



Temptation enactment and the experience of self-control in daily life

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**ABSTRACT**

This study employed mixed methods to investigate whether individuals' self-control varied across domains of temptation, while maintaining a link with trait self-control. The study sought to replicate previous laboratory and experience-sampling findings of ego depletion, whereby multiple, contiguous self-control tasks result in reduced self-control performance. One hundred and eleven participants took part in an online questionnaire. Significant differences were found within participants' mean temptation enactment scores across domains relating to food, work, money, drugs, exercise and social temptations, and yet there was an overall pattern whereby temptation enactment scores for domains correlated with one another and with trait self-control. This provides support for the existence of a trait level of self-control that allows for intraindividual variance in self-control. It was hypothesised that a between-participants difference in temptation enactment scores would emerge on the basis of the number of domains where participants reported actively attempting self-control, but this hypothesis was not supported. Therefore, no quantitative evidence for the phenomenon of ego depletion was found. Qualitative measures were used to explore participants' experience of self-control in the domains. Emergent themes provided tentative support for the existence of ego depletion in daily life and for two models proposed to explain it.

KEY WORDS	SELF-CONTROL	EGO-DEPLETION	TEMPTATIONS	QUESTIONNAIRE CREATION
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## Temptation enactment and the experience of self-control in daily life

### Introduction

A useful definition of self-control by Baumeister, Vohs and Tice (2007) makes explicit that self-control involves altering one's own responses to align oneself with ideals and to pursue long-term goals. In addition, self-control is distinguished from other forms of self-regulation as being conscious, deliberate and effortful. Another insightful definition (Duckworth, 2011) highlights how self-control gets challenged in everyday life and implies why it sometimes fails: it comes into conflict with other impulses that are more psychologically potent and such conflicts are experienced as moments of temptation. It remains a question whether self-control is a stable capacity since it seems intuitively likely that self-control varies in strength at different times and across domains of temptation.

Self-control is often conceptualised as a domain-general, stable personality trait. As such, self-control can be measured by scales specifically designed to capture it (e.g. Tangney, Baumeister & Boone, 2004); included within the structure of overarching traits, such as conscientiousness (e.g. Costa & McCrae, 1992); or can be assessed by measuring performance at delay-of-gratification tasks (Mischel, 1974).

Support for the trait view of self-control emerges from studies in which a single, broad measure of self-control has predicted outcomes including educational attainment and social adjustment within academic contexts (Duckworth, Tsukayama and May 2010; Eisenberg & Fabes, 1997; Tangney, Baumeister & Boone, 2004); reduced binge eating and alcohol abuse, and healthier emotional responses (Tangney, Baumeister & Boone, 2004); greater popularity (Mischel, Shoda & Peake, 1990) and higher fidelity among romantically involved individuals (Pronk, Karremans, & Wigboldus, 2011). Conversely, lower levels of this trait have been linked to phenomena as wide-ranging as drug use, unplanned parenthood, debt, impulsive aggression and criminality (Baumeister, Heatherton & Tice, 1994). The predictive power of this trait makes it a favoured subject for research, for instance, as Duckworth (2011) reveals, in the years 2010 to 2011, three percent of peer-reviewed articles within psychological literature were referenced by 'self-control' or an analogous term.

However, many researchers argue that behaviour is not entirely a manifestation of stable traits but varies according to context or across domains. For instance, Mischel (1968) argued that behaviour taken to indicate stable traits is actually highly influenced by contextual cues. A perspective exists whereby personality is situation-dependent (Mischel & Peake, 1982; Mischel & Shoda, 1998; Moskowitz, 1982; Nesselroade, 1988, 1991; Revelle, 1995) and behaviour variability is seen as an innate facet of human psychology (e.g. Larsen, 1989). If this perspective is extrapolated to the area of self-control, within-individual variation would be expected in people's self-control performance.

Health psychologists have examined intraindividual variation in self-control and, for instance in the smoking domain, have reported various states to be associated with reduced self-control, including stress (e.g. Cohen & Lichtenstein, 1990) and negative affect (e.g. Shiffman & Waters, 2004). In a review of the cognitive neuroscience of self-control failure, Heatherton and Wagner (2011) concluded that self-control depends on top-down control from the prefrontal cortex over subcortical areas, and

that people experience reduced self-control capacity when either prefrontal cortex function is impeded, for instance due to fatigue, or when particularly strong impulses tip the balance of power towards subcortical areas. Heatherton and Wagner's review was based on neuroimaging studies within controlled settings but, by extension, our capacity to resist temptation should vary in daily life.

Such a finding was reported in a recent study by Tsukayama, Duckworth and Kim (2012). These researchers presented a level of within-individual variation they found as a complement to an overall trait capacity for self-control. In their study, Tsukayama et al. designed and piloted a survey to capture self-control across six different domains, with a separate scale for each domain comprising items which represented domain-specific temptations. For instance, their food domain contained such temptation items as 'Eating more than I should' and 'Eating junk food'. For each domain scale, participants indicated the frequency of their acting upon every item and their mean across items became a *temptation enactment score* for that domain, assumed to have an inverse relationship to domain-specific self-control. These researchers found that within-individual variance in self-control across domains was significantly larger than between-individual variance, but that domain general self-control nevertheless explained 40% of variance in temptation enactment across domains. Thus they found support for both intrapersonal consistency and variation in self-control.

Using electronic experience sampling methodology, rather than questionnaire scales, Hoffman, Vohs and Baumeister (2012) also found significant differences in self-control achieved across domains. Moreover, they found that the frequency and recency of prior self-control attempts negatively predicted subsequent success at temptation resistance, a result they related to the well-replicated phenomenon of ego depletion.

Ego depletion is a finding primarily observed in laboratory settings. It was first reported within an explanatory framework termed the strength model of self-control, in research led by Robert Baumeister and colleagues. This model envisions one, limited resources underlying diverse acts of self-control (e.g. Baumeister, Heatherton & Tice 1994; Baumeister, Bratslavsky, Muraven & Tice 1998). Like a tired muscle, this resource becomes depleted by an initial act of self-control so that performance at subsequent self-control tasks deteriorates. Relative to Heatherton and Wagner's (2011) neuroscientific perspective, strength-control theorists would claim that a state of self-control fatigue temporarily undermines prefrontal inhibition of impulses from subcortical areas, resulting in self-control failure.

The strength-model has been tested extensively within dual-task paradigms whereby effortful self-control in Task One is associated with reduced self-control performance in Task Two. In the classic ego depletion study by Baumeister et al. (1998) a version of Task One consisted of resisting a plate of freshly baked cookies, while ego depletion was captured in experimental participants through reduced perseverance at puzzles in Task Two, relative to a control group who had been required to show no self-control in their Task One (resisting eating radishes instead of cookies).

This finding has been very widely replicated with a wide-range of self-control domains tapped at Tasks One and Two. Interestingly, this model posits intraindividual changes in self-control independent of self-control domain, since the dual tasks eliciting and reflecting ego depletion span restraint of various forms of

appetite, social self-control and arduous perseverance at cognitively or physically demanding tasks. According to the strength model of ego depletion, self-control failure in daily life could result from more frequent self-control demands across domains as different as watching one's manners, maintaining appetite restraint and persevering at work.

A recent meta-analysis of 83 studies involving the dual-task paradigm found support for the phenomenon of ego depletion (Hagger, Wood, Stiff, & Chatzisarantis, 2010). Besides the experience sampling study by Hoffman et al. (2012), a handful of other studies conducted outside laboratories have captured ego depletion in daily life (e.g. Muraven, Collins, Shiffman & Paty, 2005; Oaten & Cheng, 2005). Support for the strength model's explanation for ego depletion has been provided by the finding that ego depletion is associated with a state of reduced blood sugar levels, and that glucose drinks between Tasks One and Two can mitigate against it (Gailliot et al. 2007). However, Hagger et al. (2010) report that this finding is not entirely reliable.

Other factors shown to militate against ego depletion are less directly supportive of the idea that the exhaustion of a single resource leads to ego depletion. For instance, it has been found that increasing participants' motivation (Muraven & Slessareva, 2003); raising their construal levels from means and processes to a more global focus on goals (Fujita, Trope, Liberman & Levin-Sagi, 2006); asking participants to affirm their core values (Schmeichel & Vohs, 2009); inducing positive affect (Shmueli & Prochaska, 2012; Tice, Baumeister, Shmueli & Muraven, 2007); and providing a period of structured self-control training (Baumeister, Gailliot, DeWall, & Oaten, 2006) can all mitigate against ego depletion.

Some researchers argue ego depletion can be explained best by a mechanism other than a depleted central self-control resource. Inzlicht and Shmeichel (2012) have proposed a dual-process model of self-control which accounts for ego depletion through changes in motivation and attention between Tasks One and Two in dual-task paradigms. According to this model, if people experience ego depletion in daily life after initial self-control tasks, this is due to their desire and attention being newly directed towards a potential reward or consolation for self-control efforts already made rather than because they are actually unable to perform self-control at a sustained level across contiguous tasks.

The drive for the current study was, firstly, to attempt to replicate Tsukayama et al.'s (2012) finding that self-control, in terms of temptation enactment, varies across different domains of temptation, while maintaining a link to trait self-control. A second was to search for evidence of ego-depletion in daily life, whereby self-control across multiple domains would be associated with reduced self-control performance, as though the ecologically-valid domains create a scenario equivalent to a dual- or multi-task paradigm. Previous studies that have looked for ego depletion in daily life (e.g. Hoffman et al. 2012) have used electronic experience-sampling methodology which is expensive, time-consuming and may limit disclosure due to the loss of anonymity involved. Thus the scales developed by Tsukayama et al. (2012) were extended in use here to look for evidence of ego depletion. Since there has not yet been a self-report questionnaire attempting to capture ego depletion, an exploratory, qualitative element was considered appropriate to allow for themes to emerge spontaneously in terms of any factors experienced as obstructing or facilitating self-control.

The study involved three hypotheses and an area of inductive exploration. Firstly, it was hypothesised that there would be within-individual differences in temptation enactment scores, or self-control, across domains, yet secondly, that temptation enactment scores across domains would correlate with one another and with a trait measure of self-control. Thirdly, it was hypothesised that there would be between-participants differences in temptation enactment scores across the six domains on the basis of the number of areas that participants reported actively trying to control. In terms of qualitative exploration, the key interest was whether factors participants reported as making self-control harder or more likely to succeed tallied with either the strength or the dual-process models of ego depletion.

## **Method**

### ***Participants***

One hundred and sixty participants were recruited via online convenience sampling. Of these, 111 participants completed the online questionnaire and only their responses were included (75.7% women,  $M$  age = 38.7,  $SD$  = 11.5).

### ***Design***

The design was a mixed model with the questionnaire including domain-specific temptation enactment scores and trait self-control as within-participant factors, and with the number of domains where control was reported as actively attempted as a between-participant factor.

### ***Procedure***

A version of the study was piloted using the Survey Monkey website and some issues with face-validity were raised. Modifications were made and then the final questionnaire was distributed through links posted online in social networks.

## ***Measures***

### ***Quantitative measures***

Participants completed the domain-specific impulsivity scales devised by Tsukayama et al. (2012) for domains of: work, food, money, exercise, drugs and social relationships. The scales instructed participants to 'rate how often [they] do the following' on a 5-point scale ranging from 1=*never* to 5=*very often*. Participants also completed the self-control scale devised by Tagny et al. (2004) which asked participants to rate 'how much each of the following statements reflects how [they] typically are' on a 5-point scale ranging from 1=*not at all*, to 5=*very much*.) In all these scales, the majority of items related to self-control failure (impulsivity) so items that related to self-control success were subsequently reverse coded. The item order in each scale was randomised for each participant. After the pilot, language in the trait-self-control scale was changed slightly to exclude double-negative phrasing that confused some participants.

### ***Qualitative measures***

Participants in each domain answered the questions: 'What might make the behaviours listed above difficult to resist?' and a question asking them if they: 'Actively try to resist any of these temptations?' If they answered 'Yes' to the latter question, they were directed to a concealed page where they were asked for any 'activities or ways of thinking' used 'to resist these temptations'.

### ***Ethical considerations***

Consent was obtained from social forum moderators before links to the questionnaire were posted online. The questionnaire was anonymous, and participants were asked to confirm that they were over 18. They were informed in advance about the type of questions included, the six domains involved and were told that they could quit the survey at any time, as well as being given researcher contact details. Before starting the questionnaire, participants received information about sources of help for any addiction relevant to the domains. This information was provided again, alongside further detail on the rationale for the study, in a debriefing page at the end of the questionnaire. The study was approved by the Ethics Committee of the University of Buckingham.

## **Results**

### ***Quantitative findings***

Sixteen participants omitted a few items from some scales. When these omissions were examined no meaningful pattern emerged and it seemed likely that these items were accidentally skipped. A conservative procedure was used to replace missing items: participants' modal responses on appropriate domains were substituted for missing data.

For hypotheses one and two, following the procedure used by Tsukayama et al. (2012), an *enactment score* per participant was calculated for each domain of temptation, using the mean of their item scores, with 5 reflecting most frequent, and 1 least frequent temptation enactment. A trait self-control score was calculated using the mean for each participant across the items of the Self-Control Scale (Tangney et al. 2004), with 5 reflected highest general impulsivity and thus lowest self-control. Table 1 shows mean enactment scores for domains, the group mean trait self-control score and the mean number of domains where active self-control was reported. Percentages of participants reporting attempted self-control are also shown.

**Table 1****Group mean enactment scores and percentages attempting control per domain**

<u>Measure</u>	<u>M</u>	<u>SD</u>	
Trait self-control	2.94	0.34	
No. domains controlled	3.61	1.70	
<u>Domain</u>			<u>% Reporting control actively attempted</u>
Food	2.97	0.68	75%
Work	2.95	0.67	73%
Exercise	2.89	1.00	50%
Money	2.67	0.78	55%
Social	2.55	0.55	71%
Drugs	1.78	0.56	38%

A within-subjects analysis of variance was used to assess differences between mean enactment scores in domains. As Mauchly's test of sphericity was significant, the Greenhouse-Geisser correction was used. The ANOVA showed a significant effect for domain,  $F(3.78, 416.09) = 55.95, p < .0001$ , partial  $\eta^2 = .34$ . Related  $t$ -tests using the Bonferroni correction showed that the mean enactment score for the drugs domain was significantly different from the mean enactment scores for all other domains ( $p < .05$ ). The work, food and exercise mean enactment scores were not significantly different from each other ( $p > .05$ ). The work and food enactment means were each significantly different from the enactment means for the money, social and drugs domains ( $p < .05$ ). The exercise enactment mean was significantly different from the social and drugs domains ( $p < .05$ ) but not the money domain ( $p > .05$ ). The social domain was significantly different from all domains except the money domain ( $p < .05$ ). The money domain was significantly different from all domains except the social and exercise domains ( $p > .05$ ). These patterns of difference are reflected in correlations between domains shown in Table 2, along with the correlations between each domain and trait self-control scores.

**Table 2****Correlations for domain enactment scores and trait self-control.**

	1	2	3	4	5	6	7
<b>1. Work</b>	—						
<b>2. Food</b>	.29**	—					
<b>3. Money</b>	.41**	.43**	—				
<b>4. Social</b>	.32**	.32**	.43**	—			
<b>5. Drugs</b>	.11	.09	.35**	.20*	—		
<b>6. Exercise</b>	.36**	.20*	.21*	.09	-.06	—	
<b>7. Trait self-control</b>	.25**	.22*	.48**	.57**	.32**	.07	—

Significance levels: \*  $p < .05$ , \*\*  $p < .01$ .



The drugs domain had the fewest number of significant correlations, and those found were weak. Trait self-control significantly correlated with each domain's enactment scores except exercise.

In order to examine enactment scores according to the number of domains controlled, as per hypothesis three, the number of domains that each participant reported trying actively to control was calculated. The numbers of participants who reported trying to control various numbers of domains are shown in Table 3 below along with relevant percentages.

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**Table 3**

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**Frequencies & percentages of participants reporting control attempted in 0-6 domains**

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<b>Number of domains with active control reported</b>	<b>Frequency</b>	<b>Percentage</b>
0	4	4%
1	7	6%
2	23	21%
3	17	15%
4	23	21%
5	17	15%
6	20	18%

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Examining each domain scale individually, one-way analyses of variance were used to examine whether there was any difference between the enactment scores of participants reporting differing numbers of domains as involving active control attempts. For each domain, the null hypothesis was supported and no significant difference was found. This remained the case when the ANOVAs were conducted with participants organised into groups based on 1-2 areas controlled compared with 3-4 areas or 5-6 areas.

***Qualitative findings***

The participants reported factors they believed made self-control harder in each domain. If they reported actively trying to control any domain they were directed to a page where they described any strategies used to boost self-control success in that area. Answers were subjected to thematic analysis and 10 recurring themes per question were identified. Tables 4 and 5 outline the percentage of participants eligible to answer these questions who cited themes identified in their answers. The themes were not mutually exclusive, so the percentages in the tables sum to more than 100%. Explanations and examples of the themes are given in two sections below the tables.

**Table 4**

**Percentage of participants including identified themes as factors making self-control harder.**

<b>Theme</b>	<b>Domain</b>					
	<b>W</b> (N 81)	<b>F</b> (N 83)	<b>M</b> (N 61)	<b>S</b> (N 79)	<b>D</b> (N 42)	<b>E</b> (N 55)
1. Tiredness/fatigue	38%	18%	10%	14%	7%	44%
2. Stress/frustration/pressure	15%	20%	13%	16%	21%	5%
3. Task overload	17%	4%	-	1%	7%	29%
4. Boredom	11%	29%	13%	15%	2%	9%
5. Low mood or motivation (including anxiety, sadness)	22%	24%	15%	11%	14%	27%
6. High mood	1%	-	10%	4%	2%	-
7. Desire for distraction or pleasure	12%	12%	10%	6%	14%	16%
8. Desire for oblivion/escape	-	-	2%	-	12%	-
9. Social or environmental issues	10%	11%	10%	24%	21%	15%
10. Personality traits (perfectionism, laziness, impulsivity)	7%	5%	3%	4%	2%	16%

*Note.* W = Work Domain; F = Food Domain; M = Money Domain; S = Social Domain; D = Drugs Domain; E = Exercise Domain.

**Table 5****Percentage of participants including identified themes as strategies used to improve self-control**

Theme	Domain					
	W (N 81)	F (N 83)	M (N 61)	S (N 79)	D (N 42)	E (N 55)
1.Thinking of personal consequences	19%	19%	18%	3%	21%	36%
2.Thinking of consequences for others	-	-	3%	10%	10%	5%
3.Conscious pausing, delaying decision	6%	5%	10%	14%	2%	-
4.Persuasive or forceful self-talk	14%	12%	18%	16%	7%	18%
5. Inducing positive affect (music, sex, fresh air etc.)	20%	28%	5%	13%	14%	2%
6.Focusing on personal values	4%	-	7%	27%	2%	2%
7.Reducing attention to temptation	9%	28%	23%	10%	15%	-
8.Set subtasks as goals, or other organisation strategies	25%	10%	26%	3%	10%	33%
9.Seeking role-models or social support	2%	6%	-	6%	7%	13%
10.Develop objective, self-observing thinking	-	7%	16%	22%	10%	4%

Note. W = Work Domain; F = Food Domain; M = Money Domain; S = Social Domain; D = Drugs Domain; E = Exercise Domain

***Themes emerging in reports of factors that made self-control harder******Theme 1: Tiredness/fatigue***

Participants listed tiredness as making self-control harder. They rarely discriminated bodily and mental fatigue.

Participant 63 (food domain): 'Being really tired and lacking in energy.'

***Theme 2: Stress/frustration***

Stress was mentioned as a factor in making self-control harder, rarely appearing along with the word 'frustration', which seemed to be used by some participants to convey the same state.

Participant 12 (money domain): 'When I am stressed.'

Participant 105 (food domain): 'Frustration'

**Theme 3: Task overload.**

Having multiple responsibilities over varied domains was cited as a constraint on self-control.

Participant 105 (exercise domain): 'Being busy, feeling guilty about taking time off work and away from family.'

**Theme 4: Boredom**

Work and exercise as being intrinsically boring was said to make self-control harder; boredom was given as a factor making it harder to resist food, money, social and drugs temptations.

Participant 106 (exercise domain): 'Gym and outdoors exercise bores me'

Participant 129 (money domain): 'If I am bored and just want to browse around for no particular reason I may buy something I don't need.'

**Theme 5: Low mood or motivation**

States including sadness, anxiety or depressed motivation were cited.

Participant 26 (work domain): 'Complete and utter disappointment in myself that I haven't achieved anything in my life.'

**Theme 6: High mood**

On occasion, elevated mood was cited as a factor in making self-control harder.

Participant 57 (money domain): 'Excitement from that payday feeling.'

**Theme 7: Desire for distraction/pleasure**

A desire to feel better was often given as an obstacle to self-control.

Participant 103 (social domain): 'Needing attention, wanting validation, wanting to be heard, to be loved, respected and appreciated.'

**Theme 8: Desire for oblivion/escape**

Escapist motivation was mentioned almost exclusively in relation to the drugs domain.

Participant 13 (drugs domain): 'Wanting to escape my reality.'

**Theme 9: Social or environmental factors**

Some participants cited obstacles to self-control as extrinsic - in their workplace, their social world or in the form of difficult life events.

Participant 66 (social domain): 'When working with idiots who think they know everything.'

Participant 127 (drugs domain): 'Issues with husband.'

**Theme 10: Personality factors (perfectionism, laziness, impulsivity)**

A few participants cited intrinsic, personality factors.

Participant 85 (work domain): 'A strong desire to "get it right".'

Participant 126 (social domain): 'I'm an excitable person and sometimes things just come out!'

**Themes emerging in reports of strategies used to improve self-control****Theme 1: Thinking of personal consequences**

Participants reported holding in mind outcomes beyond the present moment.

Participant 113 (drugs domain): 'Simply remembering about tomorrow and that I want to enjoy it fully and not miss out on anything that might happen in it.'

**Theme 2: Thinking of consequences for others**

Participants reported thinking about how indulging in temptation would affect others.

Participant 105 (money domain): 'Focusing on my responsibilities to my family helps.'

**Theme 3: Conscious pausing, delaying decision**

'Counting to 10' strategies were often cited.

Participant 93 (money domain): 'To not buy on the same day, if I see something to at least sleep over.'

**Theme 4: Persuasive or forceful self-talk**

Either positive self-affirmations or tougher self-talk were described.

Participant 19 (work domain): 'I think to myself "Just F\*\*\*\*\* Do It" just get started and at least you have won over self-sabotage.'

**Theme 5: Inducing positive affect (e.g. through music, meditation, sex, fresh air etc.)**

Doing something to raise mood was a strategy described.

Participant 126 (work domain): 'I give myself small rewards for getting things done.'

**Theme 6: Focusing on personal values**

Thinking of personally meaningful values was a strategy used, particularly in the social domain.

Participant 93 (social domain): 'Gratitude diary every night writing down 3 things I am grateful for every day no matter how small

**Theme 7: Reducing attention to temptation**

Participants reported trying to distract themselves from the temptation, increase their focus on a task at-hand, or preventing exposure to the temptation.

Participant 160 (food domain): 'Don't purchase tempting food. Keep busy reading and writing where I need two hands.'

**Theme 8: Setting sub-tasks as goals and other organisational strategies**

Participants reported that it was helpful to break down self-control tasks into manageable chunks, and to keep track of self-control demands or goals.

Participant 76 (work domain): 'To do lists, making goals more achievable.'

**Theme 9: Seeking role-models or social support**

Turning to others for inspiration or support was a thread within the answers.

Participant 24 (exercise domain): 'I will try to exercise with a partner or get a personal trainer so I can't get out of it without risk of letting them down.'

**Theme 10: Developing more objective, self-observational thinking**

Reframing thinking to be less emotive, more self-observational was a strategy mentioned.

Participant 91 (social domain): 'I try to look down on self from above and analyse self - am I currently one of those boring people who is talking too much, interrupting too much, too me me me etc.?'

## Discussion

The first hypothesis of differences to be found among the enactment scores of the six domains was partially supported: significant differences were found in 10 out of 15 pairwise comparisons between domain means. This suggests that participants did not maintain a consistent level of self-control in all areas, leaving open the possibility of ego-depletion as one of many possible sources of within-subjects variation across domains.

The second hypothesis that there would be correlations among the temptation enactment means for each domain, and between those means and the domain-general self-control measure was partially supported. Eleven significant correlations were found out of the 15 possible among the domains, and all of these were positive, meaning that higher enactment in one area was associated with higher enactment in others. Five out of the six domains correlated with the trait score, and again these correlations were positive as would be expected, since the items within the trait scale reflect low self-control, as do the domain specific scales. To an extent, this finding supports the idea of a unitary self-control trait influencing temptation resistance across varying domains.

The third hypothesis, that there would be a between-participants difference in each domain's mean enactment scores on the basis of the number of domains where participants were attempting control was not supported. Thus within this study there was no quantitative evidence found to support theories of ego depletion whereby contiguous self-control demands make higher enactment of temptation inevitable.

The significant differences found between most mean enactment scores indicate that individuals are prone to variation in their self-control motivation or practices in different domains of temptation. This finding tallies with findings and propositions of theorists who argue for flexibility in conceptions of self-control (e.g. Inzlicht & Schmeichel, 2012; Tsukayama et al. 2012), as well as with a wider body of psychological theory that emphasises the importance of context to behaviour (e.g. Mischel & Peake, 1982; Mischel & Shoda, 1998).

Looking at the temptation enactment scores in the six domains (Table 1), there are effectively three clusters in the data: the food work, and exercise domains show relatively high temptation enactment, the money and social domains are at an intermediate level (overlapping with exercise); and the drugs domain has relatively low enactment. These relative means are aligned with previous research: the descriptive statistics reported by Tsukayama et al. (2012) showed an identical pattern, with food, work and exercise as the most enacted domains.

In their experience sampling study, Hoffman et al. (2012) found the most frequent desires were to eat, drink and sleep; and the desire to sleep they found may relate to the frequently enacted temptations to avoid work and exercise here. The weakest desires Hoffman et al. found were for alcohol and tobacco which tallies with the relatively low enactment for the drugs domain here. It seems that, at least within a general population as sampled here and by other researchers mentioned, the most prevalent temptations in daily life may involve food, work, exercise and for any future studies investigating ego depletion, these domains may be suitable areas to focus on, with exercise being of particular interest for reasons discussed below in reference to the correlations found and the qualitative data.

A limitation to bear in mind is that the difference among domains' mean temptation enactment does not specifically tap ego depletion since intraindividual variance in self-control could be influenced by a wide variety of factors, including transitory states and stable tendencies not related to fluctuating self-control capacity. For instance, variation in temptation enactment could be influenced by individual differences in responses to stress and an interaction between the experience of stress and the extent to which any temptation's indulgence offers stress relief. The questionnaire did not ask for information about participants' stress levels, or whether some domain-specific temptations tended to arise simultaneously with stressors or provide release from stress. This is particularly relevant given that stress emerged within the qualitative data as a theme when participants described what made self-control harder in many domains and given that health psychologists have linked stress with self-control failure previously (e.g. Cohen & Lichtenstein, 1990). Any future attempts to capture changes in self-control capacity as a causative factor in varying responses to temptation should attempt to control for stress. The same can be said for negative affect which previous research has found to be associated with greater temptation enactment (e.g. Shiffman & Waters, 2004).

It is also possible that stable personality traits played a causative role in differences found in participants' enactment scores across domains, for instance in making some domains more subjectively tempting than others. Such a role for personality traits has been reported, for instance, by Elfhag and Morey (2008) who found differences in behaviour towards food temptations on the basis of the five-factor model of personality (Costa & McCrae, 1992). The differences in the domain means do not of themselves mean that participants' self-control capacity was varying but could simply reflect individual differences in which domains elicit high temptation enactment due to mood or personality. It would therefore be advisable that future studies ask participants to nominate and complete domain scales which they personally find tempting so that changes in enactment across domains do not simply reflect personal preferences.

The strength model of self-control and ego depletion would predict some level of correlation among the domains, since it postulates that due to drawing on a common resource, different domains of self-control are interdependent. The partial evidence here of correlations among domains, and between domains and the domain-general self-control measure, is thus in line with this model. Yet correlations found could be due to other factors than a shared resource or a stable self-control trait. For instance, the positive correlations could reflect dispositional tendencies that lead to clusters in which domains participants find tempting and therefore challenging to self-control.

For instance, stable tendencies relating to conscientiousness, openness to experience or extraversion within the Five-Factor Model of personality (Costa & McCrae, 1992) may be at work within the patterns of correlation. For instance, the drugs domain only correlated with the social and money domains, a pattern which might reflect a manifestation of participants' levels of openness to experience or extroversion. The relatively high correlations between temptation enactment in the social domain and trait self-control may in fact reflect a phenomenon whereby more conscientious people are more likely to monitor their behaviour in the social domain and thus report subjectively higher enactment of temptation, while scoring high for trait self-control, whereas people with lower conscientiousness may report lower enactment on this domain simply because they are oblivious to it. This is an



illustration of how self-reports of temptation enactment may reflect heightened self-monitoring and self-criticism rather than objectively high enactment.

Ego-depletion theory does would also predict that correlations should be inconsistent, since individuals' capacity to practise self-control would drop every time they tapped their self-control resource multiple times within a short time period. This is somewhat in line with the current findings given that the highest correlation found among domains is only .43 (for the money domain with both food and social domains). Yet again, the imperfect patterns of correlations, as with the positive correlations found, may reflect personality traits at work in terms of which domains' enactment levels are related and which are relatively independent; this need not be due to instable self-control capacity.

The drugs and exercise domains stand out amid the patterns of correlation: the drugs domain because it fails to correlate significantly with the work or food domains; the exercise domain because it fails to correlate significantly with the social and drugs domains or with trait self-control. Although they do not draw attention to this finding, in Tsukayama et al.'s study (2012) the drugs domain also showed fewer correlations with the other domains. It is possible that this is to do with the construction of the drugs subscale which includes illegal or extreme behaviours such as 'Getting high on drugs' and 'Binge drinking', alongside more normative behaviours such as 'Drinking wine' and 'Smoking cigarettes'. The other scales refer only to legal and more normative behaviour which might make it easier for participants to report their behaviour honestly and for the scales to capture everyday self-control practises. It does seem that trait self-control interacts with personality and or contextual factors to manifest differently across different domains. In the exercise domain, the trait as measured here seems here to have played little part in behavioural temptation enactment. The exercise domain therefore may be a particularly suitable area in which to explore factors beyond trait self-control which make temptation resistance difficult in daily life.

When it comes to the third hypothesis, there was no evidence of ego depletion found since the participants' temptation enactment across domains did not change according to the number or areas they were simultaneously trying to control. Thus any conjecture as to ego depletion playing some role within patterns found is purely speculative on the basis that this final finding may be a type two error. The support for the null hypothesis is counter to the previous findings of ego depletion based on experimental designs in laboratory settings (e.g. Baumeister et al. 1998; Muraven et al. 1998; Schmeichel, Vohs & Baumeister, 2003; Vohs & Heatherton 2000), and context-based studies (e.g. Oaten & Cheng, 2005; Vohs et al 2005,) as well as the experience sampling study that found evidence supporting the theory of ego depletion (Hoffman et al. 2012).

In terms of whether a type two error is possible, one methodological confound that should be noted is the scarcity of participants reporting self-control in one domain or none (seven and four participants respectively) which limited the statistical power of tests looking for differences between participants based on the numbers of domains controlled. However, additional calculations were done with the participants in larger groups according to numbers of domains controlled (0-2, 3-4, 5-6 domains), and the null hypothesis was still supported with larger group sizes. Thus it does seem that if there is a type two error at work here, there are deeper problems with the methodology than sample size.

In laboratory studies of ego depletion, there is careful manipulation of self-control so that it involves effort. This is important because it has been found that ego depletion does not occur when the first self-control task in the dual-task paradigm does not require effort (vanDellen, Hoyle, and Miller 2012). The question assessing whether self-control was practised in any domain was intended to discriminate between effortful and non-effortful self-control, but it seems that the wording was not adequately precise, since some participants who reported active self-control then implied in their qualitative responses that their self-control was actually effortless. For instance Participant 64 in the drugs domain reported actively trying to practise self-control but later commented: 'It's not that hard for me to resist these temptations.' There are many individual differences which could result in some domains being easy for participants to resist, or the ease or resistance could reflect a practise effect observed to build up the 'strength' of the self-control 'muscle' and mitigate against ego depletion (e.g. Baumeister et al. 2006). In any case, affirmative answers to the self-control question when self-control was not actually effortful may have undermined the possibility of capturing ego depletion through this questionnaire.

Another issue with the validity of the question used to capture whether self-control was practised is that some participants who answered 'yes' later contradicted themselves. Thus for instance Participant 106, in the social domain, commented: 'I don't any more'. Five participants explicitly revealed this in their answers, and it may have been a more widespread, implicit trend. One possible model which could explain why a participant would report practising self-control when they do not in fact do is the transtheoretical stages of change model for health behaviours (Prochaska & DiClemente, 1983) in which contemplation and preparation phases precede actual change, and whether change is sustained is dependent on the success of a maintenance phase. Thus participants might have reported self-control when it was not yet, or no longer still, attempted.

A further problem with the measures used here is to do with the way the frequency of control attempts was calculated. Participants were grouped according to the number of domains where they reported self-control as attempted, and it is possible their contiguous self-control attempts were domain specific, and thus not captured in frequencies calculated across domains. Additionally, ego depletion is a time-based phenomenon; it relies on the contiguity of self-control attempts which is said to 'weaken' a self-control muscle. While the scales asked for the frequency of temptation enactment, no measure was taken of the frequency of self-control attempts. In future, some diary methodology tracking self-control attempts over time might increase the chances of capturing ego depletion within daily life.

When it comes to the measures of self-control success here, as shown inversely through domain enactment scores, there are four potential confounds with using self-report to measure the extent to which temptation is succumbed to. The first is a simple social desirability confound, whereby even in anonymous online questionnaire, participants may not wish to be honest about their enactment levels (e.g. Paulhus, 1991). Alternatively, participants have thought they were being honest when actually protecting themselves from acknowledging their true level of enactment (e.g. Sackeim 1983). In addition, it has been established that some temptations are indulged in precisely in order to escape self-awareness (e.g. Heatherton & Baumeister, 1991) and this might limit the possibility of accurate reports of temptation enactment. Moreover, when participants reported high

temptation enactment in a domain, it is unclear whether this represents self-control success or failure for them as individuals, since their baseline self-control capacity was not established. It would be advisable in any future questionnaire studies to include objective measures of self-control success such as observer ratings, and when asking participants to complete scales for domains they find personally tempting, to ask them to indicate a baseline for their habitual self-control strength in those areas.

Turning to the qualitative data, 10 themes emerged both in relation to factors making self-control harder and strategies used to improve self-control. These themes are not exhaustive, especially given that there was no second coder independently searching for themes. Thus it can be inferred from the range of themes and their lack of definitiveness that a complex range of factors are experienced as playing a role in self-control.

In terms of factors cited as making self-control harder, two themes emerged which strike a chord with the strength model of self-control. Firstly, tiredness was mentioned, by a maximum of 44% of relevant participants in the exercise domain, and this theme may encompass a kind of fatigue compatible with the idea of a depleted self-control resource. Task overload was also frequently mentioned, by a maximum of 29% of relevant participants in the exercise domain, and it is possible that participants may have meant by this an overwhelmedness analogous to that ensuing from contiguous self-control demands in a dual task paradigm.

However, two factors cited as making self-control harder are relatable to the dual-process model of self-control. A considerable number of participants mentioned factors related to low mood or motivation, a maximum of 27% of relevant participants in the exercise domain, and also factors relating to desire for distraction or pleasure, a maximum of 16% of relevant participants, again in the exercise domain. These themes are relatable to the dual-process model whereby ego depletion is said to occur due to changes in motivation and attention.

Interestingly, the highest percentages of people mentioning these four themes occurred in the exercise domain, where self-control was attempted relatively seldom and where temptation was frequently enacted. Thus themes which may relate to ego depletion, either through the mechanism of a depleted resource or due to shifts in attention and motivation, were most prevalent in one specific domain where there was low self-control success. Thus exercise practices should be considered for future research on the effects of ego depletion in daily life.

In terms of strategies reported to increase self-control success, one factor emerged which may be related to the strength model of self-control. A sizeable proportion of relevant participants, 33% in the exercise domain, mentioned themes that effectively involved reducing the contiguity of tasks through time management and organisational strategies. It is almost as though participants reported trying to manage their self-control demands so as to avoid ego depletion.

Strategies also emerged relatable to the dual process model of self-control, including tactics that would effectively boost motivation (such as persuasive or forceful self-talk, which was mentioned by 18% of people answering the question for the exercise domain), and tactics that involved conscious manipulation of attention, which were mentioned by a maximum of 28% of relevant participants in the food domain. Thus

in answers to each qualitative question, it is possible to find tentative support for both models of ego depletion.

Other strategies mentioned as ways to boost self-control success, including inducing positive affect, raising construal levels by thinking of consequences, and calling upon personal values at moments of temptation, are aligned with previous findings in relation to ego depletion (Fujita et al. 2006; Schmeichel & Vohs, 2009; Shmueli & Prochaska, 2012; Tice, Baumeister, Shmueli & Muraven, 2007). The notable coherence with ego depletion studies suggests that qualitative methodology may be a good method for capturing aspects of ego depletion in the field.

This is particularly true given that there were various methodological problems in using quantitative self-report here. Besides problems already mentioned to do with self-reports of control attempts and temptation enactment, there may have been a problem with asking participants to complete every domain scale, whether or not it was relevant to their experience of self-control failure. This is because order effects may have confounded their answers since, while the order of items in each scale was randomised, the software used did not allow for the randomisation of the order in which the scales were completed. Therefore fatigue or boredom may have systematically influenced self-reports in latterly presented scales. Also, if a quantitative questionnaire is attempted again, one methodological confound which should be excluded is a gender bias, such as the female bias in participant numbers here, which may have influenced findings since women have been found to be intrinsically better at self-control than men (e.g. Duckworth and Seligman, 1998) .

If qualitative methods are favoured going forward, these could be based on an electronic experience sampling design as used by Hoffman et al. (2012). However, this method is difficult to roll out to large numbers of people. An alternative would be a more comprehensive qualitative questionnaire, with questions more precisely worded to target to self-control only in domains which participants select as being areas where they are motivated to practice self-control and where they do not find it easy or unnecessary. Additional domains such as emotion-regulation could be included. Moreover, participants should be asked to class their level of temptation enactment as representing self-control success or failure relative to their general level of self-control in that domain. The questionnaire could also include questions relating to stress and affect at the points of temptation, and with a diary element to pinpoint the temporal relationship between temptations.

In conclusion, in terms of the partial pattern of significant mean differences between temptation enactment scores for the six domains, and the partial pattern of correlation among the domains and between the domains and the trait measure of self-control, this study provides limited support for the existence of a stable trait of self-control which allows for intraindividual differences in self-control across different domains. The study has failed to provide quantitative evidence of ego depletion. This does not subtract from the importance of laboratory findings of ego depletion, since for instance Cushman and Greene (2009) have argued that findings in the laboratory can illuminate cognitive mechanisms which can get overshadowed by confounds in more ecologically valid studies. It has been shown previously that experience sampling methods can capture ego depletion and here, themes arising within the qualitative data suggest that an improved qualitative questionnaire, potentially including a diary-element, may be a reasonable next step in devising a cost-effective instrument for capturing ego depletion in daily life.

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