The Mediating Role of Metacognitive Self-Regulation on Student Procrastination and Academic Performance

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Abstract: The current study intends to investigate the link between procrastination, academic performance, and metacognitive self-regulation, as well as the mediation role of metacognitive self-regulation between procrastination and academic performance. There were 199 undergraduate students of psychology participated in this study. They were administered metacognitive self-regulation scale, pure procrastination scale, and also reported their recent Grade Point Average (GPA). Results indicate that procrastination correlated significantly and negatively with metacognitive self-regulation. In line with that, metacognitive self-regulation has a positive and significant association with GPA. Furthermore, metacognitive self-regulation fully mediated the link between procrastination and GPA.

1 INTRODUCTION

Having a good standard to meet academic attaining is demanding for the student. But in fact, many students reported had a problem dealing with an academic deadline. Postponing to start or complete assignment being an issue in this context, it is procrastination. (Özer, Demir and Ferrari, 2009) have investigated among 784 undergraduate students in Turkey, 52% of them describe themselves as procrastinators. The three most problematic assignment according to the student is studying for an examination, writing term papers, and reading assignments.

Procrastination seems to occur not only in the certain culture but across the nation and culture. (Ferrari, O'Callaghan and Newbegin, 2005) have reported from United States, United Kingdom, and Australia samples, that 11% of the participants labelled themselves as chronic arousal procrastinators and 9.9% as chronic avoidant procrastinators. In accordance with that, (Ferrari *et al.*, 2007) also highlighted this prevalence which takes place across the six nations: Spain, Peru, Venezuela, the United Kingdom, Australia, and the United States.

In the Indonesian context, based on (Adrianta and Tjundjing, 2007) survey, from 316 samples of undergraduate students in Surabaya, Indonesia, there are 30.9% students reported having high procrastination. In line with that, (Ursia, Siaputra and Sutanto, 2013) also underlined high academic procrastination, for about 56.7% on undergraduate student. Recently, high procrastination of undergraduate student has reported of 36% (Wijaya and Tori, 2018). Three academic demands reported as highly perceived as a problem are writing papers, weekly reading assignments, and studying for exams.

Procrastination referred to as a "voluntary delay of an intended action despite the recognition that this delay may have a negative effect" (Sirois and Pychyl, 2016). The main problem of procrastination is not the absence of intention, but the consequence to acting as it was initiated at the beginning, namely intention-action gap (Steel *et al.*, 2018). High procrastinate student does have the intention to finish any task or assignment, they make any planning, but in the end, they fail to meet the deadline or standard. As a consequence, the student feels more stress (Sirois, 2013), anxiety, depressed, less life satisfaction (Beutel *et al.*, 2016), and less well-being (Krause and Freund, 2014). Furthermore, it has a detrimental effect on academic performance (Steel, 2007; Klassen *et al.*, 2010).

Numerous studies have linked procrastination with metacognitive self-regulation (Park and Sperling, 2012; de Palo *et al.*, 2017; Ziegler and Opdenakker, 2018). This association could be described by the lens of self-regulation theory, where procrastination seen as a self-regulation failure (Wolters, 2003; Park and Sperling, 2012). The term

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metacognition can be defined as thinking about our own mind, which places our own cognition as a central object of thinking (Veenman, 2015). When student employs metacognition, it is not only activated how to acquire and to use an information, but also metacognitive skill such as goal setting, planning, monitoring, and evaluation. By controlling one's own cognition, it can minimize procrastinate behaviour.

Metacognitive self-regulation is closely related to academic performance as well as procrastination. (Richardson, Abraham and Bond, 2012) have denounced that metacognition correlates positively and significantly on academic performance. Similar to that finding, (Dent and Koenka, 2016) have underlined the relationship between those variables. High metacognitive self-regulation associated with high academic performance, though it differs depends on the academic performance indicator that has chosen. Metacognitive self-regulation correlates with standardizing achievement test, average grade across a course, and assignment, but not GPA.

Based on the previous background, this present study would address three hypotheses. First, procrastination will be negatively related to metacognitive self-regulation. Secondly, metacognitive self-regulation will be positively associated with GPA. Thirdly, metacognitive self-regulation will be mediating the relationship between procrastination and GPA.

2 METHOD

2.1 Participant

There were 199 undergraduate students participated in this study. They were from the psychology department of the Islamic University of Indonesia, 44 males (20%) and 155 females (80%). All participants were from the cognitive psychology course of a private university in Yogyakarta, Indonesia.

2.2 Instruments

This present study administrated two questioners to collect the data. There are metacognitive self-regulation scale and pure procrastination scale. Participants reported themselves their recent Grade Point Average (GPA) by filling the questioners. It ranging from 0 to 4 point index.

The metacognitive self-regulation subscale is a self-report scale, part of Motivated Strategies for Learning Questionnaires (MSLQ), which developed by (Pintrich *et al.*, 1993). It has 15 subscales and can be administrated separately (Duncan and Mckeachie, 2005). For this current study, we administrated metacognitive self-regulation to assess student use of metacognitive regulation. It comprises of 12 items. Cronbach's α reported in this current sample is 0.83. Likert response with five alternative answers were given, ranging from strongly disagree (1), disagree (2), hesitation (3), agree (4), and strongly agree (5).

Procrastination were assessed by Pure Procrastination Scale (Steel, 2010). It has 12 items and comprises three factors: decisional procrastination, implemental delay, and timeliness/lateness, as specified by recent refinement scale (Svetina *et al.*, 2017). In this present study, Cronbach's α were 0.92. Five Likert responses also applied: strongly disagree (5), disagree (4), hesitation (3), agree (2), and strongly agree (1).

2.3 Procedure

All of the questionnaires were performed through on an online survey at the beginning of cognitive psychology course. After researcher introduced himself, all of the student attending the class were asked their cooperation to fulfil the questionnaires. They were informed that their responses would be confidential.

2.4 Data Analysis

The correlation analysis was employed to seek out the relationship between self-control, learning strategies, and academic performance. A simple mediation analysis also calculated to find the metacognitive self-regulation mediation between procrastination and GPA.

3 RESULT AND DISCUSSION

Descriptive analysis from Table 1 shows the means, standard deviations, and categorization of procrastination, metacognitive self-regulation, and GPA. GPA mean reported relatively high (M=3.31). There are 18.6% students has identified themselves as a high and 16.1% very high procrastination. In another word, 34.7% students having risk in postponing academic task or assignments. On the contrary, 44.7% students reported themselves having no trouble in dealing with the academic deadline.

Table 2 shows the correlation analysis between procrastination, metacognitive self-regulation, and GPA. Procrastination correlated negatively and

significantly with metacognitive self-regulation (r = -0.41, p < .001). That means the hypothesis 1 is supported. Another result also confirms the hypothesis 2, where metacognitive self-regulation correlated positively and significantly with GPA (r = 0.18, p < .05). There is no correlation found between procrastination and GPA (r = -0.10, p > .05). Accordingly, path analysis could be applied to find the mediating role of metacognitive self-regulation.

Table 1: Descriptive statistics of procrastination, metacognitive self-regulation, and GPA.

	Metacognitive self-regulation	**PPS**	**GPA**
N	199	199	199
Mean	44.06	33.20	3.31
S.D	6.18	9.28	0.44
Very Low	14.6%	18.6%	19.1%
Low	26.6%	26.1%	21.1%
Moderate	24.6%	20.6%	21.1%
High	19.6%	18.6%	22.6%
Very high	14.6%	16.1%	16.1%

Table 2. Bivariate correlation between procrastination, metacognitive self-regulation, and GPA.

		GPA	Procrastination	Metacognitive_reg
GPA	Spearman's rho	-		
	p-value	-		
Procrastination	Spearman's rho	-0.100	-	
	p-value	0.159	-	
Metacognitive_reg	Spearman's rho	0.179*	-0.401***	-
	p-value	0.012	< .001	-

* p < .05, ** p < .01, *** p < .001

Table 3 shows the bootstrapping result, where path (a) between procrastination and metacognitive self-regulation is statistically significant (95% CI = -0.359, -0.189, p = 0,000) as well as path (b) between metacognitive self-regulation and GPA (95% CI = 0.006, 0.027, p = 0,002). These results suggest that metacognitive self-regulation mediated the effect of procrastination on GPA. Moreover, simple mediation models were tested by using PROCESS v.3.0 in SPSS (model 4). According to (Hayes, 2018), this mediation analysis need no assumption such normal theory approach. The result indicated that the indirect effect of procrastination on GPA via metacognitive self-regulation was significant and the association was negative (Effect = −0.027; SE = 0.013; 95% CI =−0.055,−0.006). The model supported the mediation model, it was full mediation considering both direct (Effect = −0.0004 SE = 0.004; 95% CI = −0.007,−0.007) and total effect (Effect = −0.098; SE = 0.002; 95% CI =−0.012,−0.001) were not significant. Thus, hypothesis 3 was confirmed.

Table 3: Coefficient for the mediation analysis

Testing path	Unstandardized coefficient				Bootstraping	
	Coefficient	Std. error	t	sig	LLCI	ULCI
Procrastination–metacog self-reg (a)	-0.274	0.043	-6.33	0.000	-0.359	-0.189
Metacog self-reg – GPA (b)	0.017	0.005	3.127	0.002	0.006	0.027
Procrastination – metacog self-reg – GPA (c')	-0.0004	0.004	-0.121	0.904	-0.007	0.007
Procrastination – GPA (c)	-0.005	0.003	-1.510	0.132	-0.012	0.001
Indirect effect	-0.098	0.002			-0.009	-0.001

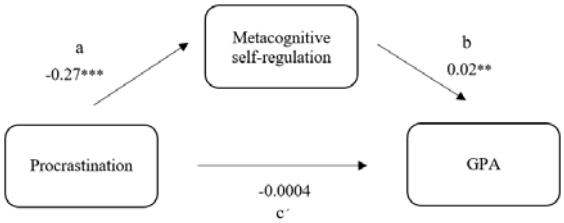

Figure 1: Path diagram for the mediation model of procrastination on GPA via metacognitive self-regulation.

The present study was aimed to investigate the link between procrastination, GPA, and metacognitive self-regulation as well as the mediation role of metacognitive self-regulation between procrastination and GPA. Results indicate that procrastination correlated significantly and negatively with metacognitive self-regulation. Along with that, metacognitive self-regulation has a positive and significant association with GPA. Furthermore, metacognitive self-regulation has fully mediated the link between procrastination and GPA.

Consistent with the previous finding (Spada, Hiou and Nikcevic, 2006; Park and Sperling, 2012; Fernie *et al.*, 2016), procrastination negatively associates with metacognitive self-regulation. It is not surprising that both variables are significantly correlated. A student with high procrastination lack of action despite the initial intention has settled, especially when facing any distractions. This intention-action gap could be minimized by controlling one's own cognitive process such as planning and monitoring. Long-term goals can be broken down into the short term in order to maintain willpower.

Finding also corroborates the idea of (Richardson, Abraham and Bond, 2012) that metacognitive self-regulation correlates with GPA. High use of metacognitive self-regulation, associates with high GPA. A student who regulates their learning behaviour would take advantage of the learning outcome. Since learning occurs intentionally, not automatic, a student needs to plan and choose what really want to do. Moreover, strategy use will be required to master what they have learned. In addition, by monitoring and evaluating learning result considering the target, the student would have more awareness about their performance.

Contrary to the previous study (Eerde, 2003; Steel, 2007; Rabin, Fogel and Nutter-upham, 2011), the finding indicates that procrastination doesn't correlate with GPA. A possible explanation for this result is the academic performance preference that chosen. Some studies (Kim and Seo, 2015; Morris and Fritz, 2015) has investigated the link between both variables which differ, depends on the performance indicator chosen. GPA, assignment grade, quiz score or course grade were reported associated with procrastination, but not when academic performance was measured by using mid-term or final examination score. The highest correlation emerged when academic performance was indexed by using assignment grade. Specifically, (Kim and Seo, 2015) also reported for the Asian sample, the correlation between the two variables was not robust. Further analysis indicates that the link between procrastination and GPA could be explained by the mediation of metacognitive self-regulation. By optimizing the use of metacognitive self-regulation, the student would be more aware of their thinking and behaviour. It would decrease the delaying behaviour and in turn, could enhance the academic performance. Low procrastinate student would affect on high GPA via metacognitive self-regulation.

Limitation of this study must be considered. Because this research was only administrated to a psychology student, a generalization of these result should be taken cautiously. Therefore, for the further recommendation, broaden sample from another department would be more advantageous. Using another academic performance indicator alongside GPA such as assignment or final exam also recommended.

4 CONCLUSIONS

This present study attempts to investigate the role of metacognitive self-regulation in mediating between procrastination and academic performance. Findings has identified that metacognitive self-regulation correlates with procrastination as well as academic performance. Metacognitive self-regulation plays an important role as a buffer between both variables. It gives respond, regulate, and evaluate delaying behaviour considering target of academic performance. University stake holder should pay attention to metacognitive skill of student. By enhancing it, institution can get benefit from preventing or reducing delaying behaviour and also promote academic performance.

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