Control Yourself! How are Trait and State Self-Control related to Prosociality in Young Adults?

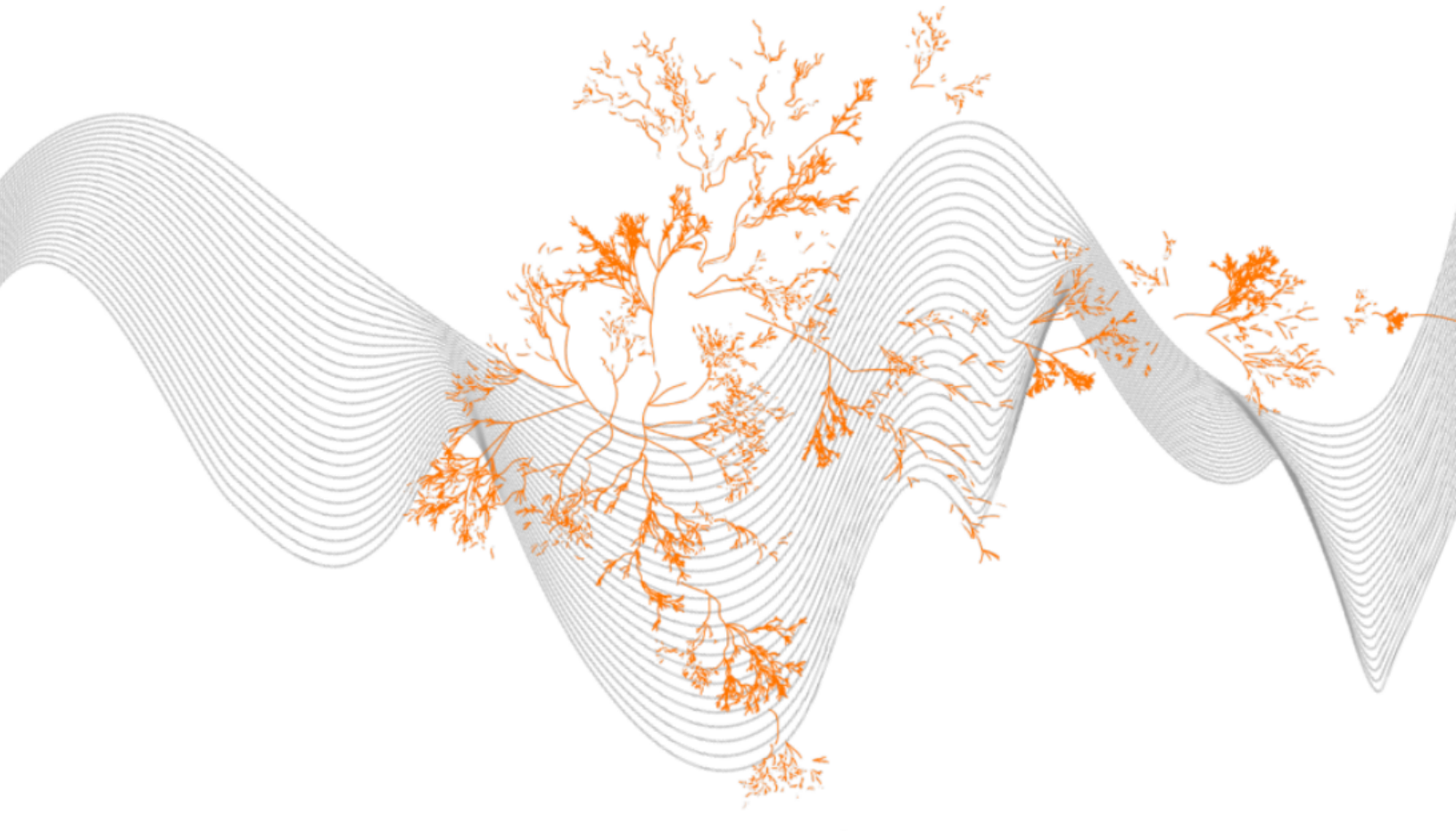
Bachelor's Thesis

Sarah Bagala

6th July, 2021

University of Twente, Enschede (NL)
Faculty of Behavioural, Management, and Social Science
Department of Positive Psychology & Technology

First Supervisor: Dr. Tessa Dekkers Second Supervisor: Dr. Hanneke Kip



Abstract

Background. Prosociality in students is known to bring enormous benefits for both the individual and the larger community. Especially during the Covid-19 pandemic the prosociality of young adults, including students, is asked. Self-control has been found to be positively associated with prosociality on a trait level. Yet, on a state level not much is known about their relationship. **Objective.** The aim of the current study was to investigate the relationship between state self-control and state prosociality. Before, it was assessed if trait and state measurements were associated. Eventually, it was examined if trait or state self-control is the stronger predictor for state prosociality. **Method.** An experience sampling study over 15 days was conducted. An experience sampling study consisting of 35 participants with German (87.9%) or Dutch (9.1%) with an age range of 18 to 26 over 15 days was conducted. The Brief Self-Control Scale and the Prosocialness Scale for Adults were used to measure trait constructs. For the state self-control, state items based on ego depletion and previous literature are used. For state prosociality, items on the basis of broader definitions of prosociality and selfishness (as opposite to prosociality) were created. Linear mixed model analyses were executed to assess both between-person and within-person effects of self-control and prosociality. **Results.** A correlation between trait measurements and their corresponding state measurement was found. Positive associations were found between state self-control and state prosociality on both within-person and between-person levels, whereas the association was higher for the between-person effect. **Conclusion.** This study is the first to investigate the association between state self-control and state prosociality. Next to finding that both state measurements are related and that state prosociality is more dependent on having more self-control in general (between-person) than being self-controlled at a given moment (within-person), the study revealed that state measurements fluctuated over the course of the study. This fluctuation seems to be influenced by external factors rather than by daytime. However, due to the ongoing pandemic both self-control and prosociality may be affected. Therefore, it is recommended to repeat the study after the pandemic. This could also provide insight that both self-control and prosociality of young adults has been affected by the pandemic and accompanying social distancing measures.

Keywords: Self-control, Prosociality, covid-19 pandemic, experience sampling study

Introduction

The variety of prosocial behaviour is enormous. It ranges from helping, sharing, volunteering to taking care and showing empathic concern, as well as obeying the rules of society (Baumeister & Bushman, 2008). In general, prosocial behaviour refers to any act that benefits other people or society as a whole, whereby these acts do not necessarily need to produce direct advantage to the person engaging prosocially (Twenge et al., 2007). A variety of research demonstrates that prosociality might be especially important after adolescence as its outcomes in later life are associated with success in interpersonal relationships (Gilbert et al., 1998) and increased motivation for learning and contributions to the classroom and the larger community (Helliwell & Putnam, 2004). Yet, little investigation has been done on such behaviour in later life, for example, to the author's knowledge not much is known for university students.

The recent pandemic provided a good illustration of the importance of prosociality in students. In the ongoing pandemic, the infectious coronavirus (Covid-19) causes mild to severe respiratory illnesses including death and has quickly spread around the world (Velavan & Meyer, 2020). To prevent the spread of the virus, the practice of social distancing is encouraged. Meaning to stay at home as much as possible and to use online communication instead of in-person contact (Zhang et al., 2020). Young adults have been seen as driving the current spike in infections, therefore politicians urge them to think of the health of elderly by following the social distancing regulations. Thus, the management of Covid-19 requires the resolution of a collective problem involving individuals doing something for others at possible disadvantage of their own interests, such as avoiding social gatherings (Cato et al., 2020). The recent study of Campos-Mercade and colleagues (2021) revealed that prosocial individuals show increased tendencies to follow e.g. social distancing and other pandemic related guidelines, suggesting that "the impact of policies on a population may depend on the degree of prosociality" (Campos-Mercade et al., 2021, p. 1).

Prosociality has been associated with a range of positive psychosocial outcomes such as increased interaction skills, increased levels of empathy as well as with harmony and cooperation in societies (Eisenberg et al., 2006). Yet people do not always choose to engage prosocially (DeWall et al., 2008). This raises an important question: if there are so many desirable outcomes,

then why do people not always engage in prosocial behaviours? DeWall and colleagues (2008) suggest that acts of prosocial nature might be related to the associated cost, such as the amount of energy, time, or other resources an individual spends. Prior research demonstrates that individuals may experience a conflict between acting in their own interest versus in the interest of others. Every day, people face conflicts between the temptation to act selfishly and the need to benefit others (Schmidt-Barad & Uziel, 2020). Therefore, to benefit others might require overcoming a human's natural impulse of selfishness (DeWall et al., 2008). To do so, people may require advanced psychological processes, such as self-control (DeWall et al., 2008; Martinsson et al., 2012).

Self-Control and Prosociality

Self-control refers to the capacity to alter and regulate one's own responses to inhibit undesirable behaviours to bring them into line with desirable long-term goals, such as behaving prosocially toward others (Baumeister et al., 2007; DeWall et al., 2008). Insufficient self-control is related to behavioural and impulse-problems, and the majority of social and personal problems (Baumeister et al., 1994; Gailliot et al., 2012). Baumeister and colleagues (2006) even argued that self-control seems to be essential to enabling the human species peaceful coexistence, again focusing on the relationship with prosociality. However, not much is studied about this association.

Specifically, previous research has not considered self-control in relation to prosociality on a state and trait level. When studying self-control, it seems important to not only study trait self-control in the traditional and predominant way of studying it via questionnaires. Instead, it should be considered to also study state self-control as overcoming selfish impulses and acting prosocially seem to be dependent on both dispositional and situational factors (Batson & Powell, 2003; Batson 2012; Graziano et al., 2007).

On a dispositional level, trait self-control can be seen as part of personality that is stable over time (Cheung et al., 2014). Commonly, the lack of trait self-control is associated with underachievement in social, personal, and educational settings (Baumeister et al., 1994; Tangney et al., 2004). In contrast, high levels of trait self-control predict higher academic achievements and mental health (Finkel & Campbell, 2001; Mischel et al., 1988). To achieve these outcomes, a long-term effort is required, which enables the individual to restate temptations and impulses

(Imhoff et al., 2014). However, as it was initially suggested that individual differences in trait self-control could explain differences in goal-oriented behaviour, it was discovered that there were situational differences as well. Thereby, situational differences may have a stronger impact on resistance and behavioural enactment and self-control on a dispositional level seem to have more influence on desire strength and conflict (Hofman et al., 2012). Thus, it seems to be important to also include situational differences when conceptualizing self-control.

The idea behind the consideration of situational and external factors is related to the concept of state self-control. This means that besides varying across individuals, self-control can also fluctuate across time and the context (Baumeister & Heatherton, 1996). Further, it is suggested that state self-control is sensitive to situational factors, such as previous attempts at self-control which is the central assumption of the strength model of self-control (Baumeister & Heatherton, 1996).

According to the strength model, state self-control relies on a limited resource that is depleted by repeated exertions. The state of reduced self-control capacities has been termed ego depletion (Baumeister et al., 1998). Like a muscle that gets tired of prior exertion, any acts of self-control may cause impaired performances in self-control, even on unrelated tasks (Baumeister et al., 1998; Muraven et al., 1998). Outside of the laboratory, Hofmann and colleagues (2012) measured peoples' desires and their regulation of everyday life within an experience sampling study. Thereby, data from self-reports have been collected twice per day over one week. To demonstrate resource-depletion effects over the day, it was examined how often participants had to withstand a desire on the same day. The results demonstrated that the more participants had resisted an earlier desire, the less successful they were to withstand later desires. Subsequently, it was suggested that self-control capacities decrease throughout the day as a result of all prior acts of self-regulatory acts (Hofmann et al., 2012).

Vohs and colleagues (2005) declared that depleted state self-control may lead to impairments in interpersonal functioning. This assumption was later demonstrated in an empirical research of DeWall and colleagues (2008), in which three experiments were conducted to measure self-control and its association to prosocial acts. In each of them, participants started with either completing a self-control task or a task that did not involve self-control. Later, they reported their willingness to help in response to hypothetical scenarios. Results showed that helping seemed to require self-control to overcome the conflict between selfish and prosocial

intentions. Thus, the depleted energy (due to the self-control task beforehand), reduced prosocial acts (DeWall et al., 2008). Additionally, recent studies suggest that ego-depletion influences behaviour "by reducing one's ability or motivation to overcome egoistic desires when helping others comes at a cost to the self" (Osgood & Muraven, 2015, p.68). Therefore, both trait and state self-control seem to correlate with prosociality.

A large variety of studies have demonstrated various benefits of self-control for prosociality. Yet, these studies have been mostly conducted in a laboratory setting, even though the link to interpersonal activities might be more frequent and important in everyday life. While some trait measurements have been examined outside the laboratory, state fluctuations of self-control have been mainly investigated by self-reports of ego depletion. As such measurement instruments are usually characterized by a retrospective data collection, recall biases are very likely to occur (Van Berkel et al., 2018). Additionally, self-reports might be endangered to include response bias or self-deception patterns that cause people to report high self-control in terms of social desirability and adjustment (Smith, 2001; Tangney et al., 2004).

Nowadays, a novel methodology is available to gain more insight into the relationship between daily life and psychological constructs, including self-control. This is the Experience Sampling Method (ESM), which measures behaviour, thoughts, and feelings of participants throughout the course of the day within everyday activities. Here, participants are requested to provide self-reports on their activities and emotions multiple times per day (Van Berkel et al., 2017), which enables the evaluation of common experiences of situations (Csikszenmihalyi, 2014).

Prior research on self-control with ESM has been done by Baumeister, Right and Carreon (2019) to investigate self-control in everyday life. Their conceptualization of state self-control included ego-depleting events (restraining self, effortful decisions, and pushing self to do unwanted tasks) and feelings of depletion (emotional overreactions, difficulty making up mind, less mental energy). The results linked both low trait self-control and depletion to responding automatically, hurrying and rushing, stress, and lowered concentration. Overall, these results suggest that individuals low in both domains of self-control seem to have more frequent interpersonal conflicts (Baumeister et al., 2019). As interpersonal success and harmonious relationships are associated with prosocial behaviour (Gilbert et al., 1998), it might be essential to investigate further on the relation between self-control and prosociality.

The Current Research

Instead of conceptualizing self-control as a stable personality trait only, the current study focuses on both trait and state self-control. To enrich the laboratory research that has mainly focused on task performances to manipulate and measure state self-control as ego depletion, ESM is introduced to enable the investigation of self-control in daily life. The aim is to obtain a broader insight of how self-control fluctuates over time and how these fluctuations correlate with prosociality in young adults, which may be specifically relevant to successfully managing the COVID-19 pandemic. Firstly, the question arose if state and trait self-control are related to each other. On a state level, the question if individuals show less prosociality when they feel depleted was considered. Finally, it was asked what makes a person more prosocial: being self-controlled in general or feeling less depleted.

Research Question 1

To what extent are state and trait self-control related to each other?

Research Question 2

What is the effect of low state self-control at a given moment on state prosociality at the same moment?

Research Question 3

What is a more significant predictor for state prosociality: state or trait self-control?

Research Question 4

How does ego depletion affect state prosociality?

Methods

Design

The study was part of a larger study investigating self-control in daily life and its influence on human behaviour, including perfectionism, fatigue, anxiety, and prosociality. This bachelor thesis, however, focuses solely on the construct of prosociality and therefore only includes material that is relevant to it.

As mentioned earlier, the current study made use of ESM to measure state self-control and state prosociality. ESM is an organized, self-reported diary method created to aim at measuring behaviour and moods of participants throughout the course of the day (Myin-Germeys

et al, 2018). Therefore, participants are requested to provide self-reports on their activities and emotions multiple times per day (Van Berkel et al., 2017). Furthermore, the application of ESM tends to decrease memory biases by providing the possibility to measure states immediately after and while a direct experience (Kuppens et al., 2010). Subsequently, it seems to demonstrate strong ecological validity (Versluis et al., 2018) and supports more frequent data capture (Van Berkel, 2018). As data of ESM is collected during daily life experiences in the participants' natural environment, the researcher is provided with a "more accurate representation of the participants' natural behaviour", in comparison to the artificial laboratory environment for self-control and prosociality (Van Berkel et al., 2017).

A time-contingent design in the form of a daily state questionnaire for self-control and prosocial behaviour was adopted over a period of 15 days (see Table 1). The duration was chosen on the basis of Van Berkel and colleagues' (2017) literature review on usage of ESM on mobile devices which advocates a two-week time period as suitable to acquire a representative varied experience sample. This enabled us to investigate if participants' feelings and state might be dependent on the day of the week, especially the differences between weekdays and weekends. On day 1, participants received a baseline questionnaire in which they were asked to confirm the informed consent and fill out the demographics. On day 2, day 8 and day 15 they were provided with a questionnaire asking about their self-control and prosociality on a dispositional level. From day 2 onwards until the end of the study, additionally they were provided with three daily questionnaires measuring state self-control and state prosociality. The three daily measurements took place randomly within different time intervals in the morning, afternoon and evening. In case of a 100% response rate, this would result in a total number of 45 data points for each state measurement.

The study was approved by the Ethics committee of the University of Twente with the approval number 210672. Data collection took place from 26th April 2021 until the 12th May 2021. Data collection was administered by using an online survey environment created in the mobile application Ethica.

Table 1

Overview of ESM timeline

Time	*1 Day Before Study Start*	*Day 1 Intake Questionnaire*	*Day 2 t/m 15 State Questionnairess*	*Day 2, 8, and 15 Trait Questionnaires*
Morning (9-11 a.m)			1. State Self-Control 2. State Prosociality	
Afternoon (1-3 p.m.)	Welcome Email with Registration Code for Ethica	Informed Consent and Demographics	1. State Self-Control 2. State Prosociality	1. Brief Self-Control Scale 2. Prosocialness Scale for Adults
Evening (8-10 p.m.)			1. State Self-Control 2. State Prosociality	

Participants

The target group of the study were university students. Correspondingly, the study consists of a sample of 61 university students. The participants consisted of the researchers' social contacts and were approached through the usage of convenience sampling and snowball sampling to find additional potential participants. Criteria for inclusion were the age of 18 years or older, being registered as a student, and having a mobile device with iOS or Android to download and use Ethica. Data was only included when a response rate of 50% or higher was reached, as this is the suitable threshold for ESM according to Connor and Lehman (2012). In this study, 22 participants were excluded as they did not confirm the informed consent. Four additional participants were excluded as they were not students, leading to a final sample size of 35. The age range of the participants was between 18 and 26 (M_{age} = 22, SD_{age}= 1.64). Out of the 35 participants, 21 described themselves as female and 12 stated to be male. Furthermore, three participants were Dutch (9.1%), 31 were German (87.9%), and one person (3%) had another nationality. Overall, 6.1% of the participants indicated "HAVO/ High School", 72.7% "VWO/ Gymnasium" and 21.2% "Bachelor's degree" as the highest educational level. Out of this sample, 60.6% were psychology students.

Measurements and Materials

An online survey was created by using the application Ethica. To assess trait self-control, the Brief Self-Control Scale (Tangney et al., 2004) was used (see Appendix A). As so far, there is "extraordinary diversity in how the construct of self-control is operationalized in research studies", another dimension of trait self-control was included namely inhibitory control (Duckworth & Kern, 2011, p 259). Additionally, trait prosociality was measured with the Prosocialness Scale for Adults (Caprara et al., 2005) (see Appendix A). For state self-control, the 3-item State Self-Control Scale (Baumeister et al., 2019) and two items related to goal-directed self-control as well as two items based on inhibitory self-control were used. To measure state prosocialness, two items were self-created based on empirical conceptualizations of prosocial behaviour and selfishness (Baumeister & Bushman, 2008; Martinsson et al., 2012) (see Table 2).

Brief Self Control Scale (BSCS)

To measure trait self-control, this study uses the BSCS, which assesses one's degree of self-control based on thirteen different items (see Appendix A). It is measured on a 5-point Likert-Scale ranging from 1 (*not at all*) to 5 (*very much*) (Tangey et al., 2004). Example items include "I am good at resisting temptation" and "I have a hard time breaking bad habits" (reverse coded). By that, it covers subdomains of self-control, such as task performance, impulse control, and interpersonal relationships. The BSCS was selected because it is a widely used and well validated measure of self-control to the point that the longer version has become almost obsolete (Duckworth & Kern, 2011). According to more than 100 empirical studies on different target groups, the BSCS has demonstrated an overall scale score for predicting different behavioural outcomes (Baay et al., 2014; De Ridder et al., 2012). Further, its length is beneficial for ESM as participants have to fill in multiple questionnaires per day in this research, an excessive amount of questions would result in a lowered participant engagement and would decrease adherence (Van Berkel et al., 2017). Moreover, suitable internal consistency for this survey was found (α = .83) (Tangey et al., 2004). Similar findings for this instrument were made in the current study (α = .89). For the test-retest reliability the scale scored high as well (r = .87), so it is appropriate for this study, which collected trait data at three different times (Tangey et al., 2004).

Prosocialness Scale for Adults (PSA)

The PSA is a self-report 16-item scale for assessing individual differences in adult prosocialness on a 5-point Likert scale ranging from 0 (*almost never true*) to 4 (*almost always true*) (see Appendix A). Items included taking care of, (i.e. "I am pleased to help my colleagues in their activities"), sharing (such as in "I easily share with friends any good opportunity that comes to me"), voluntary activities (i.e. "I am available for volunteer activities to help those who are in need" as well as empathic concern for others (see "I intensely feel what others feel"). Higher total score indicates better prosociality. The items demonstrated robust psychometric properties, with an excellent internal consistency ($\alpha = .91$). Likewise, in the current study a Cronbach's alpha of .83 was found. Researchers have also found a moderately high correlation ($r = .54$) between self- and other-ratings on this prosociality scale, further supporting its validity (Caprara et al., 2012).

Daily Questionnaires

State Self-Control: To assess state self-control, seven items were used. To measure ego-depletion the 3-item State Self-Control Scale (SSCS) was used (Baumeister et al., 2019) (see Table 2). The questions could be answered on a 5-point Likert-Scale, ranging from 0 (*not at all*) to 4 (*very much*). Item 4 to 7 were designed to measure the concepts of goal-directed and inhibitory self-control. The items were formulated based on research of Simons and colleagues (2016) and Tornquist and Miles (2019). Item 4 and 5 concern self-control goal-directness, whereas 6 and 7 measured the inhibitory aspect of self-control (see Table 2). As well, these questions could be given answers based on a 5-point Likert-Scale, ranging from 0 (*not at all*) to 4 (*very much*).

State Prosociality: As it was assumed that selfishness seems to be on the other side of a continua compared with prosociality (Batson & Powell, 2003; Martinsson et al., 2012), the first item measured reversed prosociality based on a definition of selfishness. Thus, item 1 measures selfishness as the opposite to prosociality, which is why it was reversed for later data analysis (see Table 2). The other item is based on a broader definition of prosocialness (see Baumeister & Bushman, 2008) and asked if the participant recently engaged in any kind of prosocial behaviour (see Table 2). The items could be answered with a 5-point likert scale from 0 (*not at all)* to 5 (*very much)*. Moreover, for the prosocial item there was the option to indicate "I did not have the opportunity to do so" in order to not misinterpret scores as not prosocial when in reality, the

individual just did not have a chance to behave prosocial. However, a note was added stating that in order to act prosocial no direct or physical contact with others is necessary but that prosocial behavior could also include showing empathic concern for others or following society's rules to promote public welfare. All state questions were prefaced with the stem "In the past couple of hours, have you felt that …" to gather a momentary snapshot of the different states.

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. It allows the researchers to obtain and view the data of the participant in real-time, allowing them to identify possible errors while the study is still running. Further, it amplifies ecological validity, possibilities and reliability of data collection (Van Berkel et al., 2017). At the same time, Ethica is used by participants to complete the surveys using any form of digital devices (see Appendix C). It reduced the strain on participants, as they no longer have to worry about carrying additional study related material. The trigger logistics is a fundamental element of ESM (Lathia et al., 2013) which reduces the participants' burden by reminding them to fill out the survey (Chang et al., 2015) (see Appendix C).

Table 2

Items for state questionnaires

Construct		Item
Self-Control	Ego Depletion	1. "In the past couple of hours, have you felt that it is 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)?"
		5. "In the past couple of hours, were you able to stick to

		your goals?"
	Inhibitory Self-Control	6. "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)?"
		7. "In the past couple of hours, were you able to resist temptations?"
Prosociality	Selfishness	8. "In the past couple of hours, were you concerned extremely for your own advantage, pleasure, or welfare, regardless of the consideration for other people?"*
	Prosocial Behaviour	9. "In the past couple of hours, to what extent did you benefit others e.g. helping, sharing or taking care of others, or did you feel empathic concern for others?"

*Note.**Items with reversed scoring

Procedure

The study took place over the course of 15 days in total. An overview of the 15 day study is provided in Table 1. Before the study started, participants were informed about the purpose, the overall procedure and duration of the study via email. Moreover, they were asked to download Ethica on their mobile devices and to create an account for the application. Once registered, they were asked to join the study by entering the study code which was provided to them in the email and to allow Ethia to send them notifications. The study on Ethica and all incorporated functions like clarity of user interface, notifications, functionality of surveys and response functionality were repeatedly tested and adapted by the researchers before the studies' deployment.

Day 1

On day 1, all participants joined the study voluntarily by accepting the informed consent. At the same time, the participants were provided with the first survey asking about their demographic information (see Appendix C). A set notification reminded the participants to fill out the first questionnaire.

Day 2 t/m 15

From the second day onwards, three daily state questionnaires were sent. Ethica's trigger logistic reminded participants to answer these in fixed time-slots. The first notification appeared

in the morning between 9 and 11 a.m., in the afternoon between 1 and 3 p.m. and in the evening between 8 and 10 p.m.. When exactly a participant received the notification was randomly assigned by Ethica itself. After 30 minutes, a notification was sent to remind participants to fill in their responses. Participants were only able to answer the questionnaire during the corresponding time slots which ensured that the data entailed missing measures rather than a sequential depiction of all obtained measurements. Further, it ensured to obtain a snapshot of the current emotional state that is as accurate as possible.

Day 2, 8, and 15

To obtain trait measurements, on day 2, 8 and 15 additional measures to assess trait self-control, as well as trait prosociality, perfectionism, fatigue and anxiety took place. The trait measurements were conducted three times to obtain information if these indeed were stable over time. After the participants completed a survey, they were provided with a positive message in which the researchers continuously thanked them for their participation. This aimed at increasing and maintaining high response rates and a positive attitude towards the study in general.

Data Analysis

The data were analyzed using IBM SPSS Statistics (Version 26). The answers of the different questionnaires were exported from Ethica to SPSS and merged to one single dataset. As the design of this investigation resulted in numerous measurements from multiple participants each, the average mean per person (PM) was calculated. This allowed the investigation of a between-person analysis by comparing the data from trait and state measurements (Curran & Bauer, 2011). Thereby, the PM was used to look at the between-person effect (trait-like association). The Person mean-centred (PMC) was calculated by subtracting the state scores from their PM to assess the within-person effects, which indicates the state-like association.

To determine the internal consistency of the trait measurements, Crombach's alpha was calculated. To interpret Crombach's alpha, the recommendations of Field (2013) were used. Accordingly, an $\alpha > .5$ is deemed as acceptable, $\alpha > .6$ is considered as good, and $\alpha > .7$ is interpreted as excellent. Further, to examine the validity of the state questionnaires items, the Pearson correlation between trait and their corresponding state measurements was conducted. Moreover, the correlation of both trait measurements for each other was examined. Interpretation

of effect size was based on Cohen's correlation coefficient (r), whereas r>.5 suggests a strong correlation, r.>.3 a moderate, and r>.1 a weak correlation (Cohen, 2013).

To explore the associations between self-control and prosociality, visualizations were made. First, a graph was created to illustrate the average mean scores of trait self-control and trait prosociality sorted from low to high on trait self-control. This aimed to investigate the association of the mean levels between both trait measurements. A similar graph was generated for the state measurements of self-control and prosociality. Moreover, for a selection of two individual participants graphs for levels of state self-control and state prosociality per measurement point over the course of the study was made. These allowed the investigation of the fluctuation of the constructs over time on an individual level. An additional individual analysis was illustrated in a graph, to assess the fluctuation of ego depletion in addition to state self-control and state prosociality per measurement point. As ego depletion refers to the phenomenon that initial exertion of self-control decreases later self-control performance, it was expected that ego depletion scores would decrease over the time of the day as during the day an individual has to resist various temptations (Tangney et al., 2004).

Multiple Linear Mixed Models (LMM) were conducted to analyse the data of the ESM study. To obtain Estimated Marginal means (EM means) for repeated state measurements per person and measurement point, a first-order autoregressive (AR1) structure was utilized. The mean values gathered by LMM took missing data into account by providing estimated and continuous data referred to as marginal means for the repeated measurements of state self-control and state prosociality per person and per time point.

Prior to all LMM analyses, the variables were standardized. The first LMM was conducted to investigate the association between trait and state self-control. Accordingly, for the first LMM, state self-control was set as the dependent variable. The fixed and independent factor was specified to be trait self-control. Another LMM was conducted to explore the association between state self-control and state prosociality as well as to separate between-person and within-person associations. In this case, state prosociality (PM) was set as being dependent on the fixed and independent factor of state self-control. Both state self-control PM (between-person) and state self-control PMC (within-person) were set as the fixed independent variable to examine which of both shows stronger correlations with the dependent variable. In addition, to differentiate the effects of overall state self-control and ego depletion specifically on state

prosociality, a LMM was created to investigate the within- and between-person effects of ego depletion on state prosociality. In this case, ego depletion was set as the dependent variable.

Results

Descriptive Statistics

Of the 61 participants, 35 provided data that was valid for the analysis. No exclusion due to insufficient data points was needed. The conduction of the little's MCAR test revealed that the data was missing completely at random, $\chi 2 = 5.51$, $p = .06$. Subsequently, no clear pattern of missing values was identified across the missing values and the measurement timepoints. Both the BSCS and PSA showed excellent reliability with a Cronbach's alpha of .89 for the BSCS and a .83 for PSA.

Table 3 provides an overview of the means (M), minimum and maximum scores and the standard deviation (SD) of self-control and prosociality for both state and trait measurements. Trait scores are based on the results of the BSCS and the PSA, whereas state scores are displayed by the PM of the state constructs. Overall, participants scored higher on the prosociality scales than on the self-control scales. However, the difference is more pronounced for trait measurements than it is for state measurements.

Table 3

Means (M), Minimum, Maximum Scores and Standard Deviations (SD) of all Trait and State Measurements

Variables	Minimum (Scale Minimum)	Maximum (Scale Maximum)	M	SD
Trait Self-Control (BSCS)	1.02 (0)	2.67 (4)	1.76	0.46
Trait Prosociality (PSA)	2.47 (0)	3.41 (4)	2.97	0.88
State Self-Control (PM)	1.64 (0)	3.56 (4)	2.39	0.84
State Prosociality (PM)	1.69 (0)	3.80 (4)	2.80	0.86

Note. Trait Self-Control displaying the scores on the Brief Self-Control Scale (BSCS), Trait Prosociality displaying the scores on the Prosocialness Scale for Adults (PSA), and State Self-Control and State Prosociality displaying their Person Mean (PM) Scores.

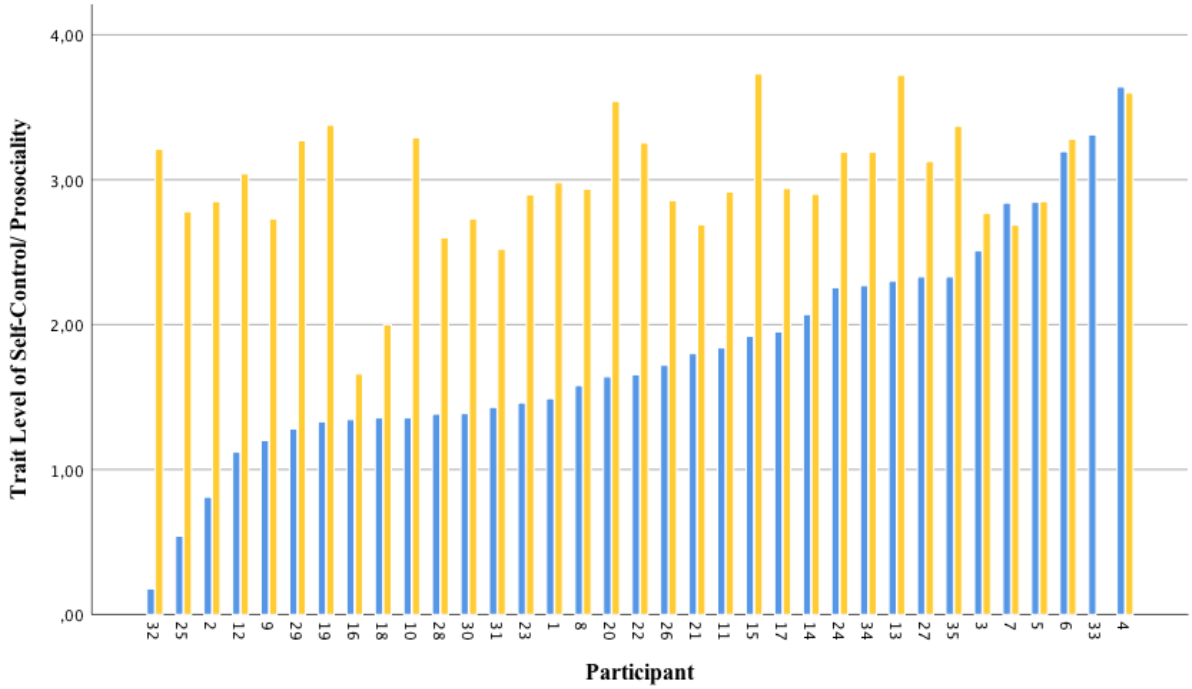
Visual analyses

Association on the Mean Levels between Trait Self-Control and Trait Prosociality

Figure 1 depicts the average trait levels of self-control and prosociality for each participant measured as average mean scores of the BSCS and of the PSA. The participants are sorted ascending from low to high on trait self-control. If there would be a strong correlation between trait self-control and trait prosociality, it would be expected that the scores of the PSA would also increase as the scores of BSCS increase. As this does not seem to be the case here, they seem to be less closely associated. Participant 32 scores lowest on the BSCS (M=0.18), whereas participant 4 scores highest (M=3.56). Overall, participants scored higher on the PSA than they did on the BSCS (see Figure 1). In addition, the variation between participants for trait self-control is almost double as high as it is for trait prosociality (see Table 1). (M=.18), whereas participant 4 scores highest (M=3.56). Overall, participants scored higher on the PSA than they did on the BSCS (see Figure 1). In addition, the variation between participants for trait self-control is almost double as high as it is for trait prosociality (see Table 1).

Figure 1

Trait Self-Control (in Blue) and Trait Prosociality (in Yellow) Sorted from Low to High on Trait Self-Control



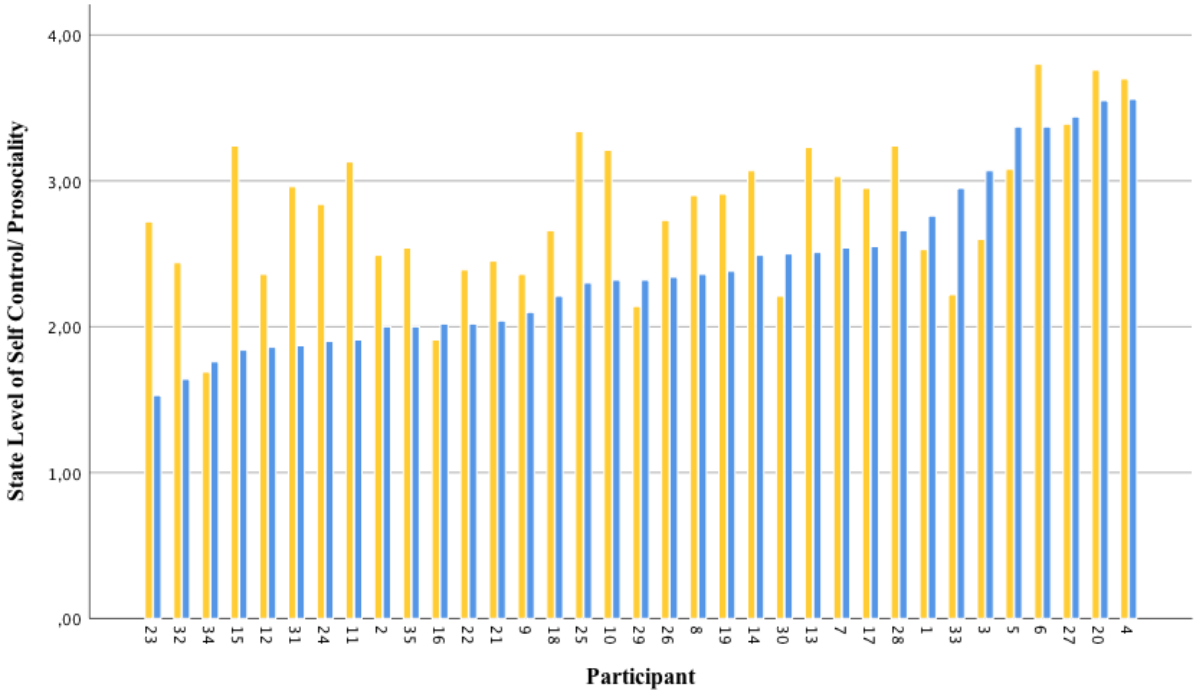
Note. Trait self-control refers to the average mean score on the Brief Self-Control Scale and trait prosociality refers to the average mean score on the Prosocialness Scale for Adults.

Association on the Mean Levels between State Self-Control and State Prosociality

The PM scores for both state measurements were used to provide an overview of the average scores of daily self-control and prosociality. Likewise, participants were sorted from low to high on state self-control. Similar findings as for trait measurements were demonstrated for the state measurements (see Figure 2). Again, state prosociality did not show a clear pattern of increasing as scores of state self-control increased. This implies that state self-control and state prosociality may also not be correlated. Participant 23 had the lowest PM score on self-control (M=1.18), followed by participant 32 who scored also lowest on trait self-control. Participant 4, who demonstrated the highest levels of trait self-control, also had the highest score of state self-control (see Figure 2).

Figure 2

Person Mean Scores of State Self-Control (in Blue) and Person Mean Scores of State Prosociality (in Yellow) per Participant Sort from Low to High on Person Mean Score of State Self-Control



Individual Case Analysis

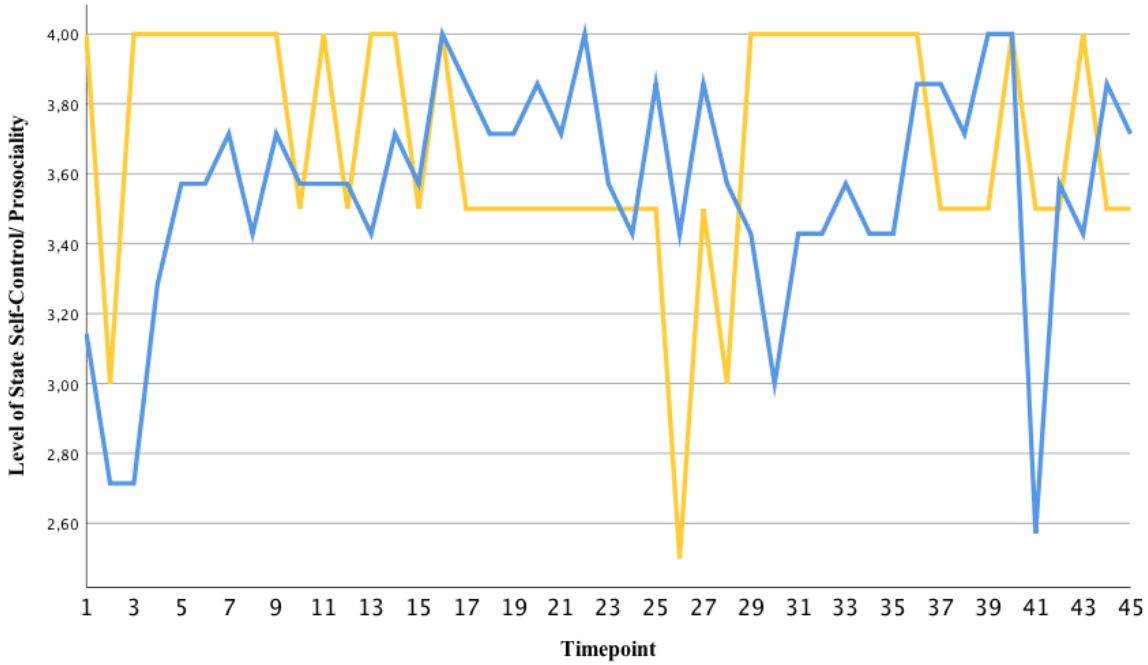
To obtain a more precise overview of the daily fluctuations of state self-control and state prosociality over time, two participants were selected as examples for a further examination of fluctuations over time on an individual level. To examine whether fluctuations differ between people with high or low in trait self-control, one participant with low scores on trait self-control and one participant with a rather high score on trait self-control were selected for analysis. The measurement time point 1 is Wednesday morning on the first day of the study and subsequently measurement point 45 is on Wednesday evening, which represents day 15 and at the same time the last day of the study.

The first example is participant 4, who had the highest trait self-control score of all subjects (see Figure 1). Participant 4 showed high state self-control on average (M= 3.56, SD = 0.33, min = 2.5, max = 4.0). Likewise, the participant showed a high average score on state prosociality (M=3.7, SD= 0.34, min = 2.5, max = 4.0) A visual representation of the pattern of the participant's state self-control and state prosociality is demonstrated in Figure 3. In general, both state self-control and state prosociality showed variation over the course of 15 days. However, no clear pattern of relation becomes apparent among state self-control and state

prosociality indicating that both variables seem to fluctuate independently from each other over the course of the study (see Figure 3).

Figure 3

State Self-Control (in Blue) and State Prosociality (in Yellow) per Measurement of Individual with High Trait Self-Control (Participant 4)



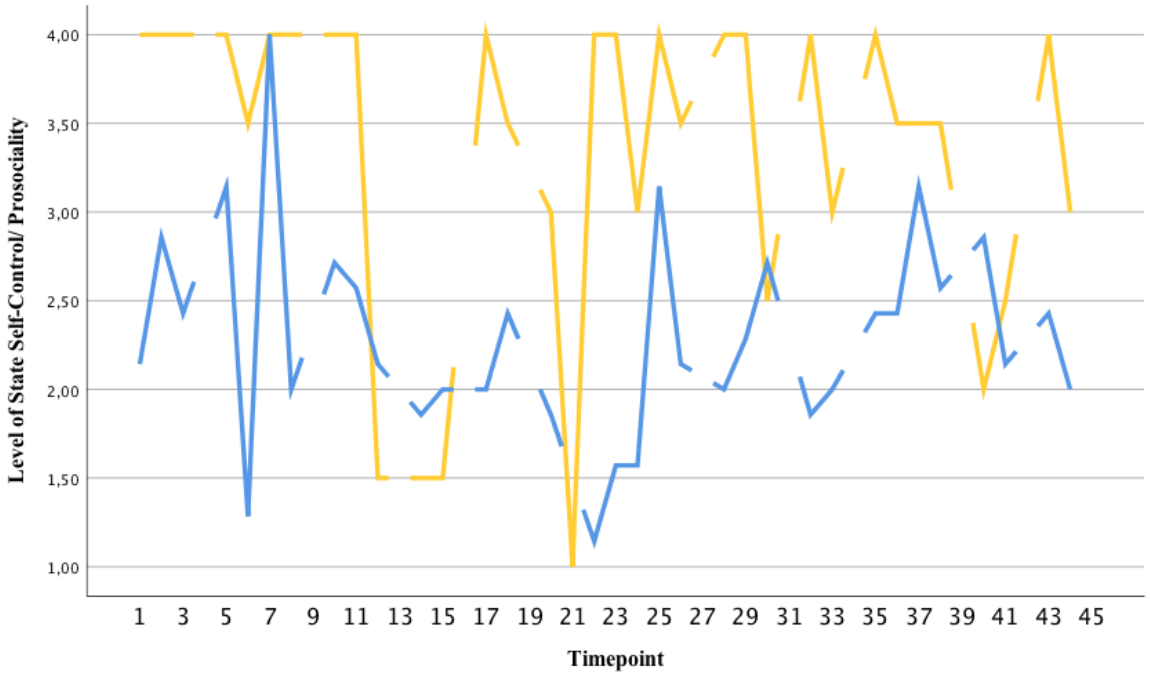
Note. Participant 4 scored the highest on the Brief Self Control Scale (Trait Self-Control) (M=3.56). Time point 1 displays study start (Day 1, Wednesday morning) and time point 45 refers to the study end (Day 15, Wednesday evening).

The second example is participant 32, who demonstrated the lowest scores in trait self-control (see Figure 1). In Figure 4, the patterns' of state self-control and state prosociality over the course of 15 days are displayed. Similar as for participant 4, the magnitude in change appears in both variables with no clear pattern of relationship among them. Again, this means that both constructs seem to fluctuate independently from each other over the course of the study (see Figure 4). Participant 32 indicated moderate levels of state self-control (M=1.64, SD=0.96) and of state prosociality (M=2.44, SD=1.2). It can be noted that with a minimum of 1.2 and a maximum of 4 in state self-control and a minimum score of 1.0 to a maximum score of 4.0 in

state prosociality, participant 32 generally showed higher fluctuations within the state measurements than participant 4 had (see Figure 4).

Figure 4

State Self-Control (in Blue) and State Prosociality (in Yellow) per Measurement of Individual with Low Trait Self-Control (Participant 32)

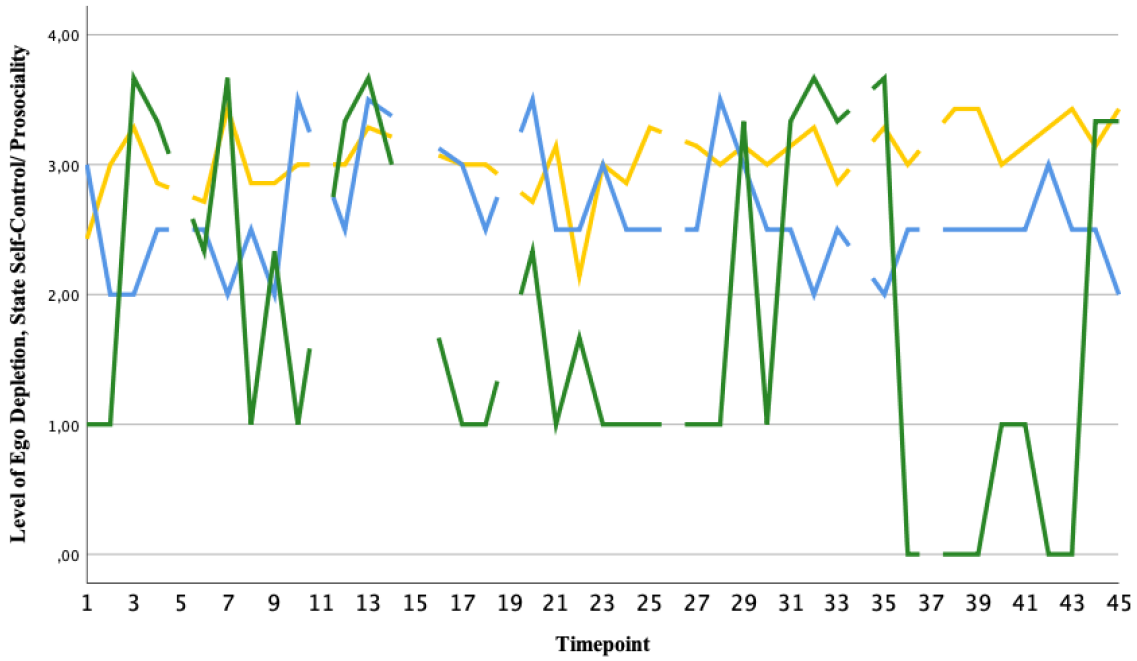


Note. Participant 32 scored the lowest on the Brief Self Control Scale (Trait Self-Control) (M=1.18). Time point 1 displays study start (Day 1, Wednesday morning) and time point 45 displays study end (Day 15, Wednesday evening). Time points 3, 8, 16, 19, 23, 34, 35, 36, 37, 41, 42 and 45 are missing; the participant did not fill out the survey during those sessions.

Finally, participant 3 with average mean scores in trait self-control was chosen to investigate the level of fluctuation of ego depletion within a person. Similar to the two other constructs, ego depletion as well fluctuations over the course of the study. No patterns between ego depletion and time points, neither between ego depletion and state prosociality was detected (see Figure 5). To a certain extent, ego depletion followed a contrary course as state self-control. No clear ego depleting effect was demonstrated as fluctuations appeared random, without any time pattern.

Figure 5

Ego Depletion (in Green), State Self-Control (in Blue) and State Prosociality (in Yellow) of Participant 3 per Measurement



Note. Participant 3 had a mean score of 2.51 on the Brief Self-Control Scale. Time point 1 displays study start (Day 1, Wednesday morning) and time point 45 displays study end (Day 15, Wednesday evening). Time points 5, 13, 16, 23, 31 and 34 are missing; the participant did not fill out the survey during those sessions.

Correlations

Trait self-control and state self-control show a significant and moderate positive correlation (r=.42, p<.001). This means that individuals who scored higher on trait self-control are also more likely to score high on state self-control. Further, it indicates the validity of the state measurements as counterparts for the trait measurements. The association between trait prosociality and state prosociality was significant as well, yet only a weak positive correlation was demonstrated (r=.28, p=.00). Again, this means that those who score high on trait prosociality tend to score as well high on state prosociality. Eventually, trait prosociality and trait self-control demonstrated a significant but weak positive correlation (r=.29, p<.001).

Linear Mixed Models

Association between Trait and State Self-Control and Trait and State Prosociality

Two LLM analyses were conducted to obtain the associations between trait self-control and state self-control as well as for trait prosociality and state prosociality. Prior to the analysis, all variables were standardized. For the first analysis, trait self-control was used as an independent variable for state self-control (PM). The results showed that trait self-control has a significant positive association with state self-control (PM), (β_{pm}=.44, p <.001, 95% CI [.404, .469]). Likewise, using trait prosociality as the independent factor for state prosociality (PM), trait prosociality showed a significant positive association with state prosociality (PM), (β_{pm}= .46, p <.001, 95% CI [.321, .608]). This means that individuals who show higher levels of self-control on a dispositional level, tend to be more self-controlled at a certain moment. Likewise, participants who possess more trait prosociality, also are more prosocial at a given moment.

Between- and Within-Person Associations between Self-Control and Prosociality

Moreover, a LMM analysis was examined to obtain the associations between both state self-control and state prosociality over time as well as to disaggregate between-person effect (trait-like association) and within-person effects (state-like association) in the between both variables. The trait association was conducted by using the PM of state self-control, whereas the state association was obtained using the PMC of state self-control. This made it possible to investigate what makes individuals more prosocial at a given moment: being self-controlled in general (PM) or feeling less self-controlled (PMC). Before running the analysis, the scores were standardized. Using state prosociality as a dependent variable, both state self-control (PM) and state self-control (PMC) showed a positive association with state prosociality. This means that both being self-controlled in general and feeling less depleted are positive predictors for showing prosocial tendencies at a given moment. However, the trait association of self-control (PM) showed a significantly stronger positive prediction of being prosocial at a given moment (β_{pm}=.32, p<.001, 95% CI [.256, .387]) than the state association of self-control does (PMC) (β_{pmc}=.14, p<.001, 95% CI [.083, .187]).

Between- and Within-Person Associations between Ego Depletion and Prosociality

A final LMM analysis was conducted by treating ego depletion as a separate domain of state self-control and to investigate its association to prosociality. Hereby, items 1-3 of state self-control were used but not recoded. Using state prosociality again as a dependent variable,ego depletion (PM) (β_{pm}=-.15, p<.001, 95% CI [-.218, -.090]) showed a weak and negative association to state prosociality. Ego depletion (PMC) (β_{pmc}=.01, p<.001, 95% CI [-.031, .057]) did not show a clear association to prosociality.

Discussion

The purpose of this study was to investigate the association between young adults' self-control and prosociality, which relation became particularly important in the current Covid-19 pandemic, in which prosociality of young adults is highly asked. In addition, the study aimed to gain a better insight into the relationship between state self-control and state prosociality in young adults and how these state measurements fluctuate over time. The first research question asked if trait and state self-control are related to each other. A positive association between both was found meaning that individuals high in trait self-control also demonstrate high levels of state self-control on average. Additionally, the results suggested that individuals high in trait self-control show less fluctuation in state self-control than individuals low in trait self-control do. The second research question asked if participants would show less prosociality when their self-control was low at that point or when they are less self-controlled in general. The findings showed that both state and trait self-control are related to state prosociality, but that being self-controlled in general (between-person effect) had a stronger effect on state prosociality, which also answers the third research question: what accounts more for state prosociality, trait or state self-control. Finally, ego depletion showed a slightly negative association to state prosociality on a trait level, meaning that in general individuals who feel depleted show less prosociality. No association was found on a state level. Thus, there is no indication that an individual who feels depleted at a given moment shows less prosociality at the same moment.

Interpretation and Similarities with Previous Literature

The present study reveals that the positive trait association between self-control and prosociality which was found in prior studies, is also applicable on a state level. Therefore, this study brings the needed extension and validation of patterns that have been suggested by

previously laboratory research that focused on traits mostly. Further, new findings for the association between self-control and prosociality on a within-person level were made which can be considered as a preliminary step to fill the research gap of both variables. This study is the first study to the author's knowledge that investigated the association between state self-control and state prosociality in young adults. Particularly, first evidence was found that state self-control and state prosociality are related, suggesting that a person is less prosocial at a given moment when their self-control resources are depleted. To build on those findings, future research should examine the outcomes that are associated with both state measurements. As it is expected that these outcomes are positive, this would reinforce the importance for both constructs and increase the awareness of benefits for having high state self-control and state prosociality. Eventually, this research added a new conceptualization of state self-control which does not exclusively measure ego depletion. Therefore, the conceptualization which includes goal-directed self-control and inhibitory self-control next to ego depletion should be further explored in future research.

Moreover, similar to previous studies (e.g. DeWall et al., 2008), the current study confirms that ego depletion reduces prosociality in general. Yet, no association between ego depletion and prosociality within a person was found. Following Osgood and Muraven (2015), prosociality consists of two aspects: affective/ cognitive concern for others and prosocial behaviour. Thereby, ego depletion can influence prosociality without changing underlying cognitive concern for others (Osgood & Muraven, 2015). As the state item did not distinguish between both, it is possible that depleted individuals showed less prosocial behaviour but still had concern for others. Hence, it is likely that a decrease in prosocial behaviour remained undetected.

The found association between state and trait self-control are in line with the study results of Baumeister and colleagues (2019), which could imply that both underlie one common construct. However, as the correlation is not that high it might be more reasonable to argue that it covers different aspects of the construct under investigation, which seem to be equally important to consider. This gives additional confirmation that trait and state self-control are different concepts being influenced by different things. Whereas on a dispositional level it might be rather influenced by personality, on a state level, self-control seems to be affected by external factors such as the environment, the time of the day, the presence of others, or other factors such as sleep or substance use. This assumption is shared by different scholars (see Baumeister et al., 2007). However, in comparison to previous studies which only considered ego depletion for state

self-control, the current study adapted inhibitory and goal-directed self-control on a state level as well. This indicates that not only ego depletion but also other domains of trait self-control, such as goal-directed or inhibitory self-control, on a state level seem to fluctuate and be influenced by time and context. Reinforcing the assumption that on a state conceptualization, state self-control seems to relate to trait self-control but not being the same. Clearly, future research should investigate more to find out in which way state and trait self-control can be conceptualized the same and in which day differently from each other. Similar to previous findings (see Baumeister et al., 2019), it was expected that state self-control fluctuates over time and that over the course of the day, state self-control would diminish due to resource depletion effects. In the current study, neither for state self-control nor for ego depletion only such patterns were found. As it is known that on average adults spend approximately 8 hours per day experiencing desires while resisting them for 3 hours (Hofmann et al., 2012), the findings were surprising. It is not assumed that students simply did not use any self-control resources or did not encounter temptations. Nonetheless, the time of the day does not provide any causal information or indicate anything about external circumstances. For instance, sleep quality or other stressful events which would affect state self-control are not considered when interpreting the results. Subsequently, time points do not indicate whether self-control resources were used or not. Thus, it might be the case that an individual had higher state self-control later on in the day because they were not exposed to earlier temptations and therefore those participants did not experience ego depletion effects. Thus, existing research that only takes daytime but not external influences into account may be a bit too simple to explain depletion effects. It is suggested that future research may include the option for participants to indicate whether they experienced a desire and therefore, had to resist a temptation. It is even recommended to indicate the content of desire (such as food, substances, work, social media, etc.) to distinguish between different subdomains. Whereas in line with prior research (see Baumeiser et al., 2019), the results of the current study confirm that state self-control is positively associated withstate prosociality, surprisingly, the visual analyses did not show clear correlation patterns for both constructs. Following Van Berkel et al. (2017), it is likely that people are very self-controlled and exhibit high levels of prosociality on average, but are experiencing something different at the moment. This may be explained by external factors, which may interfere and affect both self-control and prosociality on a momentary basis (Van Berkel et al., 2017). As this study was conducted during the Covid-19 pandemic, several

preventative measures against the coronavirus came into force including social distancing, quarantine, and lockdowns. Those restrictions may have challenged individuals' self-control as they were not able to stick to their daily routines and habits. Similarly, their prosociality was challenged as i.e. the need to prevent the spreading of the disease interfered with the obligation to protect individual rights. Furthermore, the opportunities to engage in direct prosocial acts decreased due to lack of social contact. Subsequently, the implications of the pandemic may have interfered or moderated both variables.

Strengths, Limitations and Future Implications

Several strengths of the present study can be identified. First of all, due to the usage of an ESM, high ecological validity is ensured as it allows the investigation of self-control outside of a laboratory setting (Van Berkel et al., 2017). The ESM allowed the researcher to evaluate the participants' state behaviours and feelings three times daily over 15 days, which took fluctuations of the state components into account (Myin-Germeys et al., 2018). Moreover, a high compliance rate was achieved with little missing data. This provided a coherent picture of the state conducts over the course of the study. Besides the strengths, several limitations have to be taken into account. To start with, the methodological choice of using a convenience sampling method has to be discussed. This technique is least expensive and time consuming, but it might lead to selection bias and may negatively affect the representativeness and generalizability of the sample (Etikan et al., 2016). This is demonstrated by a dominance of German Psychology students within the participants. Additionally, Psychology students may be more familiar with psychological concepts and testing, might be better able to recognize their own feelings and further, and students generally might be higher in self-control compared to the population (Tangney et al., 2004). Thus, it would be recommended to use a different or additional sampling method to obtain a more accurate picture of the population.

Further, this research is subject to structural limitations concerning the online platform Ethica. Initial mistakes with the study set up lead to the outcome that participants had to prematurely cancel the study and sign up again, resulting in a loss of participants. Nonetheless, according to Connor and Lehman (2012) the remaining sample size of 35 participants is still said to provide sufficient reliability for ESM. Moreover, a technical error includes the demographic questionnaire including the informed consent which was not available to answer for all

participants which led to the exclusion of participants even though they provided continuous data. Therefore, in future research on this platform, the set-up should be double checked and a pilot study should be conducted.

Another limitation considers the lockdown and social distance regulations that were in place while the study was conducted. Even though people can engage prosocially without the direct contact to others, the severely limited opportunities for social interaction may be the reason some participants chose the option "I did not have an opportunity" to act prosocial almost half of the time. Especially as all participants were students of whom the majority studied online from home. It is assumed that the lack of on-campus socialization may have caused less prosocial acts in general in students and that the association between state self-control and state prosociality would have been stronger in a non- pandemic setting. Moreover, the pandemic might have also affected individuals' self-control as the lockdown challenged people's ability to stick to their daily routines and habits. Studying from home requires high levels of self-control as possible distractions (such as family members) may interfere with the learning process of a student outside of the university. Hence, the demands of independent online learning, time and task management and the lack of contact with teachers and peers seems to also affect self-control. Therefore, it is assumed that self-control would be higher in students under normal circumstances. Overall, this is why it is recommended to repeat the study in times of on campus teaching. A replication would also be beneficial to examine a comparison between crisis and post-crisis state measurements to see to what extent the pandemic influenced the outcome.

Another limitation deals with the fluctuations of the state measurements. As already indicated those fluctuations may be influenced by external factors such as the ongoing pandemic, however, the current study cannot account for any causal relations. As no causality regarding time points can be made, an inclusion of situational context should be considered for future investigations. Different contexts could have varying effects on both state self-control and state prosociality of an individual. Perhaps students demonstrate different state self-control and state prosociality when faced with a particular type of situation such as a stressful study environment or being in an academic test compared to moments where they do not particularly feel challenged. Thus, future studies could include additional categorical context variables such as the presence or absence of social, study or personal stressors.

On a methodological level, another limitation has to be considered facing state prosociality. There was only a weak correlation between trait and state prosociality. This might be caused due to the fact that contrary to the trait measurements, state prosociality included selfishness as opposed to prosociality as conceptualization. However, instead of considering both constructs as related they might not. As the survey only included two items for measuring the construct no valid reliability analysis could be conducted. Thus, it is recommended to find a valid measurement of state prosociality. This could be done by asking for more concrete behaviour. Such as asking for helping acts (see DeWall et al., 2008) or for interpersonal conflicts as indicators for low state prosociality (Baumeister et al., 2018). This could also make it possible to link state self-control to certain behaviour patterns associated with state prosociality, which in turn would also tell more about benefits and consequences of the constructs.

Conclusion

In conclusion, the present study is the first to investigate the association between state self-control and state prosociality. The results confirm previous findings that trait self-control and trait prosociality are related, but that they are not a common construct. Further, it was found that state self-control and state prosociality are positively related. The analysis of the between-person and within-person effects implies that students state prosociality is more dependent on being self-controlled in general (between-person) than being self-controlled at a given moment (within-person). Eventually, the results of this study showed that state measurements fluctuating over the course of the study suggested to be influenced by external factors rather than by daytime. However, due to the ongoing pandemic both self-control and prosociality may be affected. Therefore, it is recommended to repeat the study after the pandemic. This could also provide insight into the extent that both self-control and prosociality of young adults has been affected by the pandemic and accompanying social distancing measures.

References

Baay, P. E., de Ridder, D. T., Eccles, J. S., van der Lippe, T., & van Aken, M. A. (2014). Self-control trumps work motivation in predicting job search behavior. *Journal of Vocational Behavior, 85*(3), 443-451. https://doi.org/10.1016/j.jvb.2014.09.006

Batson, C. D. (2012). *A history of prosocial behavior research.* In A. W. Kruglanski & W. Stroebe (Eds.), *Handbook of the history of social psychology* (p. 243–264). Psychology Press.

Batson, C. D., & Powell, A. A. (2003). *Altruism and prosocial behavior*. In T. Millon & M. J. Lerner (Eds.), Handbook of psychology: Personality and social psychology, Vol. 5 (p. 463–484). John Wiley & Sons, Inc.. https://doi.org/10.1002/0471264385.wei0519

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. https://doi.org/10.1037/0022-3514.74.5.1252

Baumeister, R. F., & Bushman, B. J. (2008). *Social psychology and human nature* (Annotated instructor's ed.). Thomson Wadsworth.

Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). Self‐regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of personality, 74*(6), 1773-1802. https://doi.org/10.1111/j.1467-6494.2006.00428.x

Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. Psychological Inquiry, 7(1), 1–15. https://doi.org/10.1207/s15327965pli0701_1

Baumeister, R.F., Heatherton, T.F., & Tice, D.M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

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. https://doi.org/10.1111/j.1467-8721.2007.00534.x

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.

https://doi.org/10.1080/15298868.2018.1478324

Campos-Mercade, P., Meier, A. N., Schneider, F. H., & Wengström, E. (2021). Prosociality predicts health behaviors during the COVID-19 pandemic. *Journal of Public Economics, 195*(5), 104367. https://doi.org/10.1016/j.jpubeco.2021.104367

Caprara, G. V., Alessandri, G., & Eisenberg, N. (2012). Prosociality: The contribution of traits, values, and self-efficacy beliefs. *Journal of personality and social psychology, 102*(6), 1289. https://doi.org/10.1037/a0025626

Caprara, G. V., Steca, P., Zelli, A., & Capanna, C. (2005). A new scale for measuring adults' prosocialness. *European Journal of psychological assessment, 21*(2), 77-89. https://doi.org/10.1027/1015-5759.21.2.77

Cato, S., Iida, T., Ishida, K., Ito, A., McElwain, K. M., & Shoji, M. (2020). Social distancing as a public good under the COVID-19 pandemic. *Public health*, *188*, 51-53. https://doi.org/10.1016/j.puhe.2020.08.005

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (Rev. ed.). Lawrence Erlbaum Associates, Inc.

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

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. https://doi.org/10.1177/1088868311418749

DeWall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal of Experimental Social Psychology, 43*(1), 62–76. https://doi.org/10.1016/j.jesp.2005.12.005

Duckworth, A. L., & Kern, M. L. (2011). A meta-analysis of the convergent validity of self-control measures. *Journal of research in personality, 45*(3), 259-268. https://doi.org/10.1016/j.jrp.2011.02.004

Eisenberg, N., Fabes, R. A., & Spinrad, T. L. (2006). *Prosocial Development*. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (p. 646–718). John Wiley & Sons, Inc.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics, 5*(1), 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

Fung, S. F., Kong, C. Y. W., & Huang, Q. (2020). Evaluating the dimensionality and psychometric properties of the brief self-control scale amongst chinese university students. *Frontiers in psychology, 10*, 2903. https://doi.org/10.3389/fpsyg.2019.02903

Gailliot, M. T., Gitter, S. A., Baker, M. D., & Baumeister, R. F. (2012). Breaking the rules: Low trait or state self-control increases social norm violations. *Psychology, 3*(12), 1074 –1083. https://doi.org/10.4236/psych.2012.312159

Gilbert, D. T., Fiske, S. T., & Lindzey, G. (Eds.). (1998). *The handbook of social psychology* (Vol. 1). Oxford University Press.

Graziano, W. G., Habashi, M. M., Sheese, B. E., & Tobin, R. M. (2007). Agreeableness, empathy, and helping: A person× situation perspective. *Journal of personality and social psychology, 93*(4), 583. https://doi.org/10.1037/0022-3514.93.4.583

Helliwell, J. F., & Putnam, R. D. (2004). The social context of well–being. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *359*(1449), 1435-1446. https://doi.org/10.1098/rstb.2004.1522

Hofmann, W., Vohs, K. D., & Baumeister, R. F. (2012). What people desire, feel conflicted about, and try to resist in everyday life. *Psychological science*, *23*(6), 582-588. https://doi.org/10.1177/0956797612437426

Imhoff, R., Schmidt, A. F., & Gerstenberg, F. (2014). Exploring the interplay of trait self‐control and ego depletion: Empirical evidence for ironic effects. *European Journal of Personality, 28*(5), 413–424. https://doi.org/10.1002/per.1899

Martinsson, P., Myrseth, K. O. R., & Wollbrant, C. (2012). Reconciling pro-social vs. selfish behavior: On the role of self-control. Judgment and Decision Making, 7(3), 304–315. *Journal.* http://journal.sjdm.org/11/111202/jdm111202.html

Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification. *Journal of Personality and Social Psychology, 54*(4), 687–696. https://doi.org/10.1037/0022-3514.54.4.687

Myin-Germeys, I., Kasanova, Z., Vaessen, T., Vachon, H., Kirtley, O., Viechtbauer, W., & Reininghaus, U. (2018). Experience sampling methodology in mental health research:

new insights and technical developments. *World Psychiatry, 17*(2), 123–132. https://doi.org/10.1002/wps.20513

Osgood, J. M., & Muraven, M. (2015). Self-control depletion does not diminish attitudes about being prosocial but does diminish prosocial behaviors. *Basic and Applied Social Psychology*, *37*(1), 68-80. https://doi.org/10.1080/01973533.2014.996225

Schmeichel, B. J. & Zell, A. (2007). Trait self-control predicts performance on behavioral tests of self-control. *Journal of Personality, 75*(4), 743–755. https://doi.org/10.1111/j.1467-6494.2007.00455.x

Schmidt-Barad, T., & Uziel, L. (2020). When (state and trait) powers collide: Effects of power-incongruence and self-control on prosocial behavior. *Personality and Individual Differences, 162*, 110009. https://doi.org/10.1016/j.paid.2020.110009

Smith, S. M. (2001). *Self-control and academic performance*. Society for Personality and Social Psychology, San Antonio, TX.

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*, 271–322. https://doi.org/10.1111/j.0022-3506.2004.00263.x

Twenge, J.M., Baumeister, R.F., DeWall, N.C., Ciarocco, N.J., Bartels, M.J. (2007). Social Exclusion Decreases Prosocial Behavior. *Journal of Personality and Social Psychology, 92*(1), 56-66. https://doi.org/10.1037/0022-3514.92.1.56

Velavan, T. P., & Meyer, C. G. (2020). The COVID‐19 epidemic. *Tropical medicine & international health, 25*(3), 278. https://doi.org/10.1111/tmi.13383

Vohs, K. D., Baumeister, R. F., & Ciarocco, N. J. (2005). Self-Regulation and Self-Presentation: Regulatory Resource Depletion Impairs Impression Management and Effortful Self-Presentation Depletes Regulatory Resources. *Journal of Personality and Social Psychology, 88*(4), 632–657. https://doi.org/10.1037/0022-3514.88.4.632

Zhang, X., Cai, H., Hu, J., Lian, J., Gu, J., Zhang, S., ... & Yang, Y. (2020). Epidemiological, clinical characteristics of cases of SARS-CoV-2 infection with abnormal imaging findings. *International Journal of Infectious Diseases, 94*, 81-87. https://doi.org/10.1016/j.ijid.2020.03.040

Appendix A

Trait Questionnaires

13-item Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004).

1. I am good at resisting temptation
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 they are fun
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

Prosocialness Scale for Adults (Caprara et al., 2005)

1. I am pleased to help my colleagues in their activities.
2. I share the things that I have with my friends.
3. I try to help others.
4. I am available for volunteer activities to help those who are in need.
5. I am empathic with those who are in need.
6. I help immediately those who are in need.
7. I do what I can to help others avoid getting in trouble.
8. I intensely feel what others feel.
9. I am willing to make my knowledge and abilities available to others.
10. I try to console those who are sad.
11. I easily tend money or other things.
12. I easily put myself in the shoes of those who are in discomfort.
13. I try to be close to and take care of those who are in need.

14. I easily share with friends any good opportunity that comes to me.
15. I spend time with those friends who feel lonely.
16. I immediately sense my friends' discomfort even when it is not directly communicated to me.

Appendix B

Informing Email for Participants

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: it 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 short 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 C
Ethica

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.

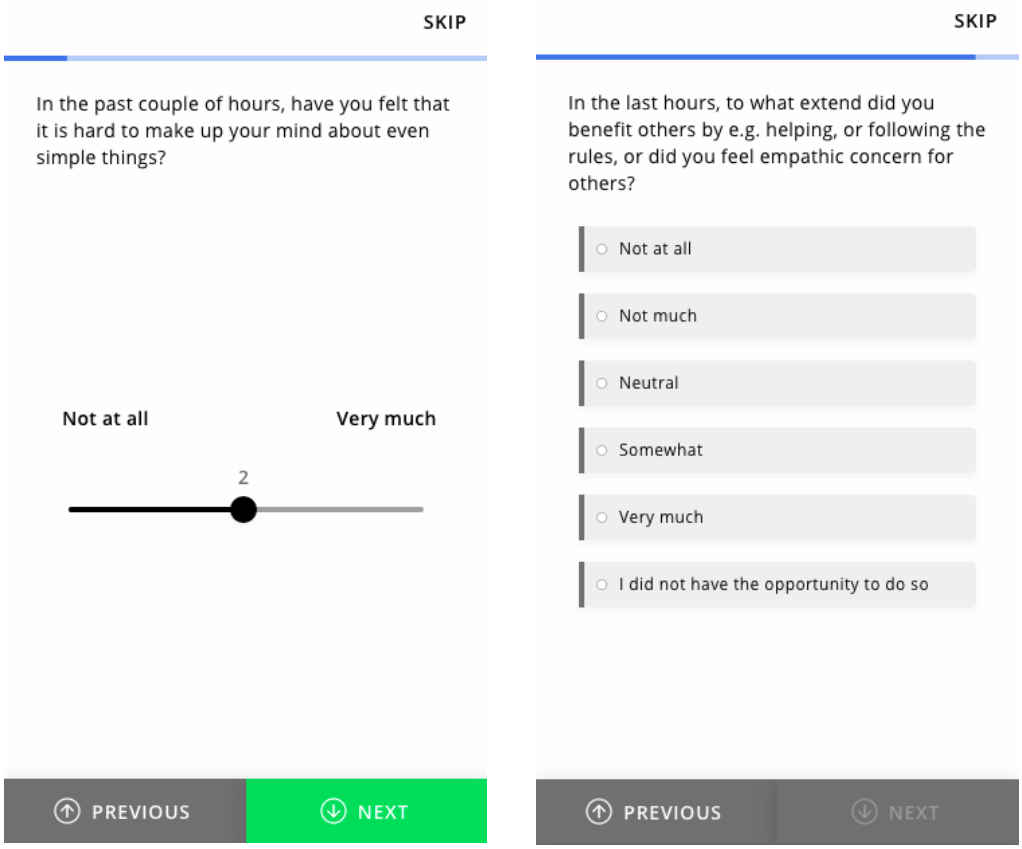
Your participation in this study is completely voluntary and you can withdraw from it at any time without reason. All data will be treated anonymously and will not be shared with third parties.

If you have any further questions or would like to receive more information about the study, please feel free to contract 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
() I agree that I have been informed properly and that I had the opportunity to ask questions, if wanted.
() I agree that I am participating on a voluntary basis and that I can quit my participation without reason, if wanted.
() I agree that my data will be used anonymously for research and that it can be removed, if wanted.

Example Daily Questions (Mobile Version)



Example Trigger Notifications

N ID: 88

Offset	Send the notification immediately.
In-App	Good morning, hope you slept well. 😴 Let's start the day with answering the daily questions.

N ID: 87

Offset	Send the notification after 30 minutes
In-App	Time to wake up sleepyhead 😴 How are you doing? Fill out the survey and let us know.