



Utrecht University

What is the relationship between Trait Self-control, Threat or Challenge Appraisal, and Healthy Eating Behavior?

Inger Wieringa, 5627001

Utrecht University

Master's Thesis Social, Health and Organisational Psychology (201700810)

Supervisor: Dr. Marleen Gillebaart

Second Grader: Jantina Brummelman

09-07-2020, Utrecht

Amount of words: 6006

(manuscript can be made publicly accessible)

What is the relationship between Trait Self-control, Threat or Challenge Appraisal, and Healthy Eating Behavior?

Abstract

Self-control is important to make decisions in self-control dilemmas, for example to choose healthy options instead of unhealthy options. It is noteworthy how people with high trait self-control experience these situations and how they react. In previous research, they reported fewer self-control dilemmas, therefore they used their self-control less than others. To explain this, it is interesting to examine the possible link between trait self-control and the biopsychological model (BPSM) of challenge and threat appraisal, because high trait self-control and challenge appraisal seem to be connected. In this study, it was examined why some people are better at resisting temptations than others, by examining the connection between trait self-control and the BPSM. It was hypothesized that high trait self-control would positively affect healthy eating behavior. Appraisal would have a mediating effect on the relationship between trait self-control and healthy eating, in a way that more challenge appraisal will lead to healthier eating behavior. Participants ($N = 154$, $Mean = 23.71$, 112 females, 1 other) were asked to fill out an online survey. The results (based on self-reports) showed a significant direct effect between trait self-control and healthy eating behavior. No significant mediation effect of appraisal was found. Remarkably, there was a significant relationship between trait self-control and appraisal. Therefore, these findings suggest underlying mechanisms of trait self-control. Overall, it can be concluded that trait self-control is an important concept when investigating healthy eating behavior, as well as the relationship with appraisal. Strengths and limitations were discussed, together with future directions.

Keywords: Trait Self-control, Threat Appraisal, Challenge Appraisal, Healthy Eating Behavior

Table of Content

Introduction to self-control..... 3

The biopsychological model of challenge and threat..... 5

Research questions and hypotheses 7

Methods..... 7

 Participants and design..... 7

 Procedure..... 8

 Measures..... 8

 Self-control 8

 Threat and challenge appraisal 8

 Healthy eating 9

 Data analysis 9

Results..... 10

 Descriptives..... 10

 Mediation analysis..... 10

Discussion..... 12

 Strengths, limitations and future directions..... 14

 Concluding remarks 15

References..... 17

Appendix A..... 20

What is the relationship between Trait Self-control, Threat or Challenge Appraisal, and Healthy Eating Behavior?

In the last decade(s), there has been a lot of research on self-control. Self-control is what people use when they want to reach their long-term goal, often described as the ability to inhibit or overrule behavior that conflicts with the long-term goal (Gillebaart & De Ridder, 2015). For example, if someone chooses to take a run instead of chilling on the sofa, if someone eats a piece of fruit instead of a bag of crisps or if a student decides to study in the evening instead of having a drink with friends. These kinds of self-control behaviors match with the long-term goals of people. Many studies have found that having more self-control basically leads to a healthier and happier life (Hofmann, Luhmann, Fischer, Vohs & Baumeister, 2014; Tangney, Baumeister & Boone, 2004). Research has also shown that higher trait self-control can be linked to more positive life outcomes, for instance, higher work and academic performance (Duckworth & Seligman, 2005; Tangney et al., 2004), better overall health (Moffit et al., 2001), more interpersonal success (Vohs, Finkenauer & Baumeister, 2011) and less maladaptive adaptations, which will eventually be better for personal health and successes (Cheung, Gillebaart, Kroese & De Ridder, 2014). Trait self-control can be seen as a core element of personality as it develops (Cheung et al., 2014; Rothbart, Ahadi & Evans, 2000). Hence, understanding the principles and mechanisms of trait self-control is not only important for theoretical insights but can also be beneficial for people in day to day life.

Introduction to self-control

Gillebaart (2018) describes self-control as: “Everything that someone does to steer one’s behavior toward the desired end state” (p. 3). Self-control is needed when people experience self-control dilemmas: situations in which people are conflicted by two behavioral tendencies, one to reach a short-term goal and another to reach a long-term goal (Bogaers, 2018; Gillebaart & De Ridder, 2015). An example of a self-control dilemma, in which people need to use their self-control, could be the conflict in choosing between a healthy snack or tempting/unhealthy snack. On the one hand, someone may really like a chocolate bar, but this is conflicting with their long-term goal of eating according to a healthy diet. Eating an apple instead would be better and matches with this long-term goal. To make this choice, people need their self-control to overrule the tendency to grab the chocolate.

The dominant model of self-control is the strength model of self-control (Baumeister, 2002; Baumeister & Vohs, 2007; Baumeister, Vohs, & Tice, 2007). This model states that self-control is effortful to use and that it can be seen as a muscle; if people use it often, it can become depleted. This means that, according to this model, continuously using self-control is not possible. One of the typical tests to measure self-control depletion is a handgrip test: people are instructed to do a handgrip task after they had to face a situation in which they needed to use their self-control (e.g. being confronted with cookies, while the control group was confronted with radishes). When already using their self-control in the first task, the self-control of the experimental group is depleted in the second (handgrip) task and, therefore, these people cannot squeeze the handgrip as long as people who were confronted with radishes (and used their self-control less; Baumeister, Bratslavsky, Muraven & Tice, 1998; Martijn et al., 2007; Muraven, Tice & Baumeister, 1998). To illustrate, this 'limited' self-control reveals itself when you first had to resist the birthday cake at a birthday party, but when you subsequently get offered some crisps, it would be harder to resist this offer. According to the strength model, self-control successes (to overcome a short-term desire by acting to achieve a long-term goal) are difficult to achieve, and especially having more self-control successes in a row is difficult. Some people do succeed in having multiple self-control successes in a row, but this is conflicting with the strength model. Previously, studies showed that self-control successes were achieved in multiple areas (De Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). For instance, not eating a cookie and taking an apple instead, going to the grocery store by bike instead of by car, and studying a night before a test instead of watching a movie are all self-control successes. So the question arises, how were these successes achieved, and moreover, how were multiple self-control successes achieved?

Recently, a new perspective on self-control has been proposed. In some cases, it seemed like people could effortlessly use their self-control and thus not get depleted, instead of the effortful way of using self-control (Gillebaart & de Ridder, 2015). For example, some people are able to use their self-control multiple times in a row, where others are already depleted and give in to the temptation. This way of 'effortlessly' using self-control is especially the case for people with high trait self-control. People with high trait self-control may report experiencing fewer or less difficult self-control dilemmas (De Ridder et al., 2012; Gillebaart & De Ridder, 2015), such as choosing between a cake and fruits or choosing between watching a movie or doing sports. These kinds of situations seem to be less difficult or hard for people with high trait self-control, whereas people

with a lower trait self-control have to actively use their self-control to master the situation (Gillebaart, Schneider & De Ridder, 2016). Because people with high trait self-control might experience these situations differently, they are not forced to draw from their self-control resources as much as people with low trait self-control. Therefore, it appears that they are using their self-control in a more 'effortless' way (De Ridder et al., 2012; Gillebaart & de Ridder, 2015).

The question arises why people with high trait self-control seem like they have fewer problems with using their self-control and why they can use their self-control in this effortless way. Some clues (e.g. having high trait self-control, having a different experience of self-control dilemmas) about people and using effortless self-control were found, but it is still unclear why some people are able to use their self-control in this way, while others cannot do so. Therefore, it is important and interesting to research the underlying mechanisms of self-control more in-depth.

The biopsychological model of challenge and threat

Apparently, some people can effortlessly use their self-control, but it is not clear in what way these people use their self-control. To look into this other perspective of self-control, the model of Blascovich and Tomaka might be promising. Blascovich and Tomaka (1996) proposed the biopsychological model (BPSM) of challenge and threat. This model states that people face motivated performance situations, where they must actively behave in a certain way to reach self-relevant goals. To reach the self-relevant goal in the motivated performance situation, someone must actively choose the behavior that fits the goal. In these situations, people need to assess whether they are able to cope with the situation, by weighing the situational demands (e.g. danger, uncertainty) and their abilities (e.g. skills, knowledge). According to the model, people can feel threatened or challenged by this situation, whereas feeling challenged is more adaptive for future behavior than feeling threatened. When people feel threatened, they experience situational demands as exceeding their abilities. For challenged people, this is the opposite; they experience that their abilities exceed the situational demands. For example, when students need to do an oral presentation, students who prepared for this will feel more challenged and students who did not prepare will feel more threatened. Being in a challenged state may result in superior performance, due to a better focus of attention (Blascovich & Mendes, 2000; Bogaers, 2018). Additionally, the state of feeling threatened is related to a 'freeze-reaction' and avoidance of the task. It is expected that being in a state of challenge might result in higher performance quality, compared to being in

a state of threat, which might set back performance quality (Blascovich & Mendes, 2000; Bogaers, 2018). The challenged state might be similar to high trait self-control because people in a challenged state feel more competent in dealing with the situation, which might be the same for people with high trait self-control.

Motivated performance situations are similar to self-control dilemmas (Bogaers, 2018). In self-control dilemmas, people have to choose between two kinds of behavior; one more fitting to the short-term goal and one more fitting to the long-term goal. In motivated performance situations, people also have to choose the behavior that fits the self-relevant goal, which can be compared to the long-term goal. Imagine someone who wants to be more active in life, but is tempted by spending the evening in front of the TV with a bag of crisps. A challenged state, or using self-control can help this person to choose for the self-relevant or long-term goal: get off the couch and take a walk. Therefore, it looks like the psychological states of challenge and threat are important for how people manage self-control dilemmas and are, moreover, of great value in how people achieve self-control success. Using the BPSM might thus be promising for new insights in self-control.

Although there is not a lot of literature about (high) trait self-control and the BPSM, there seems to be an important link between the two. There might be a connection between people with high trait self-control and facing motivated performance situations in a different way than people with low trait self-control. People with high trait self-control might appraise motivated performance situations differently because they feel that they have more resources than demands, and thus feel more challenged than threatened. Since the link between trait self-control and BPSM is not clear, it is important and interesting to dive into this possible relationship. If this relationship is clear, it can be used to design or improve strategies and interventions that use these kinds of appraisals.

Research questions and hypotheses

To examine the relationship between self-control, threat/challenge appraisal, and healthy eating behavior, the following research question was formulated: “Do threat and/or challenge appraisals mediate the relationship between trait self-control and healthy eating?” Healthy eating behavior was chosen as outcome behavior because this is one of the domains of self-control dilemmas. It was hypothesized that a direct positive effect exists between trait self-control and healthy eating, whereas people with higher trait self-control have more healthy eating behavior and people with lower trait self-control have less healthy eating behavior (Adriaanse, Kroese, Gillebaart & De Ridder, 2014; De Ridder et al., 2012).

H1: A direct positive association between trait self-control and healthy eating is expected.

Secondly, it was expected that there is a mediation effect of appraisal in the relationship of trait self-control and healthy eating. This effect is expected to appear in two ways; firstly, meaning that people with lower trait self-control have a stronger tendency for threat appraisal and that this threat appraisal will decrease healthy eating. Secondly, meaning that people with higher trait self-control have a stronger tendency for challenge appraisal and that this challenge appraisal will increase healthy eating. Therefore, there should be a mediation effect of appraisal in the relationship of trait self-control and healthy eating.

H2: A mediation effect of appraisal is expected in the relationship of trait self-control and healthy eating, in a way that people with lower trait self-control have a stronger tendency for threat appraisal, and that this will decrease healthy eating, and in a way that people with higher trait self-control have a stronger tendency for challenge appraisal, and that this will increase healthy eating.

Methods

Participants and design

To recruit participants, an online request was sent out on multiple platforms. In total, 276 participants were gathered. 77 Participants were excluded from the sample because they did not complete to fill in the survey, and 45 participants were excluded because they were either too

young or too old. Based on previous research, only the data of participants between 18 and 30 years old were used in the analyses. The final sample size of this research consisted of 154 participants, of whom 41 men (26,6%), 112 women (72,7%), and 1 person reported as 'other' (0,6%). The mean age of the participants was 23.71 ($SD = 2.57$). The survey was filled in by people all over the world; participants lived in 14 different countries. Most of the participants were highly educated: 47,4% had a Bachelor's degree, and 20,1% had a Master's degree.

Procedure

An online survey was used to gather the information that was needed. The participants were informed that this information would not be shared with other parties and would only be used for this research. Before starting the survey, participants were asked to give their consent. When participants were recruited, they were presented with a screen, containing study-specific information. After this screen, participants were asked to fill in a survey about self-control, threat/challenge appraisal, and their eating behavior in general. They were allowed to quit the survey at any moment. This study was registered with the Ethics Committee of the Faculty of Social and Behavioral Sciences.

Measures

Self-control. To measure trait self-control, the 'Brief Self-Control Scale' by Tangney et al. (2004) was used, which consists of 13 items. 9 of the 13 items were reverse coded. An example of a statement from the Brief Self-Control Scale is: "I am good at resisting temptation", with answer options on a 5-point Likert scale, ranging from 1 (not at all like me) to 5 (very much like me). The higher the mean score on the scale, the more self-control a person should have. The scale proved to be reliable, with a Cronbach's α of .78.

Threat and challenge appraisal. Threat and challenge were measured through self-reports; to assess challenge and threat appraisals, demand and resource evaluations were measured using the cognitive appraisal ratio (based on Blascovich & Tomaka, 1996; Moore, Vine, Wilson & Freeman, 2012). Participants were asked to read a small vignette (appendix A) about healthy and unhealthy eating and place themselves in this same situation. Now, demand evaluations were

measured with the question, “How demanding do you expect this situation to be?”. Resource evaluations were assessed by asking “How able are you to cope with the demands of the task in this situation?”. Both items were rated on a 6-point Likert scale ranging from 1 (not at all) to 6 (extremely). After these questions, a ratio was calculated by dividing demands by resources so that a ratio greater than 1 indicates a threat state and a ratio smaller than 1 indicates a challenge state. The use of this scale is based on earlier research, as well as similar work of Bogaers in 2018.

Healthy eating. Information about healthy eating behavior was also based on self-reported information from the survey. The participants were asked questions about their eating behavior. These questions were based on the ‘Rate your Plate’ scale (Gans et al., 1993; Gans, Hixson, Eaton & Lasater, 2000). Participants were shown statements, for which they had to choose one of the answer options that fitted the most to their eating behavior. One of the items asked participants about fried food. They could choose between: “Often eat fried foods”, “Sometimes eat fried foods” or “Rarely/Never eat fried foods”. The original scale was adjusted after data collection because it consisted of questions about meat, chicken, and fish. Since some participants follow a vegetarian diet, six items about meat, fish, and chicken were deleted to keep the answers and scale reliably. To compute the scale, all the scores were added up to a total score. This score was then divided by the number of items of the healthy eating scale. The healthy eating scale proved to be reliable, with a Cronbach’s α of .74.

Data analysis

The outcome (and thus dependent) variable of this research was eating behavior, as this is a good way to measure the outcome of the self-control choices that people make. For this study, the independent variables are (self-reported) trait self-control and appraisal.

After all the required data was gathered, IBM SPSS Statistics Software 25 was used to analyze the data in this study and to investigate the effects of trait self-control, threat, and challenge appraisal on healthy eating behavior. Additionally, within IBM SPSS Statistics, PROCESS macro module 4 (Hayes, 2017) was used to test a possible mediation between trait self-control, appraisal, and eating behavior (figure 1).

Results

Descriptives

Participants reported a mean on the self-control scale of 2.97 ($SD = .59$). The appraisal scale had a mean of .80, which means that participants overall had more of a threat appraisal ($SD = .62$). The mean score on the healthy eating scale was 45.15 ($SD = 5.85$). Correlations between the variables are shown in table 1 below.

Table 1

Means, standard deviations, and correlations between dependent and independent variables.

	1	2	3	4	5	6
1. Sex	—					
2. Age	-.13	—				
3. Education	.08	.46***	—			
4. Trait self-control	.09	.07	.26***	—		
5. Appraisal	.24***	-.09	-.01	-.21***	—	
6. Healthy eating	.18*	-.07	.09	.36***	-.10	—
<i>Mean</i>	1.74	23.71	6.08	2.97	.80	45.15
<i>SD</i>	.46	2.57	2.03	.59	.62	5.85

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Before discussing the correlations between the key variables, it is interesting that there is a positive significant correlation between the level of education of the participants and trait self-control ($r(152) = .26, p = .001$). This means that participants who score higher on the Brief Self-control Scale, overall are higher educated. As shown in Table 1, trait self-control was significantly positive related to both appraisal ($r(152) = -.21, p = .01$) and healthy eating ($r(152) = .36,$

$p < .001$). Besides this, there is also a significant correlation between sex and appraisal. Apparently, there is a big difference if men or women appraise a situation. Overall, it looks like women appraise situations more threatening and men appraise situations more challenging. However, the sample size consisted of more women than men, so it is important to be cautious with this conclusion.

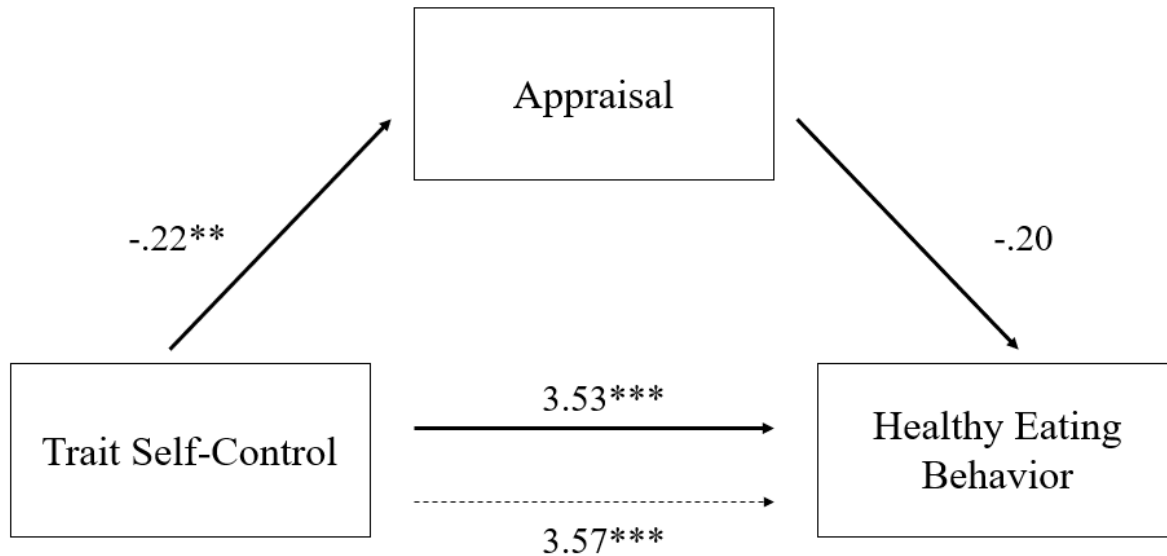
Mediation analysis

After testing the direct relationship between trait self-control and healthy eating behavior, the regression analysis showed a positive significant effect of $B = 3.53$, $t = 4.54$, $p < .001$ (95% C.I.: 1.99; 5.06). As Figure 1 on the next page illustrates, the standardized regression coefficient between self-control and eating behavior was statistically significant, as was the standardized regression coefficient between self-control and appraisal: $B = -.22$, $t = -2.63$, $p < .001$ (95% C.I.: $-.39$; $-.05$). The relationship between appraisal and healthy eating behavior turned out to not be significant: $B = -.20$, $t = -.28$, $p = .78$ (95% C.I.: -1.65 ; 1.24).

The relationship between self-control and eating behavior was expected to be mediated by appraisal. To test this, a bootstrapping method was used according to the guidelines and macro developed by Andrew Hayes (Hayes, 2017). Requesting 5000 bootstrapping samples ($z = 5.000$), the indirect effect between self-control and healthy eating behavior, mediated by appraisal was estimated at $-.045$. The 95% confidence interval of the estimated indirect effect did include 0 (95% C.I.: $-.31$; $.40$), indicating that the proposed mediation was not statistically significant.

Figure 1

Standardized regression coefficients for the relationship between trait self-control and healthy eating behavior, mediated by appraisal (dotted line indicates the total effect).



Note. * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Discussion

To find a possible explanation for the success of having high trait self-control, this research examined if there was a relationship between trait self-control, threat and challenge appraisal, and healthy eating behavior. The current study provides evidence for the hypothesized relationship between trait self-control and healthy eating behavior. It was found that a positive significant relationship exists between trait self-control and healthy eating behavior. This means that people with high trait self-control overall would have a healthier eating pattern than people with lower trait self-control.

While there is evidence for a relationship between trait self-control and healthy eating behavior, evidence for the second hypothesis of this research (a mediation effect of appraisal) is lacking. Even though this mediation analysis did not show significant results, a negative significant relationship between trait self-control and appraisal was found. This means that having high trait self-control is associated with feeling more challenged (instead of threatened) by the situation. In

other words, people with high trait self-control feel challenged by situations in which they have to use their self-control, where people with low trait self-control feel more threatened by the demanding situation. This matches with the existing literature of the BPSM and the connections that were made earlier in the literature study with (trait) self-control (Blascovich & Mendes, 2000; Bogaers, 2018). Surprisingly, no effect was found between having this challenged state of mind and the actual eating behavior. This means that there is a relationship between trait self-control and appraisal, but this is not translating into the expected eating behavior.

As can be concluded from the literature, self-control is what people use when they want to reach their long-term goal, often described as the ability to inhibit or overrule behavior that conflicts with the long-term goal (Gillebaart & De Ridder, 2015). Therefore, when people have more self-control, they can use this to overrule their cravings for unhealthy food. This finding can also be explained by the fact that people with high trait self-control might experience fewer self-control dilemmas and thus are less tempted by unhealthy food, and eat less unhealthy food (Gillebaart et al., 2016). Moreover, there might be a possibility that people with high trait self-control can use their self-control in a more effective or effortless way than people with low trait self-control (De Ridder et al., 2012; Gillebaart & de Ridder, 2015). This may have something to do with the depletion-effect of self-control, where some get depleted and others do not get depleted as much (Baumeister & Vohs, 2007; Hagger, Wood, Stiff & Chatzisarantis, 2010). However, this cannot be concluded straight away.

A possible explanation for the finding of the second hypothesis might be that the model of a mediation effect is not fitting with the expected relationship. Apparently, there is a connection between trait self-control and healthy eating behavior, and a connection between trait self-control and appraisal. It appears that there are two direct effects, instead of the expected direct effect and mediation effect. Therefore, appraisal does not explain the relationship between trait self-control and healthy eating behavior. Although appraisal does not explain this relationship, it is clear that appraisal is important in some way. As written in the introduction above, self-control dilemmas and motivated performance situations seem to be similar (Bogaers, 2018), and the current research finds evidence for this similarity (since there is a significant relationship between the two). This (negative) significant effect of self-control on appraisal shows that appraisal is important, but not in the way it was expected.

Additionally, it is interesting to find out if there will be different results when the appraisal scale is based on different domains of appraisal. For example, in this research, the appraisal (based on an eating domain) and the actual healthy eating behavior did not relate to each other, but maybe this is not the case for other domains like work or sports. Maybe, people appraise every situation in a different way, and therefore the challenge or threat scale might differ in domains. Blascovich and Tomaka (1996) shortly discussed behavioral domains in their research, but not in a way that different domains can result in different appraisals. Moreover, appraisal can also be measured by looking at the physiological reactions of people (Bogaers, 2018). There is a possibility that these reactions are different from the self-reports of appraisal.

Strengths, limitations and future directions

This study benefits from several strengths. To begin with, the existing literature of self-control is mostly corresponding. Researchers mostly agree with the strength model and this way of studying self-control. However, this study tries to examine self-control in a different way than the majority of self-control researchers. Trait self-control and the BPSM were not often connected to each other. Therefore, this study adds valuable new insights of (trait) self-control in connection to the BPSM to the existing base of knowledge. In addition, participants from this study came from a total of 14 different countries. Besides the different origins of the participants, this study also has a good number of participants. These strengths make the generalizability of the results more trustworthy. Furthermore, this study uses only reliable scales.

Some limitations of the current study are important to be discussed. First of all, the sample consisted of a lot of women, of whom a majority was highly educated. This might reduce the generalizability of the findings. Secondly, this study can suffer from biases, since all of the information used in this research is based on self-reports only. This might affect the reliability of the outcome of this research because participants knew the subject of the research. Participants could have stated their answers more positively than they actually are, to give socially desirable answers (Arnold & Feldman, 1981; Van Mortel, 2008). If they did, the outcome of the research is more positive than the actual behavior. However, if participants suffered from biases, this would not by definition lead to invalid results, because the scales were proven to be reliable. It is still important to find out more information about the relationship between trait self-control, appraisal, and healthy eating behavior.

For future research, it is important to think about how to measure healthy eating behavior. In the current research, the Rate your Plate scale (Gans et al., 1993; Gans et al., 2000) was used as a base for the new computed healthy eating scale. It might be important to consider a scale that can be adapted to the lifestyle of people who follow a vegetarian or vegan diet. Although this is found to be a small group of the world's population (Ruby, 2012), overall more highly educated people are following a vegetarian or vegan diet (Rimal, 2002). Since this study and a lot of other studies have mostly students as their participants, the adjustment of the scale can be an important consideration. In the current study, the Rate your Plate had to be adjusted afterwards because the scale was not a right fit for people who follow a vegetarian or vegan diet. Future adjustments in a scale measuring healthy eating behavior might benefit the outcome of future research, for example, adjustments that allow for different diets or allergies. Another suggestion can be to use a food diary instead of a scale measuring healthy eating behavior (for example done by Adriaanse et al., 2014). Furthermore, it can be important to think about the origin of the participants. The Rate your Plate is originally a scale from The United States of America, thus all the measurements are American ones (oz, pounds, etc.). For the current study, this was not a problem, since the reliability of the scale still scored high. For future research, this is a detail to keep in mind.

Lastly, future research might consider doing more research about threat and challenge appraisal. In the current study, the appraisal scale was based on two items, which were reduced to one scale. This self-reported appraisal has been used in previous research (Blascovich & Tomaka, 1996; Moore et al., 2012) and was shown to be reliable, but the appraisal in the current research has been specifically targeted at healthy eating behavior. A significant relationship between trait self-control and appraisal was still found, but there was no significant relationship between appraisal and healthy eating behavior. Also, as written earlier in the discussion, it is interesting to find out if there will be different results when the appraisal scale is based on different domains of appraisal. This has not been examined yet, although Blascovich and Tomaka (1996) mentioned it shortly. Therefore, this is very interesting for future research.

Concluding remarks

This research has added valuable new insights on trait self-control and its underlying mechanisms. It is clear that having more trait self-control leads to a healthier diet. It was proven that self-control and appraisal have a connection, but this single effect does not affect healthy

eating behavior. Even though this mediating relationship was not found to be significant, it is becoming evident that there is a connection between trait self-control and appraisal. Therefore, future research should look more into the working mechanisms of trait self-control and its relations to appraisal. Moreover, appraisal should be tested in different domains to find out how it is relating to domains other than healthy eating behavior. Having more knowledge about trait self-control and appraisal is important because it can benefit all kinds of self-control successes in one's life further on.

References

- Adriaanse, M. A., Kroese, F. M., Gillebaart, M., & De Ridder, D. T. (2014). Effortless inhibition: habit mediates the relation between self-control and unhealthy snack consumption. *Frontiers in psychology*, *5*, 444. doi: 10.3389/fpsyg.2014.00444
- Arnold, H. J., & Feldman, D. C. (1981). Social desirability response bias in self-report choice situations. *Academy of Management Journal*, *24*(2), 377-385.
- 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*(5), 1252.
- Baumeister, R. F., & Vohs, K. D. (2007). Self-Regulation, ego depletion, and motivation. *Social and personality psychology compass*, *1*(1), 115-128.
doi: 10.1111/j.1751-9004.2007.00001.x
- 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.
doi: 10.1111/j.1467-8721.2007.00534.x
- Baumeister, R. F. (2002). Ego depletion and self-control failure: An energy model of the self's executive function. *Self and Identity*, *1*(2), 129-136. doi: 10.1080/152988602317319302
- Blascovich, J., & Mendes, W. B. (2000). Challenge and threat appraisals: The role of affective cues. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 59–82). New York, NY: Cambridge University Press.
- Blascovich, J., & Tomaka, J. (1996). The biopsychosocial model of arousal regulation. *Advances in Experimental Social Psychology*, *28*, 1–51. doi: 10.1016/s0065-2601(08)60235-x
- Bogaers, M. (2018). Challenge vs. Threat in Self-Control Dilemmas: How Trait Self-Control Predicts Cognitive and Physiological Responses. (*n.p.*).
- Cheung, T. T., Gillebaart, M., Kroese, F., & De Ridder, D. (2014). Why are people with high self-control happier? The effect of trait self-control on happiness as mediated by regulatory focus. *Frontiers in psychology*, *5*, 722. doi: 10.3389/fpsyg.2014.00722

- De Ridder, D. T. D., Lensvelt-Mulders, G., Finkenauer, C., Stok, 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*, 76–99. doi: 10.1177/1088868311418749
- Gans, K. M., Hixson, M. L., Eaton, C. B., & Lasater, T. M. (2000). Rate Your Plate: a dietary assessment and educational tool for blood cholesterol control. *Nutrition in Clinical Care, 3*(3), 163-169. doi: 10.1046/j.1523-5408.2000.00045.x
- Gans, K. M., Sundaram, S. G., McPhillips, J. B., Hixson, M. L., Linnan, L., & Carleton, R. A. (1993). Rate your plate: an eating pattern assessment and educational tool used at cholesterol screening and education programs. *Journal of Nutrition Education, 25*(1), 29-36.
- Gillebaart, M. (2018). The ‘operational’ definition of self-control. *Frontiers in psychology, 9*, 1231. doi: 10.3389/fpsyg.2018.01231
- Gillebaart, M., & de Ridder, D. T. (2015). Effortless self-control: A novel perspective on response conflict strategies in trait self-control. *Social and Personality Psychology Compass, 9*(2), 88-99. doi: 10.1111/spc3.12160
- Gillebaart, M., Schneider, I. K., & De Ridder, D. T. (2016). Effects of trait self-control on response conflict about healthy and unhealthy food. *Journal of personality, 84*(6), 789-798. doi: 10.1111/jopy.12219
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. (2010). Ego depletion and the strength model of self-control: a meta-analysis. *Psychological bulletin, 136*(4), 495. doi: 10.1037/a0019486
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.
- Hofmann, W., Luhmann, M., Fischer, R. R., Vohs, K. D., & Baumeister, R. F. (2014). Yes, but are they happy? Effects of trait self-control on affective well-being and life satisfaction. *Journal of Personality*. doi: 10.1111/jopy12050.
- Martijn, C., Alberts, H. J., Merckelbach, H., Havermans, R., Huijts, A., & De Vries, N. K. (2007). Overcoming ego depletion: the influence of exemplar priming on self-control

performance. *European Journal of Social Psychology*, 37(2), 231-238.
doi: 10.1002/ejsp.350

Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., et al. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proc. Natl. Acad. Sci. U.S.A.* 108, 2693–2698. doi: 10.1073/pnas.1010076108

Moore, L. J., Vine, S. J., Wilson, M. R., & Freeman, P. (2012). The effect of challenge and threat states on performance: An examination of potential mechanisms. *Psychophysiology*, 49, 1417–1425. doi: 10.1111/j.1469-8986.2012.01449.x

Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as a limited resource: regulatory depletion patterns. *Journal of personality and social psychology*, 74(3), 774.

Rimal, A. P. (2002). Factors affecting meat preferences among American consumers. *Family Economics and Nutrition Review*, 14(2), 36-43.

Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: origins and outcomes. *Journal of personality and social psychology*, 78(1), 122.
doi: 10.1037//0022-3514.78.1.122

Ruby, M. B. (2012). Vegetarianism. A blossoming field of study. *Appetite*, 58(1), 141-150.
doi: 10.1016/j.appet.2011.09.019

Van de Mortel, T. F. (2008). Faking it: social desirability response bias in self-report research. *Australian Journal of Advanced Nursing, The*, 25(4), 40.

Vohs, K. D., Finkenauer, C., and Baumeister, R. F. (2011). The sum of friends' and lovers' self-control scores predicts relationship quality. *Soc. Psychol. Pers. Sci.* 2, 138–145.
doi: 10.1177/1948550610385710

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, 271-324. doi: 10.1111/j.0022-3506.2004.00263.x

Appendix A

Text used to measure appraisal

“Now, imagine that you are at a birthday party of your best friend. It is a big day, you want to really celebrate it, but you just started to be on a strict diet. Your friend offers you a piece of cake. You do not want to let your friend down, but also do not want to fail the diet. What to do?”