The Relationship Between Procrastination, Self-Efficacy and Episodic Future Thinking

Viola Wins
Master Thesis
Student number: 4354079
Master´s specialization: Clinical Psychology
Supervisor: Dr. Mareike Altgassen
Radboud University Nijmegen
Nijmegen, February 2018

Abstract

The aim of the present study was to investigate the relationship between Episodic Future Thinking and procrastination and the role of self-efficacy as a possible moderator within this relationship. Additionally, it was examined if there is a difference in amount of detail between the representation of positive and negative future events and if there is an interaction between valence of the event and the tendency to procrastinate. The 78 participants had to do an "Episodic Future Thinking Task" to measure how detailed the stimulation of future events is. Furthermore, they had to fill in the "Tuckman Procrastination Questionnaire" to measure the tendency to procrastinate and the "College Academic Self-Efficacy Scale" to quantify the confidence level for completing certain tasks in the academic setting. The results indicated that there is no relationship between Episodic Future Thinking and procrastination and no moderating effect of self-efficacy. No difference in amount of detail between the representation of positive and negative future events and no interaction between valence of the event and procrastination has been found. A possible explanation for the results might be that a combination of different interlaced mechanisms rather than one mechanism plays a role in Episodic Future Thinking. Additionally, an explanation for the findings might be based on the methodology used in this study.

Procrastination is a phenomenon that involves unnecessary and voluntary delay of tasks in spite of being aware of the negative results of delaying (D'Argembeau & Van der Linden, 2006; D'Argembeau & Van der Linden, 2012; Milgram, Sroloff, & Rosenbaum, 1988; Rebetez, Barsics, Rochat, D'Argembeau, & Van der Linden, 2016). Procrastination is a very common behavior. According to a study by Harriott and Ferrari (1996), 15-20% of the adult population reports to be negatively influenced by their procrastination behavior. In the student population procrastination seems to be even more prevalent. Research has shown that more than half of the students procrastinate regularly (Solomon & Rothblum, 1984).

There are number of studies indicating that procrastination has several negative outcomes. So research has shown that people who tend to procrastinate perform more poorly than non- procrastinators (Steel, Brothen, & Wambach, 2001; Tice & Baumeister, 1997). Furthermore, it has been indicated that procrastination has a negative effect on well-being (Sirois & Tosti, 2012) and health (Sirois, Melia-Gordon, & Pychyl, 2003; Sirois & Pychyl, 2013). The negative effect on health seems to be both; direct due to higher level of stress procrastinators experience (Sirois et al., 2003) and indirect because procrastinators are less

likely to make use of medical (Sirois et al., 2003; Sirois, 2007) and mental health treatment (Stead, Shanahan, & Neufeld, 2010). Procrastination also seems to be linked to experiencing negative emotions such as anxiety (Solomon & Rothblum, 1984) and guilt (Blunt & Psychl, 2000).

Several studies have indicated that the basis mechanism of procrastination is a deficit in self-regulation resulting in a lack of self-control to start or to carry on with a task (Sirois & Pychyl, 2013). In this process, the lack of considering future needs seems to play an essential role (Sirois & Pychyl, 2013). It has been theorized that procrastination is a momentary mood reparation strategy in which the temporary mood repair by delaying the task is favored over striving to achieve long term goals (Rebetez et al., 2016). Likewise, people who tend to procrastinate are less likely to consider the consequences of their actions (Rebetez et al., 2016). For anticipating future needs and possible consequences of the own behavior it is essential to be able to form a detailed representation of possible future events (Rebetez et al., 2016). In addition, a detailed representation leads to an increase in motivation to accomplish the imagined future state (Karniol & Ross, 1996). The ability to form a representation of future events is called Episodic Future Thinking (Rebetez et al., 2016). In the study by Rebetez et al. (2016) a link between procrastination and Episodic Future Thinking has been found. It was indicated that procrastinators envision less sensory details of possible future events than non-procrastinators. Research has shown that a representation of a possible future event is formed by recombining elements educed from episodic memory (Suddendorf & Busby, 2005; Suddendorf & Corballis, 2007). This notion is supported by studies indicating that remembering past events and imaging future events is strongly related (Brown, Dorfman, Marmar, & Bryant, 2012; Szpunar, 2010). So studies have shown that the same brain regions are activated during both processes (Hassabis, Kumaran, & Maguire, 2007; Schacter & Addis, 2007) and that people showing deficits in episodic memory functioning also perform poorly when they have to form a representation of future events (Hassabis, Kumaran, Vann, & Maguire, 2007; Tulving, 1985).

An important factor influencing both; remembering past and envisioning possible future events seems to be self-efficacy, which can be defined as the sense of confidence people have in their ability to achieve a task (Bandura, 1977). The study by Brown et al. (2012) has shown that when a participant's perceived self-efficacy is manipulated, people with a high sense of self-efficacy form a more detailed representation of past and future events. This finding could be explained by the *CaRFAX model* (Williams, 2006) stating that people with a high sense of self efficacy are using more executive control than people with a

low sense of self efficacy which leads to a stronger perseverance of effort (Bandura, 2001) when retrieving elements from memory to form a representation of a future event. Furthermore, the model states that people with a high sense of self-efficacy are ruminating less about difficulties during the retrieval process and are less likely to stop the retrieval at a premature stage (Williams, 2006). All these mechanisms might be an explanation why people with a high perceived self-efficacy are able to form a more detailed representation of past and future events than people with a low sense of self efficacy (Brown et al., 2012; Williams, 2006)

Perceived self-efficacy seems not just to have an influence on how well people can envision possible future events but also seems to have a link with procrastination since there are several studies showing that self-efficacy is s a strong predictor of procrastination behavior (Klassen, Krawchuk, & Rajani, 2008; Steel, 2007). Research has shown that people who have a low perceived self-efficacy tend to procrastinate more than people with a high sense of self efficacy (Klassen et al., 2008). Several studies indicated that this phenomenon can be explained by the *self-efficacy theory*, which states that the beliefs of a person about their own abilities strongly influence decision making, amount of determination and the level of resistance when encountering difficulties (Bandura, 1977, 1986; Capara et al., 2008; Hen & Goroshit, 2012; Klassen et al., 2008) which are all factors playing a role in procrastination behavior.

The sense of self -efficacy is not the only factor influencing the stimulation of future events. There is evidence that also the valence of the event plays an essential role in this process. Studies have shown that the representation of past and future positive events is more detailed than the representation of negative events (D'Argembeau, Comblain, & Van der Linden, 2003; D'Argembeau & Van der Linden, 2004; Destun & Kuiper, 1999). This finding can be explained by theories stating that most people prefer to process information containing a positive view about themselves (Taylor & Brown, 1988). This might lead to better encoded positive information in memory (Sedikides & Green, 2000) and preferred access of positive information when forming a representation of future events which consequently leads to a more detailed representation of positive future events (D'Argembeau et al., 2003; D'Argembeau & Van der Linden, 2004).

The study by Conway and Pleydell-Pearce (2000) has revealed that which kind of information in memory is accessed also depends on the goals of a person. They developed the *Self Memory System model*, stating that people show the tendency to access information which are consistent with their goals. So even though a broad spectrum of positive and

negative memories is stored, the goals of a person are influencing how easily certain memories are accessed in order to form a representation of future events. How easy positive and negative memories are retrieved in turn influences how detailed the envisioned future event is (Brown et al., 2012; Conway, 2005; Conway, Meares, & Standart, 2004; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004). It might be possible that the tendency to procrastinate which represents the preference for achieving short term goals such as feeling good instantly over striving to achieve long term goals (Rebetez et al., 2016) is influencing how easy positive and negative memories are accessed and by this also influences the amount of perceptual detail of the representation of positive and negative future events.

In sum there are studies indicating that procrastination is related to Episodic Future Thinking (Rebetez et al., 2016), that self-efficacy is a strong predicator of the tendency to procrastinate (Klassen et al., 2008; Steel et al., 2007) and that people with low self-efficacy imagine less perceptual details than people with high perceived self-efficacy (Brown et al., 2012). The findings of these studies give the indication that there is a relationship between these variables, but the connection is not clear yet. Moreover, even though that there are many studies indicating that the memory of positive events is more detailed compared to negative events (D'Argembeau et al., 2003; Destun & Kuiper, 1999) just a few studies have focused on the influence of valence on forming a representation of future events (D'Argembeau & Van der Linden, 2004) and no research has been done yet investigating if there is an interaction between the valence of the event and the tendency to procrastinate. Therefore, the aim of this study is to close this gap.

The first research question of the present study is: What is the relationship between procrastination, Episodic Future Thinking and perceived self-efficacy? It is hypothesized that there is a negative relationship between Episodic Future Thinking and procrastination so that people who show the tendency to procrastinate form a less detailed representation of future events than people who do not have this tendency. Additionally, it is expected that self-efficacy is moderating this effect so that the lower the perceived self-efficacy of a person is the stronger the relationship between Episodic Future Thinking and procrastination becomes.

The second research question is: Is there a difference in amount of detail between the representation of positive and negative future events and is there an interaction between the valence of the event and the tendency to procrastinate? The first hypothesis in regard of this question is that there is a difference in amount of detail between positive and negative future events and that the representation of positive future events is more detailed than the representation of negative events. The second hypothesis is that there is an interaction

between the valence of the event and the tendency to procrastinate. Due to a lack of research this hypothesis is explorative so there is no indication about the direction of the effect.

Considering the high prevalence and several negative outcomes of procrastination, such as poorer performance, less well-being and poorer health, gaining more insights in the mechanisms influencing procrastination is crucial. The insights gained by this study could also help by considering interventions to decrease procrastination and its negative effects.

Method

Participants

Seventy-eight students (69 female & 9 male) were recruited for the study via the Radboud Research Participant system. The data of one participant had to be excluded because the analysis revealed that this was an outlier in multiple variables and he was suspected to not understand the tasks due to a lack of English skills. Therefore, the data of 77 subjects was used in the analysis. The age of the participants ranges between 18 and 27 (M = 20,57). For participants recruited via the Radboud Research Participant system 1 point was granted for their participation.

Material

Demographic questionnaire. The participants had to fill in a demographic questionnaire with seven items: Age, gender, nationality, years of higher education, average grade in high school, average grade in university and number of years speaking English

Episodic Future Thinking Task. To measure Episodic Future Thinking an adapted version of the task developed by D'Argembeau and Van der Linden (2012) was used. The participants got the oral instruction to imagine three positive and three negative events that might plausible happen to them in the academic setting. The description of the positive and negative events included the same core elements (e.g. giving a presentation) and some valence depending elements (e.g. everyone listens, you know exactly what you want to say; see Appendix A for the full description). The order of events was counterbalanced. In the instructions, it was emphasized that the event must be novel and precise, and that the description has to be as detailed as possible. The description of the event was read out loud. Afterwards the participants got 45 seconds to form a representation of the situation. Then the

researcher gave a sign to begin and the participant had to describe the imagined event. The answer of the participant was recorded. After describing each event the participants had to fill in a questionnaire on the computer about the stimulated event. The participant had to rate the representation on a five-point Likert scale in regard of the following factors: detail (ranging from “few details” to “many details”), plausibility (ranging from “very implausible” to “very plausible”), valence (ranging from “very negative” to “very positive”), ease of stimulation (ranging from “very difficult” to “very easy”) and arousal (ranging from “very calming” to “very arousing”). These ratings are based on the questionnaire used in the study by Wu, Szpunar, Godovich, Schacter and Hofmann (2015).

Tuckmann Procrastination Questionnaire. To measure the tendency to procrastinate the Tuckman Procrastination Scale (Tuckman, 1991) was used (Appendix B). To adapt it to the present study the participants were instructed to answer the questions in regard of their behavior in the academic setting. The questionnaire consists of 16 statements about the tendency to delay tasks which had to be rated on a four-point Likert scale (ranging from ‘that’s not me for sure’ to ‘that’s me for sure’) The internal consistency reliability of this questionnaire is high (Cronbach´s $\alpha = .90$). .

College Academic Self-Efficacy Scale. This 33-item questionnaire was used to measure academic self-efficacy by asking the participants how confident they feel in regard of their capabilities to perform in certain tasks in the academic setting (Owen & Froman, 1988) (Appendix C). The level of confidence had to be rated on a Five-point Likert scale (ranging from ‘quite a lot’ to ‘very little’). The internal consistency reliability of this questionnaire is high (Cronbach´s $\alpha = .90$).

Procedure

The study took place in the Thomas van Aquino building at the Radboud University Nijmegen and took around 45 minutes. The participants were collected at the main entrance and were brought to the experimental room. Initially the participant had to sign the informed consent papers. Afterwards they had to fill in the demographic questionnaire on the computer. Hereafter the “Episodic Future Thinking Task” was conducted. Then the participants had to fill in the “Tuckmann Procrastination Questionnaire” and the “College Academic Self-Efficacy Scale” on the computer. Moreover, two other questionnaires had to be filled in, which are used by two other researchers and are no relevant for this study. After the experiment, the participants got the chance to leave their email address if they want to receive

a debriefing letter and for participants recruited via the Radboud Research Participant system 1 point was granted.

Data-Analysis

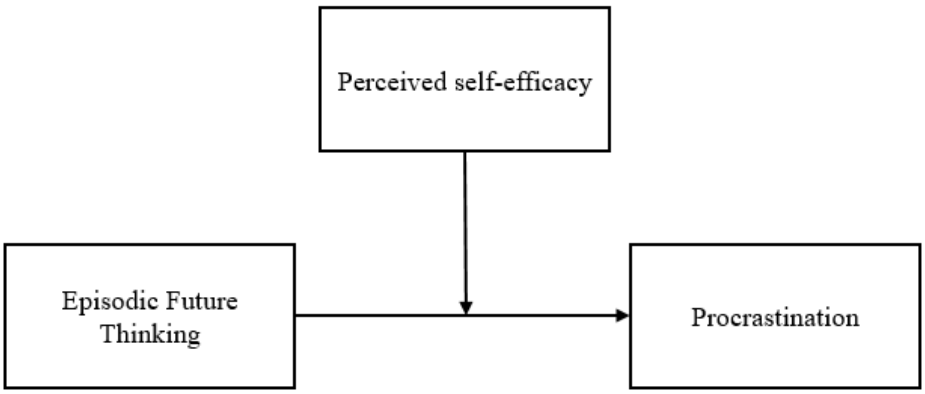

Figure 1. A moderation model with Episodic Future Thinking as independent variable, procrastination as dependent variable and perceived self-efficacy as a moderator was tested

For the data analysis IBM SPSS Statistics (version 23.0) was used. Initially the data was exported from Qualtrics to SPSS. Then it was controlled for outliers. One subject was identified as an outlier in multiple variables therefore this data was removed from the data set. Hereafter reversed items of the "Tuckmann Procrastination Questionnaire" were recoded and the sum score was calculated by adding up all item scores. A high score on this questionnaire indicates a strong tendency to procrastinate. Furthermore, for a better understanding, all items of the "College Academic Self-Efficacy Scale" were recoded so that a low score indicates a low sense of self-efficacy. Then the sum score was calculated by adding up all item scores. Additionally, the sum score for amount of perceptual detail was calculated by adding up the rating scores for all six events. The higher the score for perceptual detail, the more details are envisioned. To compare the representation of positive and negative events the sum score was calculated respectively for the three positive and negative items for amount of detail and for valence of the event by adding up the item scores. The higher the valence score, the more positive the event is rated.

To investigate the relationship between Episodic Future Thinking and procrastination and the role of self-efficacy as a possible moderator within this relationship, a moderation analysis (model 1; see Figure 1 for illustration) was done by using the macro PROCESS of Hayes for SPSS (Preacher & Hayes, 2004). The scores of self-efficacy were centered prior to

the analysis. Bootstrapping (5000 samples) was used, which has the benefit that no assumption about the shape of the distribution of the variables must be done (Preacher & Hayes, 2004).

To test if there is a difference in amount of detail between the representation of positive and negative events and if there is an interaction between the valence of the event and tendency to procrastinate a Repeated Measures ANOVA was conducted with valence of the event (positive/negative) as within subject factor, the amount of detail of the representation as a dependent variable and procrastination as a covariate. The procrastination score was standardized prior to the analysis.

To investigate if there is a significant difference in perceived valence between the positive and negative events the participants had to imagine, a paired samples t-test was conducted comparing the valence ratings of the three positive and the three negative events.

Results

Table 1.

Descriptive Statistics: mean scores (SD), range of scores (N =77)

	Mean score(SD)	Range of scores
Detail situation		
Total	20(3)	10-27
Positive	10(2)	5-14
Negative	10(2)	5-14
Valence situation		
Positive	13(1)	9-15
Negative	5(2)	3-12
Procrastination	36(8)	17-54
Self-efficacy	115(16)	74-151

The descriptive statistics of this study are illustrated in Table 1. The moderation analysis revealed that the overall model was significant (R^2 = .54, $F(3,73) = 11.15$, $p < .001$). The analysis revealed no significant relationship between Episodic Future Thinking and procrastination (b = 0.13, SE = 0.29, p = .65) and no moderation effect of self-efficacy (b = -0.02, SE = 0.02, p = .37). A significant negative relationship between self-efficacy and procrastination was found; b = -0.26, SE = 0.06, $p < .001$, 95% CI [-0.38, -0.15]. People who

have a high sense of self-efficacy procrastinate less than people with a low sense of self-efficacy.

The Repeated Measures ANOVA revealed no significant main effect of valence of the event ($F(1,75) = 1.41$, $p = .24$). The reported amount of detail does not differ when people have to imagine positive ($M = 9.7$, $SD = 1.98$) or negative ($M = 10$, $SD = 2.12$) possible future events. There was no significant effect of procrastination ($F(1,75) = 0.2$, $p = .89$) and no significant valence × procrastination interaction ($F(1,75) = 2.89$, $p = .09$).

The paired samples t-test revealed that there is a significant difference between the valence rating of the representation of positive ($M = 12.78$, $SD = 1.44$) and negative ($M = 5.49$, $SD = 1.97$) future situations; $t(76) = 25.83$, $p < .001$). The rating of the positive future events is more positive than the rating of negative future events.

Discussion

The purpose of this study was to investigate the relationship between Episodic Future Thinking and procrastination and the role of self-efficacy as a possible moderator within this relationship. It was hypothesized that there is a negative relationship between Episodic Future Thinking and procrastination so that people who show the tendency to procrastinate form a less detailed representation than people who do not have this tendency (Rebetez et al., 2016). Furthermore, it was expected that perceived self-efficacy has a moderating effect so that the lower the perceived self-efficacy of a person is the stronger the relationship between Episodic Future Thinking and procrastination becomes (Brown et al., 2012; Klassen et al., 2008; Steel et al., 2007). In addition, the aim of this study was to examine whether people show a difference in amount of detail when forming a representation of positive and negative future events and to investigate if there is an interaction between valence of the event and the tendency to procrastinate. The first hypothesis in regard of this question was that a more detailed representation of positive compared to negative future events is formed (D'Argembeau &Van der Linden, 2004). The second hypothesis was that there is an interaction between valence of the event and procrastination (Conway, 2005; Conway & Pleydell-Pearce, 2000). Due to a lack of research this hypothesis was explorative so there was no indication about the direction of the effect. In contrast to our expectations, the results revealed that there is no relationship between Episodic Future Thinking and procrastination and no moderating effect of self-efficacy. Furthermore, unlike as expected the results indicate that there is no difference in amount of detail between the stimulation of positive and negative

future situations and no interaction between the valence of the event and tendency to procrastinate. Despite of not being part of the hypotheses of this study it is noteworthy that a significant negative relationship between procrastination and self-efficacy was found indicating that people with a low sense of self efficacy show a stronger tendency to procrastinate.

The finding of this study that there is no relationship between Episodic Future Thinking and procrastination is not in line with the study of Rebetez et al. (2016) which indicated that people who envision less details when forming a representation of a possible future events show a stronger tendency to procrastinate. One possible explanation might be that not just forming a detailed representation of a future situation, but the combination of different interlaced mechanisms plays a role in Episodic Future Thinking. Several studies have indicated that people who tend to procrastinate do not consider future needs which leads to a preference for immediate mood repair over long term goals (Rebetez et al., 2016) and that they have the tendency to not think about the consequences of their own behavior (Rebetez et al., 2016; Sirois & Pychyl, 2013). In this context, research has revealed that the ability to form a representation of possible future situations seems to be essential because it allows people to anticipate the consequences of their actions (D'Argembeau & Van der Linden, 2006, Suddendorf & Corballis, 2007) and it increases the motivation to achieve the imagined future state (Karniol & Ross, 1996). However, several studies have revealed that even though forming a detailed representation of a possible future event by recombining elements derived from episodic memory (Suddendorf & Corballis, 2007) is the key component of Episodic Future Thinking, there might be other mechanisms which play an essential role in this process and there is evidence that the different processes might be interconnected (D'Argembeau & Van der Linden, 2012). In this context studies have indicated that one of these crucial mechanisms is autonoetic consciousness, which is a process, which can be defined as the subjective sense of pre-experiencing a possible upcoming event (D'Argembeau, Ortoleva, Jumentier, & Van der Linden, 2010; D'Argembeau & Van der Linden, 2006; Tulving, 1985). There are studies which hypothesize that autonoetic consciousness is the component, which creates the difference between imagining fictitious and personal future events (de Vito, Gamboz, & Brandimonte, 2012; Hassabis, Kumaran, Vann, et.al., 2007). Moreover, the study by D'Argembeau and Van der Linden (2012) has revealed that amount of sensory detail and the subjective feeling of pre-experiencing an event seems to be interconnected since the sense of pre-experiencing depends partly on how detailed the formed representation is. However, another factor influencing the intensity of pre-experiencing is the strength of the feeling that

the future event is perceived as connected to personal goals and the subjective feeling of closeness in time of the event (D'Argembeau & Van der Linden, 2012). It seems reasonable that feeling a strong connection between the imagined future event and personal goals and the subjective feeling that the event will occur close in time might be both factors influencing a person's tendency to procrastinate. Therefore, by taking the results of earlier research in this field into account it seems reasonable that not just forming a detailed representation of a future situation but the combination of different interlaced mechanisms including autonoetic consciousness may play a role in Episodic Future Thinking and in making use of this ability in order to achieve long term goals and anticipate the consequences of the own behavior. By focusing on the amount of detail of the formed representation in this study only one of the possible mechanisms playing a role in Episodic Future Thinking was taken into account. This might be the explanation why no relationship between procrastination and Episodic Future Thinking was found in this study. The findings of this study emphasize the need for more research in the field in regard of the different mechanisms playing a role in Episodic Future Thinking and the possible interaction between the different processes.

Regarding the second research question comparing the amount of detail of positive and negative stimulations and investigating if there is an interaction between valence of the event and procrastination, the results revealed unlike expected that there is no difference in amount of detail when people have to imagine positive and negative future events and no interaction between valence and the tendency to procrastinate. This result is not in line with study by D'Argembeau and Van der Linden (2004) which found that the stimulation of positive future situations is more detailed than the stimulation of negative situations. There are several explanations imaginable for this discrepancy. One explanation might be based on the difference with regard to the methodology used in this study. The most significant difference compared to earlier studies is that in this study no cue words but a more detailed description of the scene the participants have to construct was used. The description of the positive and negative events the participants had to imagine included the same core elements (e.g. giving a presentation) and some valence depending elements (e.g. everyone listens, you know exactly what you want to say). So overall, the general scene the participants had to imagine was very similar for positive and negative situations. It is possible that due to the fact that the general situation constructed showed many analogies the difference in amount of detail between positive and negative events was not substantial enough to lead to a significant effect. Further research is needed to investigate the possible influence of the used methodology on the representation of future events. Another possible explanation for the

found result might be grounded in a limitation of this study. By examining the ratings of the participants, it became clear that the "positive presentation" and "positive essay" condition were not rated as positive as intended. Even though our analysis revealed that the overall valence ratings of the positive and negative events differs significantly, it might be possible that the difference in perceived valence was not substantial enough to produce an effect on the amount of detail of the formed representation.

The finding that there is no interaction between valence of the event and the tendency to procrastinate is not in line with what was expected based on the *self-memory model*, which states that the goals of a person influence which kind of information in memory is accessed in order to form a representation of future events (Brown et al., 2012; Conway, 2005; Conway, Meares, et al., 2004; Conway & Pleydell-Pearce, 2000; Conway, Singer, et al., 2004). One explanation for the finding might be that in this study the general tendency to procrastinate in the academic setting was measured. Research has shown that the tendency to procrastinate might be situation specific (Steel, 2007) and is influenced by factors such as perceived task aversiveness (Blunt & Pychyl, 2000) and distance of the reward (Strongman & Burt, 2000). It might be possible that the preference for accessing information in memory which are consistent with the own goal can just be observed in a situation in which a person procrastinates and prefers immediate mood repair and cannot be measured as an overall preference for accessing certain memories such as measured in this study.

The finding of a negative relationship between self-efficacy and procrastination is in line with several studies showing that there is a strong link between procrastination and self-efficacy (Klassen et al., 2008; Steel, 2007, Steel et al., 2001). The results can be understood in the light of the *self-efficacy theory*, which states that how confident a person feels regarding their own abilities influences the choices they make, the amount of effort they take and how much resistance they show when they encounter difficulties (Bandura 1977, 1986; Capara et al., 2008; Hen & Goroshit, 2012; Klassen et al., 2008) which are all factors playing a role in procrastination behavior. However, it has to be noted that there is an indication that self-efficacy is not just the cause of procrastination but also a consequence since research has shown that the feeling of self-efficacy of a person is formed by past success and failing experiences (Capara et al., 2008; Sitzmann & Yeo, 2013; Wäschle, Allgaier, Lachner, Fink, & Nückles, 2014). Therefore, it can be assumed that people with a low sense of self efficacy are more likely to procrastinate and to perform more poorly (Tice & Baumeister, 1997) which in turn reduces the sense of self efficacy of a person (Wäschle et al., 2014). The negative relationship between self-efficacy and procrastination found in this study supports the notion

that using interventions to strengthen students' self-efficacy can potentially decrease their procrastination behavior (Wäschle et al., 2014) and can reduce negative consequences derived from procrastination such as poorer academic performance and a low level of well-being (Steel, 2007; Steel et al., 2001).

This study has several limitations. First of all, the small sample size is decreasing the power of the analysis. Furthermore, it has to been noted that self-efficacy and procrastination are very domain-specific concepts (Klingsieck, 2013; Pajares, 1996), so no general conclusions can be drawn from this study about other domains. In regard of future research, it would be important to investigate if there is a substantial difference between the participant's self-reported amount of detail and the rating of an observer since by comparing the reported amount of detail and how detailed the given answers were, the impression was derived that both ratings differ to some extent. This might also be relevant regarding the development of new methods to measure Episodic Future Thinking.

In this study no relationship between Episodic Future Thinking and procrastination and no moderation effect of self-efficacy was found. In addition to that no difference in amount of detail was found between the stimulation of positive and negative possible future situations and no interaction between valence of the event and procrastination could be indicated. However, the results indicate that there is a negative relationship between self-efficacy and procrastination so that people with a low sense of self efficacy procrastinate more than people with a high sense of self efficacy. The results emphasize that more research is needed in the field of Episodic Future Thinking to indicate which different mechanisms play a role in this process. Additionally, more research is necessary to investigate the potential influence of the used methodology.

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215. doi:10.1037//0033-295x.84.2.191

Bandura, A. (1986). The Explanatory and Predictive Scope of Self-Efficacy Theory. *Journal Of Social and Clinical Psychology*, *4*(3), 359-373. doi:1986.4.3.359

Bandura, A. (2001). Social Cognitive Theory: An Agentic Perspective. *Annual Review Of Psychology*, *52*(1), 1-26. doi:10.1146/annurev.psych.52.1.1

Brown, A., Dorfman, M., Marmar, C., & Bryant, R. (2012). The impact of perceived self-efficacy on mental time travel and social problem solving. *Consciousness and Cognition*, *21*(1), 299-306. doi:10.1016/j.concog.2011.09.023

Blunt, A., & Pychyl, T. A. (2000). Task aversiveness and procrastination: A multi-dimensional approach to task aversiveness across stages of personal projects. *Personality and Individual Differences*, *24*(6), 837-846. doi:10.1016/S0191-8869(99)00091-4

Caprara, G., Fida, R., Vecchione, M., Del Bove, G., Vecchio, G., Barbaranelli, C., & Bandura, A. (2008). Longitudinal analysis of the role of perceived self-efficacy for self-regulated learning in academic continuance and achievement. *Journal Of Educational Psychology*, *100*(3), 525-534. doi:10.1037/0022-0663.100.3.525

Conway, M. (2005). Memory and the self. *Journal Of Memory And Language*, *53*(4), 594-628. doi:10.1016/j.jml.2005.08.005

Conway, M., Meares, K., & Standart, S. (2004). Images and goals. *Memory*, *12*(4), 525-531. doi:10.1080/09658210444000151

Conway, M., & Pleydell-Pearce, C. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261-288. doi:10.1037//0033-295x.107.2.261

Conway, M., Singer, J., & Tagini, A. (2004). The Self and Autobiographical Memory: Correspondence and Coherence. *Social Cognition*, *22*(5), 491-529. doi:10.1521/soco.22.5.491.50768

D'Argembeau, A., & Van der Linden, M. (2004). Phenomenal characteristics associated with projecting oneself back into the past and forward into the future: Influence of valence and temporal distance. *Consciousness and Cognition*, *13*(4), 844-858. doi:10.1016/j.concog.2004.07.007

D'Argembeau, A., & Van der Linden, M. (2006). Individual differences in the phenomenology of mental time travel: The effect of vivid visual imagery and emotion regulation strategies. *Consciousness and Cognition, 15*(2), 342-350. doi:10.1016/j.concog.2005.09.001

D'Argembeau, A., & Van der Linden, M. (2012). Predicting the phenomenology of episodic future thoughts. *Consciousness and Cognition, 21*(3), 1198-1206. doi:10.1016/j.concog.2012.05.004

D'Argembeau, A., Comblain, C., & Van der Linden, M. (2003). Phenomenal characteristics of autobiographical memories for positive, negative, and neutral events. *Applied Cognitive Psychology, 17*(3), 281-294. doi:10.1002/acp.856

D'Argembeau, A., Ortoleva, C., Jumentier, S., & Van der Linden, M. (2010). Component processes underlying future thinking. *Memory & Cognition, 38*(6), 809-819. doi:10.3758/MC.38.6.809

Destun, L. M., & Kuiper, N. A. (1999). Phenomenal characteristics associated with real and imagined events: The effects of event valence and absorption. *Applied Cognitive Psychology, 13*(12), 175–186. doi:10.1002/(SICI)1099-0720(199904)13:2<175:AID-ACP552>3.0.CO;2-W

de Vito, S., Gamboz, N., & Brandimonte, M. (2012). What differentiates episodic future thinking from complex scene imagery?. *Consciousness and Cognition, 21*(2), 813-823. doi:10.1016/j.concog.2012.01.013

Harriott, J., & Ferrari, J. (1996). Prevalence of Procrastination among Samples of Adults. *Psychological Reports, 78*(2), 611-616. doi:10.2466/pr0.1996.78.2.611

Hassabis, D., Kumaran, D., & Maguire, E. (2007). Using Imagination to Understand the Neural Basis of Episodic Memory. *Journal of Neuroscience, 27*(52), 14365-14374. doi:10.1523/jneurosci.4549-07.2007

Hassabis, D., Kumaran, D., Vann, S., & Maguire, E. (2007). Patients with hippocampal amnesia cannot imagine new experiences. *Proceedings Of The National Academy Of Sciences, 104*(5), 1726-1731. doi:10.1073/pnas.0610561104

Hen, M., & Goroshit, M. (2012). Academic Procrastination, Emotional Intelligence, Academic Self-Efficacy, and GPA: A Comparison Between Students With and Without Learning Disabilities. *Journal of Learning Disabilities, 47*(2), 116-124. doi:10.1177/0022219412439325

Karniol, R., & Ross, M. (1996). The Motivational impact of temporal focus: Thinking About the Future and the Past. *Annual Review of Psychology, 47*(1), 593-620.

doi:10.1146/annurev.psych.47.1.593

Klassen, R., Krawchuk, L., & Rajani, S. (2008). Academic procrastination of undergraduates: Low self-efficacy to self-regulate predicts higher levels of procrastination. *ContemporaryEducational Psychology*, *33*(4), 915-931. doi:1016/j.cedpsych.2007.07.001

Klingsieck, K. (2013). Procrastination in Different Life-Domains: Is Procrastination Domain Specific?. *Current Psychology*, *32*(2), 175-185. doi:10.1007/s12144-013-9171-8

Milgram, N., Sroloff, B., & Rosenbaum, M. (1988). The procrastination of everyday life. *Journal of Research In Personality*, *22*(2), 197-212. doi:10.1016/0092-6566(88)90015-3

Owen, S., & Froman, R. (1988, April). *Development of a college academic self-efficacy scale*. Paper presented at the annual meeting of the National Council on Measurement in Education, New Orleans, LA.

Pajares, F. (1996). Self-Efficacy Beliefs in Academic Settings. *Review Of Educational Research*, *66*(4), 543-578. doi:10.3102/00346543066004543

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36* (4), 717-731. doi:10.3758/BF03206553

Rebetez, M., Barsics, C., Rochat, L., D'Argembeau, A., & Van der Linden, M. (2016). Procrastination, consideration of future consequences, and episodic future thinking. *Consciousness and Cognition, 42*, 286-292. doi:10.1016/j.concog.2016.04.003

Schacter, D., & Addis, D. (2007). The cognitive neuroscience of constructive memory: remembering the past and imagining the future. *Philosophical Transactions Of The Royal Society B: Biological Sciences*, *362*(1481), 773-786. doi:10.1098/rstb.2007.2087

Sedikides, C., & Green, J. D. (2000). On the self-protective nature of inconsistency-negativity management: Using the person memory paradigm to examine self-referent memory. *Journal of Personality and Social Psychology, 79*(6)906–922. doi:10.1037/0022-3514.79.6.906

Sitzmann, T., & Yeo, G. (2013). A Meta-Analytic Investigation of the Within-Person Self-Efficacy Domain: Is Self-Efficacy a Product of Past Performance or a Driver of Future Performance?. *Personnel Psychology, 66*(3), 531-568. doi:10.1111/peps.12035

Strongman, K. T., & Burt, C. D. B. (2000). Taking breaks from work: An exploratory

inquiry. *Journal of Psychology, 134,* 229–242. doi:10.1080/00223980009600864

Sirois, F. M. (2007). ‘‘I’ll look after my health, later’’: A replication and extension of the procrastination–health model with community-dwelling adults. *Personality and Individual Differences, 43*(1) 15-26. doi:10.1016/j.paid.2006.11.003

Sirois, F., Melia-Gordon, M., & Pychyl, T. (2003). “I'll look after my health, later”: an investigation of procrastination and health. *Personality and Individual Differences, 35*(5), 1167-1184. doi:10.1016/s0191-8869(02)00326-4

Sirois, F., & Pychyl, T. (2013). Procrastination and the Priority of Short-Term Mood Regulation: Consequences for Future Self. *Social and Personality Psychology Compass, 7*(2), 115-127. doi:10.1111/spc3.12011

Sirois, F., & Tosti, N. (2012). Lost in the Moment? An Investigation of Procrastination, Mindfulness, and Well-being. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *30*(4), 237-248. doi:10.1007/s10942-012-0151-y

Solomon, L. & Rothblum, E. (1984). Academic procrastination: Frequency and cognitive-behavioral correlates. *Journal of Counseling Psychology*, *31*(4), 503-509. doi: 10.1037//0022-0167.31.4.503

Stead, R., Shanahan, M. & Neufeld, R. (2010). “I’ll go to therapy, eventually”: Procrastination, stress and mental health. *Personality and Individual Differences*, *49*(3), 175-180. doi:10.1016/j.paid.2010.03.028

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, *133*(1), 65-94. doi: 10.1037/0033-2909.133.1.65

Steel, P., Brothen, T., & Wambach, C. (2001). Procrastination and personality, performance, and mood. *Personality and Individual Differences,30,* 95–106. doi:10.1016/S0191-8869(00)00013-1

Suddendorf, T., & Busby, J. (2005). Making decisions with the future in mind: Developmental and comparative identification of mental time travel. *Learning & Motivation, 36*(2) 110-125. doi:10.1016/j.lmot.2005.02.010

Suddendorf, T., & Corballis, M. (2007). The evolution of foresight: What is mental time travel, and is it unique to humans?. *Behavioral And Brain Sciences*, *30*(3). doi:.10.1017/s0140525x07001975

Szpunar, K. (2010). Episodic Future Thought: An emerging concept. *Perspectives On Psychological Science*, *5*(2), 142-162. doi:10.1177/1745691610362350

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*(2), 193–210. doi:10.1037/0033-2909.103.2.193

Tice, D., & Baumeister, R. (1997). Longitudinal Study of Procrastination, Performance, Stress, and Health: The Costs and Benefits of Dawdling. *Psychological Science, 8*(6), 454-458. doi:10.1111/j.1467-9280. 1997.tb00460.x

Tuckman, B. (1991). The Development and Concurrent Validity of the Procrastination Scale. *Educational and Psychological Measurement, 51*(2), 473-480. doi:10.1177/0013164491512022

Tulving, E. (1985). Memory and consciousness. *Canadian Psychology/ Psychologie Canadienne, 26*(1), 1-12. doi:10.1037/h0080017

Wäschle, K., Allgaier, A., Lachner, A., Fink, S., & Nückles, M. (2014). Procrastination and self-efficacy: Tracing vicious and virtuous circles in self-regulated learning. *Learning and Instruction 29,* 103-114. doi:10.1016/j.learninstruc.2013.09.005

Williams, J. (2006). Capture and rumination, functional avoidance, and executive control (CaRFAX): Three processes that underlie overgeneral memory. *Cognition And Emotion*, *20* (3-4), 548-568. doi:10.1080/02699930500450465

Wu, J., Szpunar, K., Godovich, S., Schacter, D., & Hofmann, S. (2015). Episodic future thinking in generalized anxiety disorder. *Journal of Anxiety Disorders, 36*, 1-8. doi:10.1016/j.janxdis.2015.09.005

Appendix A

Episodic Future Thinking Task

Positive Events

1. Imagine you receive a good grade for an exam you thought you might not even pass.
2. Imagine you upload your essay way before the deadline and you already know from your fellow students that the content of your essay is similar to theirs, and so likely meet expectations and will get a good grade.
3. Imagine you are giving a presentation: Everyone listens, you are on time and you know exactly what you want to say.

Negative Events

1. Imagine you just receive the news that you failed the exam of an important course.
2. Imagine you just noticed that your essay does not meet the requirements and you only have one day left to upload a revised version.
3. Imagine you are giving a presentation: The other students look bored and all of a sudden you have a blackout and you do not know what to say anymore.

Appendix B

Tuckmann Procrastination Scale

1. I needlessly delay finishing jobs, even when they're important.
2. I postpone starting in on things I don't like to do.
3. When I have a deadline, I wait until the last minute.
4. I delay making tough decisions
5. I keep putting off improving my work habits
6. I manage to find an excuse for not doing something
7. I put the necessary time into even boring tasks, like studying.
8. I am an incurable time waster
9. I'm a time waster now but I can't seem to do anything about it
10. When something is too tough to tackle, I believe in postponing it.
11. I promise myself I'll do something and then drag my feet.
12. Whenever I make a plan of action I follow it.
13. Even though I hate myself I don't get started, it doesn't get me going.
14. I always finish important jobs with time to spare.
15. I got stuck in neutral even though I know how important it is to get started
16. Putting something off until tomorrow is not the way I do it

Appendix C

College Academic Self-Efficacy Questionnaire

How much confidence do you have about doing each of the behaviors listed below?

1. Taking well-organized notes during a lecture.
2. Participating in a class discussion.
3. Answering a question in a large class.
4. Answering a question in a small class.
5. Taking "objective" tests (multiple-choice, T-F, matching)
7. Writing a high-quality term paper.
8. Listening carefully during a lecture on a difficult topic.
9. Tutoring another student.
10. Explaining a concept to another student.
11. Asking a professor in class to review a concept you don't understand.
12. Earning good marks in most courses.
13. Studying enough to understand content thoroughly.
14. Running for student government office.
15. Participating in extracurricular events (sports, clubs).
16. Making professors respect you.
17. Attending class regularly.
18. Attending class consistently in a dull course.
19. Making a professor think you're paying attention in class.
21. Understanding most ideas presented in class.
22. Performing simple math computations.
23. Using a computer.
24. Mastering most content in a math course.
25. Talking to a professor privately to get to know him or her.
26. Relating course content to material in other courses.
27. Challenging a professor's opinion in class.
28. Applying lecture content to a laboratory session.
29. Making good use of the library.
30. Getting good grades.
31. Spreading out studying instead of cramming.

32. Understanding difficult passages in textbooks.
33. Mastering content in a course you're not interested in.