

**Exploring the Relationship between TikTok use, Academic stress, and Procrastination
as a Mediator among Students**

Zakaria Slimani

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Supervisors:

Nienke Peeters

Erik Taal

THE UNIVERSITY OF TWENTE

Faculty of Behavioural Management and Social Sciences

Department of Positive Psychology & Technology

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Abstract

Throughout the last few years, the social media app TikTok has gained increasing popularity among young adults and university students, with research linking prolonged usage of the app to a decline in academic performance, elevated stress, and procrastination. However, research investigating these relationships is still sparse, creating a barrier to intervention development and possible solutions. Therefore, this study aims to add to this present knowledge by examining the link between TikTok usage and academic stress among university students, focusing on procrastination as a mediator. A cross-sectional online survey was employed to assess students' TikTok usage, academic procrastination, and academic stress using the Problematic TikTok Use Scale (PTTS), the Academic Procrastination Scale (APS), and the Lakaey Academic Stress Response Scale (ASS) among a sample of 38 university students. Findings showed that TikTok use was positively related to both academic procrastination ($r = .33$) and academic stress ($r = .58$), with procrastination also showing a strong correlation with academic stress ($r = .72$). Further, the usage of TikTok was significantly associated with increased levels of academic stress ($\beta = .55, p < .001$), explaining 33% of the variance in academic stress ($R^2 = .33$). However, procrastination has not been found to mediate the relationship between TikTok usage and academic stress (Prop.Mediated = .31, $p = .09$). Despite significant research limitations, this study contributes to the literature exploring the impact of social media usage on academic performance and creates possible focus points for future studies and practical intervention design.

Keywords: Academic Stress, Social Media Use, TikTok, Procrastination, Students, mediation

Introduction

“The deadline approaches without mercy, and I stare at an empty screen. We procrastinated for too long” (Digitallybaffled, 2022).

In 2022, these exact words echoed throughout university libraries worldwide, after the user ‘digitallybaffled’ uploaded a viral clip called “deadline mode” to the social media platform TikTok (Digitallybaffled, 2022). In the comment section situated below the video, which has reached over 10 million views to date, users describe their shared experiences, relating the videos’ content to their own personal situations. One of the over 9000 comments reads: “me, when I had to do my thesis of 10.000 words in about two weeks”. The comment, written by a university student, has garnered over 1000 likes, resonating with students worldwide, and highlighting the shared sentiment and potential effects social media platforms such as TikTok might have on students’ academic performance, stress, and procrastination.

TikTok, which was originally known as Musical.ly or Douyin until 2018, is a short-video social network application that allows users to create, edit, and share short videos that often display entertaining or educational content (Regasa & Ettisa, 2023). After its introduction to the international market in 2018, the app has risen to be one of the most widely downloaded mobile apps worldwide, boasting over one billion monthly active users (Azni, 2024). Although the app includes content for every age generation, nearly half of TikTok users are between the ages of 16-24, followed by the age group of 25- to 29-year-olds (Yang et al., 2019; Montag et al., 2021). This makes the app specifically attractive to adolescents or younger generations, including students, as the majority of the app's content is created by and tailored to the same demographic (Omar & Dequan, 2020).

Parallel to the rise of social media platforms such as TikTok, scholars started to investigate the effects social media apps and platforms might have on these demographics, as recent research has suggested a link between social media, smartphone overuse, and increasing anxiety and depression rates in young adults (Bettmann et al., 2021). These concerns have also recently been connected to the rise in social media consumption numbers, as 22% of American teenagers indicated using TikTok for 2-3 hours daily- a number that has almost tripled since the introduction of the app in 2018, surpassing usage numbers of other popular social media apps (Duarte, 2024).

TikTok's high usage and engagement numbers can be explained by its unique working mechanisms, as the individually curated content of the platform encourages users to spend more time on the app. Specifically, TikTok's advanced algorithm, which suggests videos to users based on their past interactions, likes, and viewing history, makes the app more captivating and engaging when compared with other social media platforms (Qin et al., 2022; Zhao, 2021). Further, TikTok's mechanisms have been linked to a dopamine-driven feedback loop, as the short, flashy, and pleasurable videos contribute to dopamine release in the users' brains, thus reinforcing app engagement behaviour (Wu, 2023). Engagement can also partially be explained by Uses and Gratifications Theory (UGT) (Katz et al., 1973), creating a strong incentive for prolonged usage and formation of anomalous usage patterns, eventually leading to dependence or addiction to the platform and possible impacts on academic stress and overall academic performance (Pedrouzo & Krynski, 2023; Hassan Ali Raza, 2022; Qin et al., 2022).

Social Media, Academic Stress, and Procrastination

Dependence, addiction, or other maladaptive social media behavior can have significant adverse impacts on a young person's daily functioning, along with behavioral

problems, insomnia, stress, depression, headaches, and a general decline in mental well-being (Ramsden & Talbot, 2024; Chao et al., 2023; Shannon et al., 2022). For students, spending too much time on social media can also pose challenges to their academic trajectory, including elevated levels of academic stress or procrastination (Nizam et al., 2021). Academic stress is commonly defined as ‘negative emotions due to the academic workload’, and manifested by feelings of anxiety, pressure, and difficulties coping with academic work and examinations (Tom, 2022; Koudela-Hamila et al., 2020). In students, prolonged periods or high levels of academic stress can often affect their mental health, academic achievement, and contribute to a reduction in their quality of life (Pascoe et al., 2019; Shankar & Park, 2016).

On the other hand, procrastination is the voluntary delay of an intended action despite the recognition that this delay may have adverse effects (Steel, 2007) and is one of the main driving factors behind academic stress in students (Kuftyak, 2022). Procrastination can have multiple origins, for example, a lack of proper time management, fear of failure, or a general lack of motivation (Steel, 2007; Zhang et al., 2019). While the link of TikTok and procrastination has not been thoroughly studied yet, Pekpazar and colleagues (2021) have investigated other social media apps, such as Instagram, to be significantly linked to procrastination behavior. In their study, they investigated the overuse of Instagram among Turkish university students, finding that students tend to prioritize social media over academic tasks, leading them to disregard their educational duties, submit assignments at the last moment, or fail to do so altogether (Pekpazar et al., 2021). While a similar relationship has been found for TikTok use and procrastination in general, research on academic procrastination however remains sparse (Rogowska & Cincio, 2024).

Such persistent procrastination is positively associated with stress and a decline in academic results and overall academic performance (Kuftyak, 2021). In addition, further

negative consequences are increased levels of anxiety and depression symptoms among students (Kufiyak, 2021), possibly incentivizing the search for short-term relief that social media platforms, such as TikTok, can offer. Although the effects of social media platforms, for example, Instagram, WhatsApp, or Facebook on academic stress and procrastination have received increasing scholarly attention (Lau, 2017; Abi-Jaoude et al., 2020; Hou et al., 2019), evidence on TikTok remains sparse and inconclusive. and inconclusive.

While TikTok use has been found to impact academic stress levels and a student's mental health negatively (Azizi et al., 2019; Fatima Zahra et al., 2022; Chao et al., 2023; Ramsden & Talkbot, 2024), it is still unclear whether this relationship might be mediated by procrastination. Understanding this interplay is crucial for addressing the underlying causes of academic stress and developing effective interventions. Surveys with young adults have also supported the existence of a positive correlation between social network dependence and increased stress levels (Maguire et al., 2022). According to Sha and Dong (2021), stress partially mediates the association between SMA and Chinese high school students' memory loss, besides depression and anxiety. However, study results are limited by the high variability in sample size and cannot be reliably used to inform solutions.

While studies have demonstrated a link between excessive social media use and increased academic stress, with procrastination acting as a mediator (e.g., Pekpazar et al., 2021; Foroughi et al., 2021), these findings cannot be directly applied to TikTok due to the platform's unique design and functionality. This creates a gap in the current research landscape that needs to be addressed, given the serious implications for students.

The present study

Therefore, the current study aims to explore the relationship between students' TikTok use and their level of experienced academic stress, emphasizing procrastination as a mediator

variable. Given the novelty, popularity, and expanding growth of the platform, it is crucial to explore its mechanisms further and add to the evidence on the short- and long-term consequences of prolonged social media use and addiction. Further, exploring this relationship could inform possible intervention strategies helping younger demographics, especially students, to develop health usage behaviours and prevent them from engaging in TikTok-induced procrastination behaviours. Further, it is hoped to inform better digital citizenship and contribute to a reduction in students' academic stress and mental ill-health.

Research Questions

1. What is the relationship between TikTok usage and academic procrastination among students aged 18 and older?
2. What is the relationship between academic procrastination and academic stress among students aged 18 and older?
3. What is the relationship between TikTok usage and academic stress among students aged 18 and older?
4. Does academic procrastination mediate the relationship between TikTok usage and academic stress?

Hypotheses

- **H1:** TikTok usage and academic procrastination will have a significant positive relationship. Higher levels of TikTok engagement are expected to be associated with increased student procrastination behaviours.
- **H2:** There will be a significant positive relationship between academic procrastination and academic stress. Higher levels of academic procrastination are anticipated to be linked to more significant academic stress.

- **H3:** TikTok usage and academic stress will have a significant positive relationship. It is hypothesized that students with higher TikTok engagement will report higher levels of academic stress.
- **H4:** Academic procrastination will mediate the relationship between TikTok usage and academic stress. Increased procrastination behaviours are expected to partially explain the effect of TikTok usage on academic stress.

Methods

Study Design

This study utilized a cross-sectional survey design to examine the mediating effect of academic procrastination on the relationship between TikTok usage and academic stress. Variables were defined as follows: TikTok usage (*IV*) was assessed using a standardized scale measuring students' TikTok usage behaviour, and academic stress (*DV*) was assessed using a standardized scale measuring students' perception of pressure and anxiety related to scholastic activities. Academic procrastination (mediating variable) was evaluated through a standardized scale which assesses the student's habits and routines related to academic work.

Participants

The original sample encompassed 52 participants (21.15% male, 76.92% female, and 1.92% third gender). As for nationality participants identified as either Dutch (40.38%), German (44.23%), or a 3rd nationality (15.38%). With regards to participants' educational level, 6 (11.54%) were students at the University of Applied Science, 38 (73.07%) were bachelor students at the university, whereas 9 (17.31%) followed a master's program. Inclusion criteria required participants to be at least 18 years old, actively use the app TikTok (daily engagement), and be enrolled in a study program during their participation. Exclusion criteria encompassed a refusal to provide informed consent, not completing the majority of

items (8 excluded), not holding a valid student status (this was checked having a item in the survey which asked for student status), or not engaging with the TikTok app as defined (6 excluded). The final sample encompassed 38 participants (18.42% male, 81.58% female) aged 18-26 years old ($M_{age} = 21.8$, $SD = 1.84$). As for nationality, participants identified as either Dutch (50%) or German (50%). With regards to participants' educational level, 32 (84.21%) were undergraduates, whereas 6 (15.79%) followed a master's program.

Table 1

Demographic Characteristics of Participants

Demographic	n	Percent (%)
Age		
18-20	15	39.47%
21-23	18	47.37%
24-26	5	13.16%
Gender		
Male	7	18.42%
Female	31	81.58%
Nationality		
Dutch	19	50%
German	19	50%
Education Level		
Bachelor's	32	84.21%
Master's	6	15.79%

Materials

An online survey was designed using the survey software Qualtrics. The survey features an informed consent form, and 71 items related to participants' demographic data, TikTok usage behaviours, academic delay, and academic pressure. Data of the demographic nature concerned participants' gender, age, nationality, and level of education of the respondents. A full overview of the questionnaire can be found in Appendix A- D.

Online Survey Design

TikTok usage. The Problematic TikTok Use Scale (PTTUS), adapted from Günlü et al. (2023) was utilized to measure participants' TikTok usage. Initially developed to measure Instagram Addiction (D'Souza et al., 2018), the 5-point Likert Scale ranging from 1 (never) to 5 (always) consists of 16 items divided into 3 sub-dimensions: Obsession (items 1-4), Escapism (items 5-10), and Lack of Control (items 11-16), with higher scores indicating higher levels of problematic use. Example items include statements such as 'I have to create a new TikTok video right after a meeting or event' (Obsession), or 'I can no longer concentrate on school/work because of TikTok' (Lack of Control). The sub-dimensions revealed strong internal consistency and reliability for Obsession ($\alpha = .84$), Escapism ($\alpha = .90$), and Lack of Control ($\alpha = .85$). The global reliability of the scale had a Cronbach's alpha of ($\alpha = .87$) (Günlü et al., 2023).

Academic Stress. In order to assess students' academic stress, the Lakaev Academic Stress Response Scale (LASRS) was utilized (Lakaev, 2022). This scale measures the impact of stress across four sub-dimensions: Affective, Behavioral, Physiological, and Cognitive. Examples of items include "I could not breathe" (Physiological), "I avoided class" (Behavioral), "I felt overwhelmed by the demands of study" (Cognitive), and "My emotions stop me from studying" (Affective). Each item is rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Always), with higher scores indicating higher levels of perceived academic stress. The sub-dimensions demonstrated high reliability with Cronbach's alpha for Affective ($\alpha = .85$), Behavioral ($\alpha = .84$), Physiological ($\alpha = .86$), and Cognitive ($\alpha = .87$), and an overall alpha of ($\alpha = .83$) (Lakaev, 2022).

Academic procrastination. The Academic Procrastination Scale (APS) assessed the student's academic procrastination. McCloskey and Scielzo's (2015) Academic

Procrastination Scale (APS) was used to measure self-reported propensity to delay academic tasks. The APS consists of 25 items answered on a 5-point Likert response scale of frequency ranging from 1 (Never) to 5 (Always) to measure the level of academic procrastination. An example of an item under this branch is "I delay starting an assignment until the last minute". The APS has several reverse score items to eliminate response bias. Reverse items are worded in the opposite way of the directions of the measurement of procrastination behaviours, such as "I begin tasks immediately after they are assigned." The scores of these items are also reversed, such that higher amounts are associated with less procrastination. These principal scores are submitted and are averages of item scores with possible values ranging from 1 to 5. McCloskey and Scielzo (2015) reported internal consistency of the APS, with Cronbach's alpha ($\alpha = .94$).

Procedure

Participants were recruited using multiple online communication channels, including the University's internal mailing lists for students and social media groups. Additionally, participants were encouraged to forward the survey-provided link to their friends. In order to increase the reach of university students, the 'SONA'- system of the University of Twente was used, as a participant pool management tool for universities. For students participating through the SONA- system, 0.5 credits were awarded to them upon the completion of the questionnaire. The data was collected from April 20 until May 20 and received approval by the BMS Ethics Committee of the University of Twente. The completion time was estimated to be around 15-20 minutes.

Upon accessing the survey, participants were provided with an informed consent (Appendix B) form, including information about the study's aim, procedures, and their rights, including the right to withdraw at any time without any reason. Upon providing consent, the

survey began with demographic questions such as participants' gender, age, nationality, and educational level. Afterwards, participants were presented with items assessing their TikTok usage, perceived academic stress levels, and academic procrastination. After the successful completion of the survey, participants were debriefed about the study's aim and allowed to contact the lead researcher and distribute the link to fellow students.

Data Analysis

Data Preparation

After the data collection was completed, data was imported from Qualtrics into Excel to review and clean the data. As a first step, incomplete or ineligible responses, and responses that did not meet the inclusion criteria were excluded from the analysis. Demographic variables were renamed, categorical answers were recoded into numeric variables, and certain items were reverse-coded. Three new variables were created depicting the sum scores for TikTok use, academic stress, and procrastination, which were then used for analyses. All statistical analyses were done with the help of the statistical programming language R (Setiawan, 2020) and the statistical program RStudio Version 2024.04.0+735.

Descriptive Statistics and Assumption Testing

The descriptive statistics were computed for the three primary variables: TikTok Use Scale, Academic Procrastination Scale, and Academic Stress Scale. The resulting summary provided an overview of data distribution, including means (M), standard deviations (SD), ranges for continuous variables, and counts for categorical variables. Further, statistical assumptions of linearity, homoscedasticity, independence, and normality were checked for each relationship to ensure the appropriateness of the data for regression modeling.

Linearity was examined by computing a linear regression analysis with standardized and unstandardized coefficients. Further, a scatterplot was created, resulting in the condition of linearity being met (see Figure G1). The level of independence of residuals was assessed

using the Durbin-Watson test, which indicated no violations ($DW = 2.10, p = .786$). For the equality of variance, the Breusch-Pagan test was conducted, showing no violation of the homoscedasticity assumption ($BP = 1.95, p = .378$). To check for normality, the Q-Q plot and the Shapiro-Wilk test were used (see Figure G2). The Shapiro-Wilk test indicated that the residuals were normally distributed ($W = .97, p = .385$). After the assumptions were met, Pearson's correlation test was computed to assess the level of the synthesized relationship between the variables.

Hypothesis Testing

Several inferential statistics were used in the study. First, a correlation analysis examined the relationship between TikTok usage and academic procrastination. Second, three multiple regression analyses were performed: (1) with academic stress as the dependent variable (*DV*) and procrastination as the independent variable (*IV*), (2) with stress as the *DV* and TikTok usage as the *IV*, and (3) with stress as the *DV* and both procrastination and TikTok usage as *IVs*, while controlling for demographic variables. Lastly, whether procrastination mediates the relationship between TikTok usage and academic stress was explored through a mediation analysis, with TikTok usage as the independent variable and stress as the dependent variable.

Results

Descriptive statistics

Visualized in Table 2 are the sample means and standard deviations for the variables TikTok usage, academic procrastination, and academic stress. The data reveals that, on average, participants use TikTok moderately, procrastinate slightly above the average, and experience moderate academic stress (see Table 2).

Table 2

Table of Means and Standard Deviations

	Range	<i>M</i>	<i>SD</i>
TikTok Usage	1.00-4.13	2.53	0.76
Academic Procrastination	1.76-4.08	3.02	0.67
Academic Stress	1.09-4.55	2.68	0.80

Hypothesis Testing

Correlation Analysis

Research Question 1 (RQ1) and Hypothesis 1 (H1). The first research question focused on exploring the relationship between using TikTok and academic procrastination. A weak to moderate positive correlation ($r = .33, p = .04$) (see Table 3) was found between using TikTok and putting off academic work. This study lends credence to Hypothesis 1, which postulates that procrastination is more common among users with more TikTok use. Students who spend more time on TikTok are less likely to finish their schoolwork on time.

Table 3

Correlation matrix

	Stress	TikTok Usage	Procrastination
Stress	-	-	-
TikTok Usage	.58**	-	-
Procrastination	.72**	.33*	-

** . Correlation is significant at the 0.01 level

* . correlation is significant at the 0.05 level

Regression Analysis

The regression analysis conducted to test Hypothesis 2 (H2), which posits a positive relationship between academic procrastination and stress, yielded significant results. A strong positive correlation was found, indicating that higher procrastination is strongly associated with greater academic stress ($r = .72$). The model explained 52% of the variance in academic stress ($R^2 = .52$), indicating that academic procrastination is a substantial predictor of

academic stress levels among the participants. The model is significant ($F(1, 36) = 38.65, p < .001$), showing that the relationship between procrastination and stress is unlikely to have occurred by chance. The results, displayed in Table 4 below, demonstrated that academic procrastination significantly predicts academic stress ($\beta = .94, p < .001$), thus supporting H2 (see Table 4). This suggests that higher levels of procrastination are associated with increased academic stress.

Table 4

Simple Linear Regression Analysis for Stress DV) and Procrastination (IV)

	B	SE	t	p	95% CI	
					LL	UL
Intercept	-0.17	0.47	-0.37	.72	-1.12	0.78
Procrastination	0.94	0.15	6.22	< .001	0.64	1.24

The regression analysis results, as shown in Table 5 below, indicate that TikTok usage is a significant predictor of academic stress. The coefficient of determination ($R^2 = .33$) means that 33% of the variance in academic stress can be explained by TikTok usage, suggesting a moderate relationship. The F-statistic ($F(1, 36) = 17.95, p < .001$) demonstrates that the model is statistically significant, meaning that the relationship between TikTok usage and academic stress is not due to random chance. The significant beta coefficient ($\beta = .55, p < .001$) further indicates a strong positive correlation, implying that higher TikTok usage is associated with increased levels of academic stress, thus supporting Hypothesis 3 (H3).

Table 5

Stress as the DV and TikTok Usage as the IV

	B	SE	t	p	95% CI	
					LL	UL
Intercept	1.27	0.35	3.65	< .001	0.57	1.96
TikTok Usage	0.55	0.13	4.24	< .001	0.28	0.82

The regression analysis results presented in Table 6 below reveal that the model, which examines the impact of TikTok usage and procrastination on academic stress while controlling for demographic variables, explains 68% of the variance in academic stress ($R^2 = .68$). This indicates that the predictors together have a strong explanatory power regarding academic stress levels. The F-statistic ($F(6, 31) = 10.80, p < .001$) confirms that the overall model is statistically significant, meaning the observed relationships are highly unlikely to be due to chance. Specifically, academic procrastination ($\beta = .81, p < .001$) and TikTok usage ($\beta = .36, p = .003$) are both significant predictors, suggesting that higher levels of these behaviours are associated with increased academic stress.

Table 6

Regression Analysis of Stress with Procrastination and TikTok Usage

	B	SE	t	p	95% CI	
					LL	UL
Intercept	-1.40	1.06	-1.32	.20	-3.56	0.76
Procrastination	0.81	0.19	4.25	< .001	0.43	1.18
TikTok Usage	0.36	0.11	3.20	.003	0.13	0.59
Age	0.03	0.05	0.52	.61	-0.08	0.14
Gender (Male)	0.00	0.23	0.02	.99	-0.47	0.47
Nationality (German)	0.22	0.21	1.05	.30	-0.21	0.65
Education (HBO)	0.32	0.24	1.34	.19	-0.16	0.80

Mediation Analysis

The mediation analysis results presented in Table 7 yielded to a rejection of H4, as procrastination does not seem to mediate the relationship between TikTok usage and academic stress. Although the average casual mediation effect (ACME) initially suggests the possibility of a weak mediation relationship (Estimate = 0.17), the results were not statistically significant ($p = .09$). However, the average direct effect (ADE) of TikTok usage on academic stress remains significant (Estimate = 0.37, $p < .001$), along with the total impact of TikTok usage on academic stress (Estimate = 0.54, $p < .001$). The proportion

mediated (.31) was also found to be not statistically significant ($p = .09$). While these results support H3, they do not support H4, as procrastination has not been found to mediate the relationship between TikTok usage and academic stress.

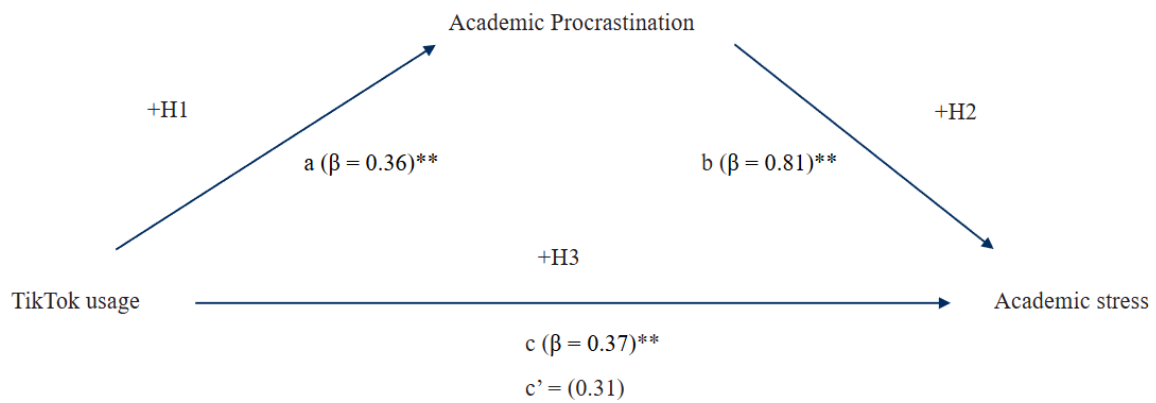
Table 7

Mediation analysis

Effect Type	B	95% CI		p
		LL	UL	
ACME	0.17	-0.03	0.33	.09
ADE	0.37	0.19	0.57	< .001
Total Effect	0.54	0.23	0.83	< .001
Prop. Mediated	0.31	-0.10	0.50	.09

Figure 1

Model of Mediation Analysis Results



C = direct effect

c' mediated

Discussion

This study aimed to determine whether academic procrastination mediates the association between TikTok use and academic stress. The findings suggest a positive significant relationship between TikTok usage and levels of procrastination and a positive significant relationship between TikTok usage and levels of academic stress. Academic procrastination was found to be a substantial predictor of academic stress; however, it did not mediate the relationship between TikTok usage and academic stress as the results were not significant, which can probably be attributed to the small sample size. However, the direct association remains evident, with increased TikTok engagement linked to higher levels of both procrastination and academic stress.

The significant positive relationship between the participants' TikTok usage and their levels of academic procrastination confirms the hypothesis that increased TikTok usage should be expected to raise the levels of procrastination. This result supports the existing literature indicating that social media's stimulating and frequently compelling qualities encourage procrastination tendencies (Günlü et al., 2023; Azizi et al., 2019). The immediate gratification offered by TikTok likely distracts students from their academic responsibilities, leading to delays in task initiation and completion.

The regression analysis also reveals data showing that academic procrastination is a significant predictor of academic stress. This adds to the hypothesis that procrastination entails greater levels of stress. Decision delay results in the expenditure of efforts at the eleventh hour and increases stress levels. This is in line with other related studies that have a well-documented history that shows that procrastination is indeed associated with poor performance and compromised mental health. (Karami & Mahmoodi, 2018; Johansson et al., 2023; Fernie et al., 2018).

Concerning academic stress, it was found that TikTok usage makes a significant prediction, which means that the higher the TikTok usage, the higher the stress level. This supplements the hypothesis that over-reliance on TikTok can lead to stress on the students, probably due to the time spent and concentration on developing relevant content that hinders academic tasks (Masood et al., 2020).

When included in the regression model, TikTok usage and procrastination were again significant for predicting academic stress while controlling for demographic characteristics. The results obtained by the combined model revealed that the model had a good fit by accounting for a large proportion of the variance in stress, which suggested that the above factors account for students' stress.

The Role of Procrastination in the Relationship between TikTok Usage and Academic Stress

This indicates that procrastination did not play a significant role in the indirect relationship between TikTok use and academic stress. While there was some suggestion that high TikTok usage might contribute to stress through procrastination, this connection was not strong enough to be considered a major factor. In other words, although procrastination might be a minor contributor, it is not a primary cause of the academic stress experienced by students who spend a lot of time on TikTok.

As a result, interventions aimed at reducing procrastination might offer limited benefits in alleviating the stress associated with excessive TikTok use. Addressing this stress likely requires a broader approach, considering other factors such as students' overall time management skills, the type and content of TikTok videos being consumed, and individual tendencies toward distraction.

For example, TikTok's notifications and structure to capture users' attention may negatively affect concentration. Thus, students can fail to focus on their assignments even if

they are not continuously procrastinating (Qin et al., 2022). Instead, the type of content the users consume may also influence the distraction and stress levels: entertainment content, for instance, may differ from educational content.

Additionally, aspects of character like discipline, drive, and perseverance may affect the student's ability to structure their time and deal with a load of tasks. When it comes to students who seem to exhibit low self-control with specific reference to this research topic, it can be argued their negative accountability is reflected by high levels of procrastination, resulting in high stress levels influenced by TikTok (Meier et al., 2016; Suprayogi & Shahab, 2023). Understanding the impact of character traits like discipline and self-control on academic procrastination and stress informs the development of interventions by highlighting the need to enhance self-regulation, time management, and stress management skills.

Strengths

This study possesses several strengths. One of the primary advantages is its focus on an emerging and underexplored research topic—the effects of TikTok use on academic procrastination and stress. By addressing this research gap, the study aims to contribute to a deeper understanding of the negative impacts of social media use on academic performance. A strength is the assessment of the key constructs through the employment of well-developed and validated scales. PTTUS, APS, and LASRS are well-recognized scales to measure TikTok use, academic procrastination, and academic stress response, respectively, for which reliability and validity have been confirmed in prior studies (McCloskey & Scielzo, 2015; Lakaev, 2022; Günlü et al., 2023).

Furthermore, since the present research employed a self-report questionnaire, Standard method variance was checked through appropriate tests, and variables such as age, gender, nationality, and education were included as covariates in the regression analysis models. This is useful in setting out confounding variables and gives a much better

understanding of the correlation between using TikTok, procrastination, and stress. Lastly, focusing solely on the app TikTok might contribute to emerging knowledge surrounding the short- and long-term effects of prolonged app use.

Limitations

Despite the studies' novelty, it is important to notice that this research has several limitations. First of all, restrictions apply toward the transferability of results due to the small sample size and operationalization of demographic variables. The small sample size, along with the detected homogeneity among the present sample decreases the ability to detect significant effects, making it difficult to propose absolute or directive statements regarding the association of the investigated variables. Therefore, results should be considered with caution due to these concerns and additional concerns of external validity. However, this opens up opportunities for future studies to control for the proposed relationship among different (or some sophisticated) samples featuring a greater variety of student years, programs, and academic progress.

In addition, the study relied on self-reported measures of TikTok usage, academic procrastination, and academic stress, which might lead to biased estimates as participants might inflate their TikTok usage or procrastination times. Furthermore, stress is also a highly subjective variable among individuals. As the data is collected through self-report measures, desirability bias might apply, along with ill effects of memory bias that might distort the findings. Therefore, future studies should account for a more standardized and objective operationalization of variables and measurement tools, for example by employing long-term designs, account for exam periods, or use user data (such as screen time or app usage) provided by phones.

Lastly, concerns regarding the cross-sectional nature of this research can be voiced, as it cannot identify causality between the variables studied. Regarding the study design,

limitations towards scale construction should be discussed, as most scales investigating this phenomenon have majorly focused on other social media applications such as Instagram, Facebook, or Whatsapp. Due to the unique working mechanisms of the app, distinct research tool development might be necessary. Future studies should preferably research to apply and report tests like the factor analysis to establish the construct validity of the scales in question.

Lastly, albeit not a direct limitation, it is essential to acknowledge that variations in TikTok usage restrictions and bans across different countries and demographic groups could influence the results. Additionally, it is essential to consider the impact of technology and social media usage among Gen Z and 'Millennials'—those born between 1997 and 2000 (Nayak, 2018). This cohort might exhibit different usage patterns and responses to social media, influencing how interventions should be tailored to address their unique needs and behaviours. For example, while younger users were linked to escapism, mood-boosting, and socializing behaviours as main motives for TikTok use, millennials have been found to rather use TikTok as a creative outlet (Dretsch, 2022; Falgoust et al., 2022). While research in this area is still sparse, it might be valuable for future research to address motivational differences among generations.

Implications for Interventions

Despite the limitations, the present study highlights various important focus points and potential directions, aiding with local intervention development, students' stress management, social media use, and procrastination tendencies. While direct inferences from this study are limited, it might be advisable to inform students about potential effects prolonged TikTok usage can have for their levels of academic stress and procrastination tendencies. The app's immersive features and tailored content may overshadow academic responsibilities, potentially leading students to prioritize TikTok over their academic duties. This is also highlighted by the finding that higher levels of TikTok usage and procrastination

were found to be predictors of stress, which may exacerbate a students' ongoing issues as the student might delay assignments crucial for academic success.

The findings underscore the need for local and targeted prevention programs, helping students manage their time and mitigate the negative effects of excessive social media use. It might be valuable for intervention designers to develop an informative program aimed at the role TikTok consumption plays in regards to procrastination and a students' level of academic stress. For example, applications empowering students to make specific decisions about time on TikTok, including the usage of in-app time restrictions, may contribute to combating procrastination. Also, measures such as courses on how to handle notifications and training students to stay away from the supply and demand system of the social network can lower stress. It is essential, therefore, to comprehend these determinants and to identify techniques to counter the attractions of TikTok to enable strategies for improving students' learning outcomes and well-being to be effectively developed.

Future Research and Implications

It is recommended that future research seek to overcome the limitations observed in this research. It is also important to note that larger samples will be required to improve the statistical power and the findings' external validity. The external validity of the results obtained in this study will be improved if participants from several universities and culturally diverse ones are selected. Further, it is recommended that future research controls for any prevalent and diagnosed mental health conditions that might additionally moderate the relationship between TikTok usage, procrastination, and academic stress. This is especially important considering the high prevalence of mental ill-health, depression, and anxiety among the main TikTok user demographics.

More longitudinal research is needed for inferring causation and comprehending the dynamic process of TikTok use, procrastination, and stress. This is especially true in the case

of experiments that could manage the usage of TikTok and look to its effects on procrastination and stress while controlling the rest of the characteristics that might interfere with these results. Since measures of discipline and self-control were not included in the study, it's speculative to base conclusions on these traits. Future research could explore the impact of these factors on academic procrastination and stress, which would inform the development of interventions focused on self-regulation, time management, and stress management.

Furthermore, future studies should strive to collect more impartial data on the use of social networks rather than self-estimated results. This could refer to tracking and recording time spent using the app or any social app such as TikTok. Measures of this sort would look more like real-world usage patterns and, therefore, would be more informative. As for the construct validity of the scales used, future research should follow the recommendations made by Clark and Watson (2019) and Badenes-Ribera et al. (2020) and perform and report factor analyses of the scales used to establish that the items in each scale indeed tap the targeted constructs. This will also improve the reliability and validity of the study's outcomes and conclusions.

Conclusion

This study explored the relationships between TikTok usage, academic procrastination, and academic stress among university students. While TikTok usage has been found to be positively associated to increased levels of academic procrastination and academic stress, no mediation effect was found for the relationship of TikTok usage and academic stress. While the results have to be considered with caution due to the studies' limitation and cross-sectional design, this work adds onto the broader research on social media's influence on academic achievement by highlighting TikTok's role among university students.

While it is difficult to draw direct and immediate consequences from the current study, it is advised to still manage digital distractions by encouraging time management in students, potentially preventing heightened levels of academic stress and procrastination, that could harm students' performance and overall health. Despite TikTok's novelty, educational institutions should be aware of the potential impacts prolonged TikTok usage has on students, by offering additional information, promote awareness about consequences, and promote healthy digital citizenship. Awareness and methods might aid students to limit their TikTok and social media usage and reduce their adverse effects on schoolwork and life.

While the findings aim to contribute to a better understanding of how TikTok affects students' procrastination and stress levels, it is advised to expand research on the matter, including longitudinal and experimental projects, more diverse and exhaustive samples, and other factors that might contribute to students' overall well-being. Therefore, the study urges the continuation of research and intervention programs to target these problems and improve students' learning and psychological well-being.

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Appendix A

The Academic Procrastination Scale (APS)

APPENDIX I: The Academic Procrastination Scale (APS).

The following questions assess your habits and routines as a student. Please answer the following as they apply to yourself.

How much do you, yourself agree to the following statements? (*Scored on a 1 to 5 Likert-type scale, with 1 = Disagree and 5 = Agree*)

1. I usually allocate time to review and proofread my work.*
2. I put off projects until the last minute.
3. I have found myself waiting until the day before to start a big project.
4. I know I should work on school work, but I just don't do it.
5. When working on schoolwork, I usually get distracted by other things.
6. I waste a lot of time on unimportant things.
7. I get distracted by other, more fun, things when I am supposed to work on schoolwork.
8. I concentrate on school work instead of other distractions. *
9. I can't focus on school work or projects for more than an hour until I get distracted.
10. My attention span for schoolwork is very short.
11. Tests are meant to be studied for just the night before.
12. I feel prepared well in advance for most tests. *
13. "Cramming" and last minute studying is the best way that I study for a big test.
14. I allocate time so I don't have to "cram" at the end of the semester. *
15. I only study the night before exams.
16. If an assignment is due at midnight, I will work on it until 11:59.
17. When given an assignment, I usually put it away and forget about it until it is almost due.
18. Friends usually distract me from schoolwork.
19. I find myself talking to friends or family instead of working on school work.
20. On the weekends, I make plans to do homework and projects, but I get distracted and hang out with friends.
21. I tend to put off things for the next day.
22. I don't spend much time studying school material until the end of the semester.
23. I frequently find myself putting important deadlines off.
24. If I don't understand something, I'll usually wait until the night before a test to figure it out.
25. I read the textbook and look over notes before coming to class and listening to a lecture or teacher. *

* *Indicates reverse-scored items*

Appendix B

Informed Consent Form

Title of Study: Exploring the Relationship between TikTok Use and Academic Stress with Procrastination as a Mediator among Students

Researcher: Zakaria Slimani, Researcher and bachelor student at the University of Twente

This research aims to identify the factors that influence university students' procrastination in their studies and determine if there is a correlation between academic stress and TikTok use among students 18 and older. In order to promote healthy digital habits and improve student academic achievements, the results will guide the development of tailored treatments to reduce the negative impacts of TikTok addiction.

Procedures:

- You should spend around fifteen minutes filling out a survey we created utilizing the Qualtrics platform.
- Questions on demographics (gender, age, country of origin, and degree of education) and topics such as TikTok use, academic procrastination, and academic stress are also part of the survey.

Potential Risks: There are no foreseeable risks associated with participating in this study beyond those encountered daily.

Potential Benefits: While there are no direct benefits to you for participating in this study, the findings will contribute to a better understanding of how TikTok usage affects academic stress and procrastination among students. This knowledge can help develop interventions to support students' academic success and well-being.

Confidentiality:

- Your responses will be kept confidential and used for research purposes only.

- Data will be stored securely and only accessible to the researcher and authorized personnel.
- Personal identifiers will be removed from the dataset to ensure anonymity.

Voluntary Participation:

- Your participation in this study is voluntary.
- You may withdraw from the study without penalty or loss of benefits.
- If you choose to withdraw, any data collected from you will be deleted and not used in the study.

Contact Information: If you have any questions or concerns about this study, please contact Zakaria Slimani at [Removed]

Consent: By clicking "I agree" below, you acknowledge that you have read and understood the information above and voluntarily agree to participate in this study.

- I agree
- I disagree

Appendix C

Lakaev Academic Stress Response Scale (LASRS)

Instructions

Please indicate how often you have experienced each of the following symptoms about your academic responsibilities over the past month by selecting the appropriate number:

1 = Never

2 = Rarely

3 = Sometimes

4 = Often

5 = Always

<u>FACTOR</u>	<u>DURATION</u>				
1. AFFECTIVE					
a) My work built up so much that I felt like crying.	1	2	3	4	5
b) I felt emotional.	1	2	3	4	5
c) My emotions stop me from studying.	1	2	3	4	5
d) I yelled at family or friends.	1	2	3	4	5
e) I felt emotionally drained by university	1	2	3	4	5
2. BEHAVIORAL					
a) I felt I was lazy when it came to university work	1	2	3	4	5
b) I procrastinated on assignments.	1	2	3	4	5
c) I was distracted in class.	1	2	3	4	5
d) I was unable to study.	1	2	3	4	5
e) I had trouble concentrating in class.	1	2	3	4	5
f) I avoided class.	1	2	3	4	5
g) I used alcohol or drugs.	1	2	3	4	5
h) I have trouble remembering my notes	1	2	3	4	5
3. PHYSIOLOGICAL					
a) I couldn't breathe.	1	2	3	4	5
b) I had difficulty eating.	1	2	3	4	5
c) My hands were sweaty.	1	2	3	4	5
d) I have had a lot of trouble sleeping.	1	2	3	4	5
e) I had headaches	1	2	3	4	5
4. COGNITIVE					
a) I felt overwhelmed by the demands of study.	1	2	3	4	5
b) I felt worried about coping with my studies.	1	2	3	4	5
c) There is so much going on that I can't think straight.	1	2	3	4	5
d) I felt emotionally drained by university.	1	2	3	4	5

Appendix D

Problematic TikTok Use Scale

<p>There are some statements about people's TikTok usage behaviours. Read each item and mark the most appropriate option from 1-5.</p> <p>1- Never</p> <p>2- Rarely</p> <p>3- Sometimes</p> <p>4- Often</p> <p>5- Always</p>					
Item	Never	Rarely	Sometimes	Often	Always
1. I often upload videos on TikTok.	1	2	3	4	5
2. I feel compelled to post a video on TikTok right after a meeting or event.	1	2	3	4	5
3. I feel unhappy when the number of comments and likes I get for the videos I upload to TikTok is low.	1	2	3	4	5
4. I check how many people see, like, or comment on my TikTok posts.	1	2	3	4	5
5. When I am active on TikTok, I say, "I will only use it for a few more minutes," but I continue to use it.	1	2	3	4	5
6. I get rid of disturbing thoughts by using TikTok.	1	2	3	4	5

7. When I am stressed, I watch TikTok videos.	1	2	3	4	5
8. I use TikTok to escape the thoughts that make me uneasy.	1	2	3	4	5
9. I use TikTok to get away from reality.	1	2	3	4	5
10. I need to understand how time passes on TikTok.	1	2	3	4	5
11. Because I use TikTok, my productivity/success in my work/school life is negatively affected.	1	2	3	4	5
12. I cannot focus on my school/work because of using TikTok.	1	2	3	4	5
13. I delay/postpone my work/classes because I use TikTok.	1	2	3	4	5
14. I have neck and back pain from using TikTok.	1	2	3	4	5
15. I felt nervous when I could not enter TikTok.	1	2	3	4	5
16. Using TikTok for a long time negatively affects my physical health.	1	2	3	4	5

Sub-Dimensions:

OBSESSION: Item, 1-2-3-4

ESCAPISM: Item, 5-6-7-8-9-10

LACK OF CONTROL: Item, 11-12-13-14-15-16

SCORING:

A high score on the relevant subdimension indicates that the user's TikTok usage is problematic. Nothing on the scale has a reverse score.

Appendix E

Use of AI in Education at the University

Artificial Intelligence on Campus While preparing for this paper, the author used Chat GPT to help rewrite original material and officially resolve RStudio code issues. The author assumed all responsibility for the work's content after utilizing this tool/service, after which they evaluated and modified it as necessary.

Appendix F

Table F1

Procrastination as the DV with TikTok Usage, Age, Gender, Nationality, and Education as IVs

Variable	Estimate	Std. Error	t Value	p Value	95% CI Lower	95% CI Upper
Intercept	2.05	0.71	2.89	0.006	0.62	3.48
TikTok Usage	0.27	0.09	2.90	0.006	0.09	0.45
Age	0.11	0.04	2.65	0.012	0.02	0.20
Gender (Male)	0.03	0.16	0.19	0.85	-0.29	0.35
Nationality (German)	0.21	0.15	1.43	0.16	-0.09	0.51
Education (HBO)	0.25	0.17	1.47	0.15	-0.09	0.59

Table F2

Stress as the DV with TikTok Usage, Procrastination, Age, Gender, Nationality, and Education as IVs

Variable	Estimate	Std.	t	p	95% CI	
		Error	Value	Value	Lower	Upper
Intercept	-1.04	1.00	-1.82	0.31	-3.52	0.20
TikTok Usage	0.37	0.10	3.56	0.001	0.16	0.58
Procrastination	0.75	0.15	4.91	< 0.001	0.45	1.05
Age	0.02	0.05	0.49	0.63	-0.04	0.13
Gender (Male)	-0.05	0.20	-0.24	0.81	-0.46	0.36
Nationality (German)	0.10	0.18	0.55	0.59	-0.25	0.45
Education (HBO)	0.25	0.20	1.24	0.22	-0.15	0.65

Appendix G

Figure G1

Residuals plot

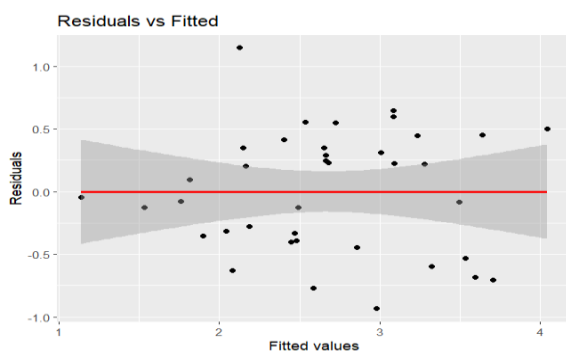
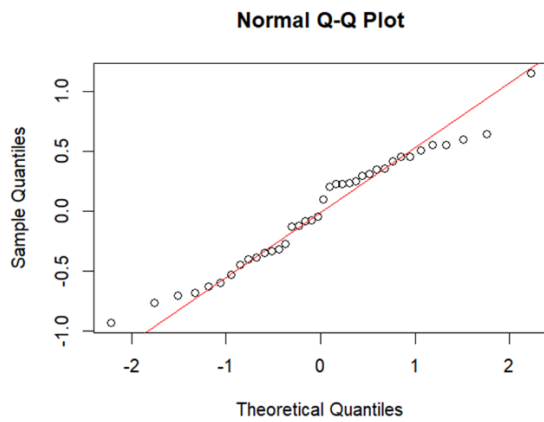


Figure G2

Normal plot



The plot of residuals against the predicted values (Figure 1) suggested no significant non-linearity, and the standard plot of residuals (Figure 2) suggested that the residuals were normally distributed. The outcomes of these tests justified the appropriateness of the regression models applied in the investigations. Therefore, this study's findings can affirm the postulates of both the exploratory variable TikTok usage to be positively linked with academic procrastination and stress and the mediating variable of procrastination in the relationship between TikTok usage and academic stress.