Universidade de Aveiro
Ano 2021

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TENDÊNCIAS RUMINATIVAS NOS ESTUDANTES UNIVERSITÁRIOS: O PAPEL DO CONTROLO EXECUTIVO NA RUMINAÇÃO E NA PROCRASTINAÇÃO ACADÉMICA.

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RUMINATIVE TENDENCIES IN UNIVERSITY STUDENTS: THE ROLE OF EXECUTIVE CONTROL IN RUMINATION AND ACADEMIC PROCRASTINATION.

Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Psicologia da Saúde e Reabilitação Neuropsicológica, realizada sob a orientação científica da Doutora Catarina Rosa, Investigadora Doutorada (Nível 1) do Departamento de Educação e Psicologia da Universidade de Aveiro

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agradecimentos

Esta dissertação é o culminar destes 5 anos de aprendizagem. O meu percurso académico foi uma verdadeira montanha-russa (e eu não gosto de carrosséis), mas a verdade é que nada seria possível se tivesse vivido esta aventura sozinha.

Dedico este trabalho aos meus pais pois sem eles não estaria onde estou hoje. Estou eternamente grata por todos os esforços que fizeram por mim e por acreditarem em mim todos os dias. Obrigada pelo amor e apoio incondicional. Por vocês sempre.

Ao meu irmão Duarte que cresceu com a irmã longe, mas que todos os fins-de-semana me recebeu com um sorriso e de braços abertos (e com uns centímetros a mais). Vales ouro miúdo.

Aos meus avós e à minha bisavó por nunca esconderem o orgulho que sentem por me verem lutar pelo meu futuro. Obrigada por tudo.

À restante família que sempre me apoiou ao longo desta caminhada.

À Mónica que veio trazer luz à minha vida quando mais precisei. Obrigada por estares sempre presente e por acreditares em mim sem hesitar. Fazes de mim uma pessoa melhor e sei todos os dias a sorte que tenho por te ter ao meu lado. Saíste-me a sorte grande.

À professora Catarina Rosa pelo apoio e orientação incansáveis durante este ano atípico repleto de adversidades que nos deixou pouco tempo para procrastinar. Obrigada por fazer parte do meu percurso.

À professora Isabel Santos, ao professor Pedro Bem-Haja e ao professor Nuno Sá Teixeira pela generosidade de estarem presentes nesta caminhada e dedicarem tantas horas a este projeto.

À Inês, à Tânia e à Maria por serem as melhores partners in crime. Não imagino esta aventura sem vocês. Obrigada do fundo do coração por estes 5 anos cheios de memórias. Tenho muito orgulho em nós. É tudo nosso!

palavras-chave

procrastinação académica; ruminação *brooding*; ruminação autocrítica; controlo executivo; treino cognitivo

resumo

A procrastinação tem sido destacada como um problema prevalente entre os estudantes universitários. Este fenómeno pode ser definido como uma tendência para adiar voluntariamente tarefas académicas, independentemente das consequências que podem advir desse adiamento. Diversos estudos têm evidenciado, consistentemente, uma associação entre a procrastinação e défices no controlo executivo, bem como com dois tipos ruminação: *brooding* e autocrítica. No entanto, a investigação sobre intervenções para reduzir a procrastinação académica com foco nestas associações específicas é escassa. Neste sentido, o presente estudo teve como objetivo explorar a eficácia de um treino cognitivo que associa a ativação do controlo executivo à exposição a conteúdo procrastinatório para reduzir a procrastinação académica e a ruminação *brooding* e autocrítica. Uma amostra de 79 estudantes universitários (20 homens e 59 mulheres) foi distribuída aleatoriamente por duas condições: na condição experimental, a ativação do controlo executivo foi maioritariamente associada a cognições procrastinatórias e na condição controlo, a cognições neutras. O grau de procrastinação, de ruminação *brooding* e autocrítica estado foram avaliados pré e pós-treino. Como esperado, o grupo experimental apresentou uma maior redução da procrastinação estado em comparação com o grupo controlo. Os resultados encontrados sugerem que treinar os indivíduos a recrutar o controlo executivo, enquanto são expostos a estímulos procrastinatórios, pode reduzir a procrastinação académica. Apesar de se tratar de um estudo exploratório, e de serem necessários novos estudos para validar a eficácia do treino, os resultados promissores poderão ter interessantes implicações para estratégias clínicas e terapêuticas focadas nos pensamentos automáticos associados à procrastinação académica.

keywords

academic procrastination; brooding rumination; self-critical rumination; executive control; cognitive training

abstract

Procrastination has been reported as a prevalent problem among university students. This phenomenon can be defined as a tendency to voluntarily postpone academic tasks regardless of the consequences that may come. Several studies indicate that procrastination is associated with deficits in executive control, as well as with self-critical and brooding ruminative tendencies. However, research on interventions that target these specific associations for reducing academic procrastination is scarce. In this sense, the present study aimed to explore the effectiveness of a cognitive training that associates executive control activation with exposure to procrastinatory content to reduce the tendency to procrastinate and ruminate. A sample of 79 university students (20 males, 59 females) was randomly assigned to one of two training conditions: experimental group (executive control activation mainly followed by the presentation of procrastinatory cognitions) and control group (executive control activation mainly followed by neutral cognitions). Participants performed a training task, and rated their state procrastination, brooding and self-critical rumination pre and post training. As expected, participants in the experimental group showed a greater reduction in state procrastination compared to the control group. The results found suggest that training individuals to recruit executive control while being exposed to procrastination stimuli can reduce academic procrastination. Although this is an exploratory study, and further studies are needed to validate the effectiveness of training, the promising results may have interesting implications for clinical and therapeutic strategies focused on automatic thoughts associated with academic procrastination.

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Introduction

Procrastination implies postponing actions or tasks (Ellis & Knaus, 1977). Although this process may occasionally help to finish some tasks, most procrastination comes from irrational choices and holds several emotional difficulties. In a recent perspective, Klingsieck (2013) has defined procrastination as ‘‘the voluntary delay of an intended and necessary and/or [personally] important activity, despite expecting potential negative consequences that outweigh the positive consequences of the delay’’ (p. 26).

Procrastination has been reported as a prevalent problem among university students, being academic procrastination defined as a tendency to voluntarily postpone academic tasks regardless of the consequences that may come (Gort et al., 2020; Simpson & Pychyl, 2009; Steel, 2007; Steel & Klingsieck, 2016). This process can be seen as a self-regulatory failure as students who procrastinate tend to have irrational beliefs and ideas about their work, working conditions, and results (Steel 2007; Zacks & Hen, 2018). Empirical studies have shown that academic procrastination entails negative consequences for the students regarding their academic achievement and their psychological well-being (Kim & Seo, 2015; Lukas & Berking, 2018; Steel & Klingsieck, 2016). More specifically, it is associated with lower grades, missing assignments’ deadlines, depression, social anxiety, and self-handicapping behaviour (Ferrari et al., 1992; Hen & Goroshit, 2012).

Numerous factors can increase academic procrastination predisposition such as time management, motivation, decision-making, perfectionism, irrational beliefs, and personality, as well as genetic traits (Düşmez & Barut, 2016). A prospective study conducted by McCown and collaborators (2012) investigated the beliefs of academic procrastinators and their results suggested that higher scores of trait procrastination were strongly associated with maladaptive thoughts such as self-depreciation thoughts and feelings. In the last decades, procrastination has been consistently associated with the recurrence of intrusive thoughts, as it happens in rumination (e.g., Flett et al., 2012; Harriott et al., 1996; Rebetez et al., 2017; Stainton et al., 2000). Rumination is a maladaptive self-focus strategy, characterized by repetitive and passive behaviour of self-focused attention on negative thoughts (Treynor et al., 2003). The rumination process has been reported as a cognitive vulnerability to depression (Dinis et al., 2011). According to the Response Styles Theory (Nolen-Hoeksema, 1991), it heightens the effects of depressive mood on negative thinking, interferes with effective problem solving and social life, and consequently triggers depressive mood. Two subtypes of ruminative

thinking have been strongly associated with depression, namely reflection – a contemplative, intentional thinking to engage in problem-solving to alleviate one's depressive symptoms - and brooding - a passive state of judgmental focus on one's mood, without actively solving the problem (Treynor et al., 2003). Evidence shows that rumination is more prevalent among people who display avoidance behaviour (Krieger et al., 2013; Morina, 2011). A study developed by Rebetez and colleagues (2017) has explored the relationships between procrastination, impulsivity (high urgency and lack of perseverance) and intrusive thoughts. Main results suggested that severe ruminators exhibit higher urgency, and thereafter higher levels of procrastination. Given the potential role of intrusive thoughts in maintaining procrastination, psychological interventions targeted to reduce rumination seem to be an interesting path to explore in helping procrastinators.

Several studies have postulated that procrastination may arise from a specific type of rumination called procrastination-related automatic thoughts, which resembles self-critical and brooding rumination over past procrastination behaviour when there is difficulty in performing upcoming tasks (Flett et al., 2012; Rebetez et al., 2017; Stainton et al., 2000). Self-critical rumination consists of a repetitive pattern of self-critical thoughts and shame about past failures, without actively solving the problem (Kolubinski et al., 2016; 2017; Milia et al., 2020; Smart et al., 2015). As previously referred, brooding can be defined by a passive and judgmental state of mood, strongly associated with psychological disorders like depression and anxiety (Treynor et al., 2003; Watkins, 2009). This knowledge highlighted the urgency to focus on the cognitive processes and beliefs of procrastinators. Therefore, Stainton and colleagues (2000) developed the Procrastinatory Cognitions Inventory (PCI) with the aim of assessing individual differences in the frequency of thoughts related to procrastination. In the validation study, a strong association between the PCI index and trait procrastination was found, and the interaction between trait procrastination and negative affect was mediated by the PCI index. In a cross-sectional study that explored the nature of procrastination-related automatic thoughts, Flett and colleagues (2012) observed strong associations between the PCI index and negative automatic thoughts and between procrastination-related automatic thoughts and more general negative automatic thoughts about the self. According to these results, the authors postulated that distress prone individuals make inferences about their personal failures and inadequacies by ruminating about past procrastination. This amount of empirical evidence seems to point out that a strategy to

decrease procrastination may be oriented towards the reduction of the frequency of procrastination-related automatic thoughts (Flett et al., 2012).

Self-criticism has been described as a maladaptive form of relationship with the self. It is characterized by an intense and persistent internal dialogue that expresses negative self-evaluation and hostility towards the self when people can't achieve high standards or in the context of perceived mistakes and failures (Gilbert et al., 2004; Shahar, 2015; Smart et al., 2015). Previous research has found out that high levels of self-criticism are often associated with psychopathologies (e.g., depression (Dunkley & Grilo, 2007; Kolubinski et al., 2017) and eating disorders (Dunkley & Grilo, 2007)) as well as with less autonomous motivation and less predisposition to engage in problem-solving (Kolubinski et al., 2017; Powers et al., 2007; Shahar et al., 2003). Smart and co-authors (2015) pointed out that self-critical rumination should be a distinct construct from other types of rumination, being defined as self-focused attention on self-critical thoughts, shame and one's overall self-worth, rather than on emotions (Kolubinski et al., 2017).

It has been stated that self-criticism may increase procrastinatory behaviours perchance because self–critics are likely to be self-critical ruminating and consequently the procrastination starts instead of active goal pursuit (Harriott et al., 1996; Powers et al., 2007). Note that the opposite also occurs, people who procrastinate tend to ruminate about their past procrastination behaviours that enhance self-criticism and self-blame (Einabad et al., 2017; Stainton et al., 2000). Powers et al. (2007) conducted a study to explore the associations among self–criticism, goal motivation, and goal progress, such as academic and social goals as well as weight loss goals. Results showed that self–criticism is negatively associated with goal progress, which is corroborated by prior research (Shahar et al., 2006). Results also pointed out that self–critics' tendencies toward rumination and procrastination appear to mediate the effects of self–criticism on goal progress. The focus of the self–critic on potential failure or critical evaluation leads to rumination and procrastination that consequently compromises goal achievement.

Flett et al. (2016) examined the associations among procrastination, ruminative brooding, mindfulness, and self-compassion in the academic context. Results showed evidence that higher scores of brooding rumination and procrastination-related automatic thoughts were related to higher levels of procrastination and depression, suggesting that procrastination is associated with ruminative brooding. These findings imply that procrastinators who have ruminative tendencies might be more prone to depression. In the last decades, a considerable amount of research has focused on the association

between rumination and procrastination, however, despite the growing interest in this matter, the study of interventions for academic procrastination concerning brooding rumination is scarce (Pychyl & Flett, 2012).

Furthermore, rumination and procrastination processes both are linked to deficits in executive control, specifically regarding inhibitory processes. Executive control is a cognitive mechanism responsible for goal-directed behaviour by suppressing the influence of distracting information and reducing the effect of emotional interference (Yang et al., 2016). In two recent studies, Cohen et al. (2015) and Cohen & Mor (2018), tested the impact of training individuals to recruit executive control to inhibit the effect of emotional content (reduce emotional interference) in easing the tendency to ruminate. The results of these studies seem to provide evidence of the causal link between a deficit in the ability to use executive control to reduce emotional reactivity and the tendency to ruminate, and that training individuals to exert executive control when processing negative stimuli can be effective in reducing rumination. Regarding the association between procrastination and executive function, Rabin and colleagues (2011) conducted a pioneer study to investigate subcomponents of self-reported executive functioning associated with academic procrastination. Their results showed evidence that all clinical subscales of executive functioning were significantly associated with increasing academic procrastination, namely, initiation, plan/organize, organization of materials, inhibition, working memory, and task monitoring. These findings provided support for the argument that all domains of executive function are predictors of academic procrastination. Further studies have also demonstrated a strong negative relationship between procrastination and executive functioning (Rinaldi et al., 2019), and that procrastination is related to difficulties in attention and error processing during the execution of task-relevant behaviour (Michałowski et al., 2020).

Since students who ruminate on academic procrastination are more vulnerable to experience distress (Flett et al., 2016), and that academic procrastination entails negative consequences, there is a need to implement clinical and therapeutic interventions focused on negative automatic thoughts in procrastinators. Thus, the transfer of knowledge from experimental procedures to a more ecological clinical strategy focused on negative automatic thoughts in procrastinators seems to be a promising avenue to personalize the intervention and expand its potential for effectiveness. The aim of the present exploratory study was to explore the effectiveness of a cognitive training that implies the activation of executive control to alleviate the effect of procrastinatory content leading to a reduction

in the tendency to procrastinate and ruminate. Specifically, it was hypothesized that (1) training executive control activation previous to exposure to procrastinatory cognitions would reduce these cognitions' interference on participants performance; (2) training executive control activation previous to exposure to procrastinatory cognitions would result in reduced self-critical and brooding rumination and academic procrastination.

Method

Participants

A total of 203 university students participated in this online study between the 15th of April and the 26th of June of 2021. This study was approved by the Ethics and Deontology Council (EDC) of the University of Aveiro (Parecer n.º 20-1-CED/2021). The inclusion criteria were: (i) be more than 18 years old; (ii) be a university student; (iii) have European Portuguese as native language; (iv) agree with the study's procedure through an informed consent; (v) have no psychopathological diagnosis; (vi) and not presenting severe depressive and/or anxious symptoms, even in the absence of a diagnosis. Data from 124 participants were excluded: 17 for scoring above the cut-off points in the anxiety and/or depression questionnaires (exclusion criteria); 74 for not completing all the phases; 21 were removed due to a low accuracy rate in the training (lower than 77% in the flanker task and lower than 65% in the discrimination task); four due to higher accuracy rates in the incongruent trials compared to the congruent trials (which is not theoretically expected); six were excluded due to problems in the *PsychoPy3* software; and two for representing severe outliers in the age parameter (55 and 43 years old). Thus, the final sample included 79 participants (20 males and 59 females; $M = 22.01$ years; $SD = 3.92$ years). Participants were randomly assigned to one of two training groups: the experimental group (EG) (11 males and 30 females) and the control group (CG) (nine males and 29 females). Normality tests (Shapiro-Wilks (W)) revealed that trait measures data (e.g., BAI, BDI, RRS, SCRS, QPE), as well as age parameter, deviated from normality. Therefore, nonparametric tests (Mann-Whitney Test) were performed and no significant differences were found between groups on: depressive and anxious symptomatology ($U_{\text{BDI-II}}$ ($N_{CG} = 38$, $N_{EG} = 41$) = 729, $p = .626$; U_{BAI} ($N_{CG} = 38$, $N_{EG} = 41$) = 756, $p = .821$; trait rumination (U_{Brooding} ($N_{CG} = 38$, $N_{EG} = 41$) = 671, $p = .289$; $U_{\text{Reflection}}$ ($N_{CG} = 38$, $N_{EG} = 41$) = 729, $p = .622$), self-critical rumination (U_{SCRS} ($N_{CG} = 38$, $N_{EG} = 41$) = 680, $p = .333$); procrastination degree (U_{QPE} ($N_{CG} = 38$, $N_{EG} = 41$) = 694, $p = .406$ and age (U_{Age} ($N_{CG} = 38$, $N_{EG} = 41$) = 693, $p = .394$). Table 1 presents the set of baseline descriptive statistics (median, interquartile range and range) for each variable.

Table 1

Descriptive Statistics for Control and Experimental Training Groups

Questionnaire	Training group					
	Control (Age = 22.74 years, F/M = 29/9)			Experimental (Age = 21.34 years, F/M = 30/11)		
	Median	IQR	Range	Median	IQR	Range
RRS						
Brooding	2.00	0.95	2.00	2.00	1.00	2.80
Reflection	2.36	1.25	2.75	2.50	1.25	3.00
BAI	6.00	7.50	20.00	7.00	10.00	32.00
BDI-II	8.00	6.50	26.00	7.00	10.00	25.00
SCRS	1.70	1.18	2.40	1.90	1.10	2.90
QPE	29.50	7.75	29.00	31.00	12.00	29.00

Note. F/M = number of female/male participants; IQR = Interquartile range; RRS = Ruminative Responses Scale; BAI = Beck Anxiety Inventory; BDI-II = Beck Depression Inventory-II; SCRS = Self-Critical Rumination Scale; QPE = Questionário de Procrastinação no Estudo.

Materials

Self-Report Measures

***Sociodemographic Questionnaire*.** The sociodemographic questionnaire (Appendix A) included the strictly necessary information for the purpose of the study and to ensure the inclusion criteria were met. Specifically, the participants indicated their sex, age, university, course, year of attendance, and if they had a student-worker status.

Beck Depression Inventory-II (BDI-II; Beck et al., 1996; Portuguese version by Coelho et al., 2002). The BDI-II is a self-report instrument that measures the intensity of depressive symptomatology through a set of 21 multiple choice items, each item containing between 4 to 7 statements. Participants were instructed to respond according to their mood in the last two weeks. The total score is obtained by summing the score of the 21 items to a maximum of 63 points, with higher scores indicating higher symptomatology: a total score between 0-13, means a minimum level or absence of

depressive symptoms; 14-19, mild depressive symptomatology; 20-28, moderate depressive symptomatology; and 29-63, severe depressive symptomatology. The Portuguese version of the BDI-II showed good psychometric characteristics with a Cronbach's α of .89 (Coelho et al., 2002).

Beck Anxiety Inventory (BAI; Beck et al., 1988; Portuguese version by Quintão et al., 2013). The BAI is a 21-item measure of anxious symptomatology. Each item represents an anxiety symptom that participants rated on a 4-point Likert-type scale (from 0 = Absolutely not, to 3 = Severely) according to how they felt in the last week. The total score is calculated by the sum of the 21 items and varies between 0 and 63: 0-21, low anxiety; 22-35, moderate anxiety; 36 and above, potentially concerning levels of anxiety. The validation study for the Portuguese population exhibited good psychometric characteristics with a Cronbach's α of .92 (Quintão et al., 2013).

Ruminative Responses Scale – 10 (RRS-10; Treynor et al., 2003; Portuguese version by Dinis et al., 2011). The reduced version of RRS is composed of 10 items that are divided into two subscales of 5 items: reflection subscale (cut-off: *M* = 2.10; *SD* = 0.61) and brooding subscale (cut-off point: *M* = 2.26; *SD* = 0.61). Participants were asked to indicate what they generally do when they feel sad or depressed, rating each item on a Likert scale ranging from 0 (almost never) to 3 (almost always). Higher scores indicate a stronger tendency to ruminate. In the validation study for the Portuguese population, the instrument presented good psychometric characteristics with a Cronbach's α of .75 for the reflection subscale and .76 for the brooding subscale (Dinis et al., 2011).

Self-Critical Rumination Scale (SCRS; Smart et al., 2015; Portuguese version by Moreira & Maia, 2018). The SCRS is a 10-item scale that aims to measure self-critical rumination. Participants rated each item with a 4-point Likert scale, ranging from 1 (not at all) to 4 (very much). The scale has a unidimensional structure, and the total score is obtained by the mean of the 10 items, with higher scores indicating higher levels of self-critical rumination. The validation study of this scale for the Portuguese population obtained an adequate internal consistency (Cronbach's alpha = .93) (Moreira & Maia 2018).

Questionário de Procrastinação no Estudo (QPE; Costa, 2007). The QPE is a self-report instrument that assesses specific procrastination behaviours during the study. This questionnaire is composed of 10 items, divided in two dimensions: five items evaluate "Procrastination in the daily study" (the postponement of academic tasks and continuous study), and five items the "Procrastination in the study for the tests" (Costa,

2007). Since the original version aimed to assess procrastination in primary school students, an adaptation to the university level ("Academic Procrastination Scale - APC"; Pereira, 2017), with only small differences in the vocabulary for greater suitability, was applied. Participants were asked to indicate the frequency of each procrastination behaviour, rating each item on a scale from 1 (never) to 5 (always). The total score is achieved by summing the score of the items, after reversing items 1, 4, 5, 7 and 10 of the daily study subscale. Higher scores are indicative of higher levels of procrastination. Regarding the internal consistency, the adaptation of this scale to the university level obtained a Cronbach's α of .67 for the "Procrastination in the daily study" subscale and .73 for the "Procrastination in the study for the tests" subscale (Pereira, 2017).

State Procrastination and Rumination Measures. To investigate the effect of the training on procrastination and rumination, as well as the reciprocal relations between these variables, a pre and post assessment was implemented. The state procrastination, brooding rumination, and self-critical rumination were assessed in two distinct moments: one day before and one day after performing the training. Participants were instructed to put an alarm, in the early morning, and answer to a set of 3 questions related to their procrastination, brooding rumination and self-critical rumination (translated and adapted from Gort, et al., 2020) using a VAS ranging from 0 (nothing or very slightly) to 100 (extremely): "Right before the alarm were you delaying a task you should have been doing?"; "Right before the alarm were you having ruminative thoughts about something?"; "Right before the alarm were you having self-critical thoughts?".

Stimuli

Procrastinatory Cognitions. A total of 16 procrastinatory cognitions (see Table 2) were translated and adapted from the Procrastinatory Cognitions Inventory (Stainton et al., 2000), which is composed of a set of 18-items that reflect procrastination-related automatic thoughts.

Neutral Cognitions. The set of 16 neutral cognitions (see Table 2) was developed by creating a pool of 20 items representing externally focused and non-emotion-related thoughts. To select the final set to include, a pilot study with 37 participants was developed. Participants indicated the degree of neutrality of the cognitions rating each item on a scale from 1 (nothing) to 4 (very much) to indicate.

Table 2

Set of Cognition Stimuli

Procrastinatory Cognition	Neutral Cognition
Porque é que não consigo fazer o que deveria estar a fazer	A casca de um kiwi tem pelo
Preciso de começar mais cedo	A mochila tem alças
Eu devia ser mais responsável	O sol é uma estrela
Eu devia estudar mais	Madrid é a capital de Espanha
Continuo a adiar as coisas, mesmo que tente não o fazer	A torre Eiffel é feita de ferro
Porque é que não consigo começar as minhas tarefas académicas	O sinal de stop é vermelho
Estou a desiludir-me a mim mesmo	A Mona Lisa está exposta no Louvre
Seria perfeito se todos os meus trabalhos já estivessem concluídos	O carro tem quatro pneus
Sou tão procrastinador(a) que nunca irei alcançar os meus objetivos	Os painéis solares absorvem energia
Posso sempre entregar o trabalho depois do prazo	O candeeiro ilumina a sala
Porque é que não consigo acabar as coisas que começo	A água do mar é salgada
Porque é que não comecei mais cedo o que tinha para fazer	O dia tem 24 horas
Estou atrasado(a) no estudo mais uma vez	O comboio está parado na estação
Eu sei que tenho trabalhos em atraso, mas faço-os depois	A torre de Belém é um monumento nacional
Não me apetece estudar agora	As janelas têm portadas
Agora não tenho vontade de acabar os trabalhos em atraso	O tomate é uma fruta

Flanker Stimuli. Flanker stimuli consisted of a line of five arrows, in which the middle arrow was either congruent (→→→→→) or incongruent (→→←→→) with the direction of the other arrows.

Discrimination Target. The discrimination target consisted of a blue or a green square with a size of [0.3, 0.3] in normalised units.

Procedure

Recruitment was carried out through social media platforms (e.g., Instagram, Facebook, LinkedIn) and institutional e-mails. Data collection was performed in two online platforms: FormsUA and Pavlovia. *PsychoPy3* software was used for programming presentation of stimuli, and timing operations of all tasks, but the online experiment was available and stored on the Pavlovia platform, with which the UA has established a protocol that ensures compliance with the RGPD regarding the data entered there. First, participants accessed the FormsUA link, where they read and signed the informed consent (Appendix B). Then, they filled out the sociodemographic questionnaire and five self-report questionnaires (BDI-II; BAI; RRS; SCRS; QPE), to assess a set of dimensions related to the goals of the study and to ensure that participants met the inclusion criteria. Participants were then asked to provide their email to be contacted to the next phase of the study and to establish an identification code (last four digits of their Tax Identification Number, TIN) that, for confidentiality issues, will identify them. After submitting their response, the participants received an email describing the study and providing the link to access the state procrastination and rumination measures.

In the first day of participation, the participants only filled the state measures of procrastination, brooding and self-critical rumination (pre-training assessment) in the early morning. On the second day, participants received a link to Pavlovia where they completed the training task. They were randomly assigned to one of two training conditions: experimental group (procrastination-incongruent pairing) or control group (procrastination-congruent pairing).

In the training task, participants were instructed to look at the fixation cross that appeared in the middle of the screen and to respond as quickly and as accurately as possible to two tasks in each trial: a flanker task and a discrimination task. In the flanker task, participants are asked to indicate the direction of the middle arrow appearing in a line of five arrows, while ignoring the distracting arrows. The distractors were either congruent or incongruent with the target arrow. For both groups, in half of the trials the flanker was congruent, and in the other half incongruent. Participants indicated that the middle arrow was pointing to the left by pressing the D key with their left middle finger, and the K key with their right middle finger in case it pointed to the right. In the

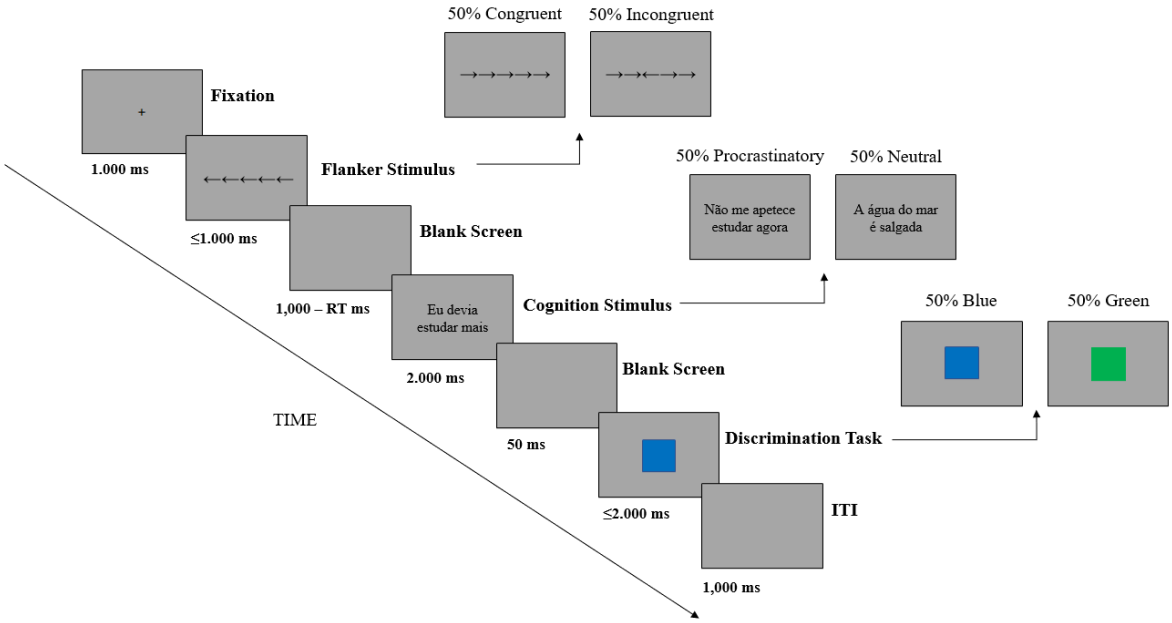
discrimination task, in half of the trials a green square was presented, and a blue square in the other half. Participants indicated that the square was green by pressing the V key with their left index finger and the N key with their right index finger to indicate that a blue square was presented.

Each trial initiated with the presentation of a fixation cross (1000 ms), and then a flanker stimulus was presented for 1000 ms or until response. Following, a cognition stimulus was presented for 1500 ms. In half of the trials, a procrastinatory sentence was presented, and in the other half, a neutral sentence was presented. The set of cognitions presented consisted of 16 procrastinatory cognitions and 16 neutral cognitions. A blank screen was presented for 50 ms between the cognition disappearance and the discrimination target which remained on screen for 2000 ms or until response. Note that half of the discrimination targets consisted of a green square, and the other half consisted of a blue square. The task consisted of six practice and 320 critical trials, which were presented in a different random order for each participant (see Figure 1 for an example of a trial). The pairing between the activation of the executive control (congruent vs. incongruent) and the cognition stimulus type (neutral vs. procrastinatory) was different for the training groups: in the EG 75% of the procrastination stimuli were preceded by incongruent flanker, while in the CG 75% of neutral stimuli were preceded by the incongruent flanker. The association of incongruent flankers with procrastinatory stimuli for the EG intended to train the participants to recruit their executive control when processing critical stimuli (see Cohen et al., 2015 for more details on this experimental paradigm). The discrimination task intended to assess the effect of executive control activation on the processing of procrastinatory stimuli. In the morning of the third day, participants completed the post-training measures by accessing the same link used in the pre-training measures.

The design of the study is a 2*2 with two within-subject factors: flanker congruity (congruent, incongruent) and cognition type (procrastinatory, neutral). The response time to the discrimination target was the dependent variable. For data analysis and processing, Jamovi and R softwares were used.

Figure 1

Example of a Training Trial



Results

Training Task

From an inferential point of view, it is not possible to directly compare the two groups due to pairing inequality (in the EG 75% of procrastinatory cognitions preceded incongruent flankers whereas in the CG they were preceded by congruent flankers). Thus, our analyses were performed according to the analytical methodology proposed by Cohen et al. (2015). First of all, mean RTs for the flanker and the discrimination tasks were calculated. The accuracy rate in the flanker task was 94.07%, with higher accuracy in the congruent trials (96.46%) compared to the incongruent trials (91.69%), and the accuracy rate in the discrimination task was 94.33%. Note that, false trials (false alarms and omissions) in the flanker and discrimination tasks and trials with RT's shorter than 100ms were eliminated.

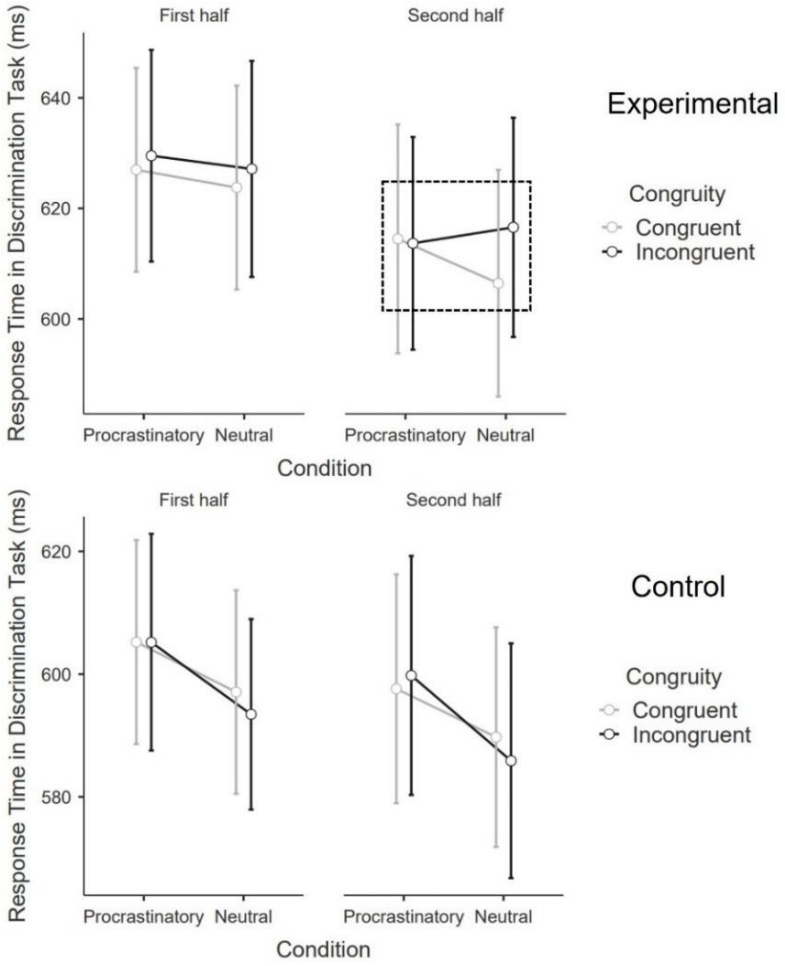
To explore the efficacy of the executive task, RTs in the flanker task were subjected to a two-way mixed analysis of variance (ANOVA) with congruity (congruent vs. incongruent) as a within-subject factor and training group as a between-subject factor. The results showed a main effect of congruity $F(1, 77) = 455.88$, $p < .001$, $\eta 2_P = .86$, with faster responses in congruent compared with incongruent trials ($M = 517$ ms, $SD = 68$ for congruent trials and $M = 565$ ms, $SD = 70$ for incongruent trials). However, the interaction between congruity and training group was not significant $F(1, 77) = 0.99$, $p = .32$, $\eta 2_p =$

.01, which indicates that there was no difference between the overall executive activation across the two groups.

Training effectiveness was evaluated by analysing the RTs to discrimination targets that were preceded by procrastinatory cognitions. Thus, a Paired T-Test for each group was performed, comparing mean RTs to discrimination targets preceded by procrastinatory stimuli in the first and second halves of the task. In the experimental group, participants showed a significant RT reduction (*M* reduction = 14.17 ms), $t(40) = 3.22$, $p = .003$, $d = 0.50$. Regarding the control group, although a reduction was observed, it was not statistically significant (*M* reduction = 6.51 ms), $t(37) = 1.38$, $p = .18$, $d = 0.22$. The main result of the training task is graphically represented in Figure 2.

Figure 2

Group Differences in Response Time in the Discrimination Task



Note. This figure demonstrates the average response time in the discrimination task after the procrastinatory and neutral cognitions, according to flanker congruity (congruent, incongruent) in the two halves of the training (first and second half).

State Measures

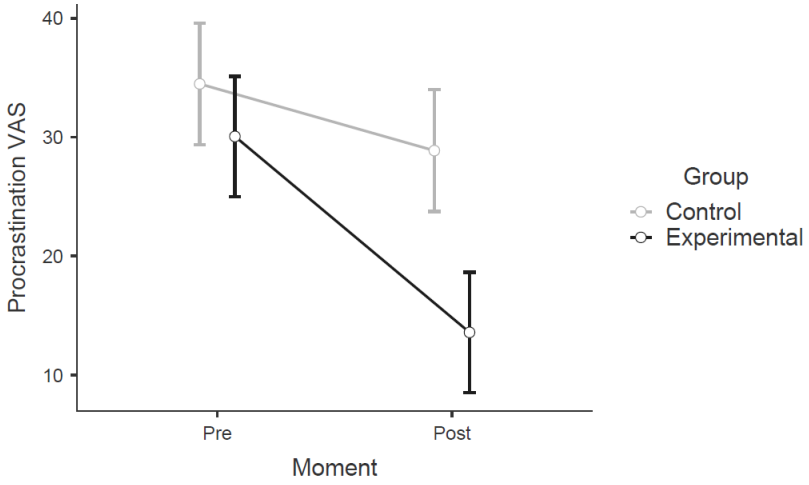
Repeated Measures ANOVA with moment (pre vs. post) as a within-subject factor and training group as a between-subject factor was performed for each of the following dependent variables: state procrastination, rumination, and self-critical rumination.

Procrastination

Regarding the state procrastination, results yielded a main effect of moment (pre-training, post-training) ($F(1,77) = 6.86$, $p = .011$, $\eta^2_G = .03$), showing a decrease in procrastination between pre and post training. Despite the absence of moment*group interaction $F(1,77) = 1.66$, $p = .202$, $\eta 2_G = .007$, and considering the conceptual interest and exploratory nature of this study, post-hoc comparisons with Bonferroni correction were performed. In fact, significant differences between pre and post procrastination were only found for the EG ($t(77) = 2.82$, $p = .037$) and not in the CG ($t(77) = 0.92$, $p > .999$) (see figure 3). Descriptively, it is possible to observe a greater decrease in procrastination values in the EG ($M_{pre} = 30.2$, $SE_{pre} = 5.21$; $M_{post} = 13.8$, $SE_{post} = 4.75$) compared to the CG ($M_{pre} = 34.7$, $SE_{pre} = 5.42$; $M_{post} = 29.1$, $SE_{post} = 4.93$). This result is particularly relevant considering the absence of difference in pre-training procrastination scores of the EG and CG ($t(140.26) = 0.61$, $p > .999$). Regarding between-subject factor, no main effect of group was found $F(1,77) = 2.85$, $p = .095$, $\eta 2_G = .024$.

Figure 3

Group Differences in State Procrastination Between Pre and Post Training Task

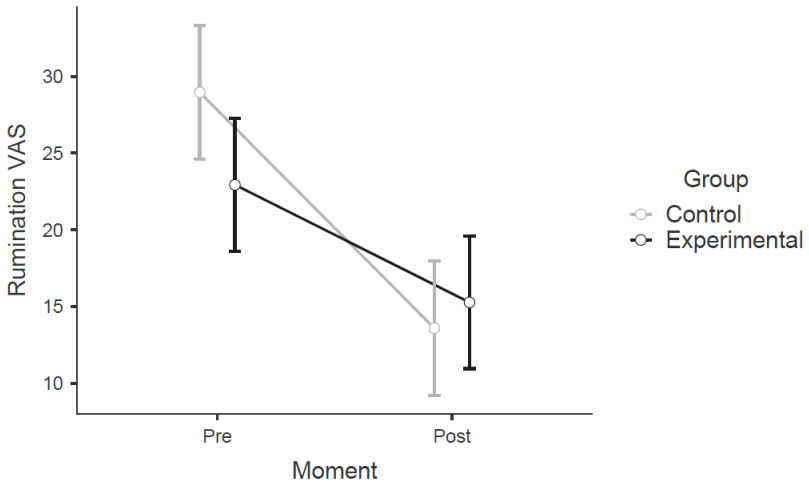


Brooding Rumination

Concerning the state brooding rumination, a main effect of moment (F(1,77) = 11.01, p = .001, $\eta 2_G$ = .044) was found, meaning that there are significant differences between pre and post training assessment in both groups. Similarly to the previous analysis, the results did not showed a significant interaction between moment*group F(1,77) = 1.23, p = .270, $\eta 2_G$ = .005. However, and contrary to what was expected, post-hoc comparisons, with Bonferroni correction, revealed that the decrease in rumination presented in Figure 4 was only statistically significant in the CG (t(77) = 3.07, p = .018) and not in the EG (t(77) = 1.59, p = .694). Descriptively, it is possible to observe a greater decrease in brooding rumination values in the CG (M_{pre} = 29, SE_{pre} = 4.95; M_{post} = 13.6, SE_{post} = 3.84;) compared to the EG (M_{pre} = 23, SE_{pre} = 4.77; M_{post} = 15.3, SE_{post} = 3.69). This result is interesting taking into account that the remaining comparisons revealed no significant difference in pre-training score between EG and CG (t(136.06) = 0.98, p > .999). In relation to the between-subject factor, no main effect of group was found (F(1,77) = 0.18, p = .670, $\eta 2_G$ = .002).

Figure 4

Group Differences in State Brooding Rumination Between Pre and Post Training Task



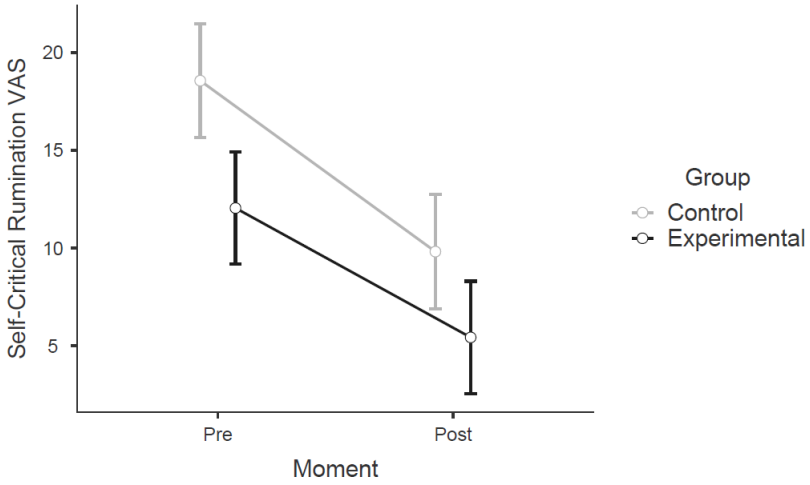
Self-Critical Rumination

Repeated Measures ANOVA was performed to explore the state self-critical rumination. Results indicated a main effect of moment F(1, 77) = 8.76, p = .004, $\eta 2_G$ = .044 (see Figure 5). However, no main effects of group were observed F(1, 77) = 2.96, p = .089, $\eta 2_G$ = .023, nor a significant interaction between moment*group, F(1, 77) = 0.17,

p =.683, $\eta 2_G$ = .001. Following the previous analysis outline, post-hoc comparisons with Bonferroni correction were also performed. No relevant comparisons achieved a statistical significant result (all p > .13).

Figure 5

Group Differences in State Self-Critical Rumination Between Pre and Post Training Task



Discussion

Departing from a previous procedure that successfully reduced state rumination by training the executive control activation prior to the presentation of task-irrelevant negative content (Cohen et al., 2015), the current study tested an adapted experimental procedure to reduce academic procrastination and self-critical and brooding rumination. The first research question consisted in exploring the impact of the executive control activation prior to exposure to procrastinatory cognitions on participants' performance in a discrimination task. Our results replicated previous findings with the same procedure (Cohen et al., 2012; Cohen et al., 2015), meaning that the association between executive control activation and irrelevant target stimuli (ruminative or procrastinatory) seem to reduce its interference on subsequent performance. However, to our knowledge, this was the first study to explore this association with procrastinatory stimuli. These findings suggest that inhibition deficits toward procrastination-related automatic thoughts can be recovered by training executive control activation. Therefore, our findings seem to provide initial evidence that this type of training procedure can be an effective strategy to attenuate the impact of procrastinatory cognitions.

Considering the second hypothesis, it was expected that training executive control activation previous to processing procrastinatory stimuli would reduce academic procrastination and self-critical and brooding rumination. Previous literature suggests that executive control deficits and inhibition biases may have a causal role in procrastination (Michalowsk et al., 2020; Rabin et al., 2011; Rinaldi et al., 2019), therefore a training that resorts to executive control to reduce procrastinatory reactivity should be well succeeded in decreasing academic procrastination. Our results showed that the frequent pairing of incongruent flanker stimuli with procrastinatory stimuli (experimental condition) resulted in lower levels of state procrastination compared with a control condition, as expected. Regardless of the absence of a significant group effect, the trend evidenced by the participants proved to be theoretically suitable and met the hypothesis raised in the present study. Individuals in the experimental group tended to report lower levels of state procrastination in the post-training moment, which is probably related to the increased coupling between executive control activation and procrastinatory cognitions. We argue that training may have increased the ability to suppress irrelevant procrastinatory information, ability that is crucial for adaptive goal-oriented behaviour. Our findings yield initial evidence that procedures reinforcing the recruitment of executive control prior to the presentation of procrastinatory information can be an effective strategy to reduce academic procrastination.

People who ruminate tend to evidence difficulties in inhibiting negative information (Joormann, 2006). In this sense, the implementation of interventions that promote this ability, by activating executive control processes, is a critical target to alleviate ruminative tendencies (Cohen et al., 2015). According to the results of previous studies, in which this procedure proved to be a successful strategy to reduce rumination (Cohen et al., 2012; Cohen et al., 2015), it would be expected that the experimental group (who had a higher proportion of trials pairing executive control activation with procrastinatory cognitions) would show a significant reduction of brooding rumination. However, contrary to this expectation, a significant decrease in this type of rumination was only observed in the control group. This result can be discussed from a methodological or a conceptual point of view. Regarding the method, even though a pilot study was carried out to define the neutral stimuli, participants were only asked to evaluate the extent of the neutral character, the affective dimensions (valence and arousal) of each “neutral” cognition was not investigated and validated in a representative sample. The control group, who had a higher proportion of trials pairing executive control

activation with neutral cognitions, did not train the ability to suppress irrelevant procrastinatory information. However, since the emotional character of the neutral cognitions was not analysed, we can suppose that participants from this group have recruited their executive control to inhibit irrelevant emotional content, which resulted in a significant decrease of state brooding rumination. These findings would be in line with the literature that proposes that training executive control deficits can be effective in reducing brooding rumination (Cohen et al., 2015). From a conceptual point of view, the cognition stimuli that participants were trained to inhibit were procrastinatory rather than ruminative. Accordingly, there was a reduction in academic procrastination in the experimental group. However, this change in the predisposition to do their academic tasks may have aroused an awareness or insight that influenced participants' brooding rumination about future performance and outcome, resulting in a non-significant decrease in the experimental group. Given previous evidence linking mistake rumination with brooding rumination and procrastination-related automatic thoughts (Flett et al., 2019), we argue that individuals from the experimental group, who showed a decrease in academic procrastination, may anticipate making future mistakes which may cause a weaker decrease in brooding rumination.

Regarding the state self-critical rumination, results were not in line with our expectations, as a significant decrease in self-critical rumination was observed for both groups, with no advantage for the experimental group. This unexpected result may be related to the non-clinical character of the sample. The participants of the present sample reported lower scores of trait self-critical rumination compared to the validation study of Moreira and Maia (2018). Since the results in samples with higher degrees of rumination have such small effect sizes, we speculate if a much larger sample size would likely be needed to find a significant effect of training on this type of rumination. Another alternative explanation is that these findings may suggest that self-critical rumination is not necessarily a cause of procrastination. Furthermore, state self-critical rumination may be more significantly affected by other factors (e.g., external events), which override the effect of the reduction of academic procrastination.

A strong association between procrastination and brooding and self-criticism rumination is well documented in the literature, meaning that procrastinators tend to ruminate about their past procrastination behaviours (Flett et al., 2012; Flett et al., 2016; Rebetez et al., 2017; Stainton et al., 2000). Our results seem to partially support this argument, in addition to the reduction in academic procrastination, both types of

rumination revealed a decreasing tendency in the experimental group. Although this is a first exploratory study, and future studies are needed to validate the training effects, these results seem to suggest that a training focused on the association between executive control activation and procrastination-related automatic thoughts that may trigger self-critical and brooding rumination over past procrastination behaviour, can ease academic procrastination and rumination tendencies. Further experimental and longitudinal research on this phenomenon is necessary to reach conceptual robustness on the adequacy of these training paradigms to reduce academic procrastination, and then incorporate this knowledge into the personalization of intervention strategies.

Several limitations of this study must be noted. First, we point out the unbalanced number of males and females in the study. Since gender was not a variable of interest, this imbalance is a limitation and not an impossibility. However, future studies that balance this distribution can explore gender specificities in the training effectiveness. The second limitation is related to the online format of data collection and the multiplicity of unforeseen complications faced: participants needed *Internet* connection during the entire procedure; technical problems from the internet service on FormsUA and on Pavlovia; no guarantee that the participants executed the online experiment in the same ideal conditions (calm environment, without noise and with an attentive manner as instructed). A third potential limitation is linked with the previous one and is related to the constraints of running experimental procedures online. The high number of trials (320) without no pause to rest was referred to as tiresome by several participants, which had not happened in previous in-person studies with a similar procedure. The fatigue may have affected the responses of the participants, leading to less attention and/or accurate responses. A fourth limitation refers to the absence of pilot studies to assess the degree of interference caused by the procrastinatory stimuli and to ensure the neutrality of neutral cognitions. The type and format of self-report measures may represent a fifth limitation. For one hand, people tend to respond biased when they report on their own behaviours, due to social desirability. On the other hand, people respond contingently to the size of the questionnaires: if they are too long, from a certain point on people respond almost randomly and if they are too short, they can respond more superficially.

Conclusion

Academic procrastination is a major concern due to the high prevalence among university students and consequences associated with it (Gort et al., 2020; Simpson & Pychyl, 2009; Steel, 2007; Steel & Klingsieck, 2016). Considering the association

between procrastination and the recurrence of intrusive thoughts (e.g., Flett et al., 2012; Harriott et al., 1996; Rebetez et al., 2017; Stainton et al., 2000), it is important to test a strategy to decrease procrastination through a reduction of the frequency of procrastination-related automatic thoughts. To our knowledge, the present study was the first to incorporate an explicit focus on procrastinatory thoughts and ruminative tendencies in a cognitive training targeting academic procrastination. The findings showed that training the recruitment of executive control prior to the presentation of procrastinatory cognitions can increase the ability to suppress irrelevant procrastinatory information and reduce its interference. Furthermore, findings showed that training that targets executive control deficits can be effective to reduce academic procrastination and rumination tendencies.

In retrospect, we would like to suggest future lines of research that emerged from these findings. Regarding conceptual suggestions, state measures of academic procrastination and rumination were assessed in the early morning and considering recent studies on the association between chronotype and rumination (Cim et al.,2021; Lovato & Gradisar, 2014), it may be relevant and interesting to explore the fluctuations throughout the day. Future research addressing attention deficits may also be a relevant path, since Attention Deficit Hyperactivity Disorder (ADHD) shares similar difficulties with procrastination (e.g., poor time management, difficulties maintaining focus on important tasks) (Rinaldi et al., 2019). Future studies should incorporate measures of attention and explore if students who report academic procrastination would benefit from behavioural strategies aimed at improving attention control. Considering methodological suggestions, the implementation of multiple training sessions with follow-up assessments would allow us to examine the course and extent of the training effects.

In summary, our results allowed to strengthen the notion that procrastination may result from a deficit in inhibiting procrastination-related thoughts. These findings seem to yield initial evidence that training executive control activation prior to exposure to procrastinatory cognitions can be an effective strategy for reducing academic procrastination. The further development of this procedure that seems to offer some relief to individuals who engage in academic procrastination can have important implications for clinical and therapeutic interventions.

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Appendix A

Sociodemographic Questionnaire

Idade: _____

Sexo:

___ Feminino

___ Masculino

A universidade que frequenta pertence à região:

___ Norte

___ Área Metropolitana do Porto

___ Centro

___ Área Metropolitana de Lisboa

___ Alentejo

___ Algarve

___ Região Autónoma da Madeira

___ Região Autónoma dos Açores

Curso que frequenta: _____

Ano Curricular:

___ 1º ano de licenciatura

___ 2º ano de licenciatura

___ 3º ano de licenciatura

___ 1º ano de mestrado

___ 2º ano de mestrado

___ Doutoramento

Neste momento está em que situação?

___Só a estudar

___ A estudar e a trabalhar a tempo parcial

___ A estudar e a trabalhar a tempo integral

Appendix B

Informed Consent

Enquanto aluna do mestrado em Psicologia da Saúde e Reabilitação Neuropsicológica da Universidade de Aveiro, venho por este meio apelar à sua participação no estudo que estou a desenvolver na minha dissertação e que irá decorrerá em duas fases distintas. A primeira parte, consiste na obtenção de informação para averiguar o cumprimento dos critérios de inclusão para a segunda fase. Na segunda fase, solicitarei o seu contributo através de uma plataforma experimental online. O objetivo deste estudo, que está integrado num projeto de investigação desenvolvido no Departamento de Educação e Psicologia da Universidade de Aveiro, consiste na exploração da eficácia de um treino cognitivo que implica a ativação do controlo executivo na procrastinação académica através da redução da ruminação associada à procrastinação.

Por favor, antes de iniciar a sua participação, leia com atenção a seguinte informação.

A participação neste estudo implica o cumprimento do seguinte conjunto de critérios de inclusão:
- Ter pelo menos 18 anos de idade;
- Ser estudante universitário;
- Ter nacionalidade portuguesa e ter o português de Portugal como língua materna;
- Não ter, no momento presente, nenhum diagnóstico de perturbação do foro mental;
- Não se encontrar a tomar, no momento presente, medicação ansiolítica ou antidepressiva;

Caso **não** cumpra um dos critérios acima mencionados, agradecemos a sua disponibilidade, mas **a sua participação ficará por aqui**.

Caso cumpra todos os critérios acima mencionados, por favor avance para a página seguinte.

Objetivo:

Explorar a eficácia de um treino cognitivo que implica a ativação do controlo executivo na procrastinação académica através da redução da ruminação associada à procrastinação (autocrítica e *brooding*).

Procedimento:

Este estudo é constituído por duas fases e a sua participação terá a duração de 4 dias.

Na fase I este estudo, ser-lhe-á solicitado que preencha um conjunto de seis questionários (dados demográficos, sintomatologia depressiva, sintomatologia ansiosa, grau de ruminação depressiva, grau de ruminação autocrítica, procrastinação académica), no sentido de recolher informação pertinente para averiguar o cumprimento dos critérios de inclusão no estudo e para caracterização do fenómeno nos estudantes do ensino superior em Portugal. Ainda nesta primeira fase irá definir um código de identificação composto pelos 4 últimos dígitos do seu número de identificação fiscal (NIF), que o/a passará a identificar na fase II.

Na fase II, receberá um email no qual a investigadora irá descrever e esclarecer qualquer questão sobre o procedimento. Na manhã do dia seguinte, irá responder a um conjunto de 3 questões relativas ao grau de procrastinação, ruminação e autocriticismo. No 3º dia, irá realizar uma experiência online que consiste na realização de duas tarefas. Esta experiência será disponibilizada e armazenada na plataforma Pavlovia. Existe um contrato estabelecido entre esta plataforma e a Universidade de Aveiro que assegura o cumprimento do RGPD relativamente aos seus dados ali inseridos. Para além disso, nesta plataforma apenas se identificará através de um código previamente indicado por si. A sua participação neste estudo termina na manhã seguinte após a experiência online respondendo novamente ao conjunto de 3 questões sobre o grau de procrastinação, ruminação e autocriticismo.

Exclusivamente para possibilitar a marcação da experiência solicitamos, no final deste consentimento, o seguinte dado pessoal - email.

Potenciais riscos e benefícios:

A participação neste estudo não acrescentará qualquer risco ou desconforto para além dos normalmente encontrados na sua rotina diária. Com a participação neste estudo estará a contribuir para aprofundar o conhecimento sobre um processo cognitivo que desempenha um papel central no desenvolvimento e manutenção de diversas condições psiquiátricas.

Confidencialidade e Anonimização:

O contacto de email é-lhe solicitado apenas para que o/a possamos contactar para a fase II do estudo. Os dados sociodemográficos disponibilizados na fase I serão descarregados regularmente da plataforma forms.ua.pt diretamente para um servidor seguro da UA. Após o download dos dados da plataforma estes são apagados da mesma. Ao serem descarregados, os dados pessoais que o/a identificam serão imediatamente armazenados num ficheiro e todos os restantes dados decorrentes da sua participação no estudo noutro ficheiro. Sobre os dados pessoais será realizado um processo de pseudoanonimização, que consistirá na atribuição de um código a cada participante, que o passará a identificar. Portanto, não existe associação entre os participantes da primeira e segunda fases, depois de ser contactado/a para a fase II, por via do email solicitado na fase I, nada mais será solicitado que possa ser diretamente associado à si.

Responsáveis pelo tratamento:

A Licenciada Mariana Ferreira será a responsável pelo tratamento dos dados. É a única a aceder aos seus dados pessoais e com a informação necessária para proceder ao emparelhamento entre estes e os restantes dados fornecidos por si. A responsável terá acesso aos dados pessoais durante o período de realização dos estudos (até Dezembro de 2021), sendo este o período de conservação dos dados. Os dados por si disponibilizados serão utilizados apenas no âmbito de trabalhos académicos e apresentações científicas, não sendo comunicados a nenhuma entidade nem transferidos para outros países.

Acesso e partilha dos dados anonimizados:

Após a finalização da dissertação de Mestrado, a responsável pretende ceder os dados, já anonimizados, ao responsável pelo projeto de investigação no qual o estudo está inserido, que está a ser desenvolvido no Departamento de Educação e Psicologia da Universidade

de Aveiro. Os dados anonimizados podem também ser partilhados com revistas internacionais ao abrigo do movimento opendata e apresentados em apresentações públicas, congressos científicos e outras publicações. Aquando da disponibilização dos dados, sempre que possível, serão aplicados os critérios de minimização dos dados (apresentando apenas os dados relevantes para o objetivo) e de alteração dos dados (atribuição de códigos a variáveis que não afetem os resultados).

Esclarecimentos:

Caso deseje obter qualquer tipo de informação adicional ou esclarecimento poderá contactar a Licenciada Mariana Ferreira (marianaferreiras@ua.pt)

Natureza voluntária e direitos de participação:

A sua participação neste estudo é voluntária, podendo a qualquer momento desistir, sem qualquer prejuízo para si. Caso queira desistir, a meio ou no final do estudo, bastará fechar a janela do seu browser e nenhum dos seus dados será gravado. Caso pretenda, em algum momento, retirar o seu consentimento deverá enviar um email para a responsável indicando a sua pretensão.

Durante o período de conservação dos dados, tem o direito de pedir a portabilidade dos seus dados, de lhes aceder, de os retificar, de pedir a sua eliminação e de restringir o tratamento dos mesmos. Para exercer qualquer destes direitos, por favor envie um email para as responsáveis, esclarecendo as suas pretensões.

Declaração de Consentimento Informado:

Ao selecionar **SIM** na caixa abaixo, declaro que:

- Tenho 18 anos ou mais;

- Li integralmente o presente consentimento informado, considerando-o explícito e concordando com o seu conteúdo;

- Compreendi as condições de participação neste estudo, nomeadamente, o seu objetivo e os procedimentos implicados;

- Participo de livre e espontânea vontade;

- Dou o meu consentimento para o tratamento dos meus dados e para a sua apresentação, de forma completamente anónima, em trabalhos académicos, apresentações públicas, congressos científicos e publicações, no âmbito da dissertação de mestrado em Psicologia da Saúde e Reabilitação Neuropsicológica da Universidade de Aveiro da licenciada Mariana Ferreira, em estrita obediência ao Regulamento Geral de Proteção de Dados e da sua Lei de execução Nacional.

- Dou o meu consentimento para ser contactado via e-mail para a segunda fase do estudo.

- Dou o meu consentimento para a transferência dos meus dados, já anonimizados, ao responsável pelo projeto de investigação no qual o estudo está inserido, que está a ser desenvolvido no Departamento de Educação e Psicologia da Universidade de Aveiro e para a sua partilha com revistas internacionais ao abrigo do movimento opendata e apresentação em apresentações públicas, congressos científicos e outras publicações, em

estrita obediência ao Regulamento Geral de Proteção de Dados e da sua Lei de execução Nacional.

Declaração de Consentimento Informado:

Ao selecionar **NÃO** na caixa abaixo, declaro que:

- Tenho 18 anos ou mais;

- Li integralmente o presente consentimento informado, considerando-o explícito e concordando com o seu conteúdo;

- Compreendi as condições de participação neste estudo, nomeadamente, o seu objetivo e os procedimentos implicados;

- Não dou o meu consentimento para o tratamento dos meus dados e para a sua apresentação, de forma completamente anónima, em trabalhos académicos, apresentações públicas, congressos científicos e publicações, no âmbito da dissertação de mestrado em Psicologia da Saúde e Reabilitação Neuropsicológica da Universidade de Aveiro da licenciada Mariana Ferreira em estrita obediência ao Regulamento Geral de Proteção de Dados e da sua Lei de execução Nacional.

- Não dou o meu consentimento para a transferência dos meus dados, já anonimizados, ao responsável pelo projeto de investigação no qual o estudo está inserido, que está a ser desenvolvido no Departamento de Educação e Psicologia da Universidade de Aveiro e para a sua partilha com revistas internacionais ao abrigo do movimento opendata e apresentação em apresentações públicas, congressos científicos e outras publicações, em estrita obediência ao Regulamento Geral de Proteção de Dados e da sua Lei de execução Nacional.

Caso tenha optado pela opção Não, agradecemos a sua disponibilidade e a sua participação ficará por aqui.