

Self-Regulation Failure: The Role of Impulsivity and Intrusive Thoughts

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ABSTRACT

Procrastination has been described as the quintessence of self-regulatory failure. This study examines the relationships between this self-regulatory failure and other manifestations of self-regulation problems, namely impulsivity and intrusive thoughts. One hundred and forty-one participants completed questionnaires assessing procrastination, impulsivity (in particular, the urgency and lack of perseverance dimensions), and intrusive thoughts (i.e., rumination and daydreaming). Main results show that urgency mediated the association between rumination and procrastination, whereas rumination did not mediate the relation between urgency and procrastination. Lack of perseverance mediated the association between daydreaming and procrastination, and daydreaming mediated the relation between lack of perseverance and procrastination. This study highlights the role of impulsivity and intrusive thoughts in procrastination, specifies the links between these self-regulation problems, and provides insights into their (potential) underlying mechanisms. It also opens interesting prospects for management strategies for implementing targeted psychological interventions to reduce impulsive manifestations and/or thought control difficulties accompanying procrastination.

Introduction

Procrastination, or "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" (Klingsieck, 2013, p. 26), is a widespread phenomenon that has been described as the quintessence of self-regulatory failure (Steel, 2007). Self-regulation can be broadly defined as the ability to regulate one's thoughts, emotions, impulses, and behavior (Baumeister, Heatherton, & Tice, 1994). Specifically, procrastination has been shown to be closely associated with impulsivity (e.g., Gustavson, Miyake, Hewitt, & Friedman, 2014; Steel, 2007) and intrusive thoughts (e.g., Flett, Stainton, Hewitt, Sherry, & Lay, 2012; Harriott, Ferrari, & Dovidio, 1996; Stainton, Lay, & Flett, 2000), both of which constitute manifestations of self-regulation difficulties (Gay, Schmidt, & Van der Linden, 2011). For example, Steel (2007) demonstrated that impulsivity is one of the

strongest correlates of procrastination ($r = .41, K=22$), and Gustavson et al. (2014) showed a genetic overlap ($r_{\text{genetic}} = 1-0$) between the two variables. With regard to procrastination and intrusive thoughts, it has been demonstrated that procrastinators frequently experience intrusions, such as rumination (defined as a "repetitive, prolonged, and recurrent thought about one's self, one's concerns and one's experiences;" Watkins, 2008, p. 163; see also Flett et al., 2012; Stainton et al., 2000) and daydreaming (defined as "stimulus-independent and task-unrelated thoughts;" Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011, p. 370; see also Harriott et al., 1996). However, to our knowledge, no study has yet examined procrastination jointly with impulsivity and thought control problems.

Examining and understanding the relationships between procrastination, impulsivity, and thought control problems requires one to realize that impulsivity is a multidimensional construct. Indeed, four distinct components of impulsivity can be identified (Whiteside & Lynam, 2001): urgency (the tendency to experience strong reactions, frequently under conditions of negative affect); premeditation (the tendency to take the consequences of an act into account before engaging in that act); perseverance (the ability to remain focused on a boring/difficult task); and sensation seeking (the tendency to enjoy and pursue new/exciting activities). Urgency, premeditation, and perseverance are related to cognitive/self-control mechanisms, whereas sensation seeking depends on motivational dispositions (Bechara & Van der Linden, 2005). Studies using this multidimensional conception of impulsivity have stressed specific relationships between the self-control-related dimensions of impulsivity (urgency, lack of premeditation, lack of perseverance) and procrastination (Dewitte & Schouwenburg, 2002; Rebetz, Rochat, & Van der Linden, 2015). The lack of perseverance observed in procrastinators could therefore reflect difficulties in staying focused on an intended task that demands attentional control; lack of premeditation could refer to difficulties in taking potential long-term negative consequences of delaying into account; and urgency could denote proneness to engage in activities other than the intended ones when dealing with intense emotional states.

Another stream of research has investigated the relationships between the self-control-related dimensions of impulsivity and thought control problems, independently of procrastination. These studies showed that urgency and lack of perseverance are associated with a wide range of intrusive thoughts (e.g., d'Acromont & Van der Linden, 2007; Gay, Rochat, Billieux, d'Acromont, & Van der Linden, 2008; Gay et al., 2011). More specifically, Gay et al. (2011) suggested that urgency is closely associated with frequent and long-lasting emotional intrusions that are difficult to control (e.g., ruminations, obsessions, and persistent worries), while lack of perseverance is more associated with intrusions that are shorter and easier to control (e.g., daydreaming, distracting thoughts, and transient worries). On the other hand, lack of premeditation does not predict general thought control problems (Gay et al., 2011). With respect to the direction of causality between impulsivity and thought control problems, it has been proposed that intrusive thoughts predict impulsive behaviors (e.g., Selby, Kranzler, Panza, & Fehling, 2015), but also that impulsivity promotes intrusions (e.g., Gay et al., 2011; Schmidt & Van der Linden, 2009).

Despite the conceptualization of procrastination as a self-regulatory failure, little research has examined this phenomenon jointly with other manifestations of self-regulation difficulties, such as impulsivity and intrusive thoughts. Consequently, our study was designed to clarify the

relationships between procrastination, impulsivity, and thought control problems, within a multidimensional framework of impulsivity. A better understanding of these links seems especially important in order to identify targeted psychological interventions to decrease the manifestations of self-regulations difficulties (impulsivity and/or intrusive thoughts) that accompany procrastination.

Specifically, this study aimed to investigate whether the links between intrusive thoughts (namely rumination and daydreaming) and procrastination were mediated by impulsivity facets (namely urgency and lack of perseverance), and whether the links between impulsivity facets and procrastination were mediated by intrusive thoughts. On the basis of previously established associations between mental intrusions and dimensions of impulsivity (see Gay et al., 2011), and assuming that these relations are bidirectional (e.g., Gay et al., 2011; Schmidt & Van der Linden, 2009; Selby et al., 2015), we hypothesized that (1) individuals who experience more rumination would demonstrate higher urgency, which in turn would be related to procrastination; and (2) individuals with higher urgency would experience more rumination, which in turn would be related to procrastination. We also hypothesized that (3) individuals who experience more daydreaming would demonstrate higher lack of perseverance, which in turn would be related to procrastination; and (4) individuals with higher lack of perseverance would experience more daydreaming, which in turn would be related to procrastination. In addition, gender was also taken into consideration since women and men have been shown to differ in terms of self-regulation (Nolen-Hoeksema & Corte, 2004).

Method

PARTICIPANTS AND PROCEDURE

Participants were 141 volunteers from the community (87 females and 54 males), who were recruited through advertisement and personal contacts; they received no compensation for their participation. The mean age of the sample was 23.79 years ($SZ = 3.91$, range = 18–35) and the mean number of years of education was 14.48 ($SD = 2.22$, range = 9–21). The inclusion criterion was being a fluent speaker of French. Exclusion criteria were a reported history of a neurological or psychiatric condition involving the use of medication. Participants were tested individually in a quiet room. They signed an informed consent form before completing a number of tasks (that are not the subject of the present article and will not be discussed further here) and questionnaires, whose order was counterbalanced. The study was approved by the Ethics Committee of the Faculty of Psychology of the University of Geneva.

QUESTIONNAIRES

Procrastination was assessed with the French version of the Pure Procrastination Scale (PPS; Rebetz, Rochat, Gay, & Van der Linden, 2014; original version, Steel, 2010), an 11-item scale (e.g., "I am continually saying I'll do it tomorrow"). In the French validation of the PPS (Rebetz et al., 2014), exploratory and confirmatory analyses revealed that the scale was composed of two factors ("voluntary delay," which refers to the notion of irrationally and/or voluntarily putting off things or decisions, and "observed delay," which relates to noticing that one is running out of time, not getting things done on time, or not being very good at meeting deadlines). These two factors depended on

a higher-order construct of procrastination (general procrastination). Good internal consistency (Cronbach's α ranged from .79 to .89) and test-retest reliability (r ranged from .81 to .87, $p < .001$) were found. In addition, external validity was supported by specific relationships with measures of the main dimensions of personality (e.g., conscientiousness, neuroticism), impulsivity, and subjective well-being. For this study, only general procrastination (total score) was considered. A higher score indicates a higher tendency to procrastinate.

The short French version of the UPPS Impulsive Behavior Scale (UPPS-P; Billieux et al., 2012) is a 20-item scale that evaluates five facets of impulsivity (four items per facet): negative urgency (e.g., "When I am upset I often act without thinking"), positive urgency (e.g., "When I am really excited I tend not to think of the consequences of my actions"), premeditation (e.g., "I usually think carefully before doing anything"), perseverance (e.g., "I finish what I start"), and sensation seeking (e.g., "I quite enjoy taking risks"). In the initial preliminary validation study of the UPPS-P (Billieux et al., 2012), confirmatory factor analysis supported a hierarchical model with two higher order factors—urgency (resulting from negative urgency and positive urgency) and lack of conscientiousness (resulting from lack of premeditation and lack of perseverance)—as well as a separate sensation seeking factor. Good internal consistency (Cronbach's α ranged from .70 to .84) and test-retest reliability (r ranged from .84 to .92, $p < .0001$) were found. External validity was supported by relationships with psychopathological symptoms (alcohol abuse, anxiety, and depression). For this study, only negative urgency and lack of perseverance were considered. Higher scores indicate higher impulsivity: the items that contribute to negative urgency (including a negative emotion component) suggest that high scorers on this dimension are likely to engage in impulsive behaviors in order to alleviate negative emotions: high scorers on lack of perseverance (associated with the self-discipline facet of conscientiousness) tend to have difficulties completing projects and working under conditions that require resistance to distracting stimuli (Whiteside & Lynam, 2001).

The French version of the Rumination-Reflection Questionnaire (RRQ; Jermann, Billieux, Bizzini, Van der Linden, & Bondolfi, 2010; original version, Trapnell & Campbell, 1999) is a 24-item questionnaire that measures two aspects of self-consciousness (12 items per aspect): rumination (e.g., "I always seem to be rehashing in my mind recent things I've said or done") and reflection (e.g., "I love exploring my "inner" self"). Confirmatory factor analysis of the French translation of the RRQ supported a two-factor model with good internal reliability (Cronbach's α values were .87 for rumination and .92 for reflection; Jermann et al., 2010). Moreover, significant relationships were shown between rumination and mindful attention to the present moment ($r = -.35$, $p < .001$), as well as depressive symptomatology ($r = .49$, $p < .001$; Jermann et al., 2010). For this study, only rumination was considered. A higher score indicates a higher tendency to ruminate.

Daydreaming was measured with the French version of the Daydreaming Frequency Scale (DFS; Stawarczyk, Majerus, Van der Linden, & D'Argembeau, 2012; original version, Giambra, 1993), a 12-item scale (e.g., "I lose myself in active daydreaming") for which a higher score indicates a higher tendency to daydream. Principal component and confirmatory factor analyses of the French version of the DFS revealed a single-factor structure with good internal reliability (Cronbach's α ranged from .88 to .92; Stawarczyk et al., 2012). In addition, Stawarczyk et al. (2012) demonstrated that this scale was related to an online measure of mind-wandering sampled during an attentional laboratory task.

STATISTICAL ANALYSES

Statistical analyses were conducted using SPSS 22. First, Pearson's correlations were computed to measure the associations between the variables (procrastination, the urgency and lack of perseverance facets of impulsivity, rumination, daydreaming, and gender).

Second, in order to investigate whether the links between intrusive thoughts and procrastination were mediated by impulsivity facets, as well as whether the links between impulsivity facets and procrastination were mediated by intrusive thoughts, mediation analyses were performed using a bootstrapping procedure, a nonparametric resampling technique that allows one to test for indirect effects (SPSS macro INDIRECT; Preacher & Hayes, 2008). This procedure, which involves the estimation of the indirect effect in thousands of resampled observations within the data set (5,000 iterations in this study), provides an approximation of the distribution of the indirect effect as well as the confidence intervals (Cis) around the effect. Cis are actually used to test whether the distribution of the indirect effect is significantly different from zero; the mediation effect is significant when the 95% bias-corrected Cis do not include zero. This method has been recommended in preference over the widely used Sobel test and the Baron and Kenny approach (Baron & Kenny, 1986), since bootstrapping has been found not to inflate type I and type II error rates and to have higher power (Fritz & MacKinnon, 2007). In addition, bootstrapping does not assume multivariate normality. All analyses were two tailed, with a level set at .05.

Results

DATA SCREENING, DESCRIPTIVE AND CORRELATION ANALYSES

Data were normally distributed. Means, standard deviations, internal consistency reliability coefficients, and correlations between the variables are reported in Table 1. Cronbach's α ranged from .78 to .92, indicating acceptable to excellent reliability (a value above .70 is acceptable, above .80, good, and above .90, excellent; George & Mallery, 2005). Correlations between .10 and .30 correspond to a small effect, between .30 and .50 to a moderate effect, and above .50 to a large effect (Cohen, 1988). Accordingly, procrastination was strongly related to lack of perseverance, moderately to urgency and daydreaming, and weakly to rumination. Urgency was moderately related to rumination, whereas lack of perseverance was weakly related to daydreaming; urgency and lack of perseverance were weakly related to each other. Finally, rumination was moderately associated with gender (women experienced more rumination), and weakly with daydreaming.

MEDIATION ANALYSES

Four mediation models were computed to test the four hypotheses: (1) the link between rumination and procrastination mediated by urgency, (2) the link between urgency and procrastination mediated by rumination, (3) the link between daydreaming and procrastination mediated by lack of perseverance, and (4) the link between lack of perseverance and procrastination mediated by daydreaming. Based on the correlations between the variables, lack of perseverance, daydreaming, and gender were entered as covariates in models 1 and 2, urgency and rumination in models 3 and 4. The results showed that the indirect effects of models 1, 3, and 4 were statistically significant (95% bias-corrected Cis not containing zero), unlike model 2 (for which the direct effect of rumination on procrastination was also not significant). Model 1 explained 52% of the variance in procrastination, $F(5, 135) = 31.07, p < .001, \text{adj}R^2 = 0.52$; models 3 and 4 explained 51%, $F(4, 136) = 25.91, p < .001, \text{adj}R^2$

= 0.51.

Table 1. Descriptive statistics and correlations between the variables.

Variables	M	SD	α	Range	1.	2.	3.	4.	5.
1. PPS	2.85	.77	.91	1-5	-				
2. UPPS-P_Urgency	2.32	.65	.79	1-4	.37	-			
3. UPPS-P_Lack of perseverance	1.81	.61	.88	1-4	.64	.27	-		
4. RRQ_Rumination	3.40	.66	.87	1-5	.24	.34	.11	-	
5. DFS	3.28	.81	.92	1-5	.45	.10	.27	.26	-
6. Gender	-	-	-	-	.02	-.06	-.02	-.36	-.10

Note. Pearson product-moment correlations were computed for all variables except gender (for which point biserial correlations were used; a positive correlation corresponds to a higher score for men). Correlations (in bold) are significant at $p < .05$. PPS: Pure Procrastination Scale; UPPS-P: short version of the UPPS Impulsive Behavior Scale; RRQ: Rumination-Reflection Questionnaire; DFS: Daydreaming Frequency Scale.

These results indicated, on the one hand, that urgency mediated the association between rumination and procrastination (Figure 1), whereas rumination did not mediate the relation between urgency and procrastination (Figure 2). On the other hand, lack of perseverance mediated the association between daydreaming and procrastination (Figure 3), and daydreaming mediated the relation between lack of perseverance and procrastination (Figure 4). Among the covariates, lack of perseverance and daydreaming (but not gender) were significantly associated with procrastination in models 1 and 2 ($b = 0.64, p < .001$, and $b = 0.27, p < .001$, respectively); urgency was the only variable to be significantly associated with procrastination in models 3 and 4 ($b = 0.22, p < .01$).

Figure 1. Mediation of the rumination-procrastination relationship by urgency after controlling for lack of perseverance, daydreaming, and gender.

BCIs: bias-corrected confidence intervals; SE: standard error.

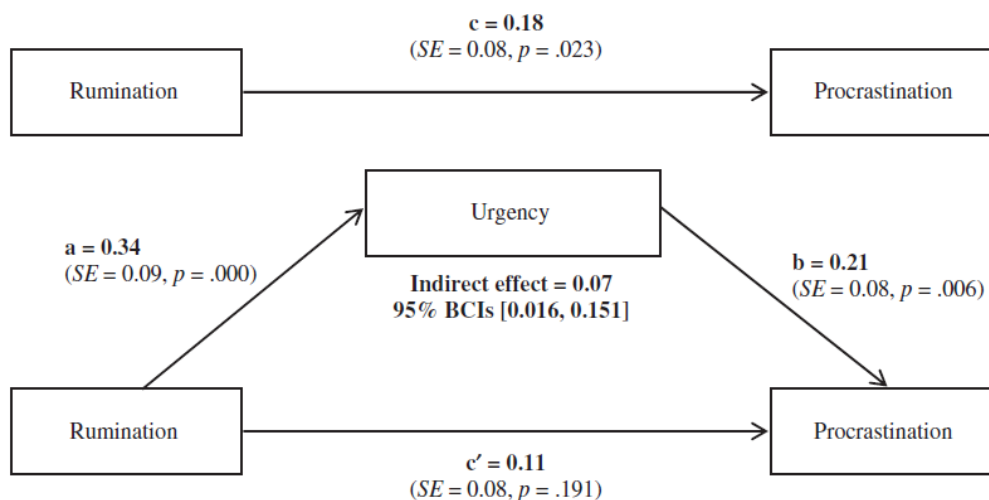
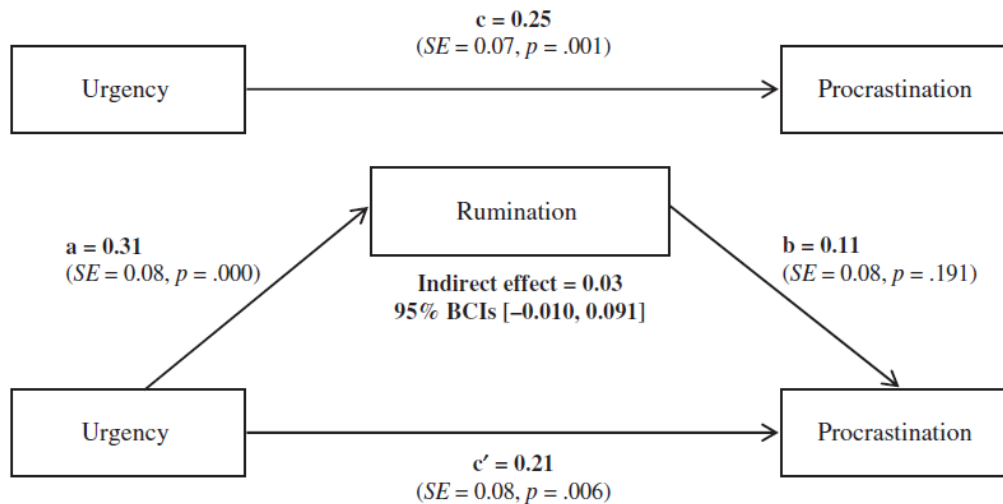


Figure 2. Mediation of the urgency-procrastination relationship by rumination after controlling for lack of perseverance, daydreaming, and gender.

BCIs: bias-corrected confidence intervals; SE: standard error.



Discussion

The aim of this study was to examine the relationships between procrastination and other kinds of self-regulation problems, namely impulsivity and intrusive thoughts. Building on earlier literature that examined these relationships independently of each other, we focused specifically on the urgency and lack of perseverance dimensions of impulsivity (Dewitte & Schouwenburg, 2002; Rebetz et al., 2015), and on rumination and daydreaming as manifestations of thought control difficulties (e.g., Flett et al., 2012; Harriott et al., 1996; Stainton et al., 2000).

Figure 3. Mediation of the daydreaming-procrastination relationship by lack of perseverance after controlling for urgency and rumination.

BCIs: bias-corrected confidence intervals; SE: standard error.

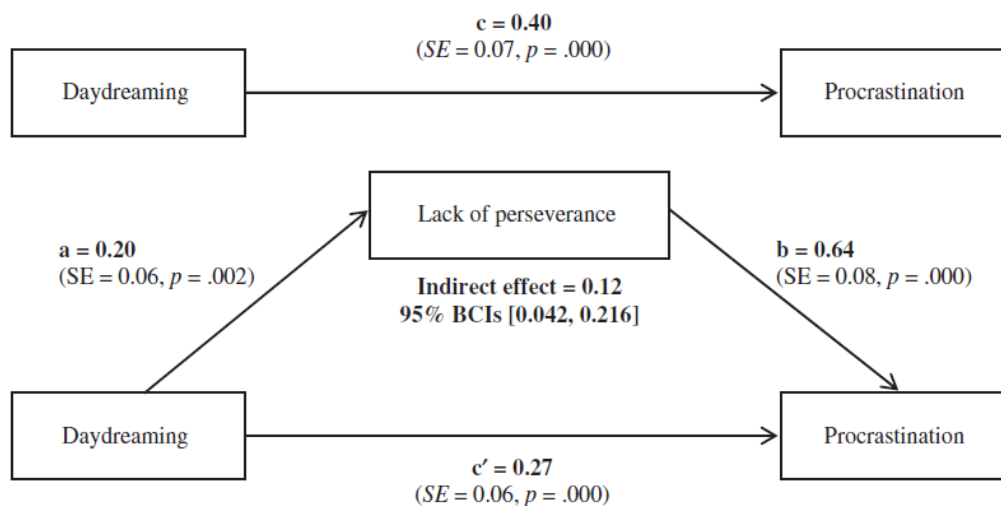
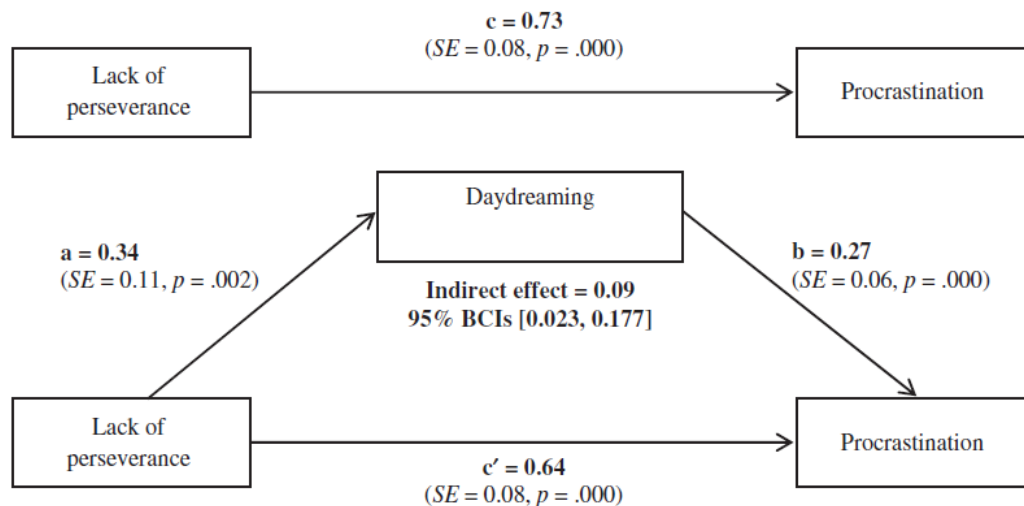


Figure 4. Mediation of the lack of perseverance-procrastination relationship by daydreaming after controlling for urgency and rumination.

BCIs: bias-corrected confidence intervals; SE: standard error.



The main findings of the study were as follows: (a) a high level of procrastination was associated with both high impulsivity (high urgency and lack of perseverance) and high frequency of intrusive thoughts (more frequent rumination and daydreaming); (b) the link between rumination and procrastination was mediated by urgency (i.e., the tendency to act rashly in response to intense negative affect), whereas the link between urgency and procrastination was not mediated by rumination; and (c) the link between daydreaming and procrastination was mediated by lack of perseverance (i.e., difficulties in remaining focused on a boring/difficult task), and the link between lack of perseverance and procrastination was mediated by daydreaming.

These results highlight the nature of procrastination as a self-regulatory failure, corroborating previous evidence of, first, a close association between procrastination and impulsivity (e.g., Dewitte & Schouwenburg, 2002; Gustavson et al., 2014; Rebetz et al., 2015; Steel, 2007) and, second, a close connection between procrastination and intrusive thoughts (e.g., Flett et al., 2012; Harriott et al., 1996; Stainton et al., 2000). The results also specify the relationships between these different manifestations of self-regulation problems. Indeed, our data suggest that individuals who ruminate more demonstrate higher urgency, which in turn results in a higher level of procrastination. The link between rumination and urgency is in line with the literature showing that intrusive thoughts facilitate impulsive behaviors. For example, Selby et al. (2015) proposed that rumination and negative affect promote each other in a self-amplifying cycle to the point that people engage in dysregulated behavior (e.g., rash actions) in order to distract themselves from the rumination. Interestingly, a high level of urgency has been found to be related to poor inhibition and decision-making capacities in an emotional context (Billieux, Gay, Rochat, & Van der Linden, 2010; Rochat, Beni, Annoni, Vuadens, & Van der Linden, 2013). Thus, when facing intense emotional states (following cascades of rumination and negative affect), individuals with higher urgency may find it hard to refrain from engaging in more enjoyable activities (or perhaps in any other activity, more or less enjoyable) than the intended ones (increasing their likelihood of procrastinating). This can be matched with mood-repair conceptualizations of procrastination, suggesting that regulation of

immediate mood is prioritized over the longer term pursuit of intended actions (Sirois & Pychyl, 2013; Tice, Bratslavsky, & Baumeister, 2001).

However, and in contrast to our hypotheses, rumination did not mediate the relation between urgency and procrastination (the direct effect of rumination on procrastination was not significant), suggesting that ruminating does not cause people to procrastinate (at least, not always). A possible explanation for these results might be the general character of the measure of ruminative thoughts used in this study. Procrastination may arise from more specific forms of rumination, in particular, procrastination-related automatic thoughts, such as self-blame and brooding about past procrastination. This specific type of ruminative thought is supposed to reflect a relatively stable tendency to engage in negative automatic thoughts about the self and to arise when people face difficulties performing actions that would help them reach their goals (Stainton et al., 2000). As such, individuals who experience more procrastination-related automatic thoughts (e.g., "I'm such a procrastinator. I'll never reach my goals," "I'm letting myself down," "People expect me to work and study more"), because of self-doubt, self-deception, or feelings of personal inadequacy, may be more prone to delay when they encounter problems in their performance. Moreover, the mode of rumination adopted might affect the likelihood of postponing a decision or an action. For instance, indecision (an aspect of procrastination) has been shown to be related to an abstract-analytical (i.e., focusing on higher level causes and meanings of the experience) rather than to a concrete-experiential (i.e., focusing on lower-level specific details and emotional reactions) rumination style (Di Schiena, Luminet, Chang, & Philippot, 2013). Indeed, an abstract-analytic mode of thinking does not provide contextual details about the specific means to solve a situation (contrary to a concrete-experiential mode of thinking) (Watkins, 2008), and thus makes decision-making more difficult (Di Schiena et al., 2013). Another possible explanation might be the dynamic nature of the link between rumination and procrastination. Rumination (general rumination, as assessed in our study, or more specific forms of rumination) may be experienced at different points in time (e.g., preceding, accompanying, or following dilatory behaviors). Therefore, a link between rumination and procrastination may or may not appear depending on the time of observation. For example, rumination may be less frequent early on before an assignment, but may become more frequent later on, as is the case with stress among student procrastinators (Tice & Baumeister, 1997). Further studies should therefore take into account the type and/or mode of rumination, as well as the dynamic nature of the relationships between procrastination and ruminative thoughts.

Finally, our data suggest that individuals who daydream more demonstrate higher lack of perseverance, or conversely those with higher lack of perseverance daydream more, which in turn results in a higher level of procrastination. Thus, daydreaming may facilitate lack of perseverance, by involving a shift in attention away from the immediate environment towards internal information that impairs behavioral responses relying on executive control (Smallwood, McSpadden, & Schooler, 2008; Smallwood & Schooler, 2006). Conversely, lack of perseverance could lead to more frequent daydreaming because of difficulties inhibiting intrusive thoughts or memories, which have been shown to underlie lack of perseverance (Gay et al., 2008). Hence, problems ignoring information that is irrelevant for the task at hand might provoke lapses or drifting of attention away from the task, or conversely an attentional shift away from the immediate task context might increase the susceptibility to distractions and irrelevant thoughts, hindering the completion of difficult or boring tasks (and therefore increasing the likelihood of procrastinating). This interpretation is compatible

with the classic view of procrastination as a self-regulatory failure representative of low conscientiousness (i.e., lack of organization, persistence, control, and motivation in goal-directed behavior) (Schouwenburg & Lay, 1995).

A number of limitations on the current study should be considered. First, data were collected concurrently, limiting causal inferences, and self-report measures are vulnerable to biases, such as social desirability. Replication is thus required with longitudinal designs and other types of measures such as behavioral measures, laboratory measures, or observations in real situations. In this perspective, the impact of procrastination on impulsivity and intrusive thoughts could also be examined. Finally, in case of competing models, structural equation modeling would probably be the most appropriate analytic strategy. However, that kind of analytical approach may not be relevant here because of the features of the mediation models (especially given the bidirectional relationships of the variables of interest).

In conclusion, this study supports the relevance of disentangling the self-regulation difficulties related to urgency and rumination versus lack of perseverance and daydreaming in order to better understand the mechanisms underlying procrastination. It points out the necessity of implementing targeted psychological interventions to decrease the impulsive manifestations (i.e., restrain urgent behavior and/or strengthen perseverance) and/or thought control problems (i.e., reduce rumination and/or daydreaming) that accompany procrastination. For example, interventions that target inhibition of automatic responses (e.g., by implementation intentions; Gollwitzer, 1999) might be useful for individuals with high urgency (Burkard, Rochat, & Van der Linden, 2013). Mindfulness-based interventions might be better suited for individuals with both high urgency and high lack of perseverance (Peters, Erisman, Upton, Baer, & Roemer, 2011), as well as to reduce rumination (Heeren & Philippot, 2011). Rumination might also be reduced by rumination-focused cognitive behavioral therapy, which encourages a concrete-experiential mode of thinking (Watkins, 2015). Finally, daydreaming might be reduced by an attention training technique that helps to strengthen awareness of attentional control (Wells, 1990).

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