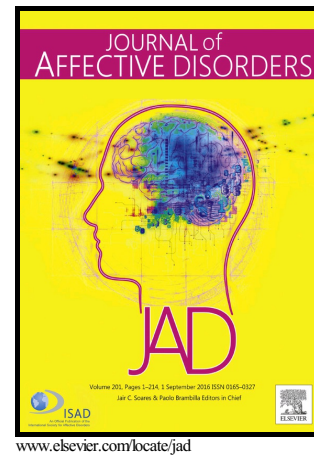# Author's Accepted Manuscript

A Metacognitive Model of Procrastination

Bruce A. Fernie, Zinnia Bharucha, Ana V. Nikčević, Claudia Marino, Marcantonio M. Spada

Cite this article as: Bruce A. Fernie, Zinnia Bharucha, Ana V. Nikčević, Claudia Marino and Marcantonio M. Spada, A Metacognitive Model of Procrastination, *Journal of Affective Disorders,* http://dx.doi.org/10.1016/j.jad.2016.12.042

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A Metacognitive Model of Procrastination[*]

Bruce A. Fernie[a,b*], Zinnia Bharucha[a], Ana V. Nikčević[c], Claudia Marino[d], Marcantonio M. Spada[e]

[a]King's College London, Institute of Psychiatry, Psychology and Neuroscience, Department of Psychology, London, UK
[b]HIV Assessment and Liaison Team, South London & Maudsley NHS Foundation Trust, London, UK
[c]Kingston University, Kingston upon Thames, UK
[d]Dipartimento di Psicologia dello Sviluppo e della Socializzazione, Universita' di Padova, Padova, Italy
[e]London South Bank University, London, UK

[*]Correspondence should be addressed to: Bruce Alexis Fernie, Department of Psychology, Institute of Psychiatry, Psychology and Neuroscience, King's College London, Henry Wellcome Building, De Crespigny Park, London, SE5 8AF, United Kingdom. Tel. +44 (0)7779 300 427, fax +44 (0)20 7848 5310, e-mail bruce.fernie@kcl.ac.uk

**Abstract**

Background: procrastination refers to the delay or postponement of task or decision-making initiation or completion and is often conceptualised as a failure of self-regulation. Recent research has suggested that metacognitions play a role in procrastination and that unintentional procrastination (UP), as opposed to intentional procrastination (IP), may be the most problematic form of this behaviour. We aimed to test a metacognitive model of procrastination that was grounded in the Self-Regulatory Executive Function model. Methods: a convenience sample of 400 participants were recruited and completed (at least partially) a battery of online questionnaires that measured IP and UP, metacognitions about procrastination, depression, and Cognitive Attentional Syndrome (CAS) configurations. Initially, we tested series of hypotheses to

establish the relationships between the experimental variables and to test whether CAS configurations would independently predict UP when controlling for age, depression, IP, metacognitions about procrastination, and whether an individual reported that they had been diagnosed with a psychiatric disorder. Results: CAS configurations, depression, and metacognitions independently predicted UP. Additionally, path analysis revealed that the study data was an excellent fit to the proposed metacognitive model of procrastination. Limitations: the study is cross-sectional. Conclusions: the metacognitive model of procrastination presented in this paper can be used to generate novel interventions to treat this problematic behaviour.

Keywords: Procrastination; metacognition; metacognitive model of procrastination; Metacognitive Therapy; Self-Regulatory Executive Function model.

## Introduction

**Procrastination**

Most of us can recall a time in our lives when we have procrastinated, perhaps because it is a nuanced concept that appears to be understood differently by different individuals. Broadly speaking, the term 'procrastination' seems to be commonly used to refer to an episode when an individual is 'putting off' or failing to complete an activity (such as doing homework or filing a tax return) in any given moment. Procrastination is a common behaviour, with the prevalence rates reported as high as 70% in students (Ellis & Knaus, 1977) and 20% in an adult sample (Harriott & Ferrari, 1996). Perhaps unsurprisingly, it has been found to be associated with diminished academic and work performance, as well as poor mental health (Stöber & Joormann, 2001).

Some psychologists have conceptualised procrastination as a failure of self-regulation (Baumeister & Heatherton, 1996; Baumeister, Heatherton, & Tice, 1994), in other words a maladaptive attempt to manage behaviour or emotion. Some individuals may believe that by postponing a task they will perform better (and successfully) at a later date, however it is unlikely that this strategy consistently results in a successful outcome (e.g., students submit assignments late, people fail to return their tax returns on time, etc.). For this study, we define procrastination as the postponement or avoidance of starting, engaging in, and/or completing a task or a decision-making process, whether intentional or unintentional (Fernie, McKenzie, Nikčević, Caselli, & Spada, 2015).

## Conceptualizations and Models of Procrastination

Several different conceptualizations and models of procrastination have been proposed in the extant psychological literature. For example, behaviourists have utilised operant conditioning to understand procrastination. This approach recruits avoidance behaviour in the role of a maintaining factor for procrastination (Ferrari & Emmons, 1995). Procrastination is reinforced because exposure to aversive stimuli (e.g., writing challenging essays, cleaning filthy toilets, etc.) is avoided. This perspective has been criticized for failing to account for individual differences amongst procrastinators (Ferrari, Johnson, & McCown, 1995). From a more cognitive perspective, much like Baumeister et al. (1994), Tuckman and Sexton (1989) also conceptualized procrastination as a failure to self-regulate. In a similar manner, Ellis and Knaus (1977) also postulated that procrastination was an illogical and non-goal directed behaviour but emphasized the key role of irrational cognitions. Central to this Rationale-Emotive Therapy perspective are the presence of two irrational beliefs: firstly, procrastinators doubt their ability to complete a task and, secondly, they fear the possible negative

social consequences of failing to complete a task well. Further studies suggested that particular cognitive constructs are implicated in procrastination. For example, the perceived difficulty of a particular task (i.e., its level of 'task aversiveness') has been shown to be associated with procrastination (Solomon & Rothblum, 1984), as well as self-efficacy beliefs (Haycock, McCarthy, & Skay, 1998), self-esteem (Ferrari, 1994), and perfectionism (Stöber & Joormann, 2001).

Later still, Steel and König (2006) presented a model of procrastination they called Temporal Motivation Theory (TMT) in an attempt to synthesize several strands of research. TMT can be represented by an equation that aims to calculate the perceived utility ascribed to the initiation of, engagement with, and/or the completion of, a task, arguing that this is a function of the likelihood that an individual will procrastinate in a given situation.  In calculating perceived utility, TMT employs several variables, specifically: valence (i.e., the 'amount' of attraction or aversion an individual feels towards the task – its level of task aversiveness), expectancy (i.e., a measure of how likely an individual believes that a given task will yield utility), delay (i.e., the length of time before the individual will experience the expected outcome), and gratification (i.e., an individual's intolerance of the delay). Arguably all of these variables tap in to several cognitive constructs that have been implicated in procrastination, namely task aversion, self-efficacy, self-esteem, and perfectionism. However, TMT (alongside other traditional CBT conceptualizations of procrastination that tend to emphasize the role of the content of cognitions) appears to neglect the possible key role of cognitive processes and attentional strategies in this behaviour.

**Metacognitions, the Self-Regulatory Executive Function model, and Procrastination**

The concept of metacognitions refers to a higher-order thinking that embodies beliefs concerning cognitive processes, attentional strategies, behaviours, and physical sensations. Metacognitions play a central role in the Self-Regulatory Executive Function (S-REF: Wells & Matthews, 1994, 1996) model of psychiatric disorders. The S-REF model describes a cognitive architecture, consisting of three interacting levels that are delineated into an automatic, low-level (or bottom-up) component, an online stage that reflects conscious cognitive processes and attentional strategies, and a higher-level that represents long-term memory and is where, according to the model, metacognitive beliefs (or metacognitions) are stored. In clinical practice, when working from a Metacognitive Therapy (MCT: Wells, 2011) perspective that was built from the S-REF model, psychiatric disorders and emotional distress are formulated using the Cognitive Attentional Syndrome (CAS) as a framework. The CAS consists of cognitive processes (such as distraction, rumination, and worry), maladaptive behaviours (e.g., avoidance), and attentional strategies (for example, self-focussed attention) that are governed by metacognitive beliefs (e.g., "My rumination is uncontrollable" and "My worry keeps me safe"). According to MCT, psychiatric disorder and emotional distress are the consequences of particular CAS configurations that result in 'perseveration': i.e., sustained engagement in unhelpful processes, which themselves represent self-regulation strategies that fail to modify maladaptive self-knowledge and behaviour. Problematic CAS configurations can be characterized by a particular relationship that individuals have with their thoughts, such that they are treated as facts that represent an objective reality (in the terms of the S-REF model, this is labelled 'object-mode') rather than mere transient mental events that are separate from the self and the world (termed 'metacognitive-mode'); in this mode,

thoughts are a form of potentially inaccurate representations that provide but a shadowy impression of reality (Wells, 2011).

**Intentional and Unintentional Procrastination**

More recently, procrastination has been delineated into intentional and unintentional domains (Fernie, Bharucha, Nikcevic, & Spada, 2016). Intentional procrastination (IP) refers to the deliberate and conscious engagement in this behaviour, while unintentional procrastination (UP) pertains to situations where it is perceived as involuntary. UP, but not IP, has been shown to be associated with low mood and anxiety (Fernie et al., 2016). The construct of IP aligns itself with the development of a self-report measure called the Active Procrastination Scale (APS; Choi & Moran, 2009) and, of particular relevance to this study, a sub-factor within the APS named 'Intentional Decision to Procrastinate'. A brief self-report measure of UP has also recently been developed and validated, namely the Unintentional Procrastination Scale (UPS: Fernie et al., 2016).

Chu and Choi (2005) proposed that there are two types of procrastinator: passive and active. They characterized a passive procrastinator in a manner that alludes to more 'traditional' conceptualizations of this behaviour. Passive procrastinators typically leave tasks to the last minute despite their good intentions, attenuating performance. Active procrastinators choose to delay task initiation or completion, believing that this strategy may actually optimize performance. This delineation between active and passive procrastinators is similar to the distinction between IP and UP. However, in this paper, we test a model of procrastination in which problematic procrastinators engage in both IP and UP due to presence of metacognitions that activate maladaptive cognitive processes, such as distraction, rumination, and worry.

We argue and test in this paper the hypothesis that cognitive or 'ego' depletion (Baumeister, Muraven, & Tice, 2000; Muraven & Baumeister, 2000) is key to

understanding UP. We propose that when engaging in IP, a problematic procrastinator initiates a particular CAS configuration, consisting of distraction, rumination, and worry, in a futile attempt to regulate their behaviour. As a result, UP becomes unavoidable and perseverative because these cognitive processes and attentional strategies consume significant mental resources and are inefficient means to achieve specific goals or complete required activities. Consequently, the problematic procrastinator has insufficient mental resources to allocate to task initiation and/or completion, in other words they begin UP. Furthermore, engagement in rumination and worry have been shown to result in negative affect (Berenbaum, Bredemeier, Thompson, & Boden, 2012; Nolen-Hoeksema, 1991; Papageorgiou & Wells, 2009), a consequence of which may be a lethargy that may further contribute to attenuated performance. The use of distraction is also likely to be unhelpful. This attentional strategy would result in the misallocation of the remnants of mental resources away from task initiation and/or completion, deleteriously affecting performance.

**Metacognitions and Procrastination**

General metacognitions, measured using the Metacognitions Questionnaire 30 (MCQ-30: Cartwright-Hatton & Wells, 1997; Wells & Cartwright-Hatton, 2004), have been found to be significant predictors of both decisional and behavioural procrastination (Spada, Hiou, & Nikcevic, 2006). Later still, metacognitions specific to procrastination (Fernie & Spada, 2008) have been shown to be significant predictors of, again, both decisional and behavioural procrastination (Fernie, Spada, Nikčević, Georgiou, & Moneta, 2009). Furthermore, three impaired factors of attentional control (focusing, shifting, and flexible control of thoughts), as well as two general metacognitive factors (negative beliefs concerning thoughts about uncontrollability and danger and lack of cognitive confidence), were found to be significantly and positively associated with

decisional procrastination (Fernie et al., 2015). In line with the S-REF model and supported by earlier research (Fernie et al., 2016), we propose that IP is, to some extent, a voluntary strategy aimed at self-regulation that is fuelled by metacognitions. Research has shown that positive metacognitions about procrastination (e.g., "When I procrastinate, I am unconsciously mulling over difficult decisions") were more strongly associated with IP than negative metacognitions about procrastination (e.g., "My procrastination is uncontrollable") when controlling for negative affect, while the relative strengths of these relationships were inverted when the bivariate associations between metacognitions and UP were examined (Fernie et al., 2016).

**Study Aims and Hypotheses**

Our first aim was to test several hypotheses to provide further evidence for the proposed metacognitive model of procrastination. These were that: (1) positive metacognitions about procrastination will be positively associated with both IP and UP (this would replicate the findings of an earlier study: Fernie et al., 2016); (2) levels of depression would be significantly associated with UP, maladaptive CAS configurations, and negative metacognitions about procrastination; (3) problematic CAS configurations, consisting of distraction, rumination, and worry result in cognitive depletion and therefore should be significantly and positively correlated with UP; and (4) CAS configurations of this type will predict significant additional variance in UP when controlling for negative affect, as well as other variables that have been found to be associated with the dependent variable.

By testing these hypotheses, and collating our findings with those from earlier research that investigated the role of metacognitions in procrastination, we would then be able to address the primary aim of this study: i.e., to use path analysis to test a metacognitive model of procrastination. In this model, positive metacognitions about

procrastination activate IP and then, if problematic CAS configurations are brought online (fuelled by negative metacognitions about procrastination), this will result in negative affect, before leading to UP.

## Methods

### Participants

A convenience sample of 400 (309 females; mean age = 30.9 years; SD = 12.6; range 18 to 72 years) participants was recruited for this study, via a university research volunteer email circular and social media, and completed a battery of online questionnaires, but only 305 participants completed all measures. This means that nearly a quarter of individuals who started to participate in the study did not go on to complete it, however this dropout rate is not unusual in web-based research (see Birnbaum, 2004 for a discussion of the issues associated with web-based research). Eligibility criteria required that participants: (1) were at least 18 years of age, (2) possessed adequate English language skills, and (3) consented to participate. Due to the significant number of international students enrolled at the university, the participants were from all continents, except Antarctica. However, the majority of participants (53.2%) reported being British or having dual citizenship (one nationality of which was British). The ethnicity of the sample was reasonably diverse, although the majority of the participants self-identified as White (73.5%). While 20.1% of the sample reported their ethnicity as Asian, 2.3% described themselves as Black, 2.3% as having a mixed ethnicity, 0.3% stated they were Arab, and the remaining participants preferred not to say. We anticipated that the sample would be international and that for many of the participants English would not be their first language. This revealed itself to be a reasonable supposition, with 36.2% of the sample reporting a first language other than English. However, 95.7% of the participants reported that they were either 'confident'

or 'very confident' in their ability to read English, while 94.3% rated their ability to write English at these same confidence levels. None of the participants reported inadequate English reading or writing skills.

We also wanted to be able to describe our sample in terms of (1) their mental health and (2) their exposure to psychological therapies, because this could mean that some participants were familiar with some of the concepts expressed by the items that comprise the experimental measures used in this study, potentially risking a response bias. Firstly, 9.3% disclosed that they had a mental health diagnosis. Of these, 73.0% reported that they had been diagnosed with depression and/or an anxiety disorder. Secondly, 24.5% of the entire sample stated that they had previous, or were currently engaged in, psychological therapy. Of these, 47.0% had been exposed to CBT and 20.4% reported that their therapy was or is, at least in part, to help with problematic procrastination. However, perhaps in part because problematic procrastination is not a clinical diagnosis in either the latest version of the Diagnostic and Statistical Manual (Association, 2013) or the International Statistical Classification of Disease and Related Health Problems (Organization, 2004), we were unable to evaluate whether this represented an approximately equivalent rate to individuals in the wider population who seek help for procrastination.

**Materials**

**Emotional measures**

The Patient Health Questionnaire 9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to assess depressive symptoms. The PHQ-9 is a nine-item scale designed to measure depressive symptoms and possesses good psychometric properties, with respondents indicating the level they have experienced the symptoms described by the items (e.g., "Feeling down or depressed") over the preceding two-weeks on a four-

point, Likert-type scale that ranges from 'not at all' (scoring zero) to 'nearly all the time' (scoring three). Responses to all items are summed together, meaning that higher scores indicate the presence of greater levels of depressive symptoms (Kroenke et al., 2001).

**Procrastination measures**

The 'Intentional Decision to Procrastinate' (IDP) factor of Active Procrastination Scale (APS) was used as a measure of IP. The full APS consists of a total of 16-items equally distributed over four factors (Choi & Moran, 2009). The IDP factor contains items such as "I intentionally put off work to maximize my motivation" and "To use my time more efficiently, I deliberately postpone some tasks". Participants are required to indicate the extent to which they agree with such statements on a four-point, Likert-type scale ranging from 'disagree' (scoring one) to 'agree' (scoring four). The responses are summed, so that higher scores reflect greater levels of IP. The IDP factor of the APS has been reported to possess good validity and adequate internal consistency (Choi & Moran, 2009). We used the Unintentional Procrastination Scale (UPS: Fernie et al., 2016) to measure UP. The UPS consists of six-items such as "Often I mean to be doing something, but it seems that sometimes I just don't get round to it" and "I really want to get things finished in time, but I rarely do". Much like the IDP, participants indicate their strength of belief in the items on a four-point, Likert-type scale, ranging from 'do not agree' (scoring one) to 'agree very much' (scoring four). Again responses are totalled and higher scores indicate greater levels of UP. The UPS possesses discriminant, construct, and concurrent validity, as well as good internal consistency (Fernie et al., 2016).

Finally, we used the Metacognitions about Procrastination Scale (MaPS) as a measure of meta-beliefs about procrastination (Fernie et al., 2009). The MaPS consists

of two, eight-item factors that assess positive metacognitions about procrastination (PMP) and negative metacognitions about procrastination (NMP). An example item of an item from the PMP factor is "When I procrastinate, I am unconsciously mulling over difficult decisions" and for the NMP factor is "My procrastination is uncontrollable". In terms of concurrent validity, NMP has been shown to be significantly correlated with both general and decisional procrastination, but PMP is only significantly associated with the latter (Fernie et al., 2009). The MaPS uses the same response-format as the UPS. Higher scores on either factor (which are summed separately) indicate a greater endorsement of positive and/or negative metacognitions about procrastination. The factors have been shown to possess good internal consistency (Fernie et al., 2009).

**Measure of Cognitive Attentional Syndrome configurations**

Participants were asked three questions about the extent that they worry, ruminate, and/or try to distract themselves during an episode of procrastination. Participants were required to respond on five-point, Likert-type scale ranging from "I do not worry about/ ruminate about/ distract myself from my procrastination or I do not procrastinate" (scoring zero) to "I always worry about/ ruminate about/ distract myself from my procrastination" (scoring four). Thus higher scores suggest greater levels of worry, rumination, and/or distraction activated in response to an episode of procrastination. The responses to each question were converted to z-scores and used to calculate a mean measure of problematic CAS configuration activation (termed CAS mean).

**Procedure**

Potential participants were directed to the study website containing the questionnaires. The first two pages of this provided information regarding the purpose of the study, describing that responses were anonymous, and that consent would be assumed once participants click on the 'submit' button that followed the battery of questionnaires. In

the pages following this information, participants were presented with a series of

questions to ascertain their demographic details, their exposure to psychotherapy

(subsequently subjected to binary coding), and their current mental wellbeing (e.g., "Do

you have a psychiatric diagnosis?"). Participants were not required to record their

names. Once more participants were informed that, by clicking on the submit button

that followed the questionnaires, they were consenting to participate in the study. Prior

to this, they were informed that once they click the submit button, it would not be

possible to withdraw their data from the study because it was uploaded in an

anonymous form.

**Statistical Analyses**

Firstly, the distribution of the study data was assessed for non-normality. Secondly

statistical differences in the study variables were examined between males and females,

those with psychiatric diagnoses, and those exposed or naïve to psychological therapy.

Four of the experimental hypotheses were evaluated using correlational and

hierarchical regression analyses. Finally path analysis was used to test a metacognitive

model of procrastination that was based on earlier work by Fernie et al. (2016) and used

UPS as the 'end-point' of the model because this variable has been shown to be

strongly associated with negative affect (Fernie et al., 2016).

**Results**

**Distribution of Data and Non-Parametric Difference Tests Between Demographic**

**Variables**

A series of Kolmogorov−Smirnov normality tests were conducted on the data from all

the experimental measures and these revealed that all of the variables were non-

normally distributed. As a consequence, a series of non-parametric Mann-Whitney $U$

tests were conducted on the data to establish whether the gender of participants, those

with psychiatric diagnoses, or individuals who had been exposed to psychological therapy differed on all experimental measures. These tests suggested that males significantly endorsed NMP more than females (Mann-Whitney $U = 8638$, $n_1 = 69$, $n_2 = 252$, $p < .05$). They also indicated that individuals that self-reported having a psychiatric diagnosis had significantly higher levels of depression (Mann-Whitney $U = 2333.5$, $n_1 = 32$, $n_2 = 273$, $p < .0001$), engaged in more UP (Mann-Whitney $U = 2466.5$, $n_1 = 32$, $n_2 = 302$, $p < .0001$), more strongly endorsed NMP (Mann-Whitney $U = 2928$, $n_1 = 32$, $n_2 = 289$, $p < .01$), and showed greater activation of maladaptive CAS configurations (Mann-Whitney $U = 2560.5$, $n_1 = 32$, $n_2 = 274$, $p < .0001$). This finding suggested the need to control for psychiatric diagnosis in the regression analysis that sought to test the fourth study hypothesis. Furthermore, these Mann-Whitney tests revealed that participants who had been exposed to psychological therapy endorsed NMP to a significantly less extent than those who had not (Mann-Whitney $U = 8663$, $n_1 = 92$, $n_2 = 229$, $p < .05$), hinting that talking therapies directly or indirectly targeted these beliefs.

**Descriptive Statistics, Internal Consistencies of the Study's Experimental Measures, and Testing the First, Second, and Third Study Hypotheses**

Table 1 shows the descriptive statistics and Cronbach's alphas for all experimental measures. We generated Spearman's Rho correlation analyses to explore the relationships between some of the participants' demographics and the experimental measures (see Table 1). The UPS significantly and positively correlated with all variables (supporting the first, second, and third study hypotheses) except age, which revealed a significant and negative relationship, suggesting that people engage in less UP as they age. The variables that were significantly associated with UPS indicated that

we needed to control for them in the later regression analysis that tested the fourth study hypothesis.

**Hierarchical Regression Analysis with UPS as the Outcome Variable to Test the Fourth Study Hypothesis**

The data concerning participants' ages, as well as their scores from the IDP, the PHQ-9, both factors of the MaPS, their mean CAS z-scores, and whether a participant had received a psychiatric diagnosis were assessed for their suitability for regression modeling. No evidence of multicollinearity in the dataset: (1) no correlations greater than r = .9 were identified between the predictor variables used in the regression analysis, (2) the ranges of the Tolerance Index (TI) were 1.00 to 0.54 (i.e., no TIs were calculated below 0.20), and (3) the Variance Inflation Factors (VIF) for all predictor variables were less than 10 (the highest VIF was 1.84). Additionally, the Durbin-Watson test suggested that the assumption of independent errors is tenable. Furthermore, histograms and normality plots suggested that the residuals were normally distributed and plots of the regression-standardized residuals against the regression-standardized predicted values provided evidence that the assumptions of linearity and homoscedascity were met.

A six-step hierarchical regression analysis was conducted with UPS as the outcome variable (see Table 2) to test the fourth study hypothesis. Participants' age was entered as a predictor on the first step, self-reported diagnosis of a psychiatric disorder on the second, PHQ-9 on the third, IDP on the fourth, both PMP and NMP on the fifth, and CAS mean on the final step. PHQ-9, PMP, NMP, and CAS mean remained independent, significant predictors in the final model. At any step following the first, participants' age was a non-significant predictor of UPS, and at no point in the hierarchical regression model was current or previous exposure to psychological

therapy an independent predictor of UP. The final model explained 37% of the variance

in UPS scores, supporting the fourth study hypothesis.

**Path Analysis of the Metacognitive Model of Procrastination**

The primary aim of this study sought to test our proposed metacognitive model of

procrastination (see Figure 1). We used the Lavaan package (Rosseel, 2012), running

on the R Studio package (R-Studio, 2012), to test the pattern of relationships of our

proposed model using path analysis (bootstrap = 1000). We were restricted to using

scores obtained from 305 of the 400 participants because cases were excluded if any

were missing data. Our model revealed that all estimated coefficients were significant

at the $p < 0.001$ level and explained 46% of the total variance in UPS, indicating that it

was an excellent fit of the observed data. To further evaluate the goodness of fit of the

model, we calculated the R-Square of each endogenous variable: IDP = 13%, CAS

mean = 40%, PHQ-9 = 16%, and UPS = 24%. Again, this suggested that our model was

at least a good fit of the observed data. Additionally all the indirect paths were

significant at a minimum of the 1% level (not shown in Figure 1). PMP had an indirect

effect on CAS mean via IDP ($\beta = .07$, $p < .01$), IDP had an indirect effect on PHQ-9 via

CAS mean ($\beta = .08$, $p < .01$), and CAS mean had an indirect effect on UPS via PHQ-9

($\beta = .20$, $p < .001$).

## Discussion

**Addressing the Aims of the Study**

The primary aim of this study was to test a metacognitive model of procrastination that

was developed within the framework of the S-REF model and synthesized the findings

from several studies that had implicated a role for metacognitions in this often

problematic behaviour (Fernie et al., 2016; Fernie et al., 2015; Fernie & Spada, 2008;

Fernie et al., 2009; Spada et al., 2006). Prior to evaluating the model, we found

evidence to support all four of the study's hypotheses. Firstly, PMP were significantly and positively associated with both IP and UP. Secondly, PHQ-9 scores were significantly associated with UP, maladaptive CAS configurations, and NMP, providing further evidence for the key roles played by the CAS and metacognitions in negative affect, and thus for the S-REF model. Thirdly, we found that problematic CAS configurations were significantly and positively correlated with UP. Fourthly, CAS configurations of this type predicted significant additional variance in UP when controlling for the participants' ages, their current or previous exposure to psychological therapy, IDP, PMP, and NMP. These findings (particularly those that resulted from the testing of the third and fourth hypotheses) lent support to our contention that UP could be significantly explained by the depletion of mental resources that had been misallocated to problematic CAS configurations consisting of distraction, rumination, and worry. Indeed, earlier research had suggested that impaired performance is associated with such cognitive and attentional processes (see Hofmann, Schmeichel, & Baddeley, 2012 for a discussion).

Arguably, we found good evidence that our proposed metacognitive model of procrastination was, at the very least, a good fit of the data obtained by this study. Our model proposes that PMP lead to IP that, alone, is not necessarily harmful. However, in the case of problematic procrastinators, if in response to IP problematic CAS configurations are brought online alongside NMP (e.g., "My procrastination is uncontrollable"), this worsens mood and perservative UP results. This is because engagement in cognitive processes such as worry and rumination drains mental resources, reducing the ability to perform and further lowering mood. These now depleted mental resources not only reinforce NMP, they are also often misallocated through maladaptive attentional strategies (i.e., distraction) that make it even more

difficult to initiate or complete the task at hand, further contributing to UP and low mood.

We suggest that our model has the capacity to offer a framework that can be used to interpret a broad range of the findings from the extant literature on procrastination. For example, our model clearly frames UP as a failure of self-regulation (Baumeister & Heatherton, 1996; Baumeister et al., 1994; Tuckman & Sexton, 1989). Additionally, intuitively it seems that the depletion of mental resources resulting from the problematic CAS configurations, intrinsic to our model, is likely to increase the perceived difficulty of a task (i.e., task aversiveness: Solomon & Rothblum, 1984; Steel & König, 2006), worsen mood (Stöber & Joormann, 2001), and lead to the perseveration of UP, consequently harming self-efficacy (Haycock et al., 1998) and self-esteem (Ferrari, 1994) beliefs. It also seems that our model would reinforce at least the first of the two beliefs that Ellis and Knaus (1977) argued were strongly endorsed by problematic procrastinators: i.e. they doubt their ability to complete a task. If maladaptive CAS configurations deplete mental resources, procrastinators will be less able to complete tasks. Furthermore, some studies have reported a degree of success in reducing procrastination using paradoxical techniques where participants were 'allowed' to procrastinate (e.g., Shoham-Salomon, Avner, & Neeman, 1989). Such an intervention may indirectly challenge NMP and reduce the activation of problematic CAS configurations.

Unlike Choi and Moran (2009)'s delineation of procrastinators into two distinct sub-types (i.e., active and passive) that may seem to share a conceptual overlap with the constructs of IP and UP, our proposed model does not see these types of behaviours as representing a categorical difference between individuals. Instead, our findings suggest that IP leads to UP via particular CAS configurations, NMP, and low mood. In fact, this

is consistent with the correlation analyses conducted by Choi and Moran (2009) that found a significant and positive correlation between IDP and their measure of passive procrastination.

**Clinical Implications**

Studies testing the efficacy of CBT for procrastination seem sparse. Indeed, the authors of this study were only able to identify a few relevant published studies. Firstly, a proposal for a RCT that plans to compare group-delivered versus Internet-based CBT for procrastination (Rozental, Forsström, Nilsson, Rizzo, & Carlbring, 2014) and, secondly, a study that reported a case series that evaluated a brief CBT intervention in a small sample (n=7) utilising an uncontrolled design that reported successful outcomes (Karas & Spada, 2009). Thirdly, another study reported that a group CBT intervention was beneficial in reducing academic procrastination (Toker & Avci, 2015) whilst, fourthly, a study that compared Acceptance and Commitment Therapy (arguably a third wave competitor to MCT) to CBT suggested that both were at least mildly affective in reducing problematic aspects of procrastination (Wang et al., 2015)

However, we propose that treatments based on our model have significant potential. The model that we have presented in this paper is grounded in S-REF theory from which MCT was developed. A recent meta-analysis provided preliminary evidence that MCT is more effective than traditional CBT in treating anxiety and depression (Normann, van Emmerik, & Morina, 2014), which we suggest bodes well for the potential efficacy of MCT-derived interventions for problematic procrastination. Our model suggests several targets that could be addressed by MCT interventions. Firstly, PMP and NMP could be challenged using restructuring techniques or behavioural experiments. Secondly, the metacognitions hypothesized to govern the problematic CAS configuration activated in response to IP could also be targeted with

the aim of reducing worry and rumination. Thirdly, a reduction of the use of distraction could be achieved by improving selective attention by using Attention Training Technique (Wells, 2007; Wells, White, & Carter, 1997).

On a side note, our analyses also provided further support for the strength of the psychometric properties of the MaPS (Fernie et al., 2009). The PMP factor of the MaPS revealed 'acceptable', and the NMP factor 'excellent', internal consistency. Furthermore, evidence for the concurrent and discriminant validity of the MaPS was generated. The PMP factor was significantly associated with IDP and UPS, while the NMP factor was only significantly related to UPS and not IDP.

**Limitations**

This study is subject to several limitations that will have to be addressed by future research. First, social desirability, self-report biases, context effects, and poor recall may have contributed to errors in the self-report measurements. Second, a cross-sectional design was adopted and this does not allow causal inferences. Third, this study utilized self-report measures to assess subjective experience and meta-awareness and as such, like much cognitive research, there is always doubt whether we are measuring the constructs we intend. Fourth, there were issues with the sample characteristics: the majority of participants were female, nearly three quarters identified themselves ethnically as 'White', and approximately half of the sample, in terms of nationality, identified as British. This impacts on our ability to generalize these findings to other ethnicities and nationalities, though a significant proportion of participants self-reported as non-white and non-British. Fifth, the lack of homogenous sample nationality risked leading to increased error measurements due to the self-report measures all being written in English; however, participants' ratings of their language abilities suggested that very few lacked confidence in reading or writing in English.

Sixth, this study recruited a convenience sample and potential confounders such as socio-economic status and education were not controlled for. Seventh, the psychometric properties of the MaPS have, to date, not been extensively tested in empirical studies. This requires the acknowledgement that the use of the MaPS in this study potentially weakens its findings. Finally, an eighth limitation could lie in in the similarities between the IDP and the PMP factor of the MaPS: i.e., are they measuring the same construct? We argue that they are not. IDP measures the frequency of IP behaviour whilst the PMP factor of the MaPS assesses the strength of positive meta-beliefs about procrastination. Indeed, whilst these two variables were significantly associated, this was found only to be a moderate correlation ($r = .35$), suggesting that these are related, but different, constructs.

**Conclusions**

This study's results are attenuated by several limitations, but we suggest that this paper presents significant evidence that describes a novel and potentially clinically relevant metacognitive model of procrastination from which new treatments, based on MCT, could be developed. We argue that problematic procrastination is a harmful behaviour that, not only deleteriously affects students' academic performance, but also reduces the productivity of those in employment. It prevents individuals from achieving their full potential, negatively impacts on their mental health, and is sometimes harmful to their interpersonal relationships. Research has suggested that it affects a significant number of people and therefore an effective treatment could be widely beneficial, both on individual and societal levels. However, to justify such optimistic speculations, further research is needed to test the validity of the metacognitive model of procrastination that we have presented. For example, it may be of interest to test the model in samples of individuals with a primary clinical diagnosis that often incorporates procrastination as

part of its presentation, such as addictive disorders. Fundamentally, however, the accuracy and robustness of our model will depend on research that tests whether modifications of the specified metacognitions, as well as improvements in selective attention, alters levels of UP. This might be achieved by conducting a pilot study that uses interventions derived from the model presented in this paper to disrupt the here within implicated maintaining factors of procrastination.

## Acknowledgements

## References

Association, A. P. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (Fifth ed.): American Psychiatric Association.

Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. *Psychological inquiry, 7*(1), 1-15.

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*: Academic Press.

Baumeister, R. F., Muraven, M., & Tice, D. M. (2000). Ego depletion: A resource model of volition, self-regulation, and controlled processing. *Social cognition, 18*(2), 130.

Berenbaum, H., Bredemeier, K., Thompson, R. J., & Boden, M. T. (2012). Worry, anhedonic depression, and emotional styles. *Cognitive Therapy and Research, 36*(1), 72-80.

Birnbaum, M. H. (2004). Human research and data collection via the Internet. *Psychology, 55*(1), 803.

Cartwright-Hatton, S., & Wells, A. (1997). Beliefs about Worry and Intrusions: The Meta-Cognitions Questionnaire and its Correlates. *Journal of Anxiety Disorders, 11*(3), 279-296. doi: 10.1016/S0887-6185(97)00011-X

Choi, J. N., & Moran, S. V. (2009). Why not procrastinate? Development and validation of a new active procrastination scale. *J Soc Psychol, 149*(2), 195-211. doi: 10.3200/SOCP.149.2.195-212

Chu, A. H., & Choi, J. N. (2005). Rethinking procrastination: positive effects of "active" procrastination behavior on attitudes and performance. *J Soc Psychol, 145*(3), 245-264. doi: 10.3200/SOCP.145.3.245-264

Ellis, A., & Knaus, W. J. (1977). *Overcoming procrastination: Or how to think and act rationally in spite of life's inevitable hassles*: Institute for Rational Living.

Fernie, B. A., Bharucha, Z., Nikcevic, A. V., & Spada, M. M. (2016). The Unintentional Procrastination Scale. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*.

Fernie, B. A., McKenzie, A.-M., Nikčević, A. V., Caselli, G., & Spada, M. M. (2015). The Contribution of Metacognitions and Attentional Control to Decisional

Procrastination. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 1-13.

Fernie, B. A., & Spada, M. M. (2008). Metacognitions about procrastination: A preliminary investigation. *Behavioural and Cognitive Psychotherapy, 36*(03), 359-364.

Fernie, B. A., Spada, M. M., Nikčević, A. V., Georgiou, G. A., & Moneta, G. B. (2009). Metacognitive Beliefs About Procrastination: Development and Concurrent Validity of a Self-Report Questionnaire. *Journal of Cognitive Psychotherapy, 23*(4), 283-293. doi: 10.1891/0889-8391.23.4.283

Ferrari, J. R. (1994). Dysfunctional procrastination and its relationship with self-esteem, interpersonal dependency, and self-defeating behaviors. *Personality and Individual Differences, 17*(5), 673-679.

Ferrari, J. R., & Emmons, R. A. (1995). Methods of procrastination and their relation to self-control and self-reinforcement: An exploratory study. *Journal of Social Behavior and Personality, 10*(1), 135.

Ferrari, J. R., Johnson, J. L., & McCown, W. G. (1995). *Procrastination Research*: Springer.

Harriott, J., & Ferrari, J. R. (1996). Prevalence of procrastination among samples of adults. *Psychological Reports, 78*(2), 611-616.

Haycock, L. A., McCarthy, P., & Skay, C. L. (1998). Procrastination in college students: The role of self‐efficacy and anxiety. *Journal of Counseling & Development, 76*(3), 317-324.

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends Cogn Sci, 16*(3), 174-180. doi: 10.1016/j.tics.2012.01.006

Karas, D., & Spada, M. M. (2009). Brief cognitive-behavioural coaching for procrastination: A case series. *Coaching: An International Journal of Theory, Research and Practice, 2*(1), 44-53.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med, 16*(9), 606-613.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychol Bull, 126*(2), 247.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *J Abnorm Psychol, 100*(4), 569-582. doi: 10.1037/0021-843x.100.4.569

Normann, N., van Emmerik, A. A., & Morina, N. (2014). The efficacy of metacognitive therapy for anxiety and depression: a meta-analytic review. *Depress Anxiety, 31*(5), 402-411. doi: 10.1002/da.22273

Organization, W. H. (2004). *International statistical classification of diseases and health related problems (The) ICD-10.* World Health Organization.

Papageorgiou, C., & Wells, A. (2009). A prospective test of the clinical metacognitive model of rumination and depression. *International Journal of Cognitive Therapy, 2*(2), 123-131.

R-Studio. (2012). R Studio: integrated development environment for R: Version 0.97.

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1-36.

Rozental, A., Forsström, D., Nilsson, S., Rizzo, A., & Carlbring, P. (2014). Group versus Internet-based cognitive-behavioral therapy for procrastination: Study protocol for a randomized controlled trial. *Internet Interventions, 1*(2), 84-89. doi: 10.1016/j.invent.2014.05.005

Shoham-Salomon, V., Avner, R., & Neeman, R. (1989). You're changed if you do and changed if you don't: Mechanisms underlying paradoxical interventions. *Journal of consulting and clinical psychology, 57*(5), 590.

Solomon, L. J., & Rothblum, E. D. (1984). Academic Procrastination - Frequency and Cognitive-Behavioral Correlates. *Journal of Counseling Psychology, 31*(4), 503-509. doi: Doi 10.1037//0022-0167.31.4.503

Spada, M. M., Hiou, K., & Nikcevic, A. V. (2006). Metacognitions, Emotions, and Procrastination. *Journal of Cognitive Psychotherapy, 20*(3), 319-326. doi: 10.1891/jcop.20.3.319

Steel, P., & König, C. J. (2006). Integrating theories of motivation. *Academy of Management Review, 31*(4), 889-913.

Stöber, J., & Joormann, J. (2001). Worry, procrastination, and perfectionism: Differentiating amount of worry, pathological worry, anxiety, and depression. *Cognitive Therapy and Research, 25*(1), 49-60.

Toker, B., & Avci, R. (2015). Effect of Cognitive-Behavioral-Theory-based Skill Training on Academic Procrastination Behaviors of University Students. *Educational Sciences: Theory & Practice, 5*, 1157-1168.

Tuckman, B., & Sexton, T. (1989). *Effects of relative feedback in overcoming procrastination on academic tasks.* Paper presented at the meeting of the American Psychological Association, New Orleans, LA.

Wang, S., Zhou, Y., Yu, S., Ran, L.-W., Liu, X.-P., & Chen, Y.-F. (2015). Acceptance and Commitment Therapy and Cognitive–Behavioral Therapy as Treatments for Academic Procrastination A Randomized Controlled Group Session. *Research on Social Work Practice*, 1049731515577890.

Wells, A. (2007). The attention training technique: Theory, effects, and a metacognitive hypothesis on auditory hallucinations. *Cognitive and Behavioral Practice, 14*(2), 134-138.

Wells, A. (2011). *Metacognitive therapy for anxiety and depression*: Guilford press.

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: properties of the MCQ-30. *Behav Res Ther, 42*(4), 385-396. doi: 10.1016/S0005-7967(03)00147-5

Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*: Psychology Press.

Wells, A., & Matthews, G. (1996). Modelling cognition in emotional disorder: The S-REF model. *Behav Res Ther, 34*(11), 881-888.

Wells, A., White, J., & Carter, K. (1997). Attention training: Effects on anxiety and beliefs in panic and social phobia. *Clin Psychol Psychother, 4*(4), 226-232.

Table 1: Means, SDs, ranges, and Cronbach's alphas for all experimental variables and a non-parametric correlation matrix

| | Mean | SD | Range | Cronbach's alpha | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | 30.89 | 12.65 | 18-72 | N/A | -.09 | -.28** | -.18** | -.17** | -.13* | -.19** |
| 2. IDP | 15.59 | 5.2 | 4-28 | 0.66 | | .15** | .16** | .35** | -.06 | .13* |
| 3. PHQ-9 | 15.42 | 5.8 | 9-35 | 0.88 | | | .48** | .22** | .44** | .43** |
| 4. UPS | 14.59 | 5.16 | 6-24 | 0.88 | | | | .21** | .46** | .50** |
| 5. PMP | 14.30 | 4.41 | 8-32 | 0.77 | | | | | -.08 | .16** |
| 6. NMP | 20.11 | 6.74 | 8-32 | 0.90 | | | | | | .60** |
| 7. CAS mean | .0013 | 0.83 | -1.43-1.78 | N/A | | | | | | |

*Note.* IDP = Intentional Decision to Procrastinate; PHQ-9 = Patient Health Questionnaire 9; UPS = Unintentional Procrastination Scale; PMP = Positive Metacognitions about Procrastination; NMP = Negative Metacognitions about Procrastination; CAS mean = Cognitive Attentional Syndrome mean z-score; n=305 to n=400;

* = p < .05;

** = p < .01.

Table 2: Six-step hierarchical regression analysis with UPS as the outcome variable

| Predictor | $R^2$ | Adjusted $R^2$ | $R^2$ Change | B | SE | β | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | LL | UL |
| Step 1 | | | | | | | | |
| Age | | | | -0.69 | 0.02 | -.17** | -.11 | -.02 |
| | .03** | .03** | .03** | | | | | |
| Step 2 | | | | | | | | |
| Age | | | | -0.08 | 0.02 | -.19** | -0.12 | -0.03 |
| EtPT | | | | 1.13 | 0.65 | .10 | -0.14 | 2.41 |
| | .04** | .03** | .01 | | | | | |
| Step 3 | | | | | | | | |
| Age | | | | -0.03 | 0.02 | -.06 | -0.07 | 0.02 |
| EtPT | | | | 0.37 | 0.58 | .03 | -0.77 | 1.51 |
| PHQ-9 | | | | 0.42 | 0.05 | .47** | 0.33 | 0.51 |
| | .24** | .24** | .21** | | | | | |
| Step 4 | | | | | | | | |
| Age | | | | -0.03 | 0.02 | -.06 | -0.07 | 0.02 |
| EtPT | | | | 0.43 | 0.58 | .04 | -0.71 | 1.57 |
| PHQ-9 | | | | 0.41 | 0.05 | .46** | 0.32 | 0.50 |
| IDP | | | | 0.10 | 0.05 | .10 | -0.00 | 0.20 |
| | .25** | .24** | .01 | | | | | |
| Step 5 | | | | | | | | |
| Age | | | | -0.02 | 0.02 | -.04 | -0.06 | 0.02 |
| EtPT | | | | 0.03 | 0.54 | .00 | -1.03 | 1.09 |
| PHQ-9 | | | | 0.25 | 0.05 | .28** | 0.51 | 0.34 |
| IDP | | | | 0.10 | 0.05 | .10 | -0.00 | 0.19 |
| PMP | | | | 0.17 | 0.06 | .14** | 0.05 | 0.29 |
| NMP | | | | 0.28 | 0.04 | .37** | 0.20 | 0.36 |
| | .36** | .35** | .11** | | | | | |
| Step 6 | | | | | | | | |
| Age | | | | -0.01 | 0.02 | -.03 | 0.05 | 0.03 |
| EtPT | | | | -0.08 | 0.53 | -.01 | -1.13 | 0.97 |
| PHQ-9 | | | | 0.23 | 0.05 | .26** | 0.14 | 0.33 |
| IDP | | | | 0.07 | 0.05 | .07 | -0.03 | 0.17 |
| PMP | | | | 0.14 | 0.06 | .12* | 0.02 | 0.26 |
| NMP | | | | 0.20 | 0.05 | .26** | 0.11 | 0.29 |
| CAS mean | | | | 1.17 | 0.37 | .19** | 0.44 | 1.91 |
| | .38** | .37** | .02** | | | | | |

*Note.* UPS = Unintentional Procrastination Scale; EtPT = Exposure to Psychological Therapy; PHQ-9 = Patient Health Questionnaire 9; IDP = Intentional Decision to Procrastinate; PMP = Positive Metacognitions about Procrastination; NMP = Negative Metacognitions about Procrastination; CAS mean = Cognitive Attentional Syndrome mean z-score; n = 305;

* = p < .05;

** = p < .01.

Figure 1: Standardized path coefficients for the metacognitive model of procrastination.

*Note.* PMP = Positive Metacognitions about Procrastination; IDP = Intentional Decision to Procrastinate; CAS = Cognitive Attentional Syndrome mean z-score; NMP = Negative Metacognitions about Procrastination; PHQ-9 = Patient Health Questionnaire 9; UPS = Unintentional Procrastination Scale; n = 305; ** = p <.001.
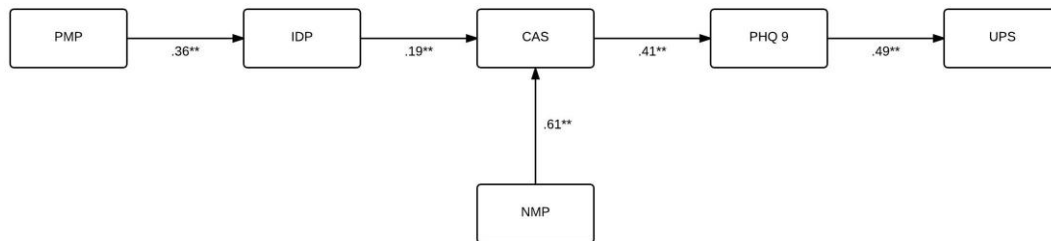


**Highlights**

- Procrastination is highly prevalent in students and adults.

- Procrastination negatively impacts a wide range of psychosocial domains.

- Unintentional procrastination is strongly associated with psychopathology.

- A metacognitive model explains disparate findings from the extant literature.

- This new model suggests new treatments for unintentional procrastination.