

Procrastination Among University Students in Singapore: Its Relationships With Time Management and Emotional Regulation

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Abstract

Procrastination is consistently viewed as problematic to academic success and students' general well-being. There are prevailing questions regarding the underlying and maintaining mechanisms of procrastination, which are yet to be learned. The present research study examines the status of procrastination among university students in Singapore and its relationships with time management and emotional regulation. A total of 105 participants completed our survey mainly containing two scales – the *Pure Procrastination Scale* (PPS) with a total of 12 items, as well as the *Assessment of Time Management Skills* (ATMS) with a total of 11 items in the time management subscale and 5 items in the regulation of emotion subscale. The results of our survey suggest that there is a negative relationship between procrastination and time management, as well as a negative relationship between procrastination and emotional regulation. Students with a disability tend to significantly procrastinate more than students without a disability. Procrastination levels were also reported to not have changed before, during, and after the COVID-19 pandemic, implying that online courses can be deployed without much concern for students' procrastination levels.

Keywords: procrastination, academic procrastination, time management, emotion regulation, university students

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Introduction

In the field of psychology, procrastination is often defined as the voluntary delay of an important activity, despite being aware of the negative consequences that will result from the delay. Sometimes, people do not necessarily procrastinate because they are lazy (Johnson, 2021). Procrastination is typically understood as an issue of self-regulation or time management (Wolters et al., 2017). Time management is defined as “a form of decision making used by individuals to structure, protect, and adapt their time to changing conditions” (Aeon & Aguinis, 2017, p. 311). Simply put, it is a cluster of skills that aid one’s ability to plan the hours in a day and organise one’s workload.

Neuroscientists pointed out that procrastination has roots in our evolutionary development, with two key parts of the brain vying for control. Specifically, procrastination is a battle between an ancient part of the brain called the limbic system and a relatively younger part known as the prefrontal cortex. The limbic system is a set of brain structures containing the pleasure centre, while the prefrontal cortex controls planning and decision making. The prefrontal cortex is less developed and thus weaker, so oftentimes the limbic system wins out, leading to procrastination (Neurosurgery, 2018). Hence, it is proposed that procrastination can also be understood as an emotion-focused coping strategy, and procrastination should be interpreted as an emotion management problem or emotional regulation problem, instead of a time management problem (Johnson, 2021).

No matter whether procrastination is a time management problem or an emotional regulation problem, importantly, the student population is especially prone to procrastination, with an estimated prevalence of 50–95% (Steel, 2007). This is no exception for university students. Past research has shown that academic procrastination is very common among university students — almost all occasionally procrastinate in their studies (Rothblum et al., 1986; Steel, 2007). According to the American Psychological Association (APA), approximately 80% to 95% of university students succumb to procrastination when completing their coursework. Approximately 30% to 60% of undergraduate students report regular postponement of educational tasks including studying for exams, writing term papers, and reading weekly assignments, to the point at which optimal performance becomes highly unlikely (Ellis & Knaus, 1977; Pychyl et al., 2000). Therefore, this study aims to investigate university students’ procrastination tendency, as well as its relationship with time management skills and emotional regulation skills, in the Singapore context, a country well-known for its emphasis on meritocracy in education.

Evidence on Procrastination Among University Students

By far, there are over ten self-report measures of procrastination that have been psychometrically validated, such as the Pure Procrastination Scale (PPS; Steel, 2010). Research found that procrastination can be related to several factors. Firstly, results show that procrastination behaviour is more commonly found in male students than females (Balkis & Duru, 2017). Procrastination was also reported to be most prevalent among the youngest cohort, ages 14 to 29 (Beutel et al., 2016). Cases of severe procrastination, as determined using the PPS, are characterised by higher levels of anxiety, depression, and stress than the less severe cases (Johansson et al., 2023). Data also indicates that inattention is correlated with procrastination (Niermann & Scheres, 2014). Many adults with attention-deficit/hyperactivity disorder (ADHD) struggle with chronic procrastination (Ferrari & Sanders, 2006).

The relationship between procrastination and self-esteem as well as self-efficacy was revealed among students. It is assumed that procrastination is related to low self-esteem, either as a determinant or a consequence. Self-esteem describes a person's overall subjective sense of personal worth or value regardless of the circumstances (Hajloo, 2014). The relationship between procrastination and self-esteem has received considerable attention in the procrastination literature. Procrastination has been described as a self-protective strategy that masks fragile self-esteem, and numerous studies have found a significant inverse relationship between self-report procrastination and self-esteem (Hajloo, 2014).

In particular, a previous study examined the issue of procrastination among university students in Singapore and in Canada (Klassen et al., 2010). A total of 1,145 university students from Canada and Singapore participated in the study. Sub-study 1 involved 418 participants and used the Tuckman's 16-item procrastination measure as well as two components of the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993), which includes five items from the MSLQ Self-Efficacy for Learning and Performance scale. Relationships between procrastination and motivation variables were found to be similar across the two country contexts, with self-efficacy for self-regulated learning being most negatively associated with procrastination in both contexts. In sub-study 2, 389 participants from Canada and 337 from Singapore completed six measures assessing various behaviours associated with procrastination. First, participants rated their daily procrastination. Second, participants completed a descriptive measure (adapted from Ferrari & Scher, 2000) of five avoidance tasks (i.e., reading tasks, writing tasks, studying tasks, research tasks, and talking with the instructor) that engendered procrastination. Third, participants rated the frequency of 14 replacement activities they engaged in when they perceived themselves to be procrastinating. Fourth, participants rated the negative impact of procrastination with four response options: "Not at all", "Not too much", "Quite a lot", and "Very much." Fifth, participants completed a three-item, 7-point procrastination scale (Ackerman & Gross, 2005) that showed acceptable reliability in both contexts. Sixth, participants completed the self-efficacy for self-regulated learning scale (Zimmerman et al., 1992) used in Study 1. Patterns of procrastinating behaviour and the negative impact of procrastination were examined and compared between Canadian and Singaporean undergraduates. Participants in both contexts reported writing to be the academic task most prone to procrastination. More Singaporeans than Canadians were classified as negative procrastinators (i.e., they rated procrastination as a negative influence on academic functioning). In both contexts, negative procrastinators spent more time procrastinating than neutral procrastinators (i.e., they tend to waste more time on other, more appealing tasks than the important tasks they have to settle) and displayed lower self-efficacy for self-regulated learning. However, the study did not measure the link between negative procrastination and self-esteem; it suggests that future research might examine the direction and intensity of the association between self-esteem and negative procrastination.

Background and Purpose of the Current Study

Singapore's population size is approximately 5.9 million as of 2022 and it lies about one degree of latitude north of the equator. There are currently 34 universities in Singapore, of which six are nationally publicly funded. During the lockdown due to SARS-CoV-2 (coronavirus lockdown), from April 2020 to June 2020, there has been a tremendous increase in the number of students taking online courses. As a result of some level of autonomy offered in online courses, students need to exert a higher level of self-control in their online actions, for example, to overcome learner isolation and less spontaneous online interaction which can cause procrastination in distance learning (Pychyl, 2011).

After the Covid-19 pandemic was declared, several countries adopted strict restrictions that abruptly shifted the average citizen's daily activities to remote settings. These changes in daily routines provoked large amounts of emotional distress (Xiong et al., 2020), which were also amplified by the uncertainty of living in a pandemic (Holmes et al., 2020). If you're fuelled by anxiety, you may feel that you are inadequate, incapable, or a failure. To deal with these stressful situations people often ended up procrastinating in fear of a negative or unknown outcome (McLean Hospital, 2022). The pandemic has caused increased stress, anxiety, and depression, which could lead to more individuals suffering from those underlying conditions, and lead to more procrastination. Hence, it is important and relevant to examine this issue, especially during this period of transitioning into the post-pandemic. The data collection of this study started around mid-September 2022. During this period of time, Singapore was at a transition state where it opened up its economy and social activities resumed. This was also the period where COVID measures were relaxed, and masks only had to be worn on public transport and healthcare facilities. To fill in the research gap described above, our study is aimed to examine the status of procrastination amongst university students in Singapore, as well as its relationship with some other variables (e.g., time management, emotional regulation).

Our research questions and hypotheses for this study are as follows:

RQ1: Is there a negative correlation between procrastination and time management skills?

Hypothesis: Procrastination has a negative relationship with time management skills. Managing time effectively can help one feel that they are in control of their workload, thus increasing productivity and improving confidence. As a result, one would feel less inclined to procrastinate. Past research has found that there is a statistically significant, negative correlation (of moderate strength) between procrastination and time management (Ocak & Boyraz, 2016).

RQ2: Is there a negative correlation between procrastination and emotional regulation skills?

Hypothesis: Procrastination has a negative relationship with emotional regulation skills. Difficulty in emotion regulation, especially the ones' belief about their ability in regulating unpleasant emotions effectively, is important in procrastination (Bytamar et al., 2020). When procrastinators are faced with tasks or situations that are seen as difficult or aversive, they prefer to regulate the negative emotions of the task immediately instead of pursuing their goals. In other words, rather than using adaptive emotion regulation strategies, they use procrastination as a way of regulating their emotions. As such, those with poorer emotion regulation are hypothesised to be more likely to succumb to procrastination.

RQ3: Does procrastination differ by certain demographic variables (e.g., gender, major, the presence of special educational needs) among university students in Singapore?

Hypotheses: 1) Female students have lower levels of procrastination than male students. A study has shown that female students reported lower levels of academic procrastination as compared to their male counterparts (Balkis & Duru, 2017).

- 2) STEM and non-STEM students could have different levels of procrastination. In one prior study, the comparison of the degree of procrastination among different high school sections revealed that students who procrastinated most were those enrolled in the Technology section, followed by the Arts, the Social Sciences, the Humanities, and finally, those who procrastinated the least were those enrolled in the Science section (Romero, 2013).
- 3) University students with special education needs have a higher tendency to procrastinate. Students with learning disabilities often exhibit high levels of learned helplessness, including diminished persistence. Also, these students were reported to have lower self-report emotional intelligence and self-efficacy. Previous studies found that they reported higher procrastination (Pychyl, 2014).

RQ4: Do students' procrastination differ at different stages of the pandemic (i.e., before the start of the pandemic when it was mostly face-to-face learning, during the pandemic when it was mostly online learning, and after the pandemic when it was mostly face-to-face learning again)?

Hypothesis: Students' procrastination differs at different stages of the pandemic. A study has shown that students have reported low engagement and participation in online classes, as compared to physical classes. This finding is attributed to the fact that online learning during the COVID-19 pandemic has negatively impacted procrastinators with regards to their desire to study (Melgaard et al., 2022), heightening their level of procrastination. As such, between the two time periods, students would have most likely shown greater levels of procrastination during the pandemic as compared to before the start of the pandemic. However, based on the existing evidence, it is difficult to make a hypothesis regarding how students' procrastination might have differed after the pandemic when it was mostly face-to-face learning again.

Method

Ethical approval was obtained from the National Technological University Institutional Review Board prior to the commencement of this study (IRB-2022-305). Participants' consent was obtained prior to the start of the survey.

Participants

The target participant pool for our research was students currently studying in local universities. The participants of our survey had to meet the following criteria at the time of the study: 1) have stayed in Singapore for 1 year, 2) are currently staying in Singapore, and 3) are currently full-time students in one of the universities in Singapore. Responses from 228 students across the universities in Singapore were collected over the span of 2 months from October to November 2022. After removing incomplete responses, 105 student responses were included in the analysis. No incentives were provided for participants, and they participated in the study purely on a voluntary basis.

Research Design

This study adopted a cross-sectional survey design.

Survey

The survey was designed to evaluate each participant's level of procrastination, time management ability, and emotional regulation ability. To do so respectively, the survey comprised the 12-item PPS (Steel, 2010), the 11-item Time Management (TM) subscale of the Assessment of Time Management Skills (ATMS; White et al., 2013), and the 5-item Regulation of Emotion (ER) subscale of the ATMS. The PPS is a 5-point rating scale, with a total score ranging from 12 to 60 (a higher score indicating a higher tendency to procrastinate). The ATMS is a 4-point rating scale. For the TM subscale, the possible total score ranges from 11 to 44 with a higher score indicating better time management skills; for the ER subscale, the possible total score ranges from 5 to 20 with a higher score indicating better emotional regulation skills. The survey also included three COVID-19 specific procrastination items. In addition, the survey contained seven demographic items, asking respondents' age, sex, ethnicity, diagnosed disabilities (if any), university, university major, and year of study. Finally, there was an item to ask if the participant procrastinated to sleep last night or not.

Procedures

The survey was disseminated to participants through the following methods: 1) uploading the details of the survey as well as the survey link and QR code on social media platforms such as Telegram, Discord, Reddit, and Instagram, 2) sending emails to all six autonomous universities in Singapore, 3) sending emails to specific departments of selected universities, namely National University of Singapore (NUS) Psychology department, Nanyang Technological University (NTU) Psychology department, NTU sociology as well as Singapore Management University (SMU) Social Sciences department since these departments were considered as being more prone to help with the dissemination of the survey.

Data Analysis

Six reversely worded items on the ATMS were reversely coded. Afterwards, the total scores for each of the three measures (i.e., PPS, TM, and ER), as well as the descriptive analyses for each item on these measures, were calculated. To supplement the validity of the reported procrastination, we performed an independent samples *t*-test to compare the PPS scores of participants who procrastinated to sleep the night before, as compared to those who did not. To answer RQ1, a Pearson Correlation Coefficient was computed to assess the linear relationship between the participants' scores on the PPS scale and on the TM scale. To answer RQ2, a Pearson Correlation Coefficient was computed to assess the linear relationship between the participants' scores on the PPS scale and on the ER scale. To answer RQ3, independent samples *t*-tests were performed to compare the means of PPS scores of different demographic groups. To answer RQ4, a one-way ANOVA was conducted to compare the procrastination levels of students before the outbreak of COVID-19 (when there were mostly face-to-face courses), after the outbreak of COVID-19 (when there were mostly online courses), and after the outbreak of COVID-19 (when there were mostly face-to-face courses again).

Results

Description of the Participants

Regarding the affiliated universities, the largest group of participants were from NTU (N = 44, 41.9%), followed by NUS (N = 29, 27.6%), Singapore Institute of Technology (N = 12, 11.4%), Singapore University of Technology and Design (N = 5, 4.8%), SMU (N = 4, 3.8%) and Singapore University of Social Sciences (N = 3, 2.9%). There were eight participants (7.6%) indicating they were from other universities. More females (N = 58, 55.2%) participated in the survey than males (N = 43, 41.0%), with four (3.8%) indicating a preference of not to say or indicating as others. Majority of the participants were Chinese (N = 83, 79.0%) followed by Malays (N = 8, 7.6%), Indians (N = 6, 5.7%), Others (N = 5, 4.8%), and Eurasians (N = 3, 2.9%). Studying the ethnic mix of the Singaporean population, as of June 2022, the percentages of Chinese, Malay, Indian and other races were 75.7%, 15.2%, 7.5%, and 1.6% respectively (Singapore Department of Statistics et al., 2022). This data shows that our study generally represents the ethnic composition in Singapore, though there seems to be an over-representation of the Chinese and Eurasian populations, and an under-representation of the Malay and Indian populations.

Most of the participants were generally on the younger end, aged 21-25 (N = 95, 90.5%) and a smaller portion belonged to the age groups 26-30 (N = 8, 7.6%) and 31-35 (N = 2, 1.9%). The mean age and standard deviation are 22.7 and 2.3 respectively. There were 33 Year 1 students (31.4%), 20 Year 2 students (19.0%), 27 Year 3 students (25.7%), 17 Year 4 students (16.2%), one Year 5 student (1.0%), six Master students (5.7%), and one doctoral student (1.0%). Seventy (66.7%) were from STEM majors while 35 (33.3%) were from non-STEM majors.

Among the 105 participants, a small fraction of them indicated that they had diagnosed physical, mental disabilities, or special education needs (i.e., Dyslexia, ADHD, Asperger's syndrome, Depression, Hearing Loss, Anxiety Disorder, or Autism) (N = 17, 16.2%), whereas the rest (N = 88, 83.8%) indicated they did not have a disability. Lastly, seventy-three (69.5%) participants indicated they procrastinated to sleep last night while 32 (30.5%) indicated they did not.

Descriptive Results of the Measures

In general, on the PPS scale, the mean and standard deviation of the total score for each participant were 37.9 and 11.4, respectively. On the TM subscale, the mean and standard deviation of the total score for each participant were 28.2 and 4.6, respectively. On the ER subscale, the mean and standard deviation of the total score for each participant were 12.1 and 4.3, respectively. In addition, there was a statistically significant difference on PPS scores in students who reported having procrastinated to sleep the night before ($M = 39.77$, $SD = 10.68$) compared to those who did not ($M = 32.28$, $SD = 11.31$); $t(103) = 3.25$, $p = .0016$. This result provides additional validity evidence for the PPS scale in assessing the participants' procrastination levels.

Relationship Between Procrastination and Time Management

Consistent with our hypothesis, the procrastination levels and time management skills were found to be significantly negatively correlated, $r(103) = -.75$, $p < .00001$. The Pearson

correlation indicates a large-size magnitude of the relationship between these two variables. This result meant that university students who had better time management skills tended to have a lower tendency to procrastinate, or students who had a higher tendency to procrastinate tended to have worse time management skills.

Relationship Between Procrastination and Emotional Regulation

Consistent with our hypothesis, the procrastination levels and emotional regulation skills were found to be strongly negatively correlated, $r(103) = -.48, p < .00001$. The Pearson correlation indicates a moderate-size magnitude of the relationship between these two variables. This result meant that university students who had better emotional regulation skills tended to have a lower tendency to procrastinate, or students who had a higher tendency to procrastinate tended to have worse emotional regulation skills.

Procrastination in Relation to Key Demographic Variables

Contrary to our hypothesis, there was no statistically significant difference between the PPS scores in females ($M = 37.38, SD = 9.95$) and in males ($M = 38.95, SD = 13.84$); $t(101) = 0.67, p = .50$. This result implies that there is no significant difference between the procrastination levels in female and male university students in the current study.

Different from our hypothesis, there was no statistically significant difference between the PPS scores in STEM students ($M = 38.12, SD = 11.70$) and the scores in non-STEM students ($M = 37.06, SD = 11.02$); $t(103) = 0.45, p = .66$. This result implies that there is no significant difference between the procrastination levels in STEM and non-STEM students.

In accordance with our hypothesis, there was a statistically significant difference between the PPS scores of students with a disability ($M = 45.12, SD = 13.96$) and the scores of those without a disability ($M = 36.46, SD = 10.41$); $t(103) = 2.96, p = .004$. This result implies that students with a disability reported higher procrastination levels than students without a disability.

Procrastination at Different Time Points of the COVID-19 Pandemic

Contrary to our hypothesis, there was no statistically significant difference for the procrastination levels across the three time points of the COVID-19 pandemic, $F(2, 312) = 1.09, p = .34$.

Discussion

The finding of a negative relationship of a strong strength between procrastination and time management in this study is consistent with a previous study conducted by Ocak and Boyraz (2016), where it was found that there was a statistically significant and moderate level of a negative relation between academic procrastination and time management. As a result, students with higher time management skills might be expected to show less tendency towards academic procrastination. The finding of a negative relationship of a moderate strength between procrastination and emotional regulation is once again consistent with a previous study conducted by Jobaneh et al. (2016). Their study found that emotion regulation could negatively and significantly predict by around 18 percent of the variance of procrastination scores among university students. This result goes to show that emotional

regulation is a factor affecting procrastination, and with better emotional regulation skills, students could be less likely to fall into the traps of academic procrastination. As such, the results of our current study imply that time management and emotional regulation skills are crucial and the education systems in Singapore should include more support to equip students with both skills, so as to lower the procrastination levels among students. In addition, a relatively stronger correlation was found in our sample between procrastination and time management, compared to the relation between procrastination and emotional regulation, which has not been reported in prior literature. The finding suggests that university students who procrastinate may have a higher tendency to do so due to their lack of time management skills than their lack of emotional regulation skills. It has been much debated whether procrastination should be interpreted as a time management problem or an emotional regulation problem (Johnson, 2021; Wolters et al., 2017). The findings of our study show that procrastination could be more strongly associated with time management issues.

The procrastination level did not differ between the two sexes in this study, which does not support the finding by Balkis and Duru (2017) that female students reported lower levels of academic procrastination as compared to their male counterparts. According to the World Economic Forum's Global Gender Gap Report (2022), Turkey ranks 101st in educational attainment for women while Singapore ranks 65th. Hence Singapore could have greater gender equality in education which helps explain the current study's finding that procrastination level did not differ between the two sexes. In other words, culture in relation to gender equality may be a broader factor that could influence the gender differences in terms of procrastination.

This study also found that there is no significant difference in procrastination levels between students majoring in STEM majors and those majoring in non-STEM ones. This is not quite in line with existing literature that suggests that amongst high school students, while those studying Technology procrastinate the most, those studying Science procrastinate the least (Romero, 2013). The sample difference (i.e., university vs. high school students) might help explain these different findings. This finding from our study could debunk any misleading stereotypes that non-STEM majors are less hardworking (Kennedy et al., 2020), and thus hopefully improve Singaporeans' perceptions of non-STEM majors.

Importantly, this study found that students with a disability procrastinate significantly more than students who do not have a disability. This finding is in accordance with existing literature that has shown how disabilities result in learned helplessness (Kumar et al., 2022; Pychyl, 2014), which often results in greater academic procrastination (Prihadi et al., 2018). As such, educational staff should be aware to better cater to university students with a disability or special education needs (e.g., an extension of deadlines, more guidance in their work). More research can be done to understand how curriculum can be modified to help those with a disability so that they are not disadvantaged compared to their counterparts due to their higher tendency of procrastination.

Interestingly, this study found that there is no significant difference in procrastination levels at three time points related to COVID-19, with respect to the differences in the proportion of online and face-to-face courses. This finding would imply that online courses could be employed without concern for students' procrastination levels. However, existing literature claims that online learning during the COVID-19 pandemic has reduced students' willpower to study, thus resulting in an increase in procrastination levels (Melgaard et al., 2022). This discrepancy could be due to the fact that the scale we deployed to measure COVID-19

procrastination levels only comprised one item for each time point and relied on each participant's potentially biased assessment of their own procrastination level. It is also plausible that it is difficult for participants to retrospectively rate their procrastination level accurately.

Limitations and Future Research Directions

As a whole, this study has succeeded in surveying university students in Singapore to learn more about their procrastination levels. However, the results of this study may be biased due to participant selection bias, as the survey was largely spread through social media alone. As such, participants of the survey would tend to be students that spend more time on social media. Past studies have shown that students who spend more time on social media tend to have higher academic procrastination levels (Muslikah & Andriyani, 2018). Future research can reach out to more students through other methods (e.g., distributing flyers, pasting posters, hardcopy survey forms, etc.) to prevent or minimize such bias. Secondly, the study was cross-sectional with data collected at one time only, which only provides correlational findings. Longitudinal cross-lagged studies could be conducted in the future to further explore the potential causal relationships among potential time management skills, emotional regulation skills, and procrastination. Thirdly, the procrastination data collected in the study were all based on students' self-report. Future research could consider taking more objective data (e.g., asking students to record the occurrence or non-occurrence of their procrastination on important academic and life activities within a certain time period). Last but not least, we investigated and interpreted the 'procrastination' from a more negative perspective in this study, whereas future research could also probe into neutral procrastination as explored in Klassen et al. (2010).

Conclusion

In this study, we have gained some insight into the procrastination levels, time management skills, and emotional regulation skills among the university students in Singapore. Alongside with some interesting findings, our study poses more questions for future research and practice, e.g., the issue of procrastination among university students with diagnosed disabilities or special educational needs, including those who are troubled by mental health issues (e.g., depression, anxiety, etc.), which are considered as 'diagnosed disabilities' in the current study. With this, the higher education systems in Singapore may become more increasingly inclusive with greater sensitivity to all students' individual needs, as the higher education in Singapore is embracing hybrid learning.

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