

Control Yourself! How are Trait & State Self-control related to fatigue in students

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Abstract

Background. Fatigue has been known to be a prevalent issue among students in a disproportionate manner, which can bring a multitude of adverse health implications. Self-control affects fatigue, and can provide a possible solution to the issues fatigue can bring. Although much is known about the relationship on a trait level, on a state level not much is.

Objective. The aim of the current study is to investigate the relationship between trait self-control and trait fatigue, to provide further evidence of the existence of this relationship.

Additionally, the study aims to provide a clearer image of the relationship between state self-control and state fatigue. **Method.** An experience sampling study over a 15 day time

period was conducted. The sample size consisted of 36 participants of which 8.6% (3) of the participants were Dutch, 88.6% (31) were German, and 2.9% (1) had another nationality,

namely Lithuanian. The age range laid between 18-26 years old. The 13-Item Brief Self-

Control Scale was used to measure trait self-control, the Fatigue Severity Scale was used to measure trait fatigue. As for state self-control, state items based on ego-depletion, goal-

directedness and inhibitory self-control were formulated at the hand of previous literature. As

for state fatigue, items were created based on the Fatigue Severity Scale. As for the analyses,

a Correlation Analysis to assess the correlation between trait self-control and trait fatigue, and

multiple Linear Mixed Models were conducted in order to assess the association between

state self-control and state fatigue. **Results.** The results showed a significant correlation

between trait self-control and trait fatigue. Moreover, significant negative associations of -

.967 between state self-control and state fatigue were found. Additionally, through Linear

Mixed Model it was found that state self-control had a stronger negative association on a

between-level than on a within-level. **Conclusion.** This study is one of its first to investigate

the association between state self-control and state fatigue. It was found that these concepts

are negatively associated with another. Additionally, it was found that there was a stronger

negative between-person association of the two concepts, $-.460$ than a within-person association, $-.353$. Moreover, the results showed that the state measurement fluctuated widely over the course of time, which indicates that there is another factor at play with which future researches need to take into account. Despite these findings, it must be said that future research on this relationship needs to be conducted in order to provide a more solid base of knowledge.

Keywords: self-control, trait fatigue, state fatigue, experience sampling study

Control yourself! How are trait and state self-control related to fatigue in students

Among the people of the “general” population, those who do not suffer any illnesses, around 15 to 25% of individuals experience non-pathological fatigue (Jason, et al., 2010). Fatigue is defined as: “*physical or mental exhaustion due to exertion*” (Cullen, Kearney & Bury, 2002). From this group, the age group of students (young adults / adolescents) experiences fatigue disproportionately, as it has been mentioned by Orzech, Salafsky and Hamilton (2011), that 25 to 50% of students experience significant levels of fatigue. This percentage of students experience significant levels of fatigue is concerning as fatigue can result in consequences, such as psychological impairments (e.g. decrease in morale and mood) (Brown, 1994), decreases of cognitive, psychomotor and emotional functioning (Abd-Elfattah, et al., 2015; Orzech, Salafsky & Hamilton, 2011), and lead sleep-related accidents which are responsible for approximately 3% of a country’s gross national product cost per year (Martiniuk, Alexandra et al., 2013). As for these cases of experienced fatigue, it has been mentioned that they mostly are due to situational factors, such as a lack of sleep (e.g. if one would sleep less, they experience more fatigue the following day) (Jason et al., 2005). However, it can also be that individuals experience fatigue on a dispositional level (e.g. one experiences more fatigue in general compared to another individual). This indicates that there is a need to investigate why individuals differ in fatigue.

As to how it occurs that students suffer from significant levels of fatigue the concept of sleep can be used as a “bridge” to better understand how the levels of fatigue increase. From research it has been found that an increase in sleep has been linked to a decrease in fatigue (Pilcher, Ginter and Sadowsky, 1997). This relationship between fatigue and sleep can give a more elaborate explanation as to how the levels of fatigue in students are reached, as 33% of students sleep less than eight hours per day (Nasim, Saade & AlBuhairan, 2019), while the recommended amount is nine hours (Noland et al., 2009). Thus, it can be stated that

students experience significant levels of fatigue due to the insufficient amount of sleep they have. Regarding this relationship between fatigue and sleep, a distinction must be made between the two. Whereas a lack of sleep / sleepiness is an awake-state where the person is more inclined to fall asleep, fatigue is a subjective experience that affects the individual's functioning (Hossain, et al., 2005). However, to just sleep more, is not an adequate solution to the issue of fatigue students experience. Despite the relationship between sleep and fatigue being present, it has only been proven to be influenced by sleep on a trait level (Pilcher et al., 1997). What must be taken into consideration regarding this relationship is that fatigue is a subjective experience that is mostly affected by situational factors (Jason et al., 2015). Thus it can also occur on a state level. Additionally, despite the availability of sources that established the relationship between sleep and fatigue, the behaviour of going to sleep can still be impaired by factors such as caffeine / alcohol consumption, or poor time management (Noland et al., 2009). Thus, sleep itself is not the key factor.

Instead, it may be a self-regulation issue that is the key factor, as it has been mentioned that those with low self-regulation are more likely to postpone going to bed (Kroese et al., 2016). Although it was mentioned that the problem may be based on self-regulation, the concept of self-control will be held central instead. The reason to is because self-control focuses on the conscious form of resisting temptations, and not on the unconscious that self-regulation does (Baumeister, 2018). As for the concept of self-control it is conceptualized as: *“the capacity that an individual has towards altering their responses and bring them in line with their ideals, values, morals and social expectations to eventually reach long-term goals”*, (Baumeister, Vohs & Tice, 2007). Self-control can provide answer to the issue of insufficient sleep. With self-control an individual can resist certain temptations in order to reach a certain goal or adhere to a desired behaviour (Baumeister, Vohs & Tice, 2007). For example, an individual can resist the temptation to consume caffeine before going

to bed in order to attain their goal of sleeping on time, and attaining sufficient sleep. This in turn will result in the individual to experience less fatigue. Thus, in this study the concept of sleep is taken in order to create the link between self-control and fatigue. The reason as to why this “bridge” needs to be formed is due to there being little knowledge available regarding the relationship between self-control and fatigue.

When studying the relationship between self-control and fatigue two different forms of self-control can be distinguished. The first form is called trait self-control (TSC). Regarding trait self-control, on a dispositional level it is perceived as a temperament forming the core of one’s personality (Cheung et al. 2014). The level of trait self-control of an individual is linked to several behavioural outcomes. As such that a higher form of trait self-control has been linked better sleep (Nauts & Kroese, 2017). As for trait self-control, according to Schmeichel and Zell (2007), it has also been found that a higher trait self-control predicts better self-regulatory behaviour. This would improve an individual’s adherence to their time schedule and drink less alcohol / caffeine, which would foster an increase in one’s sleep sufficiency (Noland et al., 2009). This increase in sleep sufficiency, will lead to a decrease in fatigue. The level of trait self-control that each individual would have, has also been mentioned to remain stable and persist across situations, and over the course of time (Schmeichel & Zell, 2007). As it was mentioned that the difference in trait self-control between individuals can lead to different goal-oriented behaviour per individual, it has been found that situational differences are present as well. With this information, to only define self-control in this manner is insufficient. This is where the second form of self-control originates from.

As for the second form of self-control, state self-control (SSC), it can provide a more comprehensive explanation of an individual’s level of self-control as it is multifaceted construct. State self-control is used in this study as most studies that are available at present

measure the relationship between self-control and fatigue on dispositional level, and not on a state level. As for state self-control, it refers to the level of self-control one has over the course of time within a day (Baumeister, Vohs & Tice, 2007). Additionally, research has shown that one's ability to exert self-control is susceptible to situational influences, such as previous attempts, mood, working memory and motivation (De Ridder et al., 2012). In other words, an individual can be more capable to use self-control to exert restraint depending on the time and situation one is in. As a result this can cause fluctuations in one's level of self-control over the course of a day. These fluctuations can affect one's self-regulatory behaviour, which as a result would affect one's level of fatigue. This explanation of state self-control is also in line with what the Strength Model proposes on how self-control can be affected (Baumeister et al., 1998). The Strength Model mentions that self-control can be perceived as a source that can be depleted. As it depletes, the capacity to exhibit further self-control becomes more difficult. This process of depletion of self-control is named *ego-depletion*, in the Strength Model (Baumeister, Vohs & Tice, 2007) Thus, it can be expected that as one's state self-control would fluctuate over the course of a day and be lowered, one's level of fatigue would be increase.

With the present study the relationship that self-control has with fatigue will be measured. This study will both measure the relationship of the two concepts on a trait and state level. The relationship will be measured on a trait level in order to replicate earlier findings, and to provide more strength to the evidence of this relation as little knowledge is available. As for the measurement on a state level, this will be measured to build knowledge and possible evidence of this relationship, as there is a lack thereof. As for research questions, they are the following:

Research Question 1

To what extent are trait self-control and trait fatigue related?

Research Question 2

To what extent are state self-control and state fatigue related?

Research Question 3

To what extent does trait self-control predict state fatigue compared to state self-control

Method**Design**

This study was a collaborative study, which entails that four different researchers together operationalized and measured the construct of self-control, but each focused on a different construct with a relation to self-control. These constructs were anxiety, perfectionism, pro-social behaviour, and fatigue, in which fatigue will be central in this report.

For this study a time-contingent design was used in the form of state questionnaires, that were administered daily for both self-control and fatigue over the course of 15 days. The decision regarding the duration was based on Van Berkel et al. (2017), who mentioned that a two-week time period was appropriate to acquire valid data. In this study, the frequency of administration of the daily questionnaires on a single day was three times per day. This was also based on Van Berkel et al. (2017), that mentioned that a suitable daily administration of questionnaires would lie between three to five times per day, as it would not overly strain the participants with questionnaires. The daily administration of three times per day was chosen, as to decrease the strain on participants as much as possible, while obtaining valid data.

The type of method this study made use of, is an experience sampling method (ESM). The experience-sampling method is a measurement method aimed at measuring behaviour, thoughts, and feelings of participants within a certain amount of days, and throughout the course of a day. Therefore, participants are requested to provide self-reports on their activities and emotions multiple times per day (Van Berkel et al., 2017). This enables the evaluation of common experiences of situations at given time points (Csikszentmihalyi, 2014). As data of the experience-sampling method is collected during daily life experiences in the participant's natural environment, it provides a more accurate representation of the participants' natural behaviour, in comparison to an artificial laboratory environment (Van Berkel et al., 2017). Thus, this measurement method is ideal for measuring the relation between self-control and fatigue on a state level as it can measure the fluctuations each construct has over the course of a day. Furthermore, it must be noted that this method was utilized for the measurement on a state and trait level of self-control and fatigue. These will also be referred to as state / trait self-control and fatigue.

Participants

The target group of this study were registered students. In this study the method of convenience and snowball sampling was utilized in order to obtain participants. With this recruitment method, the inclusion criteria consisted of being between 18 and 25 years old, being officially registered as a student at a higher educational institution. Additionally, the participants had to have sufficient understanding of the English language. This last inclusion criteria is based on the judgment that the participants themselves had on their vocabular skills. Moreover, data was only included when a response rate of 50% or higher was given, as this is the common threshold for experience sampling studies (Connor & Lehman, 2012).

Lastly, if the participants did not give their consent, the data that they provided will be omitted in this study.

The overall study was conducted by a sample of 61 students from a higher educational institution. From this sample, a total of 26 participants were excluded as they did not meet the inclusion criteria. Thus, this led to a final sample size of 35 participants. The age range of the participants lied between 18 and 25 ($M_{\text{age}} = 21.94$, $SD_{\text{age}} = 1.67$), in which 65.7% (23) identified as female, and 34.3% (12) stated to be male. Furthermore, 8.6% (3) of the participants were Dutch, 88.6% (31) were German, and 2.9% (1) had another nationality, namely Lithuanian. Furthermore, 74.3% (26) of participants finished their VWO education, 5.7% (2) finished their HAVO education, and 20.0% (7) completed their Bachelor's.

Materials

The data collection was conducted via the online application *Ethica*, which was administered through the participants' mobile phones. The measurement instruments used in *Ethica* for self-control was the 13-Item Brief Self-Control Scale (BSCS), and the Scale of Trait Inhibitory Self-Control. As for investigating fatigue, the Fatigue Severity Scale (FSS) was included. The study was approved by the Ethics committee of the University of Twente with the approval number 210672. Data collection started from 28 April 2021 until 13 May 2021.

Ethica

Ethica is an online platform that can be accessed through a web browser, which is designed for researchers to create, modify and distribute their surveys while at the same time it allows the researchers to obtain and view the data of the participant in real-time (ethicadata.com). Once a study is set-up, the participants can complete the surveys on any form any form of digital devices (e.g. smartphones, tablet, etc.). *Ethica* is chosen as a measurement platform as it allows there to be continuous exposure to surveys. Further, it enables improves possibilities for the use of ESM by reducing the strain on participants as they do not have to carry additional study related material. As for the time of responses, *Ethica* makes use of triggering logistics and notifications, both which aid the participants as a reminder of survey availability.

As for the state questions that were asked towards participants in *Ethica*, they can be seen in Table 1 (and Appendix B).

Table 1

Daily questions for state measurements

Self-control; Ego depletion	Self-control; Goal-directedness	Self-control; Inhibition	Fatigue
In the past couple of hours, have you felt that it is hard to make up your mind about even simple things?	In the past couple of hours, how easy was it for you to do something “good” that you did not really want to do (e.g. eating healthy)?	In the past couple of hours, how easy was it for you to refrain from doing something “bad” you really wanted to do (e.g. snacking)?	At the moment I feel fatigued.

In the past couple of hours, have you felt that things are beothering you more thant they usually would?	In the past couple of hours, I was able to stick to my goals	In the past few hours, I was able to resit temptations.	In the last couple of hours, fatigue has hindered me in something.
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In the past couple
of hours, have you
felt that you have
less mental and
emotional energy
than you normally
have?

State Self-control

Self-control was measured daily using 7 items (see Table 1 or Appendix B). These questions were categorized as ego depletion, goal-directed and inhibitory self-control, as self-control itself can be categorized into these sub-categories (Baumeister et al., 2019; Tornquist et al., 2019; Simons et al., 2016).

Ego depletion. The first three questions were formulated by Baumeister et al., (2019) as to measure the ego-depletion process an individual can experience. The questions could be answered on a 5-point Likert-Scale, ranging from 0 (*Not at all*) to 100 (*Very much*). As the Cronbach's alpha was adequate ($\alpha = .82$), it shows that the internal consistency is adequate and measures the concept well. What needs to be mentioned about this Cronbach's alpha of .82 from Baumeister et al., (2019), is that the three items were averaged and used into a scale, and not as individual items as is used in this study.

Goal-directed and inhibitory self-control. Question 4 to 7 were designed to measure the concepts of goal-directed and inhibitory self-control, based on a 7-point Likert-Scale, ranging from 0 (*Not at all*) to 7 (*Extremely*). These questions were formulated at the hand of Tornquist and Miles (2019), and Simons et al. (2016). Both of these researches mention questions regarding goal-directed and inhibitory self-control on different domains, such as food. In this research these questions were rephrased to an extent that the questions

concerned the aspect of self-control on a person's daily activity and not on a specific behaviour (e.g. binge-eating). Questions 4 and 5 concern self-control goal-directness, and question 6 and 7 the inhibitory aspect of self-control. These questions were based upon the methodology used from Simons et al. (2016).

State Fatigue

As for state measurement of state fatigue two questions are used. These two questions are altered versions of questions from the Fatigue Severity Scale. These altered questions needed to be made due to there not being a measurement tool available for the measurement of fatigue on a state level, there are only measurement tools available to measure it on a trait level. Thus, questions were required to be made in order to measure fatigue on a state level. The original and modified questions can be seen in Table 2. For these two questions participants could answer based on a 5-point Likert-Scale, ranging from 1 (*Completely disagree*) to 5 (*Completely agree*).

Table 2

List of items used for state measurement of fatigue

Scale	Trait question (FSS)	Modified question
FSS	I am easily fatigued.	At the moment, I feel fatigued.
FSS	My fatigue causes problems for me.	In the last couple of hours, fatigue has hindered me in something.

13-Item Brief Self-Control Scale (BSCS)

Regarding the trait measurements, the first trait measurement is the 13-Item Brief Self-Control Scale. It is a questionnaire that assess one's degree of trait self-control based on thirteen different items (see Appendix A) on a 5-point Likert-Scale, scaling from 1 (*Not at all*) to 5 (*Very much*) (Tangney et al., 2004). Regardless of the shortened version, the 13-Item Brief Self-Control Scale questionnaire still covers the multiple aspects of self-control, which are task performance, impulse control, psychological adjustment & self-esteem, interpersonal relationships, personality features and moral emotions. The 13-Item Brief Self-Control Scale is used because it is one of effective and most commonly used instruments for measuring self-control (Duckworth et al., 2007). Additionally, the length of the questionnaire is desirable as well since participants have to answer multiple surveys per day, and an excessive amount of questions could result in a lower engagement from the participants (Cairns, 2013). As for the internal consistency of this survey is adequate ($\alpha = .83$), the test-retest reliability the 13-Item Brief Self-Control Scale scored high as well ($r = .87$), and the validity was proven to be good as well (Tangney et al., 2004). In this study similar findings were found as the $\alpha = .87$. This shows that this measurement tool worked adequately, and measures the construct of trait self-control well.

Fatigue Severity Scale (FSS)

The second trait measurement included the concept of fatigue, and for this the Fatigue Severity Scale (FSS) survey was utilized to measure the level of fatigue an individual has. It consists of 11 items based on a 7-point Likert Scale, scaling from 1 (*Completely disagree*) to 7 (*Completely agree*) (Schwartz et al., 1993) (see Appendix C). This survey is appropriate to accurately measure the severity of an individual's fatigue, as indicated by Shwartz et al. (1993). The subscale has also been proven to contain a good internal consistency ($\alpha = .921$)

(Schwartz et al., 1993). Similar internal consistency has been found in this study ($\alpha = .92$). As for the validity, it was good ($r = .69$). Lastly, it has also been mentioned by Schwartz et al. (1993) that the discriminant validity of the FSS is good as well, and that it can differentiate between healthy individuals and individuals with illnesses that lead to more experienced fatigue. This is paramount as in this study no distinction regarding inclusion criteria is made between “healthy” individuals and individuals with illnesses, which can affect the scoring of fatigue.

Procedure

An overview of the 15 day study is provided in Table 3. The study on *Ethica* and all incorporated functions such as clarity of the user interface, notifications, functionality of surveys and response functionality, were repeatedly tested and adapted by the researchers before the survey deployment

Before launching the study

Participants were asked to download the *Ethica* application on their smartphones, and make an account using their email address. Afterwards, participants had to sign up for the study through a study code, which they received by email from the researchers. The first output that was shown to the participants by *Ethica* was an overview of the study, the expectations that the participants could have (see Appendix F). Additionally, the participants were asked to give *Ethica* permission to enable the notification function on their smartphones. Lastly, the participants were informed to contact the researchers in case any problems occur or if they have questions.

Day 1

On the first day participants were asked to fill in the demographic survey. In here, participants filled in their demographic information, and gave their informed consent (see Appendix E). Afterwards, participants were notified by *Ethica* at 12:00 to answer the trait measurements of self-control (13-Item BSCS), and fatigue (FSS). After the participant completed all three surveys, they were provided with a positive message in which the researchers thanked them for their input. The aim of this was to increase and maintain a high response rate, and a positive attitude towards the study overall.

Day 2-7 & 9-14

Throughout the course of fifteen days, participants were notified three times a day to answer questions concerning state self-control and state fatigue. The total of these questions consisted of seven questions concerning self-control and two questions concerning fatigue. The moments that these daily measurements took place are in the morning (09:00-10:30), the afternoon (13:00-14:30), and the evening (20:00-21:30). During these timeslots, and 30 minutes after, the participants received a notification through *Ethica* as a reminder to answer the questionnaires.

The order of the questions of each survey were randomized in order to prevent habituation and bias. This ensured that each question receives the same amount of attention from the participant. Each survey was given a 1.5 hour expiration time. This would prevent the participants to answer all surveys in one timeslot, and result in inaccurate data.

Day 8 & 15

After one week of the start of the study, and at the end of the study, the participants were asked to fill in the trait surveys again. Simultaneously, the trait surveys were also issued to the participants. Thus, on these two days, there is a higher load for the participants to answer questions from the surveys. On these days, the participants were notified at 12:00 to answer the questions concerning the trait surveys. After the last survey was answered on the fifteenth day, the participants were thanked extensively for their participation and input.

Table 3

Overview of Ethica activities

	Day 1	Day 2-7	Day 8	Day 9-14	Day 15
09:00-10:30	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions
12:00	Demographic				
12:00-13:00	13-Item BSCS		13-Item BSCS		13-Item BSCS
	FSS		FSS		FSS
13:00-14:30	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions
20:00-21:30	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions	State Self-control & state fatigue questions

Data analysis

The results of the trait measurements as well as the state measurements were analysed by means of the software program *IBM SPSS Statistics* (Version 26). Before starting the actual analysis, the data got imported from *Ethica* into *SPSS* for further analysis.

Additionally, due to the data being collected at multiple time periods, it is required to differentiate from the between-person and within-person effect. For between-person analysis the average Person Mean (PM) score per participant over the course of 15 days was calculated. As for within-person analysis, the Person Mean-Centered (PMC) score was calculated by subtracting the state scores from the Person Mean score (Curran & Bauer, 2011). The descriptive statistics were calculated for the participants' demographic data, and for the mean scoring on the trait measurements of self-control and fatigue. Visualizations were made through the program *Excel*.

For the trait measurements, existing scales have been used, which were the 13-Item Brief Self-Control scale and the FSS. In order to measure the reliability of these scales Cronbach's alpha was calculated. As for the Cronbach's alpha it needs to have specific values. If the alpha is equal to or larger than .5, it is deemed acceptable. With $\alpha > .6$, it is considered as good, and $\alpha > .7$ is excellent (Field, 2013). For the state items, test-retest reliability analysis was utilized in order to measure the reliability.

The first analysis that was conducted is a Correlation Analysis. This was done between trait self-control and trait fatigue in order to measure the possibility of a correlation between the two concepts, and to give answer to the first research question. The type of Correlation Analysis that will be run will be a Pearson correlation due to the data being

normally distributed. The Correlation Analysis can indicate the direction and the strength of the correlation.

A second analysis that will be conducted will be an Unstandardized Linear Mixed Model between state self-control and state fatigue on the average Person Mean (PM) score. This measurement will show the association between the two, the significance and the direction of the association. In this analysis, state fatigue was set as the dependent variable, and state self-control as the fixed independent variable. In this analysis, an autoregressive structure was employed. This autoregressive structure takes missing data from participants into consideration, as such that it predicts the value of it. Consequently, this would not hinder the measurement made as there would be no missing data. Additionally, visualizaitons were made to explore this association.

Lastly, a third analysis will be conducted in the form of a Standardized Linear Mixed Model, which makes use of Z-scores of state fatigue (PM) for the dependent variable, and Z-scores of state self-control (PM and PMC) for the independent variable. This measurement will show whether being fatigued in general is more associated with scoring high on being self-controlled in general (between-person variable; PM), or scoring high on being self-controlled at the moment (within-person variable; PMC).

Results

Descriptive data

Table 4 provides an overview of the descriptive data form the trait and state measurements, from which the the mean, minimum, maximum, and standard deviation of the

four constructs can be seen. From this table it can be seen that for trait fatigue the range of scoring is bigger than for the measurements of the other constructs. Additionally, the standard deviation for trait fatigue is the highest among the four constructs as well. This high standard deviation is understandable due to the big range of the minimum and maximum score of individuals. This high standard deviation of trait fatigue also shows that many individuals scored further away from the mean, compared to the other four constructs.

Table 4

Descriptive data (Minimum, Maximum, Mean & SD) of 13-Item Brief Self-Control Scale & Fatigue Severity Scale

	Min. (Scale minimum)	Max. (Scale Maximum)	M	SD
Trait self-control	0.15 (0)	3.38 (4)	1.85	.76
Trait fatigue	0.00 (0)	4.00 (4)	2.69	1.24
State Self-control	1.53 (0)	3.56 (4)	2.43	.83
State fatigue	0.13 (0)	2.52 (4)	1.38	.65

As mentioned in the data analysis plan, a Two-Tailed Bivariate Correlation Analysis with Pearson's Correlation Coefficient was computed to assess the relationship between trait self-control and trait fatigue. From this analysis, a significant correlation of trait self-control and trait fatigue was found [$r = -.473$, $n = 35$, $p = .004$]. This overall shows that there is a

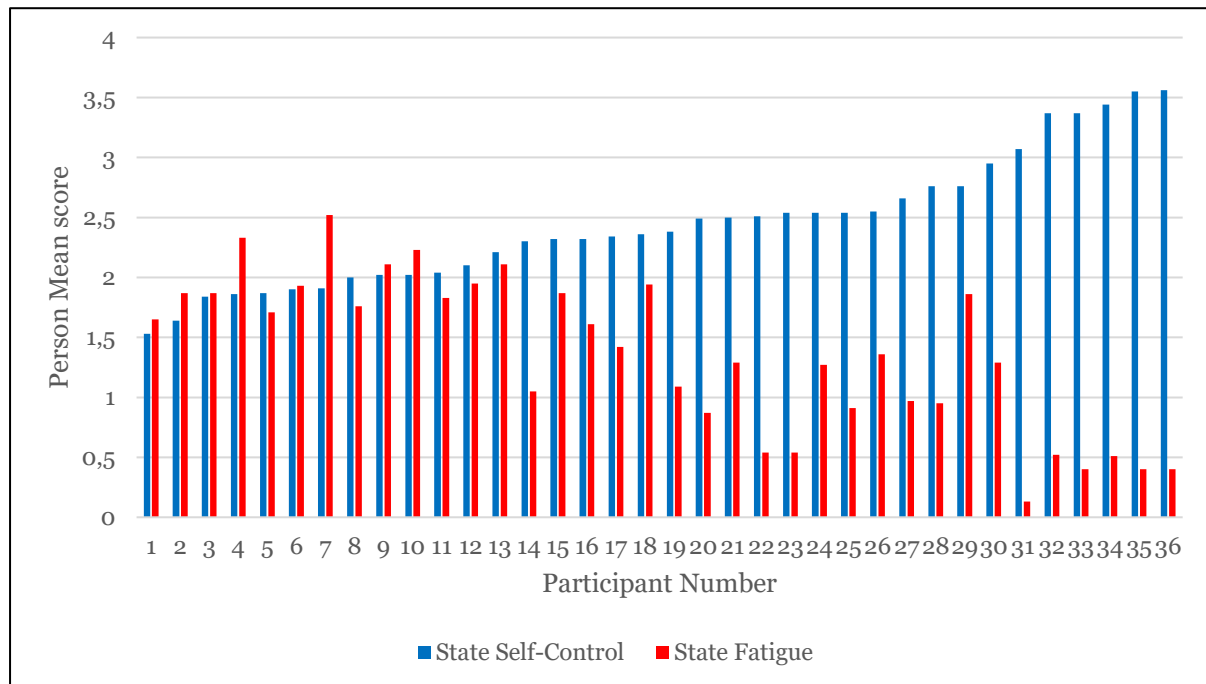
significant negative correlation with moderate strength between the two variables. Thus, it can be said that individuals who score high on trait self-control, score lower on trait fatigue.

State Self-Control and State Fatigue

As to find out the association between state self-control (PM) and state fatigue (PM), a Linear Mixed Model was conducted. From it, it shows that there is a significant negative association between the two variables, as $B = -.967$, $p < .000$, $CI [-.990, -.943]$. With this it can be stated that with each increase in the scoring of state self-control of an individual, their scoring on state fatigue would decrease. Thus, each increase of .83 of an individual's score on state self-control, will result in a decrease of .967 of an individual's score on state fatigue. Additionally, as the Confidence Intervals lie between -.990 and -.943 it can be said with a 95% certainty, that the value of decrease is .967. Furthermore, a bar chart is depicted in Figure 1 in which participants are sorted on their scoring of state self-control. From this bar chart, a similar trend of a negative association between the two variables can be seen. As the Person Mean score of self-control increases, it can be seen that the Person Mean score of fatigue generally decreases. It is noteworthy to mention that there are certain participants who do not uphold to this association. These are participants number 1, 2, 3, 4, 6, 7, 8, and 10, as they score higher on state fatigue than on state self-control. This partially counterargues against what has been found that there is a negative association between state self-control and state fatigue. This could mean that other factors are of influence on these individuals' form of state fatigue.

Figure 1

Scoring PM of State Self-Control and State Fatigue



To more precisely examine this occurrence participant 4 and 36 will be looked at further, to more accurately understand the association. Figure 2 and 3 show an overview of the state values for both self-control and fatigue of both participant 4 and 36. The light blue line indicates the levels of state self-control of an individual, and the red line indicates the levels of state fatigue. Participant 4 was selected as they had the lowest amount of missing values in their data, and the same concept applies to participant 36. Additionally, the discrepancy between their scoring of state self-control and state fatigue on a Person Mean, differed widely. Participant 4 (see Figure 2) scored higher on state fatigue than on state self-control. Participant 36 (see Figure 3) scored higher on state self self-control than on state fatigue. From the visual analysis provided by Figure 2 and 3, it can be seen that there is a discrepancy

between the levels of fluctuations of state self-control and state fatigue. Participant 36 had a narrow variance of .405, while participant 4 had a wider variance of .869. However, when looked at participant 7, who also scored considerably higher on state fatigue than on state self-control, they had a narrow variance of .297. Thus, no clear pattern can be indicated from these visual analyses.

Figure 2

State self-control and state fatigue of User #4

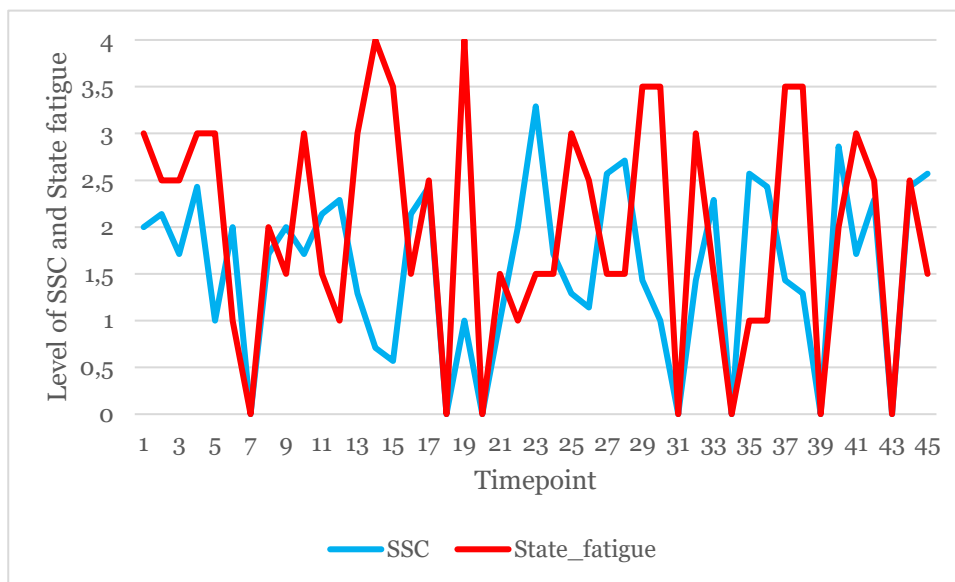
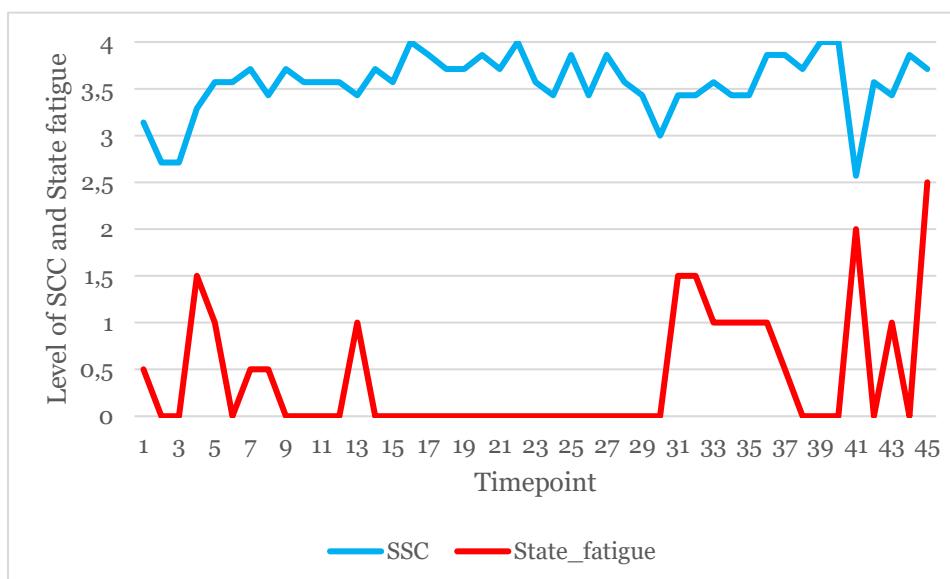


Figure 3



State self-control and state fatigue levels of User #36

Between- and Within-Person association between Self-control and Fatigue

As for the last research question, the Standardized Linear Mixed Model indicated that that both state self-control on a between- and withinii-person effect had a significant negative association. For the between-person effect it is $B = -.460$, $p < .000$, $CI [-504, -.416]$, and for the within-effect it is $B = -.353$, $p < .000$, $CI [-398, -.308]$. This means, that both being self-controlled in general and feeling self-controlled at the moment, are significantly associated to experiencing fatigue at a given moment. What must be noted, is that between-person effect of state self-control showed a stronger negative association, than the within-person effect does. This implies that being more self-controlled in general has a bigger effect in terms of an individual's scoring on state fatigue, than being self-controlled at a specific moment.

Discussion

The purpose of this study was to strengthen the already existing body of work on the relationship between self-control and fatigue, and to grant more insight into the relationship between the two. The first research question asked to what extent trait self-control and trait fatigue are related to each other. From the results, it showed that individuals who score high on trait self-control will score low levels of trait fatigue. The second research question asked to what extent state self-control and state fatigue were related. Concerning this research

question, the results indicated that as one's level of state self-control would increase, the level of state fatigue would decrease. For the last research question on to what extent trait self-control predict state fatigue compared to state self-control. It can be said that both trait and state self-control can predict an individual's state fatigue, but trait self-control is more predictive of one's scoring on state fatigue than state self-control. Thus, how self-controlled an individual feels in general affects the level of fatigue at a given moment more, than the level of being self-controlled at a given moment.

Interpretation and similarities with previous literature

The found correlation between trait self-control and trait fatigue is in line with previous research has mentioned on this relationship (Barber et al., 2010; Pilcher et al., 2015; Nauts & Kroese, 2017), which mentioned that there would be a negative correlation between the two concepts of trait self-control and trait fatigue. However, what this finding does not tell us is whether there is a present causation between the two concepts. This is partly understandable as the link between self-control and fatigue that has been made in this study is not a direct one, but one made through the concept of sleep. Additionally, the design of this study also did not allow for inference of any causality as it did not take covariation, temporal precedence nor a control group into account. As for the relationship between self-control and sleep, and sleep and fatigue causation has been found by previous research (Barber et al., 2010; Pilcher et al., 2015; Nauts & Kroese, 2017). The finding that there is a correlation between self-control and fatigue, can provide support for future research to examine whether there is a direct causation present between the concepts of self-control and fatigue. Additionally, concerning which of the concepts influences which first, it can also be mentioned that with the additional evidence this study contributes on the relationship between

self-control and fatigue, it provides an extra layer on which future research can build in order to prove the direction.

As for the second research question it can be said that the results are not in line with what previous research has mentioned (Baumeister et al., 2007; Tyler & Burns 2008). From this literature it was expected that one's level state self-control would positively be associated with the level of state fatigue. However, this was shown to not be the case as there is a negative association present between the two constructs. Thus, the higher one scores on state self-control, the lower the score on state fatigue. Despite this finding counterarguing previous knowledge, it can provide an answer to people's experience of fatigue, as such that their level of self-control would need to increase in order for their levels of state fatigue to decrease. Regarding this claim, it must be noted that future research needs to be conducted in order to strengthen it. As this research is a first, to the author's knowledge, that examines the relationship of self-control and fatigue on a state level, it needs more evidence and reliability from other researches to add additional strength and importance to it.

Regarding the third research question, it has been shown that feeling self-controlled in general is more predicative of feeling fatigued a certain moment than than feeling self-controlled at a certain moment would. In short, the between-person effect of self-control has a bigger association on the level of fatigue than the within-person effect. This finding can aid in the solution to fatigue as psychologist can opt to choose to treat individuals with high levels of trait self-control as this has a bigger effect on the the level of experienced fatigue, when compared to individuals who score high on state self-control.

Strengths, limitations and future implications

Regarding the strengths of the study, the first concerned the usage of an ESM, with which a high ecological validity is ensured as it allows research to be possible outside of a testing room (Van Berkel, 2017). The findings from this study provide further strength of knowledge on the relationship between self-control and sleep. Furthermore, novel knowledge was produced by examining the association between self-control and fatigue on a between- and within-person level. This knowledge can be used to fill the gap that is present in on the relationship between both variables. As this study would be the first to the author's awareness to investigate the association between self-control and state fatigue, it can provide a first step in discovering the present relationship between the two constructs.

Regarding limitations of this study, the first limitation of the study concerns the participation of the study itself. As the study required participants to answer surveys for a consecutive 15 day period, this would also require self-control. Thus, individuals who have a lower form of self-control would not be able to adhere to this study plan and answer all surveys. This results in data which was not included, and that could have provided different results from the analyses, because mostly individuals who have a good self-control had the grit to adhere to the study plan. Thus for future research on self-control, it can be advised to find a process of data collection where the participants are less required to exert self-control. This could perhaps be done in a collaborative process between researcher and participant.

A second limitation of the study lies with the measurement tool of fatigue, the Fatigue Severity Scale (FSS). Although this measurement tool has been shown to accurately measure the severity of an individual's level of fatigue, it has mostly been used in a clinical setting in which the Fatigue Severity Scale was used in a sample group that consisted of individuals who had illnesses, that could lead to fatigue (Shwartz et al., 1993). Despite that distinctions in scoring could be made between "healthy" individuals and those with illnesses (Schartz et al.,

1993), these differences in scoring were not mentioned. As this study did not take into account these illnesses that can cause sleep deprivation, results could be distorted. This is expected to be influential in this study as the variance on scoring on state self-control and state fatigue differed widely among participants. For future research it can be advised to provide more knowledge regarding the applicability of the Fatigue Severity Scale among “healthy” individuals. Moreover, in future research it can also be advised to measure the effect of self-control and fatigue on “healthy” individuals and individuals with illnesses separately, to discern differences in the relationship between the two constructs.

As for structural limitations, there was an implication with the execution of the study itself, which were expressed as technical errors. These errors could have hindered the participants to sign up for the study, and to sign the informed consent. Although, these events not fully hinder all participants from providing data, some participants missed instructions, and missed the signing of the demographic survey. The signing of the informed consent is of particular importance, as data got excluded if participants did not give consent. The notion that data had to be omitted could have effected the study in such manner, that it provides less accurate results, as less participants were included.

Lastly, the last limitation concerned the setting in which this study took place, as there was the presence of the global Covid-19 pandemic. Due to this pandemic most facilities, including university facilities, were closed, and the only form of contact was online. This alteration towards a online environment must also require good time management, planning and self-control, as there is a bigger possibility for the participants to be distracted by outside sources (e.g. construction workers or parents). This overall could have affected the self-control abilities and levels of fatigue in an individual to such extent that the data could be slightly distorted. How the setting affected the self-control of an individual is yet unknown, but to omit the importance of it would be unwise. Concerning this, research regarding self-

control and fatigue on both a trait and state level are advised to be conducted in a post-Covid-setting.

Conclusion

In conclusion, this study is the first to investigate the association between self-control and state fatigue, in which it was found that state self-control and state fatigue are negatively associated with another. Additionally, this research found a larger between-person effect than a within effect on self-control and fatigue, which implies that being self-controlled in general is more predictive of state fatigue, than being self-controlled at a specific moment would. Also, the results from this study provide additional evidence on previous findings that trait self-control and trait fatigue are correlated. Additionally, this study showed that the state measurement fluctuate widely across individuals despite their scoring on state self-control or state fatigue. This would indicate that another factor is at play in this relationship.

In closing, from this study it can be seen that there is indeed a relationship present between the constructs of self-control and fatigue. However, as this study is a first-of-its-kind and only can infer data based on association, more information from future research needs to be provided in order to form a solid base of knowledge on this relationship.

References

- Abd-Elfattah, H. M., Abdelazeim, F. H., & Elshennawy, S. (2015). Physical and cognitive consequences of fatigue: A review. *Journal of advanced research*, 6(3), 351-358.
- Adams, J. S., 1963. Toward an understanding of inequity. *J. Abnorm. Social Psychol.* 67, 5, 422–436. <https://doi.org/10.1037/h0040968>
- Barber, L. K., Munz, D. C., Bagsby, P. G., and Powell, E. D. (2010). Sleep consistency and sufficiency: are both necessary for less psychological strain? *Stress Health* 26, 186–193. doi: 10.1002/smi.1292
- Baumeister, R. (2018). *Self-regulation and self-control: Selected works of Roy F. Baumeister*. Routledge.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74, 1252–1265. doi:10.1037/0022-3514.74.5.1252
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current directions in psychological science*, 16(6), 351-355.
- Baumeister, R. F., Wright, B. R., & Carreon, D. (2019). Self-control “in the wild”: Experience sampling study of trait and state self-regulation. *Self and Identity*, 18(5), 494-528.
- Brown, I. D. Driver fatigue. *Hum. Factors*, 1994, 36: 298–314.
- Cheung, T. T., Gillebaart, M., Kroese, F., & De Ridder, D. (2014). Why are people with high self-control happier? The effect of trait self-control on happiness as mediated by regulatory focus. *Frontiers in psychology*, 5, 722.
- Conner, T. S., & Lehman, B. J. (2012). Launching a study in daily life. In *Handbook of research methods for studying daily life* (pp. 89–105). EBSCO Publishing.
- Cruess, D. G., Antoni, M. H., Gonzalez, J., Fletcher, M. A., Klimas, N., Duran, R., Ironson, G., & Schneiderman, N. (2003). Sleep disturbance mediates the association between psychological distress and immune status among HIV-positive men and women on combination antiretroviral therapy. *Journal of Psychosomatic Research*, 54, 185–189.
- Cullen, W., Kearney, Y., & Bury, G. (2002). Prevalence of fatigue in general practice. *Irish journal of medical science*, 171(1), 10-12.

- Curran, P. J., & Bauer, D. J. (2011). The Disaggregation of Within-Person and Between-Person Effects in Longitudinal Models of Change. *Annual Review of Psychology*, 62(1), 583–619. <https://doi.org/10.1146/annurev.psych.093008.100356>
- Denson, T. F., DeWall, C. N., & Finkel, E. J. (2012). Self-control and aggression. *Current Directions in Psychological Science*, 21(1), 20-25.
- De Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review*, 16(1), 76-99.
- DeWall, C. N., Finkel, E. J., & Denson, T. F. (2011). Self-control inhibits aggression. *Social and Personality Psychology Compass*, 5(7), 458-472.
- Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-control and academic achievement. *Annual Review of Psychology*, 70, 373-399.
- Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics* (Fourth edi). SAGE Publications.
- Forquer, L. M., Camden, A. E., Gabriela, K. M., & Johnson, C. M. (2008). Sleep patterns of college students at a public university. *Journal of American College Health*, 56(5), 563-565.
- Graham, J. D., Martin Ginis, K. A., & Bray, S. R. (2017). Exertion of self-control increases fatigue, reduces task self-efficacy, and impairs performance of resistance exercise. *Sport, Exercise, and Performance Psychology*, 6(1), 70.
- Gailliot, M. T., Plant, E. A., Butz, D. A., & Baumeister, R. F. (2007). Increasing self-regulatory strength can reduce the depleting effect of suppressing stereotypes. *Personality and Social Psychology Bulletin*, 33, 281–294.
doi:10.1177/0146167206296101
- Hagger, M. S. (2010). Sleep, self-regulation, self-control and health. *Stress and Health*, 26(3), 181.
- Hossain, J. L., Ahmad, P., Reinish, L. W., Kayumov, L., Hossain, N. K., & Shapiro, C. M. (2005). Subjective fatigue and subjective sleepiness: two independent consequences of sleep disorders?. *Journal of sleep research*, 14(3), 245-253.
- Jason, L. A., Evans, M., Brown, M., & Porter, N. (2010). What is fatigue? Pathological and nonpathological fatigue. *PM&R*, 2(5), 327-331.
- Kor, K., & Mullan, B. A. (2011). Sleep hygiene behaviours: An application of the theory of

- planned behaviour and the investigation of perceived autonomy support, past behaviour and response inhibition. *Psychology & Health*, 26, 1208-1224.
- Kroese, F. M., Evers, C., Adriaanse, M. A., & de Ridder, D. T. (2016). Bedtime procrastination: A self-regulation perspective on sleep insufficiency in the general population. *Journal of health psychology*, 21(5), 853-862.
- Leung, W. C. (2001). How to design a questionnaire. *BMJ*, 322(Suppl S6).
- Nauts, S., & Kroese, F. M. (2017). The role of self-control in sleep behavior. *Routledge International Handbook of Self-Control in Health and Well-Being*. Abingdon: Routledge, 288-299.
- Noland, H., Price, J. H., Dake, J., & Telljohann, S. K. (2009). Adolescents' sleep behaviors and perceptions of sleep. *Journal of school health*, 79(5), 224-230.
- Martiniuk, A. L., Senserrick, T., Lo, S., Williamson, A., Du, W., Grunstein, R. R., ... & Ivers, R. Q. (2013). Sleep-deprived young drivers and the risk for crash: the DRIVE prospective cohort study. *JAMA pediatrics*, 167(7), 647-655.
- Orzech, K. M., Salafsky, D. B., & Hamilton, L. A. (2011). The state of sleep among college students at a large public university. *Journal of American College Health*, 59(7), 612-619.
- Pilcher, J. J., Ginter, D. R., & Sadowsky, B. (1997). Sleep quality versus sleep quantity: Relationships between sleep and measures of health, well-being and sleepiness in college students. *Journal of Psychosomatic Research*, 42, 583-596.
- Pilcher, J. J., Morris, D. M., Donnelly, J., & Feigl, H. B. (2015). Interactions between sleep habits and self-control. *Frontiers in human neuroscience*, 9, 284.
- Schwartz, J. E., Jandorf, L., & Krupp, L. B. (1993). The measurement of fatigue: a new instrument. *Journal of psychosomatic research*, 37(7), 753-762.
- Simons, J. S., Wills, T. A., Emery, N. N., & Spelman, P. J. (2016). Keep calm and carry on: Maintaining self-control when intoxicated, upset, or depleted. *Cognition and emotion*, 30(8), 1415-1429.
- Steptoe, A., Peacey, V., & Wardle, J. (2006). Sleep duration and health in young adults. *Archives of Internal Medicine*, 166, 1689-1692.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of personality*, 72(2), 271-324.
- Tornquist, M., & Miles, E. (2019). Trait self-control and beliefs about the utility of emotions

- for initiatory and inhibitory self-control. *European Journal of Social Psychology*, 49(6), 1298-1312.
- Tyler, J. M., & Burns, K. C. (2008). After depletion: The replenishment of the self's regulatory resources. *Self and Identity*, 7, 305–321. doi: 10.1080/15298860701799997
- Van Berkel, N., Ferreira, D. & Kostakos, V. (2017). The Experience Sampling Method on Mobile Devices. *ACM Computing Surveys*, 50(6), 1-40.
<https://doi.org/10.1145/3123988>
- Wills, T. A., & Dishion, T. J. (2004). Temperament and adolescent substance use: A transactional analysis of emerging self-control. *Journal of Clinical Child and Adolescent Psychology*, 33, 69–81. doi:10.1207/S15374424JCCP3301_7

Appendix

Appendix A: trait measurement of self-control

13-Item Brief Self-Control Scale (Tagney, Baumeister & Boone, 2004)

1. I am good at resisting temptations
2. I have a hard time breaking bad habits
3. I am lazy
4. I say inappropriate things
5. I do certain things that are bad for me, if I find them fun to do.
6. I refuse things that are bad for me
7. I wish I had more self-discipline
8. People would say that I have iron self-discipline
9. Pleasure and fun sometimes keep me from getting work done.
10. I have trouble concentrating
11. I am able to work effectively toward long-term goals
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.
13. I often act without thinking through all the alternatives.

Appendix B: state measurement of self-control

Baumeister, Wright & Carreon, 2019

Ego-depletion

1. In the past couple of hours have you felt that it's hard to make up your mind about even simple things?
2. In the past couple of hours have you felt that things are bothering you more than they usually would?
3. In the past couple of hours have you felt that you have less mental and emotional energy than you normally have?

Goal-directed self-control

4. In the past couple of hours how easy was it for you to do something "good" that you did not really want to do (e.g. eating healthy food or studying for an exam)?
5. In the past couple of hours, I was able to stick to my goals?

Inhibitory self-control

6. In the past couple of hours, how easy was it for you to refrain from doing something "bad" that you really wanted to do (e.g. snacking or taking a nap)?
7. In the past couple of hours, I was able to resist temptations.

Appendix C: trait measurement of fatigue

1. Exercise brings on my fatigue.
2. I am easily fatigued
3. Fatigue intervenes with my physical functioning.
4. Fatigue causes frequent problems for me.
5. My fatigue prevents sustained physical functioning.
6. Fatigue interferes with carrying out certain duties and responsibilities.
7. Fatigue is hindering in daily life.
8. Fatigue is in the top three things that hinder me in daily functioning.
9. Fatigue intervenes with my work, family, or social life.
10. Fatigue makes me feel mentally/physically bad.
11. Fatigue that I experience now is different in quality or severity that the fatigue I experienced before I developed this condition.

Appendix D: Informing Email for Participants (1 day before start of study)

Dear Participant,

We are more than happy for the time and effort you spend in supporting us with our bachelor thesis study! Before the study starts **tomorrow (!)**, we would like to inform you a bit more about the procedure.

Overall, the study aims to investigate self-control in daily life and how it affects certain aspects of our behaviour. This will be done by collecting data with the help of questionnaires over the next 15 days.

Today, we would therefore like to ask you to download the **Ethica Data** app for your mobile device (available for Android and IOS). You will use this app on a daily basis to answer the questions. In order to take part in our study, it is necessary to create an account. Once you register, you can join our study with the following code: **1739**. Please make sure that you allow the notifications of Ethica, this ensures that you will be reminded to fill out the questionnaires within the setted time.

The study will run for 15 days. **Tomorrow** you will receive the first questionnaires. On the first day, we will start with a so-called “baseline questionnaire”. This kind of questionnaire needs to be filled out at the beginning of the study, after one week and at the end of the study (don't worry - you will be automatically provided with these questionnaires and remembered to fill them out). From the next day onward (day 2 of the study), you will receive notifications via Ethica which will remind you when it is time to fill out the next questionnaire (Please note: is necessarily to allow Ethica to send you notifications on your mobile device)! That will happen three times per day (in the morning, in the afternoon and in the evening). The questionnaires are very shortly and can be completed within approximately 1-2 minutes (Please note: it is important to fill out the questions as soon as possible (latest 1 hour after notification), as otherwise we will not be able to use your data).

Questions?

If you need more information about the study now or in the future, feel free to send an email to s.bagala@student.utwente.nl (if you prefer English or German) or to d.deira@student.utwente.nl (if you prefer Dutch).

Thank you very much for your support!

Jonathan Arzbach, Sarah Bagala, Fabienne Daniel and Donyell Deira

Appendix E: Informed Consent

This study aims at identifying determinants that correlate with self-control. Therefore, multiple constructs will be tested simultaneously, namely fatigue, perfectionism, pro-social behaviour and anxiety. At the beginning of participation, after one week, and at the end, you will be asked to fill in a questionnaire that takes approximately 20 minutes. In between, you are asked to answer a short questionnaire three times a day, over a time span of 15 days.

Your participation in this study is completely voluntary and you can withdraw from it at any time without reason. All data will be treated anonymously and will not be shared with third parties.

If you have any further questions or would like to receive more information about the study, please feel free to contact the researchers; *Donyell Deira*, *Jonathan Arzbach*, *Sarah Bagala*, or *Fabienne Daniel* at:

d.deira@student.utwente.nl

j.arzbach@student.utwente.nl

s.bagala@student.utwente.nl

f.daniel@student.utwente.nl

If you have ethical complains about the study, please contact the Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente:

Email: ethicscommittee-bms@utwente.nl

I understand the statements above and agree to participate in this study

Appendix F: welcome message in *Ethica*

 EDIT

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Consent Materials:

Dear Participant,

Thank you so much for signing up for our study! Before you start, a short introduction will follow. Information about the procedure and duration will be provided.

Overall, the purpose of this study is to measure self-control in daily life and how it affects certain aspects of our behaviour. By using monitoring tools that help us to identify the daily fluctuations of constructs from mental health, we can obtain an insight into their dynamic interactions!

Procedure & Duration

The study will run 15 days. On the first day, we will start with a so-called baseline questionnaire. This kind of questionnaire needs to be filled out at the beginning of the study, after one week and at the end of the study (don't worry you will be automatically provided with these questionnaires and remembered to fill them out). From the next day onward (day 2 of the study), you will receive notifications via Ethica which will remind you when it is time to fill out the next questionnaire (Please note: it is necessary to allow Ethica to send you notifications on your mobile device)! That will happen three times per day (in the morning, in the afternoon and in the evening). The questionnaires are very shortly and can be completed within approximately 2-3 minutes (Please note: it is important to fill out the questions as soon as possible (latest 1 hour after notification), as otherwise we will not be able to use your data).

Questions?

If you need more information about the study now or in the future, feel free to send an email to s.bagala@student.utwente.nl (if you prefer an English or German answer) or to d.deira@student.utwente.nl (if you prefer the Dutch language).

Thank you very much for your support!

Fabienne, Jonathan, Donyell and Sarah