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2019-06-17

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### Recommended Citation

Bennett, C., & Bacon, A. (2019) 'At long last, a Reinforcement Sensitivity Theory Explanation of Procrastination.', *Journal of Individual Differences*, . Available at: <https://doi.org/10.1027/1614-0001/a000296>

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*Accepted for publication in Journal of Individual Differences on 28/02/2019*

At long last, a Reinforcement Sensitivity Theory Explanation of Procrastination.

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**Abstract**

Procrastination can result in poor wellbeing and performance in academia and the workplace. The present study combined personality and motivational explanations by examining procrastination through the lens of Reinforcement Sensitivity Theory (RST), which assumes that personality traits are underpinned by basic systems of approach and avoidance motivation. Students ( $N = 336$ ; *Mean age* = 21.34) and non-students ( $N = 187$ ; *Mean age* = 37.98) completed the RST Personality Questionnaire, measures of unintentional and general procrastination and, for students only, a measure of academic procrastination. In both samples, high impulsivity and high Behavioural Inhibition System activation was associated with reports of general procrastination. In students, high Reward Reactivity was additionally associated with unintentional procrastination, while low Goal-drive Persistence was associated with all forms of procrastination. This data suggests a role for both approach and avoidance motivations in procrastination. Results are discussed in terms of RST and implications for intervention.

**KEYWORDS:** procrastination; academic procrastination; reinforcement sensitivity theory; RST-PQ

**Funding Sources**

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Conflict of Interest**

Neither author has any conflict of interest to report.

Procrastination, a delay in beginning or completing an intended course of action, is a common phenomenon, with an estimated 15-20% of adults (Wilson, 2012) and 80-95% of students engaging in it (Steel, 2007). Many people voluntarily engage in procrastination in order to allow more time to finish a current task to their best ability, or to cope with workloads (Fernie, Bharucha, Nikčević & Spada, 2017). People may actively choose to leave tasks until they have more knowledge on the subject or even enjoy the rush of doing it last minute. This has been defined as voluntary or intentional procrastination and is generally looked upon positively as an active performance enhancing strategy (Fernie & Spada, 2008; Fernie et al, 2017). On the other hand, unintentional procrastination can be seen as an uncontrollable and inadvertent behaviour. Fernie et al (2017) describe this as a more traditional conceptualisation of procrastination, such as leaving tasks to the last minute, despite good intentions, thus impairing performance

Procrastination, particularly the unintentional type, has been associated with poor academic and work performance and mental ill health (Fernie et al, 2017; Stoerber and Joormann 2001). A review by Klingsieck (2013) highlights the importance of understanding procrastination in order to develop suitable interventions, and the need for new theoretical perspectives. The present study addresses these issues in taking a novel approach to the investigation of possible personality determinants of procrastination in both students and a non-student adult population. To date, much research has suggested either that procrastination is a personality trait, or that it results from a motivation or self-regulatory failure. In the present study, we combine these approaches by examining how procrastination may be explained in terms of the Reinforcement Sensitivity Theory (RST) of personality. RST proposes that individual differences in personality and behaviour are explained by sensitivity to reward and punishment and the associated tendency to approach or avoid certain situations, principles not previously considered in the study of procrastination.

Previous personality focussed research has focussed on associations with the Big Five traits, particularly a well-documented negative correlation between procrastination and conscientiousness (Steel, 2007). Conscientiousness involves self-discipline, self-control and striving for achievement, the opposite of behaviours inherent in procrastination (Watson, 2001). Procrastination has been suggested as simply as a lack of conscientiousness (Schouwenburg & Lay, 1995; van Eerde, 2003) or failure of self-regulation (Baumeister & Heatherton, 1996). Given this, it is unsurprising that Impulsiveness is found to be positively correlated with procrastination (Steel, 2007), even though we often tend to associate impulsivity with action rather than non-action. However, if procrastination is considered a manifestation of low self-regulation (Baumeister & Heatherton, 1996), we can understand how individuals fail to regulate their behaviour in order to stop themselves from doing one (presumably more enjoyable) thing in order to pursue a potentially more valuable long-term reward (Schouwenburg & Groenewoud, 2001).

Classic motivation theory would suggest that we choose actions dependent on size of reward (Schouwenberg & Groenewoud, 2001). This is not necessarily the case with procrastination however, for instance, a student may choose short-term rewards such as socialising over bigger future rewards such as a good grade. The Temporal Motivation Theory of Procrastination (TMT; Steel, 2007) states that motivation to complete a task is dependent on expectancy (whether a person believes they can accomplish the task), value (how unpleasant the task is and how interested the individual is in accomplishing it) and sensitivity to delay (impulsiveness). If value is high, the task pleasant and rewarding and expectancy high, the task will likely be accomplished. However, if a reward is further away, the individual in question is easily distracted or lacking in self-control, this can diminish the expectancy and value of a task. According to TMT, goal pursuit incorporates both hyperbolic (choosing a smaller-sooner reward over a larger-later one) and temporal (diminishing the

value of rewards further in the future) discounting. TMT variables have all been significantly associated with procrastination levels (Steel, et al, 2018) however, TMT does not define actual cognitive processes (Fernie, et al, 2017) and the brain mechanisms behind these motivational factors are not discussed.

We propose it may be possible to combine these personality and motivational explanations in a new understanding of procrastination, based on Reinforcement Sensitivity Theory (RST). RST suggests that individual differences in personality and behaviour are explained by a tendency to approach or avoidance motivation. RST describes personality in terms of the level of activation in a set of motivational systems each of which corresponds to a circumscribed set of neural pathways which control emotional and behavioural responses to reward and punishment cues (Corr, 2008). The present study presented the Reinforcement Sensitivity Theory of Personality Questionnaire (Corr & Copper, 2016), a measure of the theoretical components defined in the most recent revised version of RST (Gray & McNaughton, 2000). This comprises a Behavioural Approach System (BAS) which is sensitive to potential rewards and motivates goal-directed behaviours in the presence of relevant cues. Upon its activation, individuals experience excitement, persistence and feel elated on attaining rewards. Most recently, BAS has been further defined and primary function is considered to be moving an individual along a spatio-temporal gradient towards a final biological reinforcer. In order to achieve this goal, four distinct but related BAS processes have been identified. “Reward Interest” and “Goal-Drive persistence” that characterize the early stages of approach can be distinguished from “Reward Reactivity” and “Impulsivity” as the final reinforcer is approached and captured (Corr & Cooper, 2016). RST also defines a Fight-Flight-Freeze System (FFFS), which mediates reactions to aversive stimuli leading to avoidance and escape behaviours, and a Behavioural Inhibition System (BIS) which is activated by goal conflict. This can occur when there is equal activation of the

FFFS and BAS and BIS is thought to be responsible for detecting and resolving this conflict. This separation between FFFS and BIS is widely recognized, in conceptual and psychometric terms (Corr, 2008; 2016; Corr & Cooper, 2016; Gray & McNaughton, 2000; Perkins, Kemp, & Corr, 2007).

The present research investigates RST and procrastination in a student and a non-student population. Students have formed a specific focus for much research in this area, as academic procrastination such as delaying completion of an assignment or putting off studying for an examination, is common (Ozer, Demir, & Ferrari, 2009; Steel, 2007) and has important performance implications in terms of lower grades and course withdrawals (Balkis, 2013; Kim & Seo, 2015; Van Eerde, 2003). Özer and Altun (2011) investigated the reasons behind the procrastination of undergraduates and concluded that students who had a low sense of responsibility delayed their studies through laziness and a fear of failure. However, students do not attribute procrastination to this (Schouwenberg, 1992) and it has been suggested that they may either not consciously know the reason for their procrastination or possibly not want to admit it (Steel, 2007). Akça (2012) has described academic procrastination as form of self-handicapping, whereby individuals who experience uncertainty about their efficacy try to externalize or legitimate failures. There is indeed evidence that students with high academic self-efficacy tend to procrastinate less (Klassen, Krawchuk & Rajani, 2008), though recent studies have shown that when energy levels and tiredness are controlled for, the fear of failure component seems to explain very little variance in procrastination (Steel, Svartdal, Thundiyil & Brothen, 2018). Overall, fear of failure and self-efficacy may be important, but motivational factors may also be key to understanding academic procrastination. Furthermore, intentional procrastinators may not lack self-regulation and their behaviour may be part of a personal goal-driven strategy, rather than based in an act of impulsivity or fear of failure.

We suggest that examining procrastination through the lens of RST will help us to understand more about procrastination in terms of mechanisms underpinning goal choice, goal pursuit and goal striving. In terms of academic procrastination in a student sample, assuming this not to be an active goal-focussed strategy, we predicted that:

- BAS GDP and RI will be negatively associated with tendency to procrastination because individuals with higher activation in these systems are likely to be focussed on the anticipated positive outcomes.
- BAS RR and Impulsivity will both be positively associated with procrastination. TMT research has suggested that impulsive individuals tend to procrastinate and hyperbolic discounting is involved in Reward Reactivity.
- FFFS and BIS will both be positively associated with procrastination. High FFFS activation is related to fear and associated inability to act. For instance in students, if fear of failure is a significant influence on academic procrastination then those high in FFFS are likely to procrastinate. People with higher BIS activations have strengthened self-protection concerns and may therefore be overcommitted to their studies, though this is due to fear and avoidance of negative emotions, rather than intrinsic motivation.

We also presented both students and non-students with a measure of general everyday procrastination (Lay, 1986). Fernie et al (2007) describe this scale as assessing both intentional and unintentional behaviour and it is probably the most widely used procrastination scale in research. We expected to observe similar results to those for academic procrastination stated above.

In addition, we presented a measure of specifically unintentional procrastination (Fernie et al, 2008) as this has not previously been considered as a separate form of behaviour in studies of personality. This type of behaviour is not thought to be actively goal driven and has been linked to deficits in performance and mental health. If this scale indeed measures



procrastination shorn of any intentional aspect, we would not expect to see an association with goal-drive persistence. However, an association with impulsivity, FFFS and BIS as above was expected. Differences in how RST relates to scores on this scale as opposed to the others may provide an indicator of which factors relate to intentional, as opposed to unintentional, procrastination.

## **Method**

### **Participants**

*Student sample:* In total, three hundred and thirty six students (179 female;  $M_{age}=21.34$ ,  $SD=5.73$ ) took part in return for course credit. This data was gathered in two waves. At wave one ( $N= 190$ ) students only completed the academic procrastination scale, while at wave two ( $N = 146$ ) they completed both this and the general procrastination scale in order to allow for a direct comparison with the non-student group (see below for details of measures). The two groups of students did not differ in terms of academic procrastination scores ( $p = .60$ ) or any of the RST factor scores ( $p$  range .2 to .9) and hence they were combined into one single sample for analysis.

*Non-student sample:* One hundred and eighty seven participants aged 25 or over were recruited from an established online academic participation website and paid £3 for their time (146 female;  $M_{age} = 37.98$ ,  $SD = 10.93$ ).

### **Materials and Procedure**

The following questionnaires were presented online, hosted by the Survey Monkey platform.

*Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ, Corr & Cooper, 2016):* All participants completed this 65-item measure which measures the Behavioural Inhibition System (e.g., “When trying to make a decision, I find myself

constantly chewing it over”), the Fight/Flight/Fear System (e.g. “I would instantly freeze if I opened the door to find a stranger in the house”) and the four components of the Behavioural Approach System: Reward Interest (e.g., “I am very open to new experiences in life”), Goal-Drive Persistence (e.g., “I will actively put plans in place to accomplish goals in my life), Reward Reactivity (e.g., “I get a special thrill when I am praised for something I’ve done well”) and Impulsivity (e.g., “I would go on holiday at the last minute”). Participants respond on a 5 point Likert scale from 1 (not at all) to 5 (highly). The scales showed good reliability in the present samples: Students FFFS  $\alpha = .78$ , BIS  $\alpha = .93$ , RI  $\alpha = .84$ , GDP  $\alpha = .87$ , RR  $\alpha = .80$ , Imp  $\alpha = .75$ . Non-students FFFS  $\alpha = .78$ , BIS  $\alpha = .93$ , RI  $\alpha = .84$ , GDP  $\alpha = .87$ , RR  $\alpha = .80$ , Imp  $\alpha = .75$ .

*Unintentional Procrastination Scale* (UPS, Fernie et al, 2017). All participants completed this 7-item scale which is suitable for students and the general population. Items such as *I often seem to start things and don’t seem to finish them off* and *I really want to get things finished in time, but I rarely do* are designed to capture perceived involuntary procrastination, and scores are associated with poor outcomes. Participants respond on a scale from 1 (Do not agree) to 4 (Agree very much), hence maximum possible score is 28. Reliability was good with the present samples, students  $\alpha = .86$  and non-students  $\alpha = .79$ .

*Academic Procrastination Scale* (APS, McCloskey, 2011): All student participants (total N = 344) completed this 25-item measure, which presents statements such “I put off projects until the last minute” and “I feel prepared well in advance for most tests”. Participants respond in terms of how much each statement applies to them personally on a scale from 1 (Disagree) to 5 (Agree), hence maximum score is 100. The APS showed good reliability in the present sample ( $\alpha = .95$ ).

*General Procrastination Scale* (GPS, Lay, 1986): All non-students and 146 students completed this 20-item scale, which is focussed on everyday tasks, rather than academic ones.

The GPS presents items such as “I usually buy even an essential item at the last minute” and “If a bill for a small amount comes, I pay it right away”. Participants are asked how characteristic each statement is of them personally and they respond on a scale from 1 (extremely uncharacteristic) to 5 (very characteristic), maximum score is 100. The GPS showed good reliability in the present sample (non-students  $\alpha = .87$ ; students  $\alpha = .85$ ).

## Results

Table 1 presents descriptive statistics.

Table 1: Mean and standard deviation of all procrastination and RST measures.

	Students		Non-students	
	Mean	SD	Mean	SD
General Procrastination	58.79	12.02	58.69	13.76
Unintentional procrastination	14.09	4.47	15.86	5.34
Academic procrastination	72.05	20.05	-	-
RI	16.79	4.354	16.69	4.48
GDP	20.04	4.22	18.11	4.31
RR	27.40	4.83	27.65	5.37
Impulsiveness	19.34	4.37	18.44	4.98
BIS	63.13	13.14	59.87	14.50
FFFS	23.72	3.30	25.27	6.29

RI = Reward interest; GDP = Goal drive persistence; RR = Reward reactivity; Imp = Impulsivity; BIS = Behavioural Inhibition System; FFFS = Fight, flight freeze system.

Non-students reported significantly more unintentional procrastination,  $t(461) = 3.60$ ,  $p < .001$  though the groups did not differ on general procrastination ( $p > .9$ ). In terms of RST measures, the groups differed significantly on GDP,  $t(521) = 4.98$ ,  $p < .001$ , Impulsivity  $t$

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(521) = 2.15,  $p = .03$  and BIS  $t(521) = 2.62, p = .01$ , with student scores highest in all cases.

The groups also differed on FFS,  $t(315) = 2.79, p = .01$ , where the non-students scored most highly. Table 2 shows Pearson's correlations between procrastination and RST measures for students and non-students respectively.

Table 2. Correlations between all measures

	GP	UP	RI	GDP	RR	Imp	BIS	FFFS
Students								
AP	.82**	.62**	-.19**	-.54**	-.06	.28**	.15**	.05
GP		.73**	-.24**	-.49**	-.19*	.19*	.31**	.06
UP			-.15*	-.35**	.01	.22**	.23**	.11
RI				.47**	.47**	.25**	-.22**	-.13*
GDP					.43**	.01	-.07	.08
RR						.42**	-.05	.15*
Imp							.08	.11
BIS								.40**
Non-students								
GP	-	.64**	-.05	-.07	.03	.30**	.32**	.05
UP			-.06	-.09	.10	.24**	.38**	.11
RI				.67**	.56**	.39**	-.12	-.05
GDP					.51**	.32**	-.01	.01
RR						.47**	.11	.17*
Imp							.31**	.24*
BIS								.31**

AP = academic procrastination; GP = general procrastination; UP = unintentional procrastination; RI = Reward interest; GDP = Goal drive persistence; RR = Reward reactivity; Imp = Impulsivity; BIS = Behavioural Inhibition System; FFS = Fight, flight freeze system.

In the student group, a significant positive correlation was observed between Academic Procrastination and Impulsivity and significant negative correlations between Academic Procrastination, Reward Interest and Goal Drive Persistence. In the non-students however, only the negative associations between procrastination and BIS and Impulsivity were apparent. In both groups, Unintentional procrastination was positively related to procrastination in the academic and general domains, and to both impulsivity and BIS. In the student group only, UP was negatively associated with both RI and GDP.

Multiple linear regressions were conducted for each group on each type of procrastination. Table 3 shows the results for students. Impulsivity (positive) and GDP (negative) shared independent variance with academic procrastination, with the overall model accounting for 38% variance. For unintentional procrastination, GDP (negative) and RR, BIS and impulsivity (positive) are the key predictors with the model accounting for 20% variance. For general procrastination, the model accounted for 32% variance, with high BIS and impulsivity and low GDP the significant factors.

Table 4 shows the results for non-students where the model accounted for 15% variance in general procrastination, with impulsivity and BIS presenting independent effects. Only BIS shared independent variance with UP, the overall model accounting for 14%. In both analyses, we also tested for potential interaction effects but none reached significance ( $p > .2$  in every case).

Table 3: Regression models on procrastination for the student group

	General Procrastination					Unintentional Procrastination					Academic Procrastination				
	95% CI					95% CI					95% CI				
	St. $\beta$	$t$	Sig.	Lower	Upper	St. $\beta$	$t$	Sig.	Lower	Upper	St. $\beta$	$t$	Sig.	Lower	Upper
RI	-.04	-.05	.96	-.45	.43	-.03	-.51	.61	-.16	.09	.001	.02	.98	-.50	.51
GDP	-.47	-5.54	< .001	-1.74	-.82	-.38	-6.40	< .001	-.52	-.28	-.28	-11.01	< .001	-3.30	-2.30
RR	.002	.03	.97	-.42	.43	.14	2.22	.03	.02	.25	.09	1.54	.12	-.10	.83
Imp	.20	2.64	.01	.14	.98	.15	2.65	.01	.04	.26	.24	4.77	< .001	.64	1.54
BIS	.25	3.06	.002	.08	.37	.18	3.33	.001	.03	.10	.08	1.61	.11	-.03	.27
FFFS	-.05	-.58	.56	-.41	.22	.03	.45	.66	-.06	.10	.03	.66	.51	-.22	.43

Table 4. Regression models on procrastination for the non-student group

	General procrastination					Unintentional procrastination				
	St. $\beta$	$t$	Sig.	95% CI		St. $\beta$	$t$	Sig.	95% CI	
				Lower	Upper				Lower	Upper
RI	.01	.09	.93	-.57	.62	-.05	-.39	.70	-.33	.22
GDP	-.15	-1.57	.12	-1.00	.12	-.27	-1.69	.13	-.46	.06
RR	-.07	-.74	.346	-.59	.27	.10	.77	.39	-.12	.30
Imp	.26	3.13	.002	.25	1.12	.17	1.77	.09	-.03	.39
BIS	.31	4.05	< .001	.14	.41	.31	3.72	.001	.05	.17
FFFS	-.12	-1.59	.12	-.54	.06	-.02	-.27	.83	-.17	.13

## Discussion

This study examined procrastination through the lens of reinforcement sensitivity theory (RST). The aim was to explicate the motivational personality traits which may underpin this behaviour. In our student sample, as predicted, all three forms of procrastination were significantly and negatively associated with GDP, and positively with impulsivity. This suggests that students who are goal-driven are the least likely to procrastinate, whereas those who are impulsive are most likely, and this applies in terms of both their academic studies and procrastination more widely. In non-students however, impulsivity was positively associated with general procrastination, though no significant effects of GDP were observed. In terms of the more directly reward focussed RST factors, RR was associated with higher unintentional procrastination in students only and we observed no significant effects of RI at all.

Finally we predicted that procrastination would be associated with activation in both FFFS and BIS suggesting the presence of goal conflict (e.g., when FFFS and BAS are in opposition; Corr, 2008). In fact, we observed no significant effects of FFFS though BIS activation was implicated in general and unintentional procrastination in both groups. In justifying our prediction regarding BIS and FFFS initially, we suggested an example whereby an individual is goal-oriented but approaches that goal with some trepidation (maybe due to fear of failure) and that procrastination may result as a form of defensive approach behaviour. In the present data, it would seem that participants experience little FFFS activation so presumably little goal conflict. Corr and Cooper (2016) describe how BIS activation can interrupt appetitive reward/goal-driven behaviour in order that potential risk can be assessed resulting in a form of passive avoidance. Other distinct processes associated with BIS are worry and rumination which can result in behavioural disengagement. Overall, this suggests that BIS can result in procrastination behaviours in the absence of an FFFS-related goal



conflict. Interestingly, our data suggested no BIS activation in academic procrastination in students. van Beek, Hu, Schaufeli, Taris and Schreurs (2012) suggested that students with high BIS activation will throw themselves into their studies to avoid negative feelings and worrying about unpleasant outcomes. They did not examine procrastination in their research however, the consequence of over-commitment was shown to be exhaustion and the intention to quit studies. It would seem that BIS activation can lead to poor academic outcomes whether or not procrastination occurs. Possible individual differences in behavioural responses to BIS activation are worthy of further investigation.

RST considers behaviour to be self-regulated in the pursuit of goals and the results here support the ideas that procrastination results from a lack of self-control/regulation (Baumeister & Heatherton, 1996; Fee & Tangney, 2000). Our results suggest that individuals prone to general everyday procrastination behaviours present high BAS impulsivity *and* high BIS. This can be explained by the revised RST proposal of joint subsystems (Corr, 2013) which describes how BAS and BIS can have a reciprocal relationship. Exercising self-control is exhausting, it can weaken over time and is known to result in negative effect. Crowell, Kelley and Schmeichel (2014) have suggested that when this exertion is unrewarded (perhaps the goal is harder to attain than expected) motivational orientation shifts in the direction of increased direct reward-seeking behaviour (e.g. impulsivity), possibly combined with increased frustration and possible anger. We can imagine how this situation could lead to BIS mediated conflict, resulting in a high BIS, high impulsivity (and in the case of students, lowered GDP) activation. Emotion was not the focus of the present study, but future research might usefully test this proposal and consider emotional factors which may be associated with high BIS-high impulsivity activation and which may help to trigger procrastination, particularly at time of high stress such as coursework deadlines for students. Beutel et al (2016) have highlighted associations between procrastination and higher levels of stress,

depression, anxiety, fatigue and reduced life satisfaction. Further work might usefully include measures of such factors to test the extent to which RST can account for additional variance in procrastination.

Accordingly, our regression analysis suggested that key predictors of general procrastination in students were low GDP, high impulsivity and high BIS, whereas in older non-students they are high BIS and impulsivity. However, it is notable that RST accounted for far more variance in the student group than it did in the non-student group. In terms of academic procrastination this might be due to the specific context which is currently very salient for the students. The general procrastination questionnaire relates to a wider range of everyday activities however, given that university is currently such a major part of their lives, academic work may be the most likely context for procrastination in students' everyday lives in general. In the older non-student sample, who are likely to have a broader range of life contexts to draw upon, the general procrastination scale may not have captured levels of the behaviour as precisely. This could also be why we did not observe associations between procrastination and GDP in the non-student data, goal-related behaviour also being too specific to be captured. Further research might consider using a more context specific questionnaire, for instance focussed on workplace procrastination. It is also possible age may have affected the results.

Academic and general procrastination as measured here have been described as potentially intentional in that they can be actively employed as a self-regulation strategy. In contrast, unintentional procrastination (UP) is suggested to reflect an uncontrollable urge to procrastinate despite good intentions (Fernie et al, 2007). The results for UP replicated those for general procrastination in the non-student group. However, the students showed a significant positive effect of reward reactivity here that was not observed for either general or academic procrastination. RST describes reward reactivity as becoming activated when a

potential reward becomes close and therefore tangible and characterises it in terms of excitement and joy at winning or doing things well (Corr & Cooper, 2016). We suggest that this may trigger procrastination, through a process of temporal or hyperbolic discounting driven by excitement at the thought of smaller-sooner rewards. Overall our data support the idea that the UPS measures a form of procrastination which is unintentional (i.e. not longer-term goal directed) and that some degree of negative emotion is connected with the behaviour as Fernie et al (2007) suggest. Moreover, the results suggest some between group differences (see Tables 3 and 4). However, within groups, the findings distinguish little in the way of differences in RST processes compared with general or academic procrastination. Scores on the procrastination scales were strongly correlated and it would seem that there is a degree of overlap in what they assess. Fernie et al (2007) observed that the GPS (Lay 1986) probably assesses both intentional and unintentional behaviours. The intentional vs. unintentional distinction is an interesting conceptualisation and is particularly relevant in terms of motivational behaviours. Future research might employ measures which are less closely related and will better distinguish the role of RST factors in the two forms of behaviour.

Our results can also be interpreted in terms of the Temporal Motivation theory (TMT; Steele, 2007). TMT components such as Expectancy and Value can be identified as the Reward Interest and Reactivity elements of BAS (can I reach the goal and how badly do I want it). Delay-related components such as hyperbolic and temporal discounting can be interpreted in terms of impulsiveness (intolerance of delay in proximity to the reward) and Goal Drive Persistence (forgoing immediate gratification for the sake of a longer-term reward). Hyperbolic and temporal discounting are also linked to impulsivity (Steel, 2007). As such, RST does not only explain procrastination, but also presents evidence for the role of personality factors in the behaviours defined within TMT.

Overall, academic, general and unintentional procrastination can be explained through RST drawing on the idea that BIS is activated to mediate the conflict between wishing to avoid the task and also to obtain the reward associated with it. In both students and non-students, high BIS and high impulsivity suggests how individuals may find difficulty with self-control. Klingsieck (2013) highlights the importance of investigating procrastination not only in students, but also in other populations where the negative mental and performance-related consequences may be just as pronounced, but are less well researched. In the present study, we have addressed this issue in part by comparing procrastination in non-student adults and undergraduate samples. Further development of our enquiry to investigate how RST explains specific procrastination-related outcomes in applied settings is recommended. For instance, as Klingsieck (2008) suggests, procrastination may affect employment by reducing productivity and job satisfaction, and sustainability through its impact on the practising of ecologically sensitive behaviours. Research in these areas might further examine the aspects of goal drive and reward interest which did not relate to procrastination in our adult sample, though were important for students. A focus on specific goal-related tasks and contexts rather than measuring generalised procrastination, may yield alternative results. Finally, the results have potential implications for the development of individualised interventions. These may draw on RST by examining specific contexts where individuals are inclined to procrastinate, the extent to which this is linked to impulsivity and how that may conflict with a desire to achieve the task in hand. One possible approach would be to collect qualitative data to identify procrastination experiences in support of questionnaire responses. In this way, interventions could be modified to offer a more bespoke, rather than one-size-fits-all, approach. In conclusion, an RST explanation may bridge the gap between a trait and a motivational view of procrastination and bring us a new perspective on why we always say we'll do it tomorrow, and why tomorrow never seems to come!

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