The Moderating Role of Self-Esteem in Trait Self-Control and Self-Control Behavior: A Quantitative Study

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Abstract

This quantitative study investigates the potential moderating role of self-esteem in the relationship between trait self-control and self-control behavior. Self-control, the regulation of thoughts, emotions, and actions to achieve long-term goals, is associated with positive outcomes in various domains. However, individual differences in self-control traits exist, highlighting its non-uniform nature. Self-esteem, the subjective evaluation of self-worth, plays a crucial role in shaping thoughts, emotions, and behaviors. The study hypothesizes that individuals with high self-esteem would exhibit better self-control due to their beliefs in their abilities and engagement in self-esteem enhancing behaviors. Data was collected through an online survey and statistical analyses were conducted to examine the moderating role of self-esteem. The primary finding suggests a lack of association between self-control trait, self-esteem, and self-control behavior. Possible explanations include declining motivation and insufficient development of trait self-control and self-control resources among young individuals. Despite non-significant results, a positive predictive relationship between self-control and self-esteem emerged, indicating that higher self-control is associated with higher self-esteem. These findings present opportunities for future research on diverse self-control strategies to enhance self-esteem and contribute to the existing literature.

Self-control represents one of the ways indicating how someone can alter themselves, override dominant behavioral tendencies and thereby, achieve long term goals (Vohs & Baumeister., 2004). Every day, across the globe, the world has been witnessing people with high trait self-control. They just simply would not mind waking up at five in the morning and doing their exercise first thing, and if anyone in any case ran into them, they would greet others with a smile. Those people are oftentimes very successful in life (Tangney et al., 2004).

The trait of self-control is known as the ability to resist temptations and easily achieve long-term goals. Lucky ones who have it simply do not mind doing the "ought to" behaviors, such as maintaining a healthy diet and resisting urges (Gillebaart & Kroese, 2020). In addition, higher amounts of self-control pave the way to better grades, better impulse control, and psychological adjustment (Tangney et al., 2004). Research shows that people with high trait self-control generally prove to be happier and higher in life satisfaction (Hoffman et al., 2013). Nowadays, research on this psychological domain is mostly focused on further exploration of effortless self-control – the new approach, which states that successful self-control depends on smart strategies of dealing with self-control dilemmas (Gillebaart & de Ridder, 2015).

Schmeichel and Zell (2007) conducted a study to test the extent to which trait self-control predicts performance on objective laboratory tests of behavioral self-control. Their research found that the trait of self-control predicts success on two tests – an eye-blink inhibition and on pain tolerance test. These results suggest that the ability to override dominant response tendencies contributes to positive outcomes associated with high trait self-control (Schmeichel & Zell, 2007). Furthermore, they explored how other individual differences, like self-esteem, could affect people's ability to override their dominant responses, and questioned if the connection between self-control and behavioral self-control might be influenced by self-esteem, but this

relationship remained puzzling. The authors proposed this mechanism but did not conduct any research to verify it.

When reflecting upon successful and happy individuals, besides attaining high self-control, they usually seem like they have high self-esteem. The research indeed showcases that individuals with high self-esteem persist longer in goal achievement, when facing failure (Baumeister et al.,2003). One Serbian best-selling novel author once wrote: "If there is a way to buy happiness, self-esteem would be a golden card for that purchase." (Dedić, 2016, p.51). Therefore, this research paper seeks to define the role of self-esteem in the relationship between trait self-control and self-control behavior.

Similarly to the trait of self-control, self-esteem is not only important for individuals but also for the society as a whole. Meta analysis suggests that high self-esteem is of great importance in almost every life domain, considering it is related to many other positive outcomes, including better work/school performance, and improved mental and physical health (Baumeister, 2003). These findings are stable between different ages, gender, and race (Orth & Robins, 2022). Many theories propose that individuals with high self-esteem strive to nurture and enhance their self-worth by creating circumstances conducive to the flourishing of their self-esteem, as well as by engaging in behaviors that reinforce their feelings of self-worth (Baumeister et al., 1989; Cast & Burke, 2002), which frequently involve exerting significant self-control. These behaviors encompass activities like exercising (Sonstroem, 1984), adopting healthy eating habits, dedicating time to studying or working (Arshad et al., 2015), and saving money (Zhang, 2009).

Furthermore, self-esteem is related to self-efficacy, which refers to individuals' beliefs in their ability to perform specific tasks or behaviors successfully (Lane et al., 2003). Higher self-

esteem is often associated with higher self-efficacy, which can contribute to greater perceived control over one's actions and therefore enhance self-controlled behavior (Lane et al., 2003).

Additionally, self-esteem is related to individuals' overall positive or negative feelings about themselves (Cast & Burke, 2002). Individuals with higher self-esteem may possess a stronger sense of self and identity (Cast & Burke, 2002) which can provide a foundation for consistent self-control behaviors. They may be more committed to upholding their self-standards and engaging in behaviors aligned with their self-concept.

In accordance with the aforementioned, natural assumption would be that people with high trait self-control and high self-esteem would be the ones who are more likely to perform self-control behavior and endure with that behavior until the goal is reached. They may view self-control as a means to uphold their positive self-image and reputation. Furthermore, because of their improved mental health (Baumeister, 2003) people with higher self-esteem may be better equipped to regulate their emotions and impulses, leading to improved self-control. Additionally, the act of self-control may be easier and more pleasurable experience for them. The present study suggests that people with high self-control and self-esteem have higher beliefs about their capabilities (and better impulse control), thereby convincing them that if they behave in a self-controlled manner, not only their efforts will pay off, but also their goals will be achieved. This heightened belief can motivate them to engage in self-control behaviors more consistently and effectively. Opposingly, reaching a goal after putting in a great level of effort and self-control provides them with an even higher self-esteem. Additionally, the study highlights that self-esteem increases the effect of trait self-control on behavior, particularly when individuals experience high levels of self-esteem.

Hence, the purpose of the present study is to gain insights into the following research question:

"Is self-esteem a moderator in the relationship between self-control trait and self-control behavior?"

By investigating the aforementioned research question, the present study further responds to Schmeichel and Zell's (2007) call for extended research investigating this particular relationship. The three constructs particularly relevant and pivotal for this research paper include: self-control trait, self-control behavior and self-esteem.

Self-control

Baumeister and Vohs (2004) define self-control as: "Any efforts by the human self to alter any of his own inner states or responses." (p.2.). There are stable individual differences in trait self-control, as measured most directly by scales designed to assess those differences (Tangney et al., 2004).

Currently, there are two main approaches to self-control. The "Strength model" views self-control as a limited resource similar to a muscle that depletes with use, resulting in impaired task performance (Baumeister, 2003; Hagger et al., 2010). This depletion, known as ego depletion, leaves the self-lacking resources (Baumeister & Vohs, 2007). Repairing ego depletion requires time and rest, and there may be levels of depletion beyond which effective self-control becomes challenging (Baumeister, 2003; Vohs & Heatherton, 2000). The strength model has found support in various domains of behavior (Wallace & Baumeister, 2002).

However, recent studies challenge the strength model, indicating that individuals who believe self-control is flexible and can be improved exhibit better self-control and do not experience ego-depletion effects (Job et al., 2010). Moreover, the relationship between self-

control trait and behavior is influenced by beliefs about self-control, self-affirmation, and positive mood (Hagger et al., 2019; Schmeichel & Vohs, 2009; Tice et al., 2007). These findings suggest that self-control depletion may be driven by motivation and attention rather than solely by resource depletion (Inzlicht et al., 2014).

The "Effortless Self-Control" model offers an alternative perspective. While the strength model focuses on understanding self-control failure, the effortless self-control approach examines successful self-control performance (Gillebaart & de Ridder, 2015). According to this approach, the difference between individuals with high and low self-control traits lies in how they handle response conflict, which arises when faced with self-control dilemmas (Gillebaart & de Ridder, 2015). Response conflict occurs in everyday situations, such as when people must choose between healthy vegetables and tempting unhealthy options like chocolate while grocery shopping.

Furthermore, effortless self-control theory suggests that people with high trait self-control are good at implementing smart, effortless strategies in managing response conflict (Gillebaart & de Ridder, 2015). They implement adaptive routines like beneficial habits or avoiding temptation and by doing so, they go through response conflict more easily. Additionally, they may not feel the same extent of response conflict whatsoever (Gillebaart & de Ridder, 2015). A study confirmed that high trait self-controlled people reported less temptations in their environment compared to low trait self-controlled individuals (Hoffman et al., 2012). High trait self-controlled people are faster to not only identify response conflict when having a self-control dilemma, but also to overcome it (Gilebaart et al., 2016). High self-control is linked to engaging in long-term goal-directed actions, such as exercising and maintaining a healthy diet, as individuals with high self-control traits exhibit less resistance towards self-controlled behaviors

(Gillebaart & Kroese, 2020). Gillebaart and Kroese (2020) further demonstrated that behavioral resistance, which involves aversion towards certain behaviors, serves as a mediator between trait self-control and the extent of self-controlled behavior.

Last but not least, extensive research has shown that self-control trait, measured via self-reports, predicts success at behavioral self-control (Schmeichel & Zell., 2007). Behavioral self-control represents a behavioral measure of self-control taken by researchers on the spot by performing different tests; for instance, asking people to restrain from blinking for a couple of seconds. (Schmeichel & Zell., 2007). Thereby, the relationship between trait self-control and behavior is proved to be significant in a diverse sample, and independent from one's race, age or gender (Shekarkhar & Gibson, 2011). For this study, we will be using Gillebaart and Kroese's (2020) scale to measure behavioral self-control. Specifically, we will focus on the domains of work and/or study behavior. This choice is based on the understanding that individuals typically do not engage in both activities simultaneously, making it relevant to examine them together.

In accordance with the above explained research, the present paper proposes:

H1: Self-control trait, measured via BSCS, will predict the amount of self-controlled behavior, collected via self-report measure. Higher scores on self-control trait measures predict higher scores on self-control behavior scale (Figure 1).

Self-esteem

Self-esteem has been one of the most interesting and investigated concepts in the field of psychology. It is believed that self-esteem plays a causal role in many important life outcomes, including successful social relationships and mental health (Zeigler-Hill, 2013) and has been defined as the level of self-approval and self-affection one attains (Wiliams, 1979). Namely, it is the measure of how much individuals accept and love themselves. Being an evaluative aspect of

the self-concept, self-esteem fits to an overall view of the self as worthy or unworthy (Baumeister, 1998). Self-concept is the answer to one particularly relevant question, "Who am I?".

Nevertheless, it is believed that self-esteem primarily pertains to perception rather than objective reality (Baumeister, 1998). Self-esteem encompasses an individual's beliefs regarding their own intelligence, sense of humor, and attractiveness, but it does not necessarily align with the actual presence of these traits in the person. In other words, self-esteem reflects how individuals perceive themselves in terms of being smart, funny, or attractive, rather than providing an accurate assessment of their actual qualities in these areas. As can be seen, self-esteem is literally defined by how much value people place on themselves, evidently having nothing to do with reality (Baumeister, 2003).

Self-esteem slowly builds over time through personal experiences, such as repeatedly succeeding at various tasks, which contributes to self-esteem being a stable personal trait (Heatheron & Wyland, 2003). As previously stated, many theories assume that people seek to maintain their self-esteem because they possess an inherent "need" to feel good about themselves. This phenomenon is also known as "the self-esteem motive" (Leary, 1999). Therefore, high self-esteem can work as a defense mechanism- protecting people from a negative self-view after a failure and reminding them of all their previous successes (Burke, 1991).

Although self-esteem can be viewed as an outcome (Cast & Burke, 2002), the level of self-esteem has its own outcomes. Low self-esteem contributes to depression and anxiety while high self-esteem is a predictor of successful social relationships (Zieger-Hill, 2013). A study by Uzun et al. (2020) found self-esteem to be a mediator in a relationship between self-control and academic procrastination (e.g., the tendency to postpone or delay an intended action or decision)

(Ferrari, 2010). Uzun et al. (2020) further found that low levels of self-esteem lead to a decrease in self-control, resulting in the behavior of academic procrastination (Uzun et al., 2020).

Furthermore, in a review of research studies on goal setting, Hougland and Brockner (1989) discovered that self-esteem moderates the relationship between the goals individuals set and their subsequent performance. This means that self-esteem interacts with the goals individuals establish, ultimately impacting their performance and behavior in reaching those goals.

Additionally, individuals with higher self-esteem tend to set more ambitious and challenging goals for themselves (Baumeister et al., 1993). Higher self-esteem is associated with greater persistence (Baumeister et al., 2003) and resilience in the face of obstacles and setbacks. Individuals with higher self-esteem are more likely to persevere in the pursuit of their goals, even when faced with difficulties or failures, which they see as a learning opportunity (Niiya et al., 2004). The research also found that high self-esteem is significantly related to proactivity, which refers to a person's willingness to behave in a manner that will change his circumstances (Potgieter, 2012).

Therefore, the present study hypothesizes that self-esteem is related to self-control behavior. The behavior that has been taken as a measure of self-control behavior in this research paper is study/work behavior.

H2: Self-esteem, measured via Rosenberg's self-esteem scale, is related to self-control behavior. The higher someone's self-esteem is, the more self-control they will manifest (Figure 1).

Relationship between self-control and self-esteem

Academic literature suggests that people with high levels of self-control also showed higher self-esteem (Tangney et al., 2004). Self-esteem is often considered as a vital aspect of mental health and well-being (Taylor & Brown, 1988), in fact, many theories propose an association between self-esteem and psychological adjustment (Baumeister et al., 2003). It is assumed that for success in any domain to be achieved, self-esteem represents one of the key components (Orth & Robins, 2014). Crocker and Park (2004) acknowledged the central role that the pursuit of self-esteem plays in human self-regulation. In fact, Carver and Scheier's (1981) theory of self-regulation posits that self-esteem serves as the superordinate goal toward which numerous more specific goals are oriented

Nowadays, there are many theories about the effects of self-esteem, and a great number of them involve having a belief in capability and competency of oneself, being successful in goal reaching, and having positive experiences in general (Cast & Burke, 2002). Additionally, Hougland & Brockner (1989) identified a positive correlation between individuals' perceived capability to achieve performance goals and their self-esteem.

Once again, Cast and Burke (2002) demonstrated that high self-esteem individuals strive to maintain or improve their self-esteem and act efficiently in their environment (Winch & Rosenberg, 1965). Therefore, the present research proposal suggests that trait self-control will predict self-control behavior differently depending on different levels of self-esteem. Specifically, low self-esteem will influence the relationship between trait self-control and self-controlled behavior. Opposingly, in the high self-esteem group, the relationship between the two variables will be stronger.

The research paper proposes better applicability of self-control amongst high self-esteem individuals because of not only the high beliefs they have in their capabilities and stronger sense of self and identity (Cast & Burke, 2002), but also because high self-esteem individuals have higher task-persistence and improved mental health (Baumeister et al., 2003). Moreover, high self-esteem individuals are found to be more proactive (Potgieter, 2012), have higher self-efficacy (Lane et al., 2003) and to set more challenging goals (Baumeister et al., 1993).

Hence, it is plausible that performing self-control behavior represents an easier and more pleasurable experience for ones that have high self-esteem. (Figure 1).

H2a: In the low self-esteem group, there will be a small but positive relationship between trait self-control and self-control behavior.

*H2b***:** In the high self-esteem group, there will be a large positive relationship between trait self-control and self-control behavior.

Figure 1

Conceptual Model: Hypothesized relationship between the concepts of the study
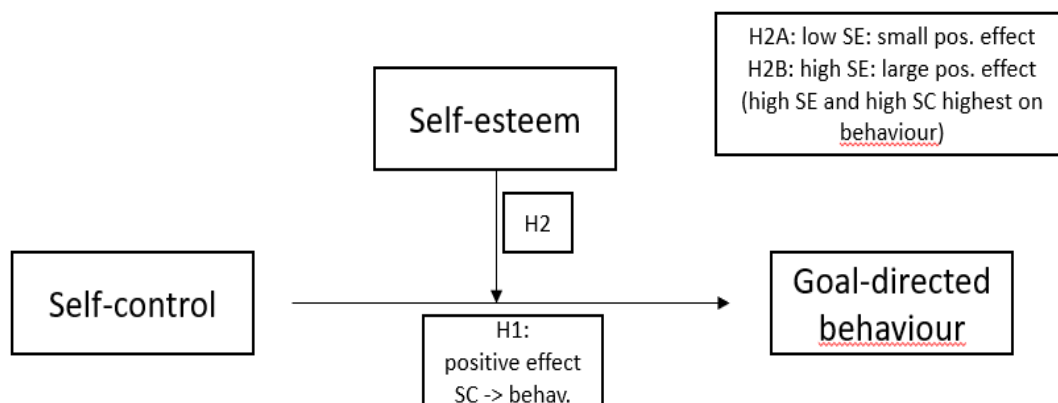
Research Methods

Study Design

The participation in this research was voluntary and uncompensated, with approval from the institution's ethics committee.

The study is non-experimental quantitative research with a cross-sectional design, where trait self-control serves as the independent variable, self-control behavior as the dependent variable, and self-esteem as the moderator. The study's hypothesis was tested using regression analysis.

Sample

Participants completed the online survey which they have received through different social media platforms, precisely through WhatsApp, Instagram and LinkedIn. Convenience sampling was used for contacting participants within the same network. In addition, snowball sampling was also used, in which respondents shared the questionnaire with other respondents. Participants of the study were mostly internationals, with roughly 48% constituting people from the Netherlands. Average education level was bachelor's degree, with 25.4 % representing unemployed people. The G*Power test was used to calculate a rough indication of the sample size for this research, which was 107 participants.

In total, 127 participants took part in the study, of which four participants were excluded from the study due to refusing to provide consent and one was excluded because he was underage. The final sample consisted of 122 participants. The number of participants in the final sample (77 females and 44 males), with a mean age of 24 (SD = 6.243) was in accordance with

the required sample (N = 107). Required sample was calculated to find a small effect in a moderation study with .95 power and .05 alpha.

Materials

Firstly, participants were asked to give their explicit, informed consent. Next, socio-demographic questions were asked including participants' gender, age, nationality, education level and their English-speaking abilities which were self-assessed on the scale from 1-7 (1 being very weak and 7 being native). This was important for estimating whether the participants understood proposed questions.

To test the proposed model, several previously published scales which have proved validity and reliability were used to measure the constructs: Self-control trait, self-esteem and self-control behavior.

Self-control trait

Self-control was measured using the Brief Self-Control Scale which consists of 13 items (Tangney et al., 2004). An example item is "I am good at resisting temptation." 6 out of 13 items were reversed so that a higher score on the scale indicated a higher amount of self-control. All items were answered on a five-point Likert scale (1 = not at all, 5 = very much). This questionnaire was chosen because it has proved to have great internal reliability and validity. Cronbach alpha for this scale was .78, which indicates high stability over a period of time.

Self-esteem

Self-esteem was measured using the Rosenberg Self-Esteem Scale, a scale that has 10 items in total (Rosenberg, 1965). Items were answered on a 4-point scale (1=Strongly agree, 2=Agree, 3= Disagree, 4= Strongly disagree). An example item is" I feel that I am a person of worth". 5 out of 10 items are reversed so that a higher score on the scale indicates a higher

amount of self-esteem. The scale is brief, does not necessitate excessive time to fill out and has excellent internal consistency and construct validity. Cronbach alpha for this scale was .876, indicating excellent stability.

Self-control behavior

Self-control behavior, specifically study/work behavior was measured via self-reports. The scale that was used is the Self-Control Behavior scale by Gillebaart and Kroese (2020), specifically, the study or work behavior on that scale. To ensure the validity of the study's results, the paper combines the study and work behaviors into a singular outcome. This choice was motivated by the recognition that the concurrent pursuit of both activities is relatively uncommon among individuals, rendering it impractical to treat them as distinct outcomes. Study/work behavior was measured via the following items:" How many hours in the previous week did you spend on your studies?" and/or "How many hours in the previous week did you spend on your work?". Participants were informed that if they do not work/study they can skip the question. Participants answered questions on a 5 point scale (0-10, 11-20, 21-30, 31-40, more than 40 hours).

Procedure

Three students from Utrecht University's Behavioral Science faculty collected data through an online Qualtrics questionnaire, targeting individuals aged 18 to 50. Data gathering spanned approximately two weeks and comprised a 32-item English-language questionnaire. The questionnaire began with informed consent and demographic questions, followed by the Self-Control Behavior Scale, the Brief Self-Control Scale, and concluded with the Self-Esteem Scale.

After completion, participants received a debriefing letter, expressing gratitude and ensuring anonymity and confidentiality to the best extent possible.[1]

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[1] The questionnaire was a collaborative work with related research projects and because of that the Behavioral Resistance Scale and Growth Mindset Scale (GMS) (Dweck, 1999, 2006) were also included in the questionnaire.

Results

The objective of the present study was to examine the potential moderating role of self-esteem in the relationship between trait self-control and behavioral self-control. The study formulated four different hypotheses, and in the subsequent section, the research paper aimed to assess whether these hypotheses are supported.

Missing value analysis and data preparation

Firstly, looking at the data, one sees that there were few missing values. The paper's two main predictor variables –trait self-control and self-esteem, had zero missing values, while the study's dependent variable, self-control behavior, had two missing values. These two participants were deleted as they failed to report the time spent studying or working. From a total of 120 participants, 99 reported that they spent a certain time studying during the week, while 92 reported the time spent working. The study further introduced a new variable called self-control behavior as 41% of participants reported that they spend time both studying and working during the week. The scale led to higher scores if a participant both studied and worked, while the score remained the same if they only did one of the two. The new variable had a minimum of one and maximum of ten and represented the sum of working and study hours. Furthermore, the study investigated the structure of both predictor scales using factor analysis. Rosenberg's self-esteem scale had high factor loadings on all items, while the trait self-control scale had relatively high factor loadings on all items, the lowest score being 0.369 on the item "I often act without thinking through all the alternatives". However, the alternative to one factor would be creating two factors and dropping five items from the scale, which is not in line with theoretical and previous empirical scale evaluations (Tangney, 2015). Taking all of this into account, both scales

were looked at as a single factor in further analysis (Appendix 1). Additionally, to better understand the interaction between the study's predictive variables, an interaction variable was created by multiplying self-esteem score by self-control trait score. This interaction variable was used in order to test possible interactions between these variables before testing the model using process (an SPSS add-on for path analysis). A grouped (categorical) variable was also introduced from the self-esteem measure, using median split ($Mdn = 3.5$) in order to further test possible moderation (see Appendix 1 for further information).

Assumptions

To ensure that the paper's statistical analysis is appropriate and reliable, normality and homoscedasticity analysis was performed. Looking at the distribution of the variables, one can see a slight skew to the left (negative skew) for both predictor variables, however the skewness is non-significant. Trait self-control showed a skew of $s = - .210$, and a kurtosis of $k = .186$; while self-esteem showed a skew of $s = - .177$, $k = - .327$, $p <- 2 * (1 - \text{pnorm(abs(skewness)}, 0, 1)))$. To test skewness, we calculated the probability of observing a Z-score as extreme as the absolute value of the skewness under the assumption of a standard normal distribution. A cutoff score of 1.96 was used to assess significance of skewness. On the other hand, self-control behavior, with a skew of $s= .317$ and kurtosis of $k = .670$ (also non-significant) showed significant results on the Kolmogorov-Smirnov test (K-S (120) $= .175$, $p < 0.01$, meaning the data cannot be looked at as normally distributed. In the subsequent analysis, the utilization of bootstrapping methods was planned. Bootstrapping is a resampling technique that can mitigate the concern of non-normality in data analysis by generating a large number of resamples from the original dataset, allowing for the estimation of sampling distributions and subsequent inference without relying on the assumption of normality (Hesterberg, 2011). Although bootstrapping does not rely on any

assumptions, homoscedasticity was evaluated graphically as an additional way to register

potential issues or patterns in the data that may affect the validity of the regression results

(Appendix 2).

Descriptive Statistics

From a total of 120 participants, 99 reported that they spent a certain time studying

during the week ($M = 1.79$, $SD = 1.380$), while 92 reported time spent working ($M = 2.11$, $SD =$

1.788) (Appendix 3). The total score on self-control behavior scale showed a mean of $M = 4$ (SD

$= 1.50$).

When it comes to the paper's predictors, trait self-control had a mean of $M = 3.13$ ($SD=$

0.57). On the other hand, self-esteem had an average of $M = 3.52$ ($SD = 0.49$).

Main effect and moderation hypothesis testing

The correlation between variables was estimated using bootstrapping with 1,000

resamples. One may see that there is a positive relationship between trait self-control and self-

esteem shown by a positive correlation of $r = 0.239$, $p < 0.01$ (95% CI [0.08, 0.403]). However,

the CIs are very wide showing uncertainty in the existing correlation. The bootstrapped 95%

confidence interval suggested no association between either of the predictor variables and self-

control behavior.

Table 1			
Correlation matrix			
	Self-Control trait (1)	Self-Esteem (2)	Self-Control Behavior (3)

		1		1		
	2	.239**			1	
	3	0.03		-0.037		1
Mean (SD)		3.13 (0.57)		3.52 (0.49)	3.967 (1.650)	
Min - Max		1 (high) - 5 (low)		1 (high) - 5 (low)	1 (low) - 10 (high)	

Further one may see that neither of the predictor variables significantly predicted self-control behavior (trait self-control: $b = - 2.204$, $p > 0.01$, [-6.211, 1.367]; self-esteem $= - 1.949$, $p > 0.01$, [-5.378, 1.22]. Bootstrap with 1,000 was also used in this analysis. Accordingly, the interaction between them did not produce any effect. The model showed no significant results (F (3, 116) = .481, p > 0.05). Opposingly, the trait self-control was a significant predictor of self-esteem, it explained around 0.5 % of its variation ($b = .239$, $p < 0.01$, [.071- .473] F(1, 118) = 7.12, $p < 0.01$). Regression analysis was performed to test this finding (Appendix 5).

Table 2				
Regression analysis				
	B	Sig. (2-tailed)	95% Confidence Interval	
			Lower	Upper
(Constant)	10.745	0.056	-0.335	23.217
Self-Control trait	-2.204	0.221	-6.211	1.367

Self-Esteem trait	-1.949	0.221	-5.378	1.22
Interaction	0.625	0.207	-0.351	1.722

Even though homoscedasticity was not a prerequisite of bootstrapping multiple linear regression, we tested whether homogeneity of variance existed using the bootstrapped average residuals and predicted values. Looking at the plots below (Appendix 6), we found that residuals are evenly distributed, and that the residuals form a normal distribution. Studentized Breusch-Pagan was conducted as a measure of homoscedasticity showing non-significant scores; this suggested that there is no evidence of heteroscedasticity in the bootstrapped multiple linear regression model.

Discussion

This research study had the primary objective of examining the moderating role of self-esteem in the relationship between trait self-control and self-control behavior. By doing so, it sought to expand the current knowledge in the field of self-control, providing valuable insights into the intricate dynamics underlying self-controlled behavior and the achievement of goals.

It was hypothesized that individuals with high self-esteem are more likely to exhibit better self-control due to their stronger beliefs in their abilities, certainty about the outcomes of their efforts, and greater motivation for sustained behavior (Winch & Rosenberg, 1965). Moreover, individuals with high self-esteem tend to engage in behaviors that will maintain or enhance their self-esteem levels, and they have stronger sense of self and identity (Cast & Burke, 2002). Additionally, research has established a causal link between self-esteem and task persistence, as well as improved mental-health (Baumeister et al., 2003), the tendency of setting more challenging goals (Baumeister et al., 1993) and better self-efficacy among high self-esteem individuals (Lane et al., 2003). Last but not least, high self-esteem was related to proactivity (Potgieter, 2012).

To address this research question, a quantitative research design was employed, utilizing measures of self-control trait, self-esteem, and self-controlled behavior. A sample of participants was recruited and data was collected through an online survey. Statistical analyses, such as factorial analysis, regression analysis and bootstrapping, were conducted to examine the moderating role of self-esteem in the relationship between trait self-control and self-control behavior.

The primary finding of the current study indicates a lack of association between the predictor variables, namely trait self-control and self-esteem, and the outcome variable, self-control behavior.

Furthermore, the examination of the interaction between trait self-control and self-control behavior did not yield any significant effects, which is an intriguing finding contradicting previous research in the field (Gillebaart & Kroese, 2020; Schmeichel & Zell, 2007). Notably, the lack of correlation between trait self-control and behavior in this study raises questions and prompts further exploration, particularly considering the majority of participants are young individuals. The second significant finding of the current research paper reveals that self-esteem does not serve as a predictive factor for self-control behavior. Despite non-significant results, this research question provided valuable insights into the absence of a moderating effect of self-esteem on the relationship between trait self-control and self-control behavior in the examined sample.

Alternative explanation

It is possible that the results are influenced by sampling error which arises from the fact that sample estimates are based on a subset of individuals from the larger population. Generally, as the sample size increases, the sampling error decreases, as the sample better represents the population (Segdwick, 2012). The small sample size of the present paper may have restricted the diversity and representativeness of participants, potentially limiting the generalizability of the findings to broader populations. Additionally, in this study, participants were recruited through social media, which makes it difficult to gauge their representativeness. The sample used may not accurately represent the general population, as it mainly consisted of highly educated young individuals, mostly students.

Furthermore, it has been observed that motivation and beliefs about internal control tend to decline among young people as the academic year progresses and their GPA decreases (Pizzaloto et al., 2018). Additionally, Hagger et al. (2019) found that beliefs about self-control moderate the impact of trait self-control on self-control behavior. It is plausible that as the school year approaches its end, beliefs about internal control and self-control diminish, potentially influencing the relationship between trait self-control and behavior. Furthermore, it is essential to note that this research was conducted in May, marking the end of the school year. Given that a significant portion of the participants are students, this temporal context aligns with the findings and is consistent with previous research by Pizzaloto et al. (2018). However, to gain a comprehensive understanding of this relationship, further investigation is warranted.

As it is previously stated, the average age of the participants was 24 years. Young individuals, in particular, tend to harbor uncertainties about their goals and future (Smithson & Lewis, 2000). It is plausible that among these participants, the formation of trait self-control may not have fully developed yet.

The "Effortless self-control" theory posits that trait self-control is associated with employing effortless strategies rather than exerting conscious effort when facing self-control dilemmas (Gillebaart & de Ridder, 2015). However, the age threshold for the development of such strategies and the necessary level of maturity have not been thoroughly investigated. Response conflict avoidance can require effort and even involve inhibiting impulsive behaviors. Nevertheless, according to the Effortless self-control theory, individuals with high trait self-control are more likely to automate these behaviors (Gillebaart & de Ridder, 2015). Evidence suggests that stronger adaptive habits and weaker maladaptive automatic behaviors may significantly influence self-control behavior (de Ridder et al., 2011). In our target group of

students, it is possible that the process of automatization or formation of adaptive habits has not yet taken place.

Additionally, high trait self-control may provide individuals with a greater reservoir of self-control resources, making them less vulnerable to self-control demands (Muraven et al., 2005). Since the majority of participants are young students, it is possible that they have not yet developed a substantial reservoir of self-control resources. These factors suggest that the observed results may be influenced by participants' stage of development, specifically regarding the formation of trait self-control and the availability of self-control resources.

Another plausible explanation for the null finding is the presence of measurement error which not only hampers the ability to detect significant results but also undermines the usefulness of scores for robust research preparation (Mohajan, 2017). It is important to acknowledge that the self-control behavior scale utilized consisted of only two items and asked participants only about one week in their lives, which is a small amount of time to detect goal directed behavior. A challenge was encountered when combining scores, because the scaling option and the fact that most participants only reported one of the two behaviors made it difficult to sensibly add them up. This may have led to systematic errors influencing participants scores (Mohajan, 2017). Additionally, instrumental error arose from narrowing down Gillebaart and Kroese's (2020) questionnaire to a single domain (work/study) and administering it to a student population. Expanding the scale in future measurements would capture a broader spectrum of behavioral nuances, increasing the visibility of behavioral self-control and potentially leading to different results.

Lastly, the normal distribution of the sample was not met for this study. A small deviation from normally distributed samples is common in the field of social sciences from

working with psychometric measures (Bono et al., 2017). It is plausible there is a substantial degree of variation among participants, with some individuals dedicating minimal time to work or study. Furthermore, an alternative explanation suggests that if a numerical interval scale had been employed to measure behavioral self-control rather than ordinal, the results would have followed a normal distribution. Interval scale serves to determine equality of intervals (Stevens, 1946), which in return allows for more precise quantitative comparisons and calculations. Another possibility is increasing the sample size, which would likely lead to a more normally distributed self-control behavior scale and enhance the research's sensitivity in identifying potential patterns or trends.

Further examination of the relationship between Self-Control and Self-Esteem

Contrarily, an intriguing finding emerged from the present study. Although the model was insignificant, there was a positive predictive relationship between trait self-control and self-esteem. Regression analysis was performed to test this surprising finding. The results indicate that trait self-control serves as a significant predictor of self-esteem, implying that individuals with higher levels of self-control trait also exhibit higher levels of self-esteem. It is noteworthy that the sample size of 122 participants yielded a notable effect size (.2) for the prediction of self-esteem by self-control trait. Although numerous factors contribute to the formation of self-esteem, these findings confidently establish that a portion of the variance in self-esteem can be attributed to the self-control trait. This observation is intriguing, especially considering most participants expressed disagreement with items representing high self-control trait and self-esteem. Although dispersion exists, participants generally showed low scores on both scales. This discovery holds great potential for enriching the existing self-esteem literature, as it suggests the possibility of employing diverse self-control strategies to enhance self-esteem.

Longitudinal studies show that training improves self-control in novel tasks within the same training domain. For example, 2-3 weeks of using their nondominant hand for daily activities helps with increasing endurance time on squeezing a handgrip (Muraven, 2010). Building upon these findings, novel avenues can be explored to foster self-esteem.

Additional Limitations of the Study and Future Directions

This paper, hereby resembling all other research papers, faces its own drawbacks. Firstly, significant limitations posed by measurement and sample errors, which were also considered as possible explanations because they account for results from a statistical perspective. The sample we obtained, consisting of young, educated individuals such as students, does not adequately represent the general population. To enhance the generalizability of future research findings, it is important to expand the sample to encompass a wider range of individuals, ensuring greater diversity and representation. Moreover, the sample was obtained through social media which may affected representativeness of the sample as well. Random sampling from the entire population would have yielded a more representative sample and also recruiting participants from diverse demographic backgrounds and considering cultural, socioeconomic, and contextual factors would have provided a more inclusive understanding of this topic.

Furthermore, in seeking a better understanding of the topic, it was evident that a more comprehensive background on the relationship between self-esteem and self-control was necessary. However, due to the lack of available literature on this specific relationship, the exploration of this topic was limited to individual elements rather than a holistic understanding of their interconnection.

The utilization of self-report measures carries its own implications. The assessment of self-control behavior relied on self-reporting, which has been suggested as a reliable method

(Gillebaart & Kroese, 2020). Instead of relying solely on self-report measures, incorporating objective measures such as observational data or behavioral tasks as Schmeichel and Zell (2007) did, can provide a more reliable assessment. Quantifying specific behavioral patterns would offer valuable insights into the manifestation of self-control in real-world contexts. Furthermore, expanding this research to other domains and examining not only work/study behavior but also sustainable behavior, eating habits, exercising (Gillebaart & Kroese, 2020) and saving money (Oaten & Cheng, 2007) would provide a broader understanding of the topic.

An intriguing avenue for future research involves exploring the long-term effects of the self-control trait on behavior. The data in the study was collected only once, leaving the room for the possibility that the impact of trait self-control on self-control behavior varies in the short-term and long-term, and that the current findings may not fully capture its true effects. Consequently, it would be valuable to adopt a longitudinal study design and investigate short-term and long-term effects of the self-control trait by measuring it at multiple time points

Conclusion

Ultimately, this research study aimed to investigate the moderating role of self-esteem in the relationship between trait self-control and self-control behavior. While the findings did not reveal a significant association between self-control trait, self-esteem, and self-control behavior, they provided valuable insights and raised important questions for further exploration.

The hypothesis that individuals with high self-esteem would exhibit better self-control behavior due to their stronger beliefs in their abilities and motivation for sustained behavior was not supported by the results.

Several factors were proposed to explain the observed findings. The stage of development among young participants, particularly in relation to the formation of trait self-

control and the availability of self-control resources, was suggested as a possible explanation. It was also noted that the research was conducted at the end of the school year, which may have influenced participants beliefs about internal control and self-control. The limited sample size and potential sampling error as well as measurement error further contributed to the need for caution in generalizing the findings.

In conclusion, while this study presented unexpected findings and faced certain limitations, it contributes to the existing knowledge in the field of self-control. The study highlights the complexities of self-control behavior, the potential role of self-esteem as a moderator, and the need for further research to explore these relationships in different contexts and populations. By addressing the identified limitations and pursuing the suggested future directions, researchers can continue to deepen the understanding of self-control and its implications for various aspects of human behavior and well-being.

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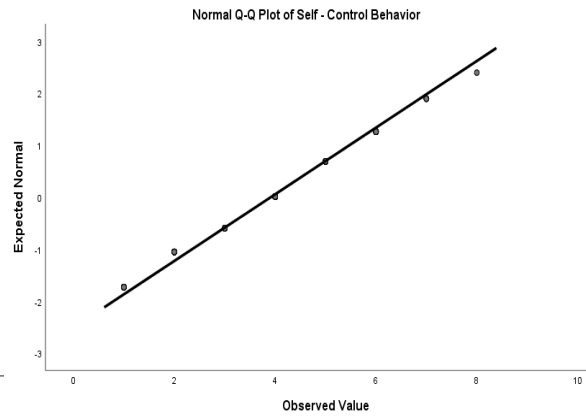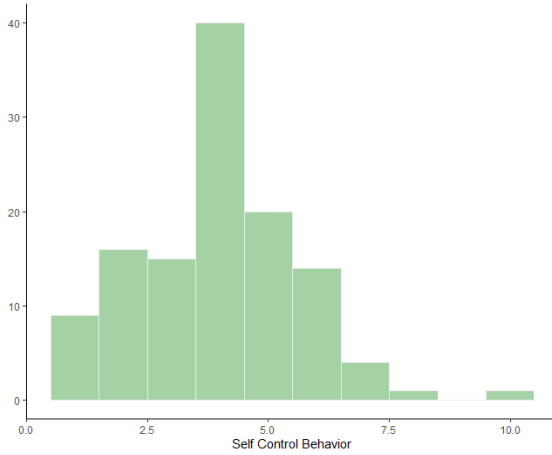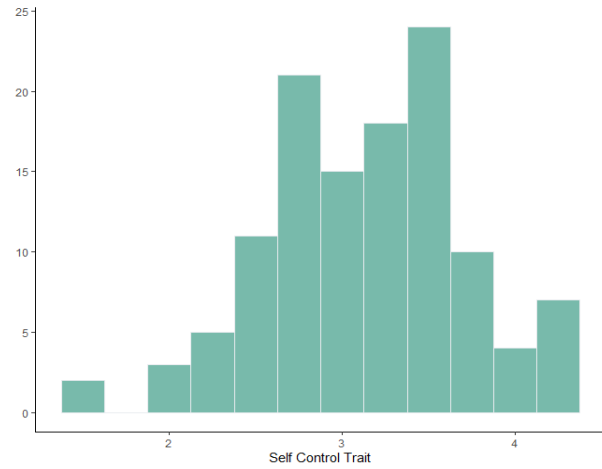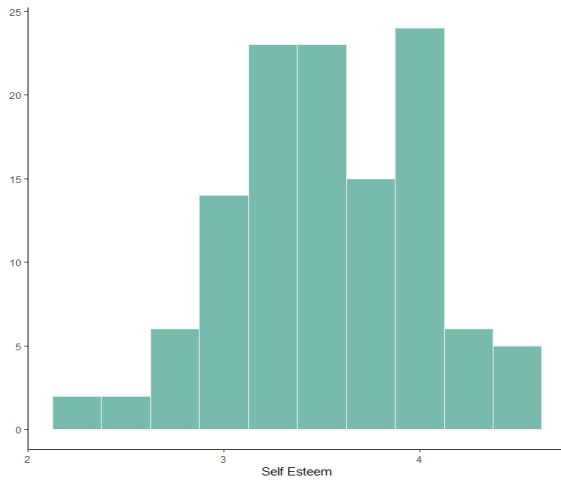
Appendix

Appendix 1: Factor analysis and descriptive statistics

| Table 3			
Factor analysis and descriptive statistics			
	Component	Mean	SD
*I have trouble concentrating.	0.67	2.8279	1.20394
*Pleasure and fun sometimes keep me from getting work done.	0.647	2.9426	1.03891
*Sometimes I can't stop myself from doing something, even if I know it is wrong.	0.631	3.0738	1.2072
*I wish I had more self-discipline.	0.588	3.5	1.02247
*I am lazy.	0.572	2.5984	1.16888
*I have a hard time breaking bad habits.	0.567	2.7459	1.06454
I am able to work effectively toward long-term goals.	0.526	3.7	1.011
I am good at resisting temptation	0.478	3.17	0.897
I refuse things that are bad for me	0.468	3.11	1.003
*I do certain things that are bad for me, if they are fun.	0.46	2.9016	1.16001
People would say that I have iron self- discipline.	0.402	2.8	1.06
*I say inappropriate things	0.4	3.6066	1.18222

*I often act without thinking through all the alternatives.	0.369	3.7459	1.04099
*I feel I do not have much to be proud of.	0.785	4.225	0.70368
*All in all, I am inclined to think that I am a failure.	0.758	4.4333	0.65764
*I certainly feel useless at times.	0.724	3.6667	0.90129
I take a positive attitude toward myself.	0.712	3.02	0.704
*At times I think I am no good at all.	0.7	3.5917	0.81474
I feel that I'm a person of worth.	0.7	3.2	0.63
On the whole, I am satisfied with myself.	0.698	3.06	0.626
I am able to do things as well as most other people.	0.664	3.31	0.591
*I wish I could have more respect for myself.	0.648	3.3583	0.89627
I feel that I have a number of good qualities.	0.569	3.4	0.509
* Are reverse coded; All items have a min of 1 and a max of 5.			

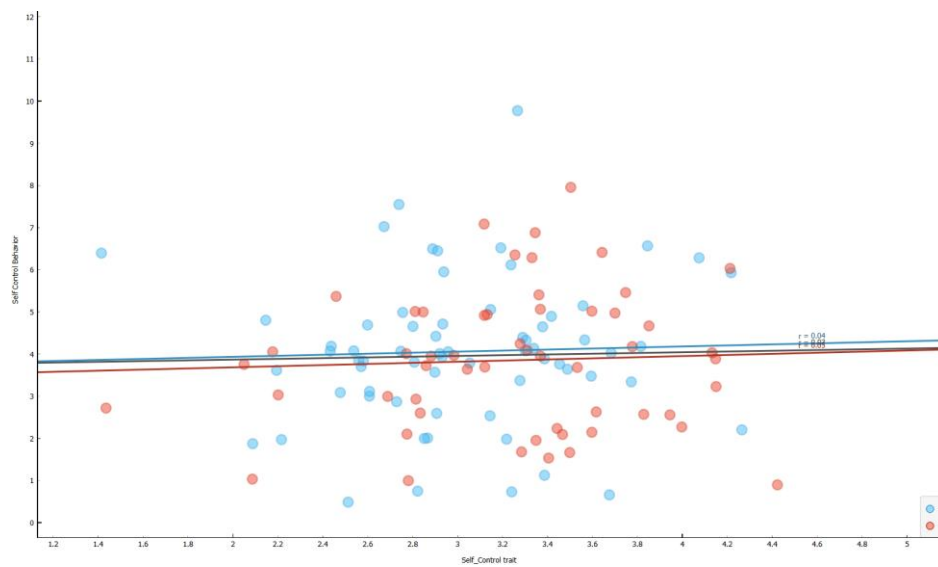Appendix 2: Histogram of all variables and Self-Control Behavior QQ plot.

Appendix 3: The visualization of study and work behavior.

Figure 1: Self-control behavior

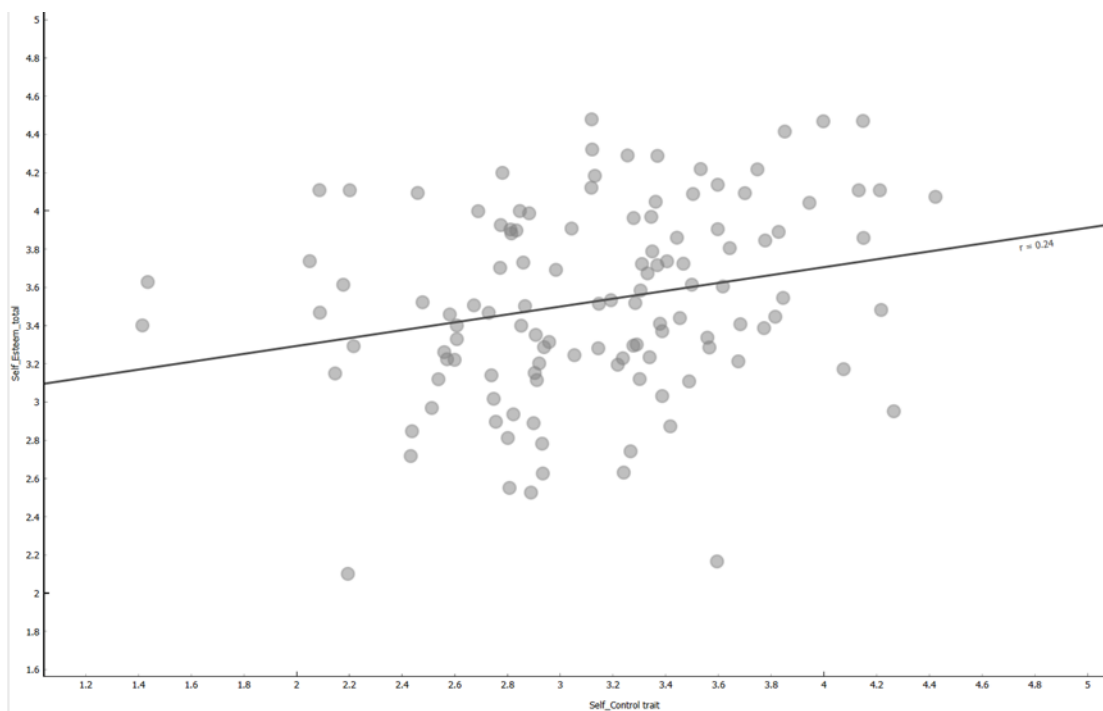Number of hours spent on work/studying during the last 7 days
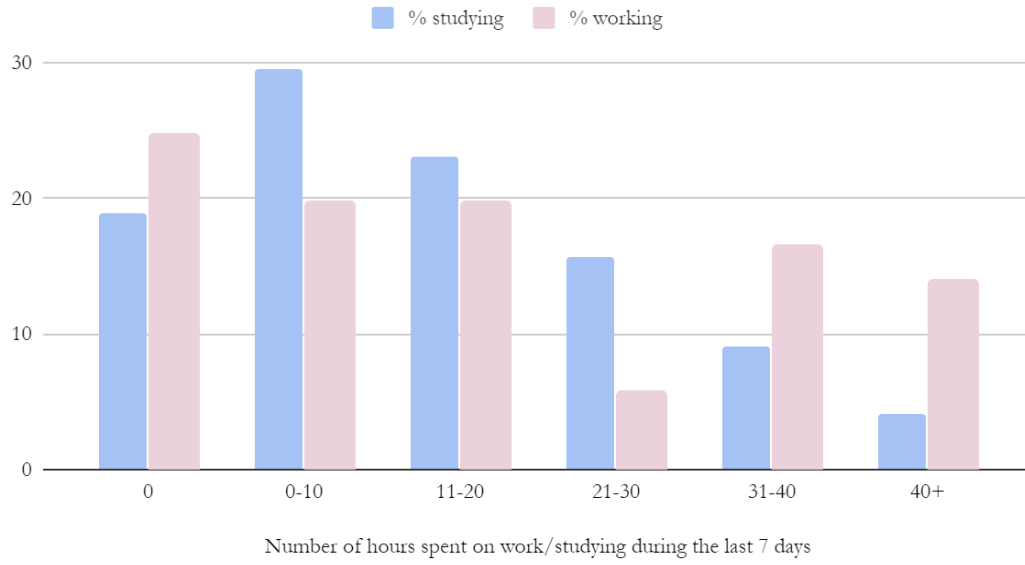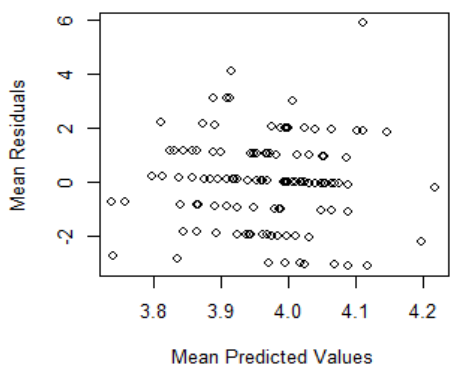
Appendix 4: The moderation effect

*1 represents high self-esteem, while 2 represents low self-esteem group.

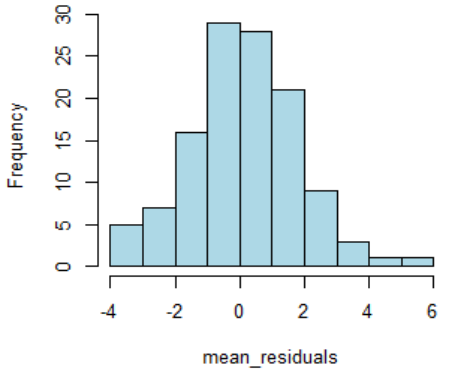Appendix 5: Regression analysis performed with trait self-control and self-esteem

Appendix 6: Residual plots