of a pilot study in which expert ratings of existing self-control items were used to distinguish between stop and start control items and a confirmatory factor analyses of these items using a student sample ($N = 474$). Also, stop and start control were related to overall affect and behavioural outcomes. Stop control was negatively related to negative affect, whereas start control was positively related to positive affect. Study 2 ($N = 226$) replicated some of these findings; stop control was the best predictor (–) of smoking and alcohol consumption whereas start control was the best predictor (+) of exercising and studying. Copyright © 2010 John Wiley & Sons, Ltd.

Key words: affect; self-control; start control; stop control

INTRODUCTION

Self-control has been defined as the exertion of control over the self by the self (Muraven & Baumeister, 2000). It is involved with different areas, such as thoughts, emotions, performance and attention (Baumeister, Heatherton, & Tice, 1994; Karoly, 1993), and has been proven to be beneficial in many different domains such as dietary restraint (Kahan, Polivy, & Herman, 2002), eating disorders, mental health (Tangney, Baumeister, & Boone, 2004), physical health (De Ridder & De Wit, 2006), addictions, aggression (DeWall, Baumeister, Stillman, & Gailliot, 2007) and criminality (Hirschi, 2004). These studies show that self-control is paramount in pursuing long-term and higher order goals.

The finding that a lack of self-control is related to problematic behaviours, such as drinking and smoking (Baumeister et al., 1994; Muraven & Shmueli, 2006), makes it clear that self-control is often involved in preventing *undesirable* behaviour. In some cases, however, self-control is needed to initiate *desirable* behaviour. This is shown by the findings that high self-control is related to better academic performance (Duckworth & Seligman, 2005; Shoda, Mischel, & Peake, 1990) and positive interpersonal relations (Finkel & Campbell, 2001). Regarding close relations, Finkel and Campbell found that self-control is related to accommodation, which consists both of inhibiting destructive responses to potentially destructive behaviour from a partner, as well as engaging in constructive responses. Engaging in *desirable* behaviour in relations, for example to talk to your partner, is as important as inhibiting *undesirable*

acts of getting angry or walking away. The current research investigates such different outcomes of self-control and suggests a distinction between two types of self-control that could differentially predict and explain these outcomes: Stop control and start control. The relevance of self-control in general has already been demonstrated and a more clearly defined construct could further self-control research as it allows for more pinpointed investigation of the relations, causes and outcomes of self-control.

Although self-control is partly situation-dependent and may vary depending on factors, such as previous self-control efforts (Muraven & Baumeister, 2000), emotions (Baumeister, Zell, & Tice, 2007), affect (Tice, Baumeister, Shmueli, & Muraven, 2007) and distress (Tice, Bratslavsky, & Baumeister, 2001), research has shown that people also systematically differ in their ability for self-control. Consequently, many studies have operationalized self-control as a stable trait (e.g. Brandon, Oescher, & Loftin, 1990; Tangney et al., 2004). Based on this research, in the present research we adopt the view of self-control as a trait-like quality.

The current paper should be considered as a first step in answering two questions about the stop and start control distinction within self-control: Is it appropriate and is it useful? The first question refers to the actual theoretical distinction and whether it fits empirical findings. We will answer this question by relating the distinction to existing theories on self-control and related constructs. Also, the distinction is appropriate if stop and start control can be empirically distinguished within the self-control construct. We will show this to be the case by factor analysing different sets of self-control items. The second question refers to the relationship of stop and start control with other constructs. We test the validity of both constructs by relating provisional

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measures of stop and start control to overall affect and behavioural outcomes, and showing that their relations with those outcomes are different.

TWO TYPES OF SELF-CONTROL

We propose that there are two forms of self-control: One for inhibiting behaviour and one for initiating behaviour. To support and explain our distinction, three examples of studies in which a similar distinction is made will be mentioned and different paradigms currently used in self-control theory will be discussed. Also different related constructs will be looked at in order to clarify some initial concerns that might arise when introducing the distinction.

Stop and start control in self-control research

In the well-known study by Baumeister, Bratslavsky, Muraven, and Tice (1998), food deprived participants were first told not to eat chocolate cookies that were right in front of them and later in the study required to do difficult figure tracing puzzles. Since the aim of the study was to see whether success on a self-control task would be impaired by a previous act of self-control, which it was, both resisting eating cookies (inhibiting) and trying to solve difficult puzzles (initiating) were considered self-control.

Another example is the study by Giner-Sorolla (2001), who differentiated between the self-control in delayed-cost dilemmas (benefit now, cost later or no benefit but also no cost) and the self-control in delayed-benefit dilemmas (cost now, benefit later or no cost but also no benefit). In delayed-cost dilemmas, one requires self-control *not to pursue* the benefit as it eventually leads to negative outcomes, like with smoking. In delayed-benefit dilemmas, one requires self-control *to pursue* the benefit since the impulse is to avoid the cost, as with preparing for exams. This shows that different types of self-control are required in different settings.

Fishbach and Shah (2006) have shown that individuals have an innate tendency to avoid an activity that 'is positive in the short term, but negative in the long term' and approach an activity that 'is negative in the short term, but positive in the long term'. Participants were requested to respond to activity words that were either 'positive' or 'negative' by either pushing or pulling a lever. Pushing a lever corresponds here with moving away from the activity and pulling to moving towards the activity. When instructed to push in response to the activity words, responses were fastest when the words represented behaviour negative in the long term and when instructed to pull a lever, responses were fastest for activities that were positive in the long term. This shows both that the distinction between positive and negative long term effects is valid and that participants are able to distinguish between the two, physically as well as psychologically. Fishbach and Shah have, therefore, shown that a distinction could possibly exist in behavioural control.

Based on this theorizing and research, we propose, that two forms of self-control can be distinguished, which we label stop control and start control. Stop control can be

defined as self-control aimed at short-term attractive but long-term undesirable behaviour, in order not to perform this behaviour. Start control is self-control aimed at short-term unattractive but long-term desirable behaviour, in order to perform this behaviour. What is considered attractive and desirable differs between people. We will explain this using an existing self-control framework. We will then discuss some implications of the distinction using similar theorizing.

Attractiveness and desirability, hot and cold

Self-control has been described as changing automatic responses in a conscious manner (Baumeister & Vohs, 2004). What is automatic and what is conscious has been further theorized by Metcalfe and Mischel (1999) in their description of a 2-system framework consisting of a hot, emotional 'go' system and a cool, cognitive 'know' system. The hot system is reflexive, fast and under stimulus control. The cool system is reflective, slow and under self-control. The separation of the reflexive and reflective functions, or the impulses and constraints, in the description of the self-control process has been extensively described by Carver (2005). These constructs can be used to clarify the attractiveness and desirability of behaviour, as described in the definitions of stop and start control.

First, the behaviour that is the target of self-control is determined by the reflexive system. If a person experiences an impulse for certain behaviour then this behaviour is attractive. Second, this person also holds some self-set goals, explicit or implicit, determined by the reflective system, the constraint. If behaviour is in line with these goals then the behaviour is desirable. Third, if the attractive behaviour is undesirable, stop control is needed to avoid the behaviour. This works similarly for start control. If a person sets goals for certain behaviour, using the reflective system, this behaviour becomes desirable. If, however, this behaviour is unattractive as determined by the reflexive system (difficult, boring, fatiguing, scary, etc.), start control is needed. In short, the immediate attractiveness of behaviour is determined by the reflexive system, and the long-term desirability is determined by the reflective system. Also, the self-control that results after a mismatch between behaviour and goals comes from the reflective system.

The previous description of the self-control process emphasizes a feedback loop pertaining to self-set goals. The definitions of stop and start control, however, incorporate the sort of behaviour that is under control and whether it is in line with self-set goals, not the goals themselves. To further clarify this, we should compare the feedback loop with the two forms of self-control. Carver and Scheier (1982) discuss two feedback systems: A negative loop (reducing discrepancy) for approaching a condition that is desirable and a positive loop (increasing discrepancy) for avoiding a condition that is undesirable. Both feedback loops influence self-control: The negative loop enforces behaviour that leads to desired outcomes (approach goals) and the positive loop enforces behaviour that leads away from negative outcomes (avoidance goals). Because the proposed distinction within self-control does not lie in the sort of goals that one is

pursuing, the negative loop can foster both stop control (for instance not smoking to increase physical fitness) and start control (going to the gym to increase physical fitness). The positive loop can also foster both stop control (not smoking to avoid risk of heart disease) and start control (going to the gym to avoid risk of heart disease).

It is important to note that the definitions of stop and start control incorporate attractiveness and desirability, and not type of goal. It has been shown that the framing of a goal, in approach or avoidance terms, has an effect on the pursuit of that goal in and of itself (Förster, Higgins, & Idson, 1998). This should be seen as separate from the difference between stop and start control, which are aimed at the behaviour.

Constructs related to stop and start control

Self-control can be related to many different constructs. Theory on extrinsic and intrinsic motivation can be used to further clarify the distinction. For example, Sansone and Thoman (2006) separated goals-defined motivation, the willingness to do a task because it brings a valued outcome, from experience-defined motivation, the enjoyment of the task itself. This fits within the distinction, for example start control is necessary if a person has low experience-defined motivation (e.g. when a task is boring), but has high goals-defined motivation (e.g. when a task leads to a valued outcome).

In their multi-dimensional conceptualization of self-control, Wills, Isasi, Mendoza, and Anette (2007) differentiated between indicators of good self-control (e.g. soothability, planfulness and cognitive effort) and poor self-control (e.g. impulsiveness, distractability and impatience). On the good self-control side, we find aspects that can be theoretically linked to high stop control (soothability) and high start control (planfulness) and on the poor self-control side, we find aspects that can be linked to low stop control (impulsivity) and low start control (distractability). The approach taken by Wills et al. (2007; see also Wills, Anette, Stoolmiller, Gibbons, Shinar(2008)) encompasses more and different indicators of trait self-control than the current approach in trying to explain different behavioural outcomes. The underlying thought, however, is similar; self-control cannot simply be divided into high and low self-control but instead consists of different dimensions or components that interplay when one is trying to control behaviour.

Two specific, well-researched constructs need to be mentioned in order to fully appreciate the distinction between stop and start control proposed here: Impulsivity and conscientiousness. If taken as indicator of self-control, impulsivity can be argued to be indicative of poor self-control (Wills et al., 2008), whereas conscientiousness may relate to good self-control. However, although strongly related to self-control, impulsivity is not synonymous with low self-control, as shown by Hofmann, Friese, and Strack (2009). Their research shows that impulsivity and self-control together explain behaviour far better than either of the constructs alone (Friese & Hofman, 2009).

Disentangling impulsivity from self-control is very much in line with the hot-cool and impulse-constraint distinctions mentioned earlier (Carver, 2005; Metcalfe & Mischel, 1999; see also Strack & Deutsch, 2004). A practical difference between the constructs can be clarified as follows: Self-control is only used when an impulse leads to behaviour with undesired consequences; without such impulse or without the undesired consequences, self-control is not necessary. Similarly, although conscientiousness is strongly related to self-control (Tangney et al., 2004), it is not the same. Conscientiousness operates as a personality trait in many different domains, with or without disruptive impulses¹. Self-control only operates in behavioural domains where there are impulses that deviate actions from self-set goals. By encompassing both impulses (attractiveness) and self-set goals (desirability) into the definitions of stop and start control, the proposed distinction clarifies some of the boundaries of self-control.

SELF-CONTROL OUTCOMES

Findings from previous research could be used to support the distinction within self-control. The present study focuses on affective and behavioural outcomes of stop control and start control. Two forms of affect are of interest in this study: Positive affect and negative affect. Four behavioural outcomes are used in this study: Smoking, drinking, studying and exercising.

Self-control and affect

We argue that affect is related to self-control through the behaviours that self-control diminishes or supports. Although there has been little previous research on the direct relationship of trait self-control with overall affect, it is known that success in goal pursuit causes positive affect and that failure in goal pursuit causes negative affect (Oatley & Johnson-Laird, 1987). A successful attempt at controlling the self will, therefore, likely result in positive affect and self-control failure in negative affect (see also Carver & Scheier, 1998). These effects will occur differently within the proposed distinction.

First, the actions resulting from successful stop control are much less visible than the actions following successful start control, because they entail no actual behaviour. Resisting a single cigarette is less rewarding than going to the gym once. Furthermore, stop control is aimed at not doing something and failure is, therefore, much more visible than success. Smoking one cigarette when one had the intention to quit can be seen as immediate failure, whereas quitting

¹This statement's accuracy very much depends on one's definition of Conscientiousness. Since Conscientiousness is a construct derived from data rather than theory, it can be said to be many different things. In their analyses, McCrae and Costa (1987) included the terms careful, reliable, hardworking, well organized, scrupulous, self-disciplined, neat, punctual, practical, deliberate, ambitious, emotionally stable, self-reliant, business-like, energetic, knowledgeable, persevering, intelligent, fair, perceptive and cultured. Certainly not all of these traits are linked to, or would require, self-control.

successfully requires resisting cigarettes for weeks or months before it can be seen as successful.

Second, the point at which success is attained is unclear for stop control, since the behaviour targeted does not lose its attractiveness instantly. This rationale does not state that successful individual acts of stop control cannot lead to positive affect, but rather that overall low stop control capability is much more likely to cause negative affect than high stop control capability is to cause positive affect. In contrast, start control is aimed at doing something and success is more visible than failure. Failing to go to the gym once, when one had the intention to get more physical exercise, does not entail immediate failure, whereas going to the gym several times can be seen as success. When people fail to do something they have other possibilities to try again before it is seen as failure. Overall low start control capability is, therefore, less likely to cause negative affect than high start control is to cause positive affect.

Self-control and behavioural outcomes

The most important outcome of self-control is the presence or absence of the behaviour it targets. Smoking and studying, for instance, are behaviours related to general self-control (Tangney *et al.*, 2004). Self-control diminishes (smoking) or supports (studying) performing these behaviours. Self-control is also negatively related to alcohol consumption (Muraven & Shmueli, 2006) and positively related to exercising (Kennett, Worth, & Forbes, 2009). We argue that the positive relations with studying and exercising are mainly due to start control, since those are behaviours that are desirable in the long term. The negative relations, however, are mainly due to stop control. Smoking and alcohol consumption are behaviours that may be attractive in the short term but can be undesirable in the long term.

Sometimes both stop and start control appear to be necessary for the same behavioural outcome: For some behaviours to occur, other behaviours should not occur. This may make the distinction somewhat unclear but we argue that stop and start control take place in concurrence rather than simultaneously and are effectively different. In the current paper, we will touch on this subject but have tried to incorporate behaviours in the studies that require either stop control or start control to perform successfully.

PRESENT RESEARCH

The different theories and research we have discussed, all either point towards a distinction within self-control or support the appropriateness and usefulness of the distinction between stop and start control. Previous studies have used a similar distinction and it fits with the current hot-cool self-control framework and theories of related constructs. Also, different established behavioural outcomes of self-control can be clarified and differentiated using the proposed distinction.

The present research will further these insights in two studies. Study 1 was designed to test whether stop control and start control can be empirically distinguished. In the pilot

phase of Study 1, experts were used to rate items from three existing trait self-control questionnaires. Based on these ratings, provisional scales for stop and start control were constructed, which were administered in two student samples. Confirmatory factor analyses were performed on these scales, and the convergent and divergent validity of stop and start control was examined by relating them to affective and behavioural outcomes. Study 2 was designed as a replication, in order to disconfirm possible alternative explanations.

Six hypotheses were formulated based on the theory discussed before: Stop control will relate negatively to negative affect and start control will not (Hypothesis 1), start control will relate positively to positive affect and stop control will not (Hypothesis 2), stop control will relate negatively to cigarette smoking and start control will not (Hypothesis 3), stop control will relate negatively to alcohol consumption and start control will not (Hypothesis 4), start control will relate positively to hours of exercise per week and stop control will not (Hypothesis 5) and start control will relate positively to hours of study per week, and stop control will not (Hypothesis 6). Hypotheses 1 and 2 are based on the differences in visibility of self-control success and failure as well as the point at which success and failure can be discerned and the subsequent affective outcomes. Note that these hypotheses only apply if self-control is seen as a trait. We know from previous research that a positive affect can increase state self-control (Tice *et al.*, 2007) and negative affect can undermine self-control efforts (Tice *et al.*, 2001). Hypotheses 3–6 predict relations between self-control and behaviour expressed that are not new; the expected differences in size of the relations for stop and start control, however, are new.

STUDY 1

The goal of Study 1 was to investigate whether the theoretical distinction between stop and start control could be empirically supported, based on the factor structure and relations to other constructs. Different questionnaires exist that aim to measure self-control. However, none of these incorporate a distinction between engaging in activities and refraining from them. For the purpose of this study, we first created such measures in a pilot.

Pilot phase

A first step in dividing self-control into two dimensions was taken by asking graduated psychologists to classify self-control items of three commonly used general self-control questionnaires as either stop control or start control items. A total of 22 scholars from a university psychology department were used as raters (15 MSc, seven PhD). These were 10 clinical psychologists, six industrial and organizational psychologists, three cognitive psychologists, two biological psychologists and one educational psychologist.

Raters were given a sheet of items and a coversheet containing instructions and short definition of stop control and start control: 'Stop control is self-control for activities

that deviate from the goals or wishes of people. The control is aimed at *not doing* something and stops behaviour. In other words, a person has to control him or herself to not do something that he or she would otherwise do. Start control is self-control for activities that are in accordance with the goals or wishes of people. The control is aimed at *doing* something and starts behaviour. In other words, a person has to control him or herself to do something that he or she would otherwise not do'. Each rater was assigned a set of 30 items out of a 94-item set and asked to rate each item as either belonging to 'stop control' or 'start control', or to classify it as 'not easily discernable'. This last category was added to make sure only items able to distinguish between stop and start control would be included in the final set. All items were rated by at least six different raters.

Measures

The self-control scale (SCS; Tangney et al., 2004) consists of 36 items and is built around the ability of the self to control itself as reflected by breaking bad habits, resisting temptation and keeping good self-discipline. Items include: 'People can count on me to keep on schedule' and 'I blurt out whatever is on my mind' (reverse coded). The Self-Control Schedule (Rosenbaum, 1980) consists of 36 items that describe (a) use of cognitions and self-statements to control emotional and physiological responses, (b) application of problem-solving strategies, (c) ability to delay immediate gratification and (d) perceived self-efficacy. Items include 'When an unpleasant thought is bothering me, I try to think about something pleasant' and 'When I do a boring job, I think about the less boring parts of the job and the reward that I will receive once I am finished'. Based on the factor analytic findings of Rohde, Lewinsohn, Tilson, and Seeley (1990) in their research on the dimensionality of coping, 21 items were selected for the present study. These 21 items clustered together in one factor labelled Cognitive Self-Control. The Ego-undercontrol scale (Letzring, Block, & Funder, 2005) consists of 37 items measuring ego-control. Ego-control is similar to self-control but its measure ranges from undercontrol to overcontrol. Overcontrolled individuals are described as relatively constricted in behavioural or attentive impulses (e.g. delaying of gratification unduly, behaviourally and perceptually constrained and disciplined). Undercontrolled individuals are described as relatively expressive or attentive to internal pushes and pulls (e.g. with immediate and direct expressions of behaviour or attention, spontaneity and unbothered by ambiguities) (Block & Block, 2006). Items include 'I tend to buy things on impulse' and 'On the whole I am a cautious person' (reverse scored).

Results

Only nine items were immediately discarded because a majority of the experts could not easily discern stop control or start control and less than a quarter of the items did not receive a majority for one of the two types of self-control. The outcomes further showed that a total of 55 items were described by experts as either stop control or start control with at least a ratio of two to one. Of these, 13 items reached

complete consensus among experts and 26 items were rated differently by only one expert.

The ratings of the items by experts were only derived from a short description of the difference between stop control and start control and without much previous knowledge of self-control. These results, thus, show that the theoretical distinction that can be made between stop control and start control is intuitive and clear. Furthermore, these results allowed us to select items in order to create provisional scales for stop and start control.

Method: Quantitative phase

Study 1 was continued by having participants fill out the stop and start control scales in combination with other measures. Overall affect was chosen as a global measure for success in controlling behaviour and reaching self-set goals. Behavioural outcomes were used as a specific measure, indicating success in controlling certain behaviours. Hypotheses 1–6 were tested, predicting differential relations with stop and start control for positive affect, negative affect and self-reported smoking, alcohol consumption, exercising and studying.

Participants and procedure

A sample of 474 students and graduates from a university in The Netherlands filled out an online questionnaire with self-control items (287 women, mean age = 22.74, $SD = 3.56$). Part of the participants also filled out affect measures (Subsample 1, $N = 295$, 175 women, mean age = 22.82, $SD = 3.85$), whereas another part also reported on behavioural measures (Subsample 2, $N = 179$, 112 women, mean age = 22.61, $SD = 3.32$).

Measures

Using the 44 items regarded by most of the experts as either measuring stop control or start control, 12 items were selected to function as a stop control scale and 12 items were selected to form a start control scale. The selection was based on item content, such that there were enough self-control domains covered by both scales, without too much difference in self-control domains between the scales. Items with the highest agreement among experts were chosen first unless they duplicated other items. All 24 self-control items were rated on a five-point scale (1 = *completely untrue for me*, 5 = *completely true for me*). See Table 1 for the complete list of items. Cronbach's α s in the total sample were .79 for the stop control scale and .75 for the start control scale.

Overall affect was measured using the positive affect, negative affect scale (PANAS, Watson, Clark, & Tellegen, 1988). The PANAS consists of 10 mood states for positive affect (e.g. 'attentive' and 'strong') and 10 for negative affect (e.g. 'hostile' and 'guilty'). Participants scored how they generally felt on a five-point scale (1 = *very slightly or not at all*, 5 = *extremely*). The mean scores for the 10 positive affect and negative affect scores were used to create a composite positive affect ($\alpha = .88$) and negative affect ($\alpha = .81$) scores.

Table 1. Factor loadings from a two-factor structure for the 24 items of the stop and start control scales (Study 1)

Item	Factor loadings	
	Stop control	Start control
1. I do many things on the spur of the moment ^{†,‡}	.70	
2. I blurt out whatever is on my mind ^{†,‡}	.63	
3. I have a hard time breaking bad habits ^{†,‡}	.53	
4. I'd be better off if I stopped to think before acting ^{†,‡}	.53	
5. I spend too much money ^{†,‡}	.51	
6. I tend to buy things on impulse ^{†,‡}	.46	
7. Sometimes I can't stop myself from doing something, even if I know it's wrong ^{†,‡}	.46	
8. Pleasure and fun sometimes keep me from getting work done ^{†,‡}	.48	
9. Sometimes I rather enjoy going against the rules and doing things I am not supposed to ^{†,‡}	.45	
10. I lose my temper too easily ^{†,‡}	.40	
11. I often interrupt people ^{†,‡}	.40	
12. I sometimes drink or use drugs to excess ^{†,‡}	.42	
13. When an unpleasant thought is bothering me, I try to think about something pleasant [§]		.57
14. When I am feeling depressed, I try to think of pleasant things [§]		.55
15. When I am depressed, I try to keep myself busy with things that I like [§]		.53
16. In order to overcome bad feelings that accompany failure, I often tell myself that it is not so catastrophic and that I can do something about it [§]		.41
17. When I find it difficult to settle down to do a certain job, I look for ways to help me settle down [§]		.50
18. When I do a boring job, I think about the less boring parts of the job and the reward that I will receive once I am finished [§]		.48
19. If I find it difficult to concentrate on a certain job, I divide the job into smaller segments [§]		.44
20. When I am in a low mood, I try to act cheerful so my mood will change [§]		.48
21. When I have to do something that is anxiety arousing for me, I try to visualize how I will overcome my anxieties while doing it [§]		.36
22. When I find that I have difficulties in concentrating on my reading, I look for ways to increase my concentration [§]		.40
23. When I am faced with a difficult problem, I try to approach its solution in a systematic way [§]		.35
24. Often by changing my way of thinking I am able to change my feelings about almost everything [§]		.29

[†]Reverse coded.

[‡]Item taken from the self-control scale (Tangney *et al.*, 2004).

[§]Item taken from The self-control schedule (Rosenbaum, 1980).

[§]Item taken from the ego-undercontrol scale (Letzring *et al.*, 2005). $N = 474$.

The behavioural self-report measure consisted of four questions: 'How many cigarettes do you smoke per week?', 'How many glasses of alcohol do you drink per week?', 'How many hours do you exercise per week?' and 'How many hours do you study per week?' Of the participants in Subsample 2, 79.9% were non-smoker, 22.3% did not drink alcohol and 14.0% did not exercise. Because of these highly skewed data, each behavioural measure was transformed into an ordinal scale consisting of six groups. For smoking, alcohol consumption and exercising, these were '0' and five groups of equal size. For studying, these were six groups of equal size; '0' was not present in these data. This procedure reduces the effects of outliers and creates more robust results when used in combination with Spearman's ρ correlations. We compared the results found in this way to the results derived from the original scores and a base 10 logarithm of this variable and values were substantially similar and subsequent conclusions remained the same.

Analyses and results: Quantitative phase

To assess the factor structure of the two-dimensional self-control measure, confirmatory factor analysis was performed using AMOS 16.0 (Arbuckle, 2006). Two models were fit to

the data: A one-factor model in which all 24 items loaded onto a single latent self-control factor and a two-factor model, in which the 12 items expected to represent stop control are loaded on one latent factor and the 12 items expected to represent start control are loaded on another latent factor. The latent factors were allowed to correlate because although stop and start control are distinct, theoretically they stem from similar reflective systems and as a function of this, they might be related. For instance, a higher general focus on long-term outcomes affects both stop and start control. Model fit was assessed using multiple indices (*cf.* Hu & Bentler, 1999). These were the chi-square statistic (χ^2), the standardized root mean squared residual (SRMR), the goodness-of-fit index (GFI) and the root-mean-square error of approximation (RMSEA). Kline (1998) suggested a χ^2/df ratio of less than 3.00.

The χ^2 test was significant for both the two-factor model, $\chi^2(251, N = 474) = 809.51, p < .01$, and the one-factor model, $\chi^2(252, N = 474) = 1441.43, p < .01$, indicating poor fit to the data. Considering the large sample size and large number of variables in the specified models, this was not surprising. However, the proposed two-factor model (SRMR = 0.06, GFI = 0.87, RMSEA = 0.07, $\chi^2/df = 3.23$) fit significantly and substantially better to the data than the

Table 2. Correlations for all variables in Subsample 1 (Study 1)

Scale	<i>M</i>	<i>SD</i>	α	1	2	3	4
1. Stop control	40.26	6.65	.80	—			
2. Start control	37.00	5.55	.75	.02	—		
3. Negative affect	2.13	0.67	.88	-.18**	-.02	—	
4. Positive affect	3.51	0.52	.81	-.02	.26**	-.06	—

Note. Both stop control and start control were measured using the 12-item scale.

N = 295.

***p* < .01.

Table 3. Correlations for all variables in Subsample 2 (Study 1)

Scale	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6
1. Stop control	40.37	6.55	.78	—					
2. Start control	37.75	5.42	.74	-.01	—				
3. Cigarette smoking	6.65	20.73	—	-.39**	.03	—			
4. Alcohol consumption	5.74	7.68	—	-.42**	.01	.34**	—		
5. Hours of exercise	1.87	1.59	—	-.04	.05	-.03	-.10	—	
6. Hours of study	20.58	11.07	—	.32**	.15*	-.19*	-.15	.01	—

Note. Spearman correlations were used. Both stop control and start control were measured using the 12-item scale. Variables 3–6 are recoded into six ordinal values, original means and standard deviations are given.

N = 179.

**p* < .05.

***p* < .01.

one-factor model (SRMR = 0.11, GFI = 0.73, RMSEA = 0.10, $\chi^2/df = 3.23$), $\Delta\chi^2(1, N = 474) = 631.92, p < .01$. Factor loadings in the two-factor model varied between .40 and .70 for stop control and between .29 and .57 for start control. All factor loadings were significant (*p* < .05).

The aim of this study was to test the proposed distinction within self-control, and thus whether the two-factor model fit better to the data than the one-factor model. However, the misfit of the two-factor model was unfortunate and it was important to find out where fit could be improved. Inspection of the modification indices showed that the largest improvements of model fit could be attained by letting the errors of various items within one scale (stop control or start control) relate to each other. The six modification indices ranged from 8.46 to 98.92. Applying them resulted in an acceptable fit, $\chi^2(245, N = 474) = 555.90, p < .01$, SRMR = 0.06, GFI = 0.91, RMSEA = 0.05, $\chi^2/df = 2.27$, with the model still displaying the proposed distinction between stop control and start control. The errors that were allowed to correlate² contained variance explained by a specific domain in which self-control can be involved, for instance saving money (items 5 and 6) and creating positive thoughts (items 13 and 14). Adding the same covariances to the one-factor model did not result in acceptable fit, $\chi^2(245, N = 474) = 1077.94, p < .01$, SRMR = 0.11, GFI = 0.79, RMSEA = 0.09, $\chi^2/df = 4.38$.

²In both models, errors from items 2 and 7, 3 and 7, 5 and 6, and 5 and 12 were allowed to correlate (stop control scale) and items 13 and 14, and 13 and 20 (start control scale). See Table 1 for the items.

Table 4. Regression analysis of positive and negative affect on stop control and start control in Subsample 1 (Study 1)

Variable	Negative affect	Positive affect
β Stop control	-.18**	-.02
β Start control	.01	.26**
<i>R</i>	.18	.26
Adjusted <i>R</i> ²	.03	.06
<i>F</i> (<i>df</i> ₁ , <i>df</i> ₂)	4.54 (2, 279)**	10.27 (2, 279)**

Note. Both stop control and start control were measured using the 12-item scale.

N = 295.

***p* < .01.

Means, *SD*s, α s and correlations for all variables are displayed in Table 2 (subsample 1) and Table 3 (subsample 2). To assess the differential relations of stop control and start control, with positive and negative affect and the behavioural outcomes, six regression analyses³ were performed. Stop and start control together explained a significant proportion of variance in negative affect and positive affect, as displayed in Table 4. In support of Hypothesis 1 and 2, β -weights showed that only stop control significantly explained variance in negative affect, with a significantly larger effect size than start control, $t(294) = 1.75, p < .05$. Only start control significantly explained variance in positive affect with a significantly larger effect size than stop control,

³All six regressions were repeated with the addition of an interaction between stop and start control. The interaction terms failed to reach significance and did not explain unique variance in the dependent variables.

Table 5. Regression analysis of smoking, alcohol consumption, exercising and studying on stop control and start control in Subsample 2 (Study 1)

Variable	Cigarette smoking	Alcohol consumption	Hours of exercise	Hours of study
β Stop control	-.46**	-.39**	-.01	.30**
β Start control	.06	-.03	.04	.19*
R	.47	.39	.04	.35
Adjusted R^2	.21	.14	-.01	.11
$F(df_1, df_2)$	23.95 (2, 173)**	15.51 (2, 175)**	0.16 (2, 175)	12.04 (2, 174)**

$N = 179$.

* $p < .05$,

** $p < .01$.

$t(294) = 3.70, p < .01$. Both effects were in the expected direction. Regression analyses further showed that stop and start control together explained a significant proportion of variance in cigarette smoking, alcohol consumption and hours of study, as displayed in Table 5. β -weights show that, consistent with Hypothesis 3 and 4, only stop control explained unique variance in cigarette smoking and alcohol consumption with effect sizes significantly larger than start control, $t(178) = 3.65, p < .01, t(178) = 3.11, p < .01$. Contrary to Hypothesis 5, stop and start control did not explain a significant amount of variance in hours of exercise and β weights did not differ significantly between stop and start control, $t(178) = 0.54, ns$. Finally, contrary to Hypothesis 6, stop and start control both explained unique variance in hours of study with β weights that did not differ significantly, $t(178) = 0.27, ns$.

Discussion

The purpose of the first study was to test whether a two-factor structure was possible and beneficial in self-control research. The factor analysis showed that a two-factor structure, displaying a distinction between stop control and start control, fit significantly and substantially better to the data than a one-factor general self-control model. Allowing errors of domain specific items to correlate resulted in an increased fit. This indicates that self-control may not only depend on the behaviour being active (doing something) or passive (not doing something), but also on the specific domains themselves. Some people have a hard time dealing with money where others have a hard time thinking positive in the face of troubles. Self-control measures are known to cover different domains, for instance the SCS (Tangney *et al.*, 2004) covers five broad domains when factor analysed. This says more about the specific difficulties of these domains than about the usefulness of self-control as a construct when trying to explain behavioural outcomes. Also, it does not negate the possibility of the stop and start control distinction but proves that more research into self-control is needed to understand where these difficulties arise.

Results overall point towards differential relationships for stop and start control with affect that cannot be explained if both constructs would represent a single trait. Stop control, aimed at not performing behaviour that might lead to negative outcomes, is negatively related to negative affect. Start control, aimed at performing behaviour that might lead

to positive outcomes is positively related to positive affect. Interpretation of these findings can be related to the core difference in stop control and start control as described in the introduction and are in line with control theory (Carver & Scheier, 1982) on affect resulting from goal pursuit and attainment.

Stop control related negatively to both smoking and alcohol consumption whereas start control did not. This gives support to the distinction within self-control. However, stop control also explained unique variance in study behaviour, besides the variance explained by start control. This might be due to the fact that studying is a more complex behaviour, which may also require refraining from other activities, rather than just focusing on a study activity and using start control for it. Since all participants are students who have many alternatives to studying, stop control may be necessary for them as well. Contrary to the expectations, start control was not related to exercising behaviour. A possible explanation is that exercising behaviour is too much dependent on specific intentions. All participants in the sample were students and, therefore, have a personal goal to study, they might not all have had a goal to exercise. Also, it is conceivable that for some people exercising does not require self-control at all, which might have been the case in this particular sample.

Although the results of Study 1 indicate that the distinction between stop control and start control is appropriate and useful, given the different ratings by experts, the two-factor structure and the differential patterns of relations with overall affect and behavioural outcomes, alternative explanations for these findings need to be considered. We therefore designed a second study.

STUDY 2

In the first study, stop and start control were investigated using scales with existing self-control items. However, this resulted in some possible confounds. Items in the stop control scale were on average shorter and reverse coded. Items in the start control scale were somewhat longer and none of the items was reverse coded (see Table 1). Instead of stop and start control, these confounds might be a possible alternative explanation for the two factors and the differential relations with other variables. Therefore, the purpose of the second study was to examine whether the distinction within

self-control still held when using measures without these confounds.

Method

The items used in Study 2 were rephrased in order to remove the possible confounds. The validity of the new scales was examined by comparing them to an existing measure for general self-control. The items were factor analysed to test the appropriateness of the distinction and again related to behavioural outcome measures in order to test its usefulness. This second study, therefore, largely replicates Study 1 with the use of a third independent sample and new scales to re-test Hypothesis 3–6.

A total of 226 students from a university in the Netherlands (196 women, mean age = 20.15, $SD = 2.33$) filled a paper questionnaire which included newly developed items to measure stop and start control. The items were based on the previous items used in the two 12-item scales from Study 1 (see Table 1), the findings of these studies and the theoretical distinction between stop control and start control. We first discerned the domains of self-control that the items were involved in and excluded those that were too closely tied to behavioural outcomes (i.e. item 12). Then we identified items measuring intentions, rather than behaviour (i.e. item 14). Items that could not be rephrased into discernable behavioural (i.e. 'I am able to ...' or 'I never ...') or effort (i.e. 'I find it difficult to ...') were discarded. Lastly, we tried to rewrite each item such that it displayed a condition that calls for self-control (i.e. 'when there is much distraction') and a result indicating self-control ability (i.e. 'I am able to concentrate'). The two scales, nine items for stop control and eight for start control (see Table 6), were created in such a way that they both had a more even distribution of reverse-coded items and that all items had approximately the same length, in order to exclude possible confounds.

Also included in this second study was the SCS (Tangney et al., 2004) to measure general self-control. The SCS was chosen because it is the scale that is used most often as a trait measure in self-control research. All self-control items were rated on a 7-point scale (1 = *completely disagree*, 7 = *completely agree*). The same behavioural self-report measures were used as in Study 1. Of the participants, 83% were non-smoker, 29% did not drink and 21% did not exercise. The behavioural data were skewed and, therefore, recoded into ordinal scales with six groups; subsequently Spearman's ρ correlations were applied. Similar to Study 1, results were robust across different transformation methods.

Analyses and results

Two models were fit to the data: A one-factor model and a two-factor model. The χ^2 test was significant for both the two-factor model, $\chi^2(118, N = 226) = 332.63, p < .01$, and the one-factor model, $\chi^2(120, N = 226) = 433.40, p < .01$, similar to Study 1. The two-factor model again fit significantly and substantially better to the data than the one-factor model, $\Delta\chi^2(2, N = 226) = 100.77, p < .01$. The proposed two-factor structure did not fit well to the data (SRMR = 0.08, GFI = 0.85, RMSEA = 0.09, $\chi^2/df = 2.81$), but better than the one-factor model (SRMR = 0.10, GFI = 0.80, RMSEA = 0.11, $\chi^2/df = 3.61$). Factor loadings within the two-factor model varied between .32 and .64 for stop control and between .39 and .64 for start control. All factor loadings were significant ($p < .05$).

An effort was made to look for possibilities for improving the scales. The largest improvements of model fit could again be attained by letting the errors of various items within one dimension relate to each other. This time, however, it only concerned the covariance between errors of items that were either both reverse coded or both not reverse coded. This showed that the replication, using scales with evenly

Table 6. Factor loadings from a two-factor structure for the 17 items of the stop and start control scales (Study 3)

Item	Factor loadings	
	Stop control	Start control
1. During shopping I make impulsive purchases*	.40	
2. I can easily stop doing something fun that I know to be bad for me	.49	
3. I do things spontaneously as soon as I think of them*	.32	
4. I stick to the rules even if I find them unreasonable	.35	
5. When it comes to spending money, I find it difficult to control myself*	.53	
6. I never take action without thinking about it first	.61	
7. I find it easy to save money	.64	
8. Before I do something I go over the possible consequences	.56	
9. I find it fun to break rules and do things that I shouldn't*	.44	
10. I persevere at important tasks, even if I'm afraid something might go wrong		.44
11. I find it difficult to do tasks that I hate doing*		.49
12. I find it difficult having to restart something after I thought I was already done*		.39
13. I'm still able to concentrate when things around me are very hectic		.45
14. Even if I don't feel like it, I'm able to complete the tasks that needed to be done		.60
15. When there is much distraction, I'm able to focus on one thing in order to get it done		.64
16. When my mind wanders while I'm reading, It's easy for my to concentrate on the text again		.59
17. I'm able to continue working even when severely tired, if something really needs to be done		.41

*Reverse coded. $N = 226$.

Table 7. Correlations for all variables in Study 2

Scale	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7
1. Stop control	37.14	7.52	.73	—						
2. Start control	35.54	6.70	.72	.29**	—					
3. SCS	154.55	24.26	.88	.58**	.50**	—				
4. Cigarette smoking	5.49	16.14	—	-.26**	.01	-.23**	—			
5. Alcohol consumption	3.50	5.02	—	-.27**	-.14*	-.27**	.25**	—		
6. Hours of exercise	2.98	3.05	—	.03	.15**	.21**	-.01	.09	—	
7. Hours of study	18.78	9.03	—	.14*	.21**	.28**	.03	-.05	.11	—

Note. Spearman correlations were used. Stop control was measured using the 9-item scale and start control using the 8-item scale. Variables 3–6 are recoded into six ordinal values, original means and standard deviations are given. SCS = self-control scale (Tangney *et al.*, 2004).

N = 226.

**p* < .05.

***p* < .01.

Table 8. Regression analysis of smoking, alcohol consumption, exercising and studying on stop control and start control in Study 2

Variable	Cigarette smoking	Alcohol consumption	Hours of exercise	Hours of study
β Stop control	-.19**	-.27**	-.03	.10
β Start control	.09	-.10	.18*	.19**
<i>R</i>	.18	.32	.18	.24
Adjusted <i>R</i> ²	.02	.10	.02	.05
<i>F</i> (<i>df</i> ₁ , <i>df</i> ₂)	3.58 (2, 223)*	12.79 (2, 223)**	3.58 (2, 223)**	7.03 (2, 223)**

Note. Stop control was measured using the 9-item scale and start control using the 8-item scale.

N = 226.

**p* < .05.

***p* < .01.

distributed reverse coded items, was indeed beneficial. The nine modification indices ranged from 4.38 to 45.05. Applying these⁴ resulted in an acceptable fit, χ^2 (109, *N* = 226) = 194.68, *p* < .01, SRMR = 0.071, GFI = 0.91, RMSEA = 0.06, χ^2/df = 1.79, with the model still displaying the proposed distinction. Adding the same covariances did not result in acceptable fit for the one-factor model, χ^2 (111, *N* = 226) = 269.60, *p* < .01, SRMR = 0.08, GFI = 0.87, RMSEA = 0.08, χ^2/df = 2.43.

Means, *SD*s, α s and correlations for all variables are displayed in Table 7. Four regression analyses⁵ were performed in order to test the hypotheses concerning the behavioural outcomes. Stop and start control together could explain variance in cigarette smoking, alcohol consumption, hours of exercise and hours of study, as displayed in Table 8. β -weights show that stop control explains unique variance in number of cigarettes and alcohol consumption and start control explains unique variance in hours of exercise and hours of study. All relations were in the expected direction. The effect sizes were significantly different between stop and start control for cigarette smoking, $t(225) = 2.27$, *p* < .05, alcohol consumption, $t(225) = 1.85$, *p* < .05 and hours of

exercise, $t(225) = 1.88$, *p* < .05, but not for hours of study, $t(225) = 0.93$, *ns*. Therefore, Hypotheses 3, 4 and 5 were supported and Hypothesis 6 was not supported.

Both the 9-item stop control scale and the 8-item start control scale separately showed a significant and large positive correlation with the SCS, as displayed in Table 7, indicating that items in both new scales adequately represent self-control. After combining the stop and start control item scores, their total showed a significant and large correlation of .71 with the SCS.

Discussion

Stop control explained variance in cigarette smoking and alcohol consumption, behaviours that have long-term undesirable outcomes but can be attractive. Start control did not explain any variance in these behaviours. Start control did explain variance in exercising and studying, behaviours that have desirable outcomes, and stop control did not. As in Study 1, however, the effect sizes for study behaviour were not significantly different for stop or start control. Overall, these findings are highly similar to the results of Study 1 and support the differential relations of stop and start control with behavioural outcomes. Study 2 has shown that the findings in Study 1 are not likely to be explained solely by possible confounds due to item phrasing.

In Study 2, stop control did not explained unique variance in studying and start control did explain variance in exercising, which is in line with the hypotheses but different

⁴In both models, errors from items 1 and 5, 3 and 9, and 11 and 12 were allowed to correlate (recoded) and errors from items 4 and 7, 7 and 8, 6 and 8, 13 and 14, 13 and 15, and 13 and 16 (non recoded). In all correlations, only sets of items are present that belong either both to the stop control scale or both to the start control scale.

⁵All four regressions were repeated with the addition of an interaction between stop and start control. The interaction terms failed to reach significance and did not explain unique variance in the dependent variables.

from Study 1. These differences might be due to the improvements made to the scales. Alternatively, although both samples are similar, because data collection took place during different seasons, samples might have differed concerning their alternatives to studying or their intentions for exercise.

Both stop and start control had significant and large correlations with the SCS, indicating that the new scales adequately represent self-control content. However, these provisional measures did not appear to improve on the predictions of the SCS when looking at the behavioural outcomes. Although the new scales for stop control and start control have fewer items than the SCS, their relations with smoking, alcohol consumption, studying and exercising are largely similar. We note that it was not our intention to improve the predictions of self-control for behavioural outcomes, rather we wanted to explain where these relations originate from; either the stop control part of self-control or the start control part. However, we think that it should be possible to improve the predictions of stop and start control over and above those of general self-control and believe part of the solution can be found in identifying more domains of behaviours that depend on one of the two self-control types. Thus, future research should seek to develop more elaborate stop and start control scales which cover multiple self-control domains, and test whether these improve the prediction of behavioural outcomes over general self-control

GENERAL DISCUSSION

The goal of this research was to show that general trait self-control can be divided into a stop control dimension and a start control dimension, and that this distinction is appropriate and useful. A review of the self-control literature showed that similar distinctions have been used (Carver, Johnson, & Joormann, 2008; Giner-Sorolla, 2001) and current self-control theories, for instance the hot/cool-system by Metcalfe and Mischel (1999), support it but no empirical investigation into the distinction itself has been previously performed. Furthermore, the results from Study 1 and 2 empirically supported the distinction within self-control. First, the expert ratings of the pilot study showed that the distinction fits within the current self-control definitions, is intuitive and can be made theoretically salient. Second, both confirmatory factor analyses from Study 1 and 2 showed that separating two types of items actually fit the data better than putting all items together in a general self control factor. Third, the different relations of positive affect and negative affect with stop and start control in Study 1 showed that the distinction can be empirically supported. Fourth, the relations of stop control and start control with behavioural outcomes found in Study 1 and 2 show that both types of self-control differently affect behaviour.

Theoretical implications

The distinction between stop and start control fits well with theoretical work on the self-control process (Carver, 2005;

Metcalfe & Mischel, 1999), and extends it. Which type of self-control is required and whether it will be successful, theoretically depends both on the dominance of the reflexive or reflective system and whether action or restraint is required. Taking both these effects into account might lead to interesting findings. An example of combining the knowledge in these and other domains is the work of Carver et al. (2008), describing effortful action, effortful restraint, impulsive approach and reflexive inhibition in relation to vulnerability to depression. When successful, stop control (effortful restraint) can override an impulsive approach and start control (effortful action) can override reflexive inhibition. Many issues still need to be resolved in order to fully understand the relation between the reflective and reflexive functions and their relevance for behavioural control (Corr, 2010).

Another implication is that having a high stop control then does not necessarily imply a high start control as well, although the scales were moderately positively correlated in Study 2. This can be useful when looking for antecedents or outcomes of self-control, theoretically, but also when finding ways to increase or aid the use of self-control, practically. For people, knowing their strongest form of self-control can be useful when striving to achieve personal goals. One could, without changing the goal, change the type of behaviour used to attain this goal. A good example here is being healthy, if one has difficulties eating less fattening food because of low stop control, one could focus on getting more physical exercise with the use of start control instead.

Sometimes it appears that both processes occur simultaneously and relate to the same behaviour. Although both stop and start control may be necessary in order for some behaviours to occur, as we saw in Study 1 where both forms of self-control explained unique variance in study behaviour, we argue that they act separately and serially rather than simultaneously. For instance, one has to first stop one's impulse to watch TV, before one can start a study activity. Also, some behaviours might not require both forms of self-control for all people. Not all students in the samples used will have required refraining from watching TV or going out, in order to get themselves to study. This might also explain why Study 1 and 2 differ in their relations between stop control and study behaviour.

This reasoning could also be used to clarify the importance of the distinction for other research areas. One such area is procrastination, which has already been linked to control processes (e.g. Blunt & Pychyl, 2005; Steel, 2007). Some procrastination may stem from not being able to stop unnecessary behaviour, others from just not being able to get started. Procrastinators may also differ in this regard, with some mostly unable to stop when they are being unproductive and others mostly unable to start the work, even when they have nothing else to do. Also, not everybody procrastinates. Is this because some individuals like the activities for which they set goals and do not require self-control or are they better able to use their self-control capabilities as they keep in mind their strongest form of self-control?

The current research also raises questions about the underlying psychological basis of self-control. It is possible

that, like in the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS) (Boksem, Tops, Wester, Meijman, & Lorist, 2006), there are biologic or neurologic explanations for the difference in self-control capabilities, for both forms. Also, similar to regulatory focus theory (Higgins, 1997), early learning experience and modelling could play a role. This would fit with the findings of affect. For example, positive experiences with goal attainment early in life could cause a person to invest more in behaviours that require start control, to repeat the positive outcomes, thus gain more experience, and eventually increase their start control ability. Negative experiences with attractive behaviour might cause a person to invest in refraining from these activities and thus gain more experience, increasing their stop control ability.

Some items in the scales used may look like they could refer to other personality traits, in addition to stop or start control. As shown by the work on good and bad self-control (Wills *et al.*, 2008), many different constructs can be included in the self-control domain. Although this is true, relatively little is known about the position that self-control takes among other personality variables to form a nomological net. The stop and start control distinction gives room for speculation on this. An example of a Big Five trait has already been mentioned; conscientiousness would relate positively mainly to start control. However, low impulsivity, which is sometimes seen as part of conscientiousness, may relate positively mainly to stop control. The implication here is that simple positive or negative relations of different personality traits with general self-control will not paint a complete picture.

Limitations and future research

This paper merely sets the first step in distinguishing between the two types of self-control and some limitations need to be mentioned to accompany the findings. First, only a few self-control domains were included in the newly developed scales. We tried to identify areas that require self-control for most people, such as saving money, since most of the people self-set goals of having money. Future research should, however, try to identify more, and more widely applicable self-control domains to include in the stop and start control scales. We acknowledge that our method of developing scales is only one of many possibilities and encourage others to construct better measures.

Second, some hypotheses were not supported, possibly because the specified behaviours did not require self-control in the particular samples. The samples used in Study 1 and 2 existed only of students and only four behaviours were measured. This raises the question whether the distinction is useful in work settings and clinical settings as well. More and different outcomes might have strengthened the results. Future research should further build on the nomological net of the distinction studying the relationships of stop and start control with more different specific behaviours as well as with trait measures, such as the Big Five and impulsivity, and apply these in different samples.

Third, variables were assessed using self-report measures. Although we cannot completely rule out the

possibility that common method variance might be partially responsible for some of the results, it seems not to threaten our conclusions for the *differential* effects of stop and start control, since both are measured the same way. Furthermore, the behavioural outcomes are objective in nature and all questionnaires were administered anonymous, attenuating social desirability responding concerns. However, future research should use different measurement techniques such as other reports or objective assessments. There are also other ways to measure self-control than questionnaires, for example a cold-pressor task (Schmeichel & Zell, 2007).

Future research could also expand on the approach taken in Study 1 by incorporating different types of affect. In the current research, we used positive and negative affect as indicators of overall successful goal attainment. More specific types of affect, for instance anxiety, dejection, relief and elation (Higgins, 1997) could possibly explain more about the exact interplay of self-control, goals and behaviour.

As a separate point we note that the focus of this paper has been on trait self-control and mainly the behavioural aspect of it. Self-control is proven to be situation dependent as well (e.g. Baumeister *et al.*, 2007; Muraven & Baumeister, 2000) and applicable in different areas (Baumeister *et al.*, 1994; Karoly, 1993). Future research should examine whether stop and start control are distinguishable in state self-control as well and whether the distinction is useful for all areas of self-control including thoughts, emotions, performance and attention (Baumeister *et al.*, 1994; Karoly, 1993).

In conclusion, self-control is an important construct for many different research domains. In the research that is currently available, a distinction between two forms of self-control can be discerned. As laid out in this paper, a distinction can be made between stop control and start control, which fits with different theories on self-control. The distinction is both appropriate and useful and applies to behavioural outcomes previously related to self-control. Based on this, we are confident that stop control and start control form a valuable distinction within self-control.

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