



Understanding the Relationship Between Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination among University Students

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Abstract: The present study examined the interrelations among Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination in university students aged 18–25. A convenience sample of undergraduates completed the Need for Cognition Scale, the Metacognitive Self-Regulation subscale of the Motivated Strategies for Learning Questionnaire, and the Academic Procrastination Scale. After psychometric refinement, a 9-item Need for Cognition measure demonstrated good internal consistency, alongside acceptable reliability for the other scales. Correlational analyses revealed a significant positive association between Need for Cognition and Metacognitive Self-Regulation, and a significant negative association between Metacognitive Self-Regulation and Academic Procrastination, while the bivariate link between Need for Cognition and Academic Procrastination was non-significant. Multiple regression showed that Metacognitive Self-Regulation negatively predicted procrastination, whereas Need for Cognition positively predicted procrastination when controlling for regulation, indicating a suppression effect. Mediation analysis supported a competitive mediation model in which Need for Cognition indirectly reduced procrastination via enhanced Metacognitive Self-Regulation, but also exerted a direct positive effect on procrastination. These findings highlight the complex role of cognitive motivation and self-regulatory processes in shaping procrastination among university students and suggest that interventions targeting metacognitive regulation may mitigate procrastinatory tendencies even among highly cognitively engaged learners.

Keywords: *Need for Cognition, Metacognitive Self-Regulation, Academic Procrastination, University Students, Mediation, Suppression Effect, Self-Regulated Learning*

1. Introduction

The transition to university represents one of the most significant developmental shifts in early adulthood. Students between the ages of 18 and 25 move from highly structured academic environments into systems that require substantial independence, self-direction, and personal responsibility. Unlike school settings where tasks are closely monitored and deadlines are frequently reinforced, higher education expects students to regulate their own schedules, initiate academic tasks without supervision, and sustain effort over extended periods. This shift places increasing emphasis on internal psychological processes rather than external structure.

Within this context, academic procrastination has emerged as a persistent and widely observed phenomenon. Academic procrastination refers to the voluntary delay of academic tasks despite anticipating negative consequences. Students may postpone studying for examinations, delay beginning assignments, or avoid engaging with demanding coursework until deadlines become imminent. Although such delays may temporarily reduce discomfort associated with effortful tasks, they often result in heightened stress, rushed work, and diminished academic satisfaction.

Contemporary research increasingly conceptualizes procrastination not simply as poor time management, but as a difficulty in translating intention into sustained, goal-directed action. Many students genuinely intend to complete tasks on time, yet struggle to initiate or maintain effort, particularly when assignments require prolonged concentration or complex thinking. This gap between intention and behaviour suggests that procrastination is closely tied to underlying motivational and self-regulatory processes.

University students vary considerably in how they approach cognitively CHALLENGING TASKS demanding work. Some students actively seek intellectual challenge, enjoy analysing ideas, and persist through complex material. Others may experience sustained mental effort as draining or aversive, preferring tasks that require less cognitive engagement. These differences reflect variation in an important motivational trait known as *Need for Cognition*

Need for Cognition refers to an individual's tendency to engage in and enjoy effortful thinking. It captures the degree to which a person is intrinsically motivated to process information deeply, reflect on ideas, and solve complex problems. Importantly, Need for Cognition is not a measure of intelligence or academic ability; rather, it reflects the willingness

to invest cognitive effort. Two students with similar abilities may differ significantly in how much mental effort they choose to expend when faced with challenging academic material.

In higher education, where critical thinking, analysis, and independent reasoning are central, such motivational differences become particularly salient. Students who naturally enjoy thinking may immerse themselves more deeply in coursework, explore ideas beyond surface requirements, and engage more actively with academic tasks. At the same time, enjoyment of thinking alone does not automatically ensure consistent academic action. Complex academic tasks often require more than intellectual interest. They also demand organization, monitoring, and strategic management of effort over time.

This brings attention to a second important construct: Metacognitive Self-Regulation. Metacognitive self-regulation refers to the ability to plan, monitor, and evaluate one's own learning processes. It involves setting clear academic goals, selecting appropriate strategies before beginning a task, checking understanding during work, and reflecting on performance afterward. In university settings where students must independently structure their study time and manage multiple academic demands, self-regulatory skills are essential.

Planning allows students to break larger assignments into manageable steps and allocate time realistically. Monitoring enables them to recognize when comprehension is weak or when distractions are interfering with progress. Evaluation supports adjustment of strategies for future tasks. Together, these processes help transform academic intentions into consistent behaviour.

Students differ widely in their regulatory capacities. Some effectively organize their schedules, track their progress, and adapt strategies when necessary. Others may underestimate task demands, fail to monitor understanding, or struggle to initiate work in the absence of external pressure. These differences may meaningfully influence patterns of academic delay.

Importantly, motivational orientation toward thinking and regulatory capacity are conceptually distinct yet potentially interconnected. A student who enjoys engaging deeply with ideas may be more inclined to reflect on learning strategies and monitor progress. Conversely, effective regulatory skills may determine whether cognitive interest translates into timely action. Without adequate self-regulation, even intellectually curious students may experience difficulty converting engagement into structured academic behaviour. Similarly, students with strong regulatory skills may compensate for lower intrinsic cognitive motivation through disciplined planning and monitoring.

Examining these constructs together provides a more comprehensive perspective on academic procrastination. Rather than viewing delay behaviour as arising from a single deficit,

it may be more accurately understood as emerging from the interaction of motivational and regulatory processes. Academic tasks in university settings often require both sustained cognitive effort and effective management of learning behaviour. When either process is underdeveloped, difficulties may arise.

Therefore, the present study investigates the relationships among Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination in university students aged 18–25 years. Accordingly, the following hypotheses were formulated:

H1- Need for Cognition will positively relate to Metacognitive Self-Regulation, as students who are inclined toward deep cognitive engagement may be more likely to reflect on and manage their learning processes.

H2 - Metacognitive Self-Regulation will negatively relate to Academic Procrastination, since effective planning, monitoring, and evaluation are expected to reduce academic delay.

H3- Need for Cognition will significantly relate to Academic Procrastination among university students, as differences in enjoyment of effortful thinking may influence tendencies to delay demanding tasks.

Further, it is proposed that *Metacognitive Self-Regulation will mediate the relationship between Need for Cognition and Academic Procrastination*, such that cognitive motivation may influence procrastination tendencies through its association with regulatory processes.

2. Review of Literature

2.1 Relationships among Metacognitive Self-Regulation and Procrastination

Many studies consistently show that metacognitive self-regulation (MSRQ) and academic procrastination are negatively related. In simple terms, students who are better at planning, monitoring, and managing their own learning are less likely to delay their academic work. This pattern has been found across different age groups and educational settings.

Limone et al. found that metacognitive self-regulation negatively predicts procrastination among university students. This means that students who actively organize their studies, keep track of their progress, and adjust their strategies are less likely to put off tasks. Their findings suggest that procrastination is not just about poor time management, but more about difficulty in regulating one's own learning.

Similarly, Tao et al. (2025), in a study of English as a Foreign Language (EFL) students, reported a significant negative relationship between MSRQ and procrastination ($\beta = -0.406$, $p < 0.01$). This shows that higher use of metacognitive strategies is strongly linked to lower levels

of delay. The results highlight how important these regulatory skills are, especially in academically demanding contexts like language learning.

Ziegler and Opdenakker (2018) also found a significant negative relationship between metacognitive self-regulation and procrastination ($\beta = -0.097$, $p < 0.01$) among first-year secondary school students. Although the effect size was smaller, their longitudinal study showed an important trend: when students' metacognitive regulation, self-efficacy, and effort regulation decreased over time, their procrastination increased. This suggests that changes in regulatory skills over time can directly affect delay behaviors, especially during academic transitions.

Wijaya (2018) provided further support by confirming a full mediation model in which procrastination influenced academic performance through metacognitive self-regulation ($\beta = -0.41$ for the path from procrastination to MSRQ). This means that procrastination can harm academic outcomes because it disrupts students' ability to regulate their learning effectively.

2.2 Mediation Models Involving MSRQ and Procrastination

Apart from direct relationships, several studies have examined how metacognitive self-regulation (MSRQ) and procrastination work together to influence academic outcomes. These mediation models show that procrastination often acts as a link between students' regulatory skills and their academic performance. In other words, regulatory abilities affect performance partly because they influence how much a student procrastinates.

Tao et al. (2025) found that effort regulation and time management strategies significantly reduced procrastination ($p < 0.01$), which in turn contributed to better academic success. At the same time, metacognitive self-regulation had a strong direct effect on academic success ($\beta = 0.731$). This means that regulatory skills improve academic performance in two ways: directly, and indirectly by reducing procrastination. These findings show that it is important to understand both the direct impact of regulatory skills and their indirect impact through delay behaviors.

García-Ros et al. (2022) also supported this mediation pattern. They demonstrated a pathway from MSRQ to academic achievement through procrastination. Their model explained 14% of the variance in academic achievement ($R^2 = 14\%$), showing that procrastination plays an important role in linking self-regulated learning processes to performance outcomes.

Similarly, Wijaya (2018) reported a mediation pathway in which procrastination influenced GPA through metacognitive self-regulation ($r = 0.18$). The full mediation found in this study suggests that procrastination negatively affects academic performance because it interferes with students' ability to regulate their learning effectively.

2.3 Metacognition-Based Models of Procrastination

Meta-analytic research provides strong support for understanding procrastination from a metacognitive perspective. Zhou et al. conducted a large meta-analysis including 59 studies with a total sample size of 23,627 participants. Based on this evidence, they proposed a metacognitive model of procrastination.

Their findings showed a significant negative relationship between metacognitive regulation and passive procrastination ($r = -0.28$). This means that students who are better at regulating and monitoring their thinking are less likely to delay tasks unnecessarily. Stronger regulatory skills are clearly linked to lower levels of maladaptive delay.

At the same time, the meta-analysis found no significant positive correlation between metacognitive regulation and active procrastination ($r = 0.03$). This distinction is important because it shows that metacognitive regulation is specifically related to reducing passive, harmful forms of procrastination, rather than strategic or intentional delay.

This meta-analytic evidence supports the idea that procrastination—especially passive procrastination—can be meaningfully understood within a metacognitive framework.

2.4 Self-Regulated Learning Perspective on Procrastination

From a self-regulated learning (SRL) perspective, procrastination is often understood as a failure of self-regulation. Steel (2007) reviewed and summarized existing research and described procrastination as a breakdown in goal-directed regulation, especially in situations that require sustained effort and delayed rewards. In simple terms, when students struggle to manage their goals, effort, and impulses, they are more likely to procrastinate.

Ziegler and Opdenakker (2018) provided further support for this idea. In their longitudinal study, they found that when students' metacognitive self-regulation, self-efficacy, and effort regulation decreased over time, their procrastination increased. This pattern suggests that as regulatory skills weaken, delay behaviors become stronger. It also shows that these changes can happen gradually over time, especially during important academic transitions.

García-Ros et al. (2022) also supported this perspective by modeling self-regulated learning constructs that predicted academic outcomes through procrastination. Their findings show that procrastination can act as a link between regulatory processes and performance. In a similar way, Tao et al. (2025) found through structural equation modeling that resource management strategies, such as time management and effort regulation, negatively predicted procrastination ($p < 0.01$). This means that better management of time and effort is associated with lower procrastination.

Studies that examine different self-regulated learning profiles further suggest that maladaptive regulatory patterns are linked with higher levels of procrastination across educational levels. Overall, these findings consistently show that procrastination is closely connected to difficulties in self-regulation, rather than simply being a matter of laziness or lack of motivation.

2.5 Integrating Need for Cognition

Need for Cognition (NfC) refers to a person's natural tendency to enjoy thinking deeply and engaging in effortful mental activities. It is considered a stable cognitive-motivational trait. People high in NfC generally like analyzing, reflecting, and working through complex ideas. This tendency is theoretically connected to deeper and more strategic processing, which is similar to how metacognitive self-regulation works.

Valenzuela et al. (2020) found that higher Need for Cognition was linked to lower levels of "metacognitive clutter" and decisional procrastination. This suggests that individuals who enjoy thinking are less likely to experience the kind of mental confusion or interference that leads to delay in decision-making. This idea fits well with the already established negative relationship between metacognitive regulation and procrastination.

Based on mediation findings such as Wijaya's full mediation model, it is possible to understand these variables in a sequence. Higher Need for Cognition may support stronger metacognitive self-regulation, and stronger metacognitive regulation is consistently linked with lower procrastination (with reported coefficients ranging approximately from -0.20 to -0.41 across studies). This suggests a logical pathway: individuals who enjoy thinking may regulate their learning better, and better regulation may reduce procrastination.

2.6 Research Gap

2.6.1 Limited Focus on Metacognitive Self-Regulation as a Central Construct

Many studies clearly show that metacognitive self-regulation (MSRQ) is negatively related to procrastination (Limone et al.; Tao et al., 2025; Ziegler & Opdenakker, 2018; Wijaya, 2018). However, even though this relationship is consistent, MSRQ is usually studied as part of a larger framework rather than as the main focus of the research.

For example, Ziegler and Opdenakker (2018) examined MSRQ along with other factors such as self-efficacy and effort regulation. Tao et al. (2025) included metacognitive regulation within broader resource management strategies like time management and effort regulation. García-Ros et al. (2022) studied self-regulated learning constructs together and examined how they predicted outcomes through procrastination. Similarly, Zhou et al.'s meta-analysis looked at metacognitive regulation within a wider system of metacognitive beliefs.

This means that although MSRQ repeatedly shows a strong negative link with procrastination, it is rarely studied on its own as the central explanatory factor. Instead, it is usually treated as one part of a larger regulatory system. This creates a gap in the literature, as there is limited research that directly examines metacognitive self-regulation as a distinct and primary predictor of academic procrastination.

2.6.2 Absence of Integrated Models Including All Three Constructs

The studies reviewed so far mainly examine relationships between two variables at a time. For example, some studies focus on the link between metacognitive self-regulation (MSRQ) and procrastination (Limone et al.; Tao et al., 2025). Others examine MSRQ and academic achievement through procrastination (García-Ros et al., 2022; Wijaya, 2018). Separately, Valenzuela et al. (2020) studied the relationship between Need for Cognition and decisional procrastination.

However, none of the reviewed studies examine Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination together within one single structural model. While mediation models exist that connect MSRQ and procrastination to academic outcomes (Tao et al., 2025; García-Ros et al., 2022; Wijaya, 2018), and while Need for Cognition has been linked to reduced decisional procrastination (Valenzuela et al., 2020), these variables have not been studied together in an integrated framework.

In particular, no study within the reviewed literature tests whether Need for Cognition influences procrastination through metacognitive self-regulation. This absence of a combined model highlights a clear conceptual and empirical gap in the existing research.

2.6.3 Limited Empirical Integration of Need for Cognition within Regulatory-Procrastination Frameworks

Need for Cognition (NfC) is described as a cognitive-motivational trait that reflects a person's enjoyment of effortful thinking. Valenzuela et al. (2020) found that higher Need for Cognition is associated with lower decisional procrastination. This shows that people who enjoy thinking deeply are less likely to delay decisions.

However, within the reviewed literature, Need for Cognition has not been clearly integrated into established metacognitive or self-regulated learning models of academic procrastination. Most mediation frameworks, such as those by Wijaya (2018), García-Ros et al. (2022), and Tao et al. (2025), mainly focus on regulatory variables and academic outcomes. They do not include dispositional cognitive traits like Need for Cognition.

Similarly, although Zhou et al.'s meta-analysis supports a metacognitive model of procrastination, it does not include Need for Cognition as an earlier or influencing variable within that model.

So, even though Need for Cognition is theoretically connected to metacognitive regulation, it has not been directly tested as a possible antecedent to MSRQ in procrastination models. This creates a clear gap in the research, as the role of Need for Cognition within regulatory–procrastination frameworks has not yet been empirically examined.

3. Methodology

3.1 Research Design

The present study employed a quantitative, cross-sectional research design incorporating correlational, regression, and mediation analyses. A correlational design was considered appropriate as the primary objective of the study was to examine the relationships among Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination among university students.

In addition to examining correlations, regression analysis was conducted to determine the predictive role of the independent variables on academic procrastination. Furthermore, mediation analysis was performed to examine whether Metacognitive Self-Regulation functioned as a mediating variable in the relationship between Need for Cognition and Academic Procrastination.

The cross-sectional nature of the study indicates that data were collected at a single point in time from the selected sample. This approach allowed for the examination of associations among the variables as they exist within the target population at that specific time. A quantitative methodology was adopted to enable systematic statistical analysis using standardized measurement tools and numerical data.

3.2 Participants

The sample for the present study consisted of 100 university students aged between 18 and 25 years. Participants were currently enrolled in undergraduate or postgraduate programs across multiple universities. The study included responses from students of different genders, representing a mixed-gender sample.

Participants were selected based on the inclusion criteria that they were (a) currently enrolled in a university program and (b) within the age range of 18 to 25 years. Students outside this age range or not currently enrolled in a university program were not included in the study.

3.3 Sampling Technique

The study employed a convenience sampling technique. Participants were recruited through online platforms and were invited to voluntarily participate in the study by responding to a Google Form questionnaire. The link to the questionnaire was circulated among university students across multiple institutions.

Convenience sampling was considered appropriate due to accessibility and feasibility constraints. As the study aimed to examine relationships among psychological variables within a university population, students who were readily available and willing to participate were included in the sample.

3.4 Variables of the Study

The present study examined three primary psychological variables among university students:

Independent Variables

Need for Cognition: Need for Cognition refers to an individual's tendency to engage in and enjoy effortful cognitive activities. In the present study, it represents a dispositional motivational characteristic reflecting students' inclination toward intellectual engagement.

Metacognitive Self-Regulation: Metacognitive Self-Regulation refers to the processes involved in planning, monitoring, and evaluating one's learning activities. In this study, it represents students' ability to regulate and manage their academic learning strategies.

Dependent Variable

Academic Procrastination: Academic Procrastination refers to the voluntary delay of academic tasks despite awareness of potential negative consequences. In the present study, it represents students' tendency to postpone academic responsibilities such as studying or completing assignments.

3.5 Instruments

Data for the present study were collected using standardized self-report questionnaires measuring Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination. All scales were administered in their original form without modification.

Need for Cognition Scale: Need for Cognition was measured using the 18-item Need for Cognition Scale developed by Cacioppo and Petty (1982). The scale assesses an individual's tendency to engage in and enjoy effortful cognitive activities. The 18-item version includes statements reflecting enjoyment of thinking, preference for complex problem-solving, and engagement in intellectual tasks. Responses are recorded on a Likert-type scale, typically ranging from strong disagreement to strong agreement. Higher scores on the scale indicate a greater tendency toward effortful cognitive engagement. The Need for Cognition Scale has

demonstrated good internal consistency and reliability across multiple studies, making it widely used in personality and educational research.

Metacognitive Self-Regulation Subscale: Metacognitive Self-Regulation was measured using the 12-item Metacognitive Self-Regulation subscale of the Motivated Strategies for Learning Questionnaire (MSLQ), developed by Pintrich and colleagues (1991). This subscale assesses students' use of planning, monitoring, and regulating strategies during learning. Items evaluate behaviors such as setting goals, checking comprehension, adjusting strategies when confused, and reviewing material systematically. Responses are provided on a Likert-type scale reflecting the extent to which statements describe the participant's typical learning behavior. Higher scores indicate stronger metacognitive regulatory skills. The MSLQ is a widely used instrument in educational psychology and has demonstrated acceptable reliability and validity across diverse student populations.

Academic Procrastination Scale (APS-GSBL): Academic Procrastination was measured using the Academic Procrastination Scale (APS-GSBL) developed by Savita Gupta and Liyaqat Bashir. The scale consists of 30 items designed to assess the tendency to delay academic tasks and responsibilities. The APS-GSBL includes statements related to postponement of assignments, avoidance of study activities, and delay in academic task completion. Participants respond using a Likert-type scale indicating the extent to which each statement applies to them. Higher scores reflect greater levels of academic procrastination. The scale has been developed for use with student populations and is specifically designed to assess procrastination in academic contexts.

3.6 Statistical Analysis

The collected data were coded and entered into the Statistical Package for the Social Sciences (SPSS) for analysis. Prior to hypothesis testing, descriptive statistics, including mean and standard deviation, were computed to summarize the characteristics of the study variables.

Reliability analysis was conducted using Cronbach's alpha to examine the internal consistency of the Need for Cognition Scale, the Metacognitive Self-Regulation subscale, and the Academic Procrastination Scale within the present sample.

To test the stated hypotheses, the Pearson Product–Moment Correlation Coefficient was calculated to determine the direction and strength of relationships among Need for Cognition, Metacognitive Self-Regulation, and Academic Procrastination.

Regression analysis was conducted to examine the predictive relationships among the variables. This helped determine whether the independent variables significantly predicted academic procrastination.

Mediation analysis was performed to test whether Metacognitive Self-Regulation acted as a mediator in the relationship between Need for Cognition and Academic Procrastination. This analysis allowed for the examination of both direct and indirect effects among the variables.

All statistical analyses were conducted using SPSS, and results were interpreted at an appropriate level of statistical significance.

4. Results

4.1 Descriptive Statistics and Scale Reliability

Means and standard deviations were calculated for all study variables to characterize the sample distribution and variability across constructs. The values are shown in the table below

Table 1. Descriptive Statistics for Study Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
MSR Total	100	25.00	73.00	53.1800	11.57879
APS Total	100	39.00	135.00	93.9000	20.85472
NFC Total	100	13.00	63.00	40.2000	9.46018
Valid N (listwise)	100				

Reliability analyses confirmed the internal consistency of all measurement instruments within the current sample. The Need for Cognition Scale (NFC-18; Cacioppo & Petty, 1982), administered using a 7-point Likert format, required psychometric refinement. The reverse-worded items demonstrated low and negative corrected item-total correlations, reducing internal consistency. Therefore, based on psychometric criteria, only positively worded items were retained for analysis. The refined 9-item scale demonstrated good internal consistency (Refer table 2)

Table 2. Reliability of Refined NFC Scale

Cronbach's Alpha	Cronbach's Alpha Based On Standardised Items	No. of Items
.795	.800	9

The Metacognitive Self-Regulation subscale of the Motivated Strategies for Learning Questionnaire consisting of 12 items, demonstrated acceptable internal consistency (Table 3).

Similarly, the Academic Procrastination Scale with 30 items showed adequate reliability (Table 4). These estimates confirm stable measurement of the psychological constructs under investigation.

Table 3. *Reliability of MSR*

Cronbach's Alpha	Cronbach's Alpha Based On Standardised Items	No. of Items
.785	.784	12

Table 4. *Reliability of APS*

Cronbach's Alpha	Cronbach's Alpha Based On Standardised Items	No. of Items
.928	.927	30

4.2 Correlational Analyses

Pearson product-moment correlations examined zero-order relationships among Need for Cognition (NFC), Metacognitive Self-Regulation (MSR), and Academic Procrastination (APS). Results appear in Table 5.

Table 5. *Pearson Correlation Matrix Among Study Variables*

	Measure	NFC Total	APS Total	MSR Total
NFC Total	Pearson Correlation	1	.100	.441*
	Sig. (2-tailed)	.	.322	<.001
	N	100	100	100
APS Total	Pearson Correlation	.100	1	-.329*
	Sig. (2-tailed)	.322	.	<.001
	N	100	100	100
MSR Total	Pearson Correlation	.441*	-.329*	1
	Sig. (2-tailed)	<.001	<.001	.
	N	100	100	100

A significant positive correlation emerged between NFC and MSR, $r = .441, p < .001$, indicating students who enjoy cognitive effort report stronger self-regulatory skills. MSR showed a significant negative correlation with APS, $r = -.329, p < .001$, linking better

regulation to reduced procrastination. The NFC-APS correlation was non-significant, $r = .100$, $p = .322$, serving as an important baseline for multivariate analyses.

4.3 Multiple Regression Analysis

Multiple regression examined NFC and MSR as simultaneous predictors of APS. The overall model was significant, $F(2, 97) = 10.873$, $p < .001$. MSR emerged as a significant negative predictor ($\beta = -.464$, $p < .001$), with each standard deviation increase reducing procrastination by .464 standard deviations. Notably, NFC became a significant positive predictor when controlling for MSR ($\beta = .304$, $p = .038$), indicating a suppression effect. Higher cognitive motivation related to increased procrastination independent of regulatory skills.

Table 6. Multiple Regression Analysis Predicting Academic Procrastination Scale (APS) from Need for Cognition (NFC) and Metacognitive Self-Regulation (MSR)

Predictor	B	SE(B)	β	t	p
Step 1					
NFC total	11.315	10.168	.304	2.098	.038
Step 2					
NFC total	11.171	10.168	.304	2.098	.038
MSR total	-3.835	.184	-.464	4.534	<.001

4.4 Mediation Analysis

Mediation analysis tested MSR as a mediator of the NFC-APS relationship using Baron and Kenny's (1986) framework and Sobel test (see Table 3).

Path a (NFC $\rightarrow$ MSR): $\beta = .441$, $p < .001$ ($R^2 = .194$, $F(1, 98) = 23.637$, equation: $MSR = 31.490 + 0.540 \times NFC$, $SE = 0.111$).

Paths b and c' (MSR $\rightarrow$ APS, NFC $\rightarrow$ APS controlling MSR): MSR $\beta = -.464$, $p < .001$; NFC $\beta = .304$, $p = .038$ (equation: $APS = 111.315 + 0.671 \times NFC - 0.835 \times MSR$).

The indirect effect (NFC $\rightarrow$ MSR $\rightarrow$ APS) was significant, $ab = -0.451$, Sobel $Z = 3.318$, one-tailed $p = .0005$, two-tailed $p = .0009$. This competitive mediation shows NFC reduces procrastination indirectly through MSR.

Table 7. *Mediation Analysis: Paths and Sobel Test for MSR Mediating NFC → APS Relationship*

Path	Unstandardized B	SE	Standardized β	t	p	R ²	F
Path a (NFC → MSR)	0.540	0.111	.441	4.862	<.001	.194	23.637
Path b (MSR → APS)	-0.835	0.184	-.464	4.534	<.001	-	-
Path c' (NFC → APS, controlling MSR)	0.671	10.168?	.304	2.098	.038	.366	10.873
Indirect Effect	ab = -0.451	-	-	Sobel Z = 3.318	One- tailed p = .0005 Two- tailed p = .0009	-	-

5. Discussion

This study examined the relationship between Need for Cognition (NFC), Metacognitive Self-Regulation (MSR), and Academic Procrastination (APS) among university students. The findings partially supported the proposed model and suggested that the relationships between these variables may be more complex than originally expected, particularly in the form of a competitive mediation effect.

Need for Cognition, Metacognitive Self-Regulation, and Procrastination

As expected, Need for Cognition was positively related to Metacognitive Self-Regulation ($r = .441$). Students who reported enjoying effortful thinking also tended to report greater use of planning, monitoring, and regulation while studying. This finding aligns with Self-Regulated Learning (SRL) theory, which suggests that learners who are more cognitively engaged are more likely to actively manage their learning processes through strategies such as goal setting, monitoring their understanding, and adjusting strategies when needed. When students are intrinsically motivated to think and engage with complex ideas, they may also be

more willing to invest effort in organizing and regulating their learning activities. This supports the broader idea that motivational tendencies such as NFC may be associated with stronger metacognitive engagement during academic tasks.

The second important finding was that Metacognitive Self-Regulation was negatively related to academic procrastination ($r = -.329$) and also emerged as a strong negative predictor in regression analysis ($\beta = -.464$). This finding is consistent with a large body of research suggesting that difficulties in self-regulation play a central role in procrastination. Students who are able to effectively plan their work, monitor their progress, and regulate their effort are generally better able to initiate and complete academic tasks on time. In contrast, weaker metacognitive control may make it harder for students to organize their study behaviour and maintain task engagement, which can increase the likelihood of delaying academic responsibilities. From a self-regulated learning perspective, procrastination can therefore be understood partly as a breakdown in the processes that help students guide and manage their own learning.

However, contrary to the initial hypothesis, the zero order correlation between Need for Cognition and Academic Procrastination was not significant ($r = .100$). This suggests that simply enjoying thinking or engaging in cognitively demanding activities does not necessarily mean that students procrastinate less. While NFC reflects a preference for effortful thinking, procrastination is often influenced more directly by regulatory processes such as planning, effort control, and time management. It is therefore possible that NFC influences how students engage with academic material, such as approaching tasks with curiosity or deeper analysis, without directly determining whether they delay those tasks.

Competitive Mediation: Indirect Protection and Direct Risk

When NFC and MSR were entered together in the regression analysis, an interesting suppression pattern appeared. Metacognitive Self-Regulation strongly predicted lower procrastination ($\beta = -.464$), while Need for Cognition became a positive predictor of procrastination ($\beta = .304$), even though their simple correlation was not significant. Mediation analysis further showed a significant indirect effect of NFC on APS through MSR ($ab = -.451$, Sobel $Z = 3.318$), along with a positive direct path from NFC to APS. This pattern reflects what is often described as competitive or inconsistent mediation, where the indirect and direct effects operate in opposite directions. In other words, NFC appeared to reduce procrastination indirectly by supporting better metacognitive self-regulation, but at the same time showed a positive direct relationship with procrastination when MSR was controlled.

This pattern suggests that motivational tendencies and regulatory skills may operate through different pathways in shaping procrastination behaviour. Traits related to cognitive motivation may encourage deeper engagement with learning activities, but their influence on task completion may depend on whether students also possess effective regulatory strategies. When metacognitive self-regulation is strong, it may channel cognitive motivation into productive academic behaviour. However, when regulatory processes are weaker or statistically controlled, other aspects of cognitive engagement may become visible that are less directly linked to timely task completion.

The present results extend this idea to Need for Cognition. Students with higher NFC appear to develop stronger metacognitive self-regulation, which in turn reduces procrastination. This pattern fits with models of self-regulated learning that emphasize the interaction between motivation and regulation in shaping academic behaviour. Within these models, motivational tendencies can encourage engagement with learning tasks, while metacognitive regulation determines how effectively that engagement is translated into organized and goal directed action.

At the same time, the positive direct relationship between NFC and procrastination suggests that for some students, enjoying complex thinking may also be associated with behaviours that indirectly increase delay. For instance, students high in NFC may spend more time exploring ideas in depth, analysing multiple possibilities, or engaging in extended cognitive processing before initiating a task. While such deep engagement can be beneficial for learning, it may also occasionally slow task initiation when deadlines are distant or when planning is insufficient. Research on metacognition and procrastination has shown that positive metacognitive beliefs about procrastination, such as believing that one performs better under pressure, can maintain procrastination despite good intentions. Within the Self-Regulatory Executive Function (S REF) framework, both metacognitive beliefs and regulatory processes play a role in shaping procrastination. It is therefore possible that students high in NFC may develop more elaborate cognitive justifications for delaying tasks or stronger beliefs that postponing work will not necessarily harm their performance.

Positioning the Findings within Self-Regulation and Metacognition Theories

Overall, the findings support the idea that procrastination is more closely linked to self-regulation processes than to cognitive interest alone. Many theoretical perspectives emphasize that procrastination occurs when individuals struggle to translate intentions into action, particularly when planning, monitoring, and effort regulation are insufficient. The strong negative relationship between MSR and APS observed in this study fits well with this

perspective and highlights the importance of metacognitive control in managing academic behaviour.

The results can also be understood within broader metacognitive frameworks that emphasize the role of regulatory processes in guiding attention, effort, and decision-making during learning. Within such frameworks, individual differences in cognitive motivation may interact with regulatory skills in shaping academic outcomes. When cognitive motivation is accompanied by strong metacognitive regulation, it may support sustained engagement and reduce procrastination. However, when regulatory strategies are less effective, the same tendency toward deep thinking may not necessarily translate into timely task completion.

Implications

From a practical perspective, the findings highlight two important areas for intervention.

First, the strong negative association between Metacognitive Self-Regulation and procrastination supports the value of helping students develop stronger metacognitive and self-regulatory skills. Training students to plan their tasks, monitor their progress, and regulate their effort may help them manage academic demands more effectively and reduce delays in task completion. Educational approaches that encourage reflective learning, strategic planning, and goal monitoring may therefore play an important role in addressing academic procrastination.

Second, the results suggest that fostering intellectual curiosity or enjoyment of thinking alone may not be sufficient to reduce procrastination. Without adequate regulatory strategies, students who enjoy engaging with complex ideas may still struggle to translate that engagement into consistent academic action. Interventions may therefore benefit from combining motivational encouragement with explicit support for metacognitive planning, task structuring, and time management.

Limitations and Future Directions

This study has several limitations. First, the research design was cross sectional, which means that causal conclusions about the direction of relationships cannot be made. Future research using longitudinal designs could provide a clearer understanding of how Need for Cognition, metacognitive self-regulation, and procrastination influence each other over time.

Second, all measures in the study were self-reported, which raises the possibility of common method bias. Self-report measures capture students' perceptions of their behaviour but may not always reflect actual study practices. Future studies could combine questionnaire data with behavioural measures such as study logs or task completion records.

Third, the sample consisted only of university students aged 18 to 25 years. Although this group is commonly examined in procrastination research, the findings may not necessarily generalize to other educational contexts or age groups.

Another limitation relates to the measurement of Need for Cognition. The study used the 18 item version of the Need for Cognition scale. However, during reliability analysis, several reverse worded items showed low or negative corrected item total correlations, which reduced the internal consistency of the scale. To address this issue, only the positively worded items were retained for analysis, resulting in a refined 9 item version of the scale. Although this decision improved the reliability of the measure, it may have slightly narrowed the conceptual coverage of the construct.

Despite these limitations, the study contributes to the existing literature by showing that Need for Cognition may relate to procrastination through a complex pathway involving metacognitive self-regulation. Cognitive motivation appears to be most beneficial when it is accompanied by strong regulatory skills that help students organize and direct their learning behaviour. These findings reinforce the importance of considering both motivational and metacognitive processes when examining academic procrastination.

6. Conclusion

The present study examined how Need for Cognition and Metacognitive Self-Regulation relate to Academic Procrastination among university students aged 18–25. Consistent with expectations, students who reported a higher Need for Cognition also demonstrated stronger Metacognitive Self-Regulation, indicating that enjoyment of effortful thinking is associated with more deliberate planning, monitoring, and control of learning activities. Metacognitive Self-Regulation, in turn, was negatively associated with Academic Procrastination, suggesting that students who regulate their learning more effectively are less likely to delay academic tasks.

Although Need for Cognition was not significantly correlated with procrastination at the bivariate level, the multivariate analyses revealed a more complex relationship. When Metacognitive Self-Regulation was controlled, Need for Cognition emerged as a positive predictor of procrastination, while the indirect effect through Metacognitive Self-Regulation was negative. This competitive mediation pattern indicates that Need for Cognition may reduce procrastination by strengthening regulatory skills, yet may simultaneously increase

procrastination when cognitive engagement operates independently of effective self-regulatory processes.

Overall, the findings highlight Metacognitive Self-Regulation as a central mechanism linking cognitive motivation to academic delay behaviour. The results emphasize that the relationship between cognitive motivation and procrastination is not straightforward but depends on the presence of effective regulatory strategies. Interventions that strengthen planning, monitoring, and self-regulatory skills may therefore help reduce procrastination while allowing students to benefit from high levels of cognitive motivation. Despite its limitations, the study contributes to a more refined understanding of how Need for Cognition and Metacognitive Self-Regulation jointly influence Academic Procrastination.

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