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Exploring the Association Between Social Media Disorder and Academic Procrastination of College Students: The Mediation Role of Intrusive Thinking and Fatigue

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ABSTRACT

The study aimed at exploring the relationship between social media disorder and academic procrastination, and to thereby investigate the mediating effects of intrusive thinking and fatigue. By enrolling 412 undergraduate college students in India, the interconnectedness of the four variables was investigated using Social Media Disorder scale by Choudhury et al. (2024), White Bear Suppression Inventory by Rassin (2003), Fatigue Assessment Scale by Michielsen et al. (2003) and Academic Procrastination Scale by Mccloskey and Scielzo (2015). The results disclosed: 1) A significant gender differences in the level of SMD; 2) Correlation

analysis displayed a significant positive correlation between the four variables; 3) The multiple mediating effect test results showed that SMD caused academic procrastination directly and indirectly through three pathways.

Keywords: Academic procrastination, fatigue, intrusive thinking, mediating effect, social media disorder.

INTRODUCTION

Internet and Social Media Usage

The internet has revolutionized the world and become an essential part of daily life due to its endless potential (Rahmani et al., 2022). With just a click, the use of internet has transformed the world in terms of information gathering and sharing, commercial prospects, communication, relationships, learning, socialization, purchasing, and even leisure time activities to name a few (AlMuammar et al., 2021). India is currently the world's second-largest internet user base and has a continually growing number of internet subscribers, with 692 million as of early 2024, which is almost half of its population (49.15%) (Times of India, 2024). However, according to *Digital 2024: India*, this number is much higher at 751.5 million internet users, or 52.4% of the country's population (*Digital, 2024*). Nevertheless, the amount of time spent on the internet by the users is extremely individualised (Joseph et al., 2021).

While some people are able to set limits on their internet usage which will not trigger behavioural, intellectual or physical distress, others find it challenging to do so. This term is called Internet Addiction (IA), and there have been a lot of discussions in its realm throughout the past years (Bay, 2023; Brendha & Mallikarjun, 2023; Chemnad et al., 2023). One of the primary reasons driving internet usage in India is the growing adoption of social media platforms. The term *'Social Media'* consists of a group of online platforms, including Facebook, WhatsApp, LinkedIn, Twitter, YouTube, and many more, where users share, communicate, express, and participate (Ahuja & Chadha, 2022; Duong, 2020; Hruska & Maresova, 2020; Madakam & Tripathi, 2021). According to Internet and Mobile Association of India (IAMAI), social media use ranks third (71%) among internet activities, closely behind communication (76%), and OTT platforms (86%). Early this year, *Digital 2024: India* disclosed that 61.5% of all internet users in India, regardless of age, handled at least one social networking platform, and 462 million people were active social media users, making up almost 32.2% of the population (*Digital 2024: India — DataReportal – Global Digital Insights*). This startling statistic emphasises the important role social media plays in the lives of Indians, especially for adolescents, who according to surveys are the most addicted (Kuss & Griffiths, 2017; Luttrell, 2021). This can lead into developing Social Media Disorder (SMD) that has a growing prevalence, yet its multifaceted

relationship with academic procrastination is scarcely explored in India. The existing research endeavours frequently concentrate on these two components separately, leaving a knowledge gap regarding the complex mechanisms and possible serial mediation effects involving intrusive thoughts and fatigue. Given the unique developmental vulnerabilities of adolescents and the academic demands that are common in India, where procrastination has a major impact on retention rates and academic success, closing this gap is imperative which this study aims.

What is Social Media Disorder?

The distinction between acceptable and harmful social media use has grown increasingly blurred in the eyes of many. The use of social media on a regular and sometimes obsessive basis can lead to the development of Social Media Disorder (SMD) which is *"a behavioural addiction, which refers to an individual's excessive attention and investment of time and energy in social media, driven by a strong motivation to use or log on to social media* (Schou Andreassen & Pallesen, 2014)." Common symptoms of SMD, also known as social media addiction, problematic social media use or social media overuse (Aladwani & Almarzouq, 2016; Kuss & Griffiths, 2017; Van den Eijnden et al., 2016), are enhanced feelings of sadness and anxiety, difficulty falling asleep, prioritizing online interactions over real life interactions, poor body image, and a decline in over satisfaction with life, other than an inability to limit the time spent on social media platforms (which is the hallmark sign) (*Social Media Disorder*, 2023). Also, the manifestations of SMD are similar to those of other behavioural addictions such as emotional instability, withdrawal, changes in mood, and tolerance to salience. Despite not being recognised as a medical condition by Diagnostic and Statistical Manual of Mental Disorders (DSM-5) or International Classification of Diseases ICD-11, SMD has a significant impact on one's behaviour and psychology, especially in adolescent populations.

Academic Procrastination

In recent years, there has been a growing correlation between Academic Procrastination (AP) and Social Media Disorder (SMD) in adolescents. Academic procrastination is defined *"as actively delaying or deferring work that must be performed in an academic setting* (Schraw et al., 2007)". It simply means putting off one's academic tasks until they become extremely anxious or uncomfortable (Rozgonjuk et al., 2018). Students' growing obsession with social media platforms can lead them spending excessive time posting, scrolling, and chatting—all of which can lead to postponing their academic tasks (Aalbers et al., 2022; Kirschner & Karpinski, 2010). The compulsive usage result in diminished self-control and poor time management abilities, both of which are critical for academic success (C.Yang et al., 2020; X.Yang et al., 2020). Additionally, students may find it challenging to concentrate on their academics due to an endless cycle of distraction

and procrastination brought on by the continual barrage of notifications and the fear of missing out (FOMO) connected with social media use (Rozgonjuk et al., 2020).

Mediating Role of Intrusive Thinking and Fatigue

The route through which SMD might lead to AP needs to be investigated inorder to gain a holistic understanding of the phenomenon. One such is intrusive thinking which is defined as *"repeatedly occurring, unwanted, and difficult to control thoughts that are generally accompanied by subjective discomfort* (Rachman, 1981)*."* They are involuntary, irregular and recurring thoughts that enter an individual's mind, triggering an array of adaptive problems and negative emotions, including anxiety, depression, and obsessive-compulsive disorder (OCD) (Julien et al., 2007). Since SMD exposes the users to a constant stream of information, notifications, entertainment and social comparisons, it might result in a cognitive overload. Because of this overstimulation, the mind is incapable of sifting through undesired and persistent thoughts, which can become intrusive (Meier et al., 2016). Also, students frequently feel restless and anxious when they are not using social media, which further exacerbates intrusive thinking (Hormes et al., 2014). It gets challenging for them to concentrate on academic assignments without being distracted due to the fragmented attention spans (McEvoy et al., 2010) which results in AP (Flett et al., 2012; Sirois & Pychyl, 2013).

Yet another mediating effect can be through fatigue which is defined as a subjective perception of physical exhaustion or a chronic state of tiredness, and encompasses the impact on one's physical, mental, and social well-being (Lai et al., 2011). The social media platforms maintain user engagement, which may result in hours of nonstop use (Montag et al., 2016) and constant processing of large amount of information leading overstimulation and mental fatigue (Hogan & Strasburger, 2018). In addition, the blue light emitted by screens throws off the body's natural circadian rhythm, resulting in a disruptive sleep pattern and thereby feeling of fatigue during the day (Fobian et al., 2016). According to a study carried out among university students in Morocco, those who were addicted to the Internet experienced higher degrees of mental and physical fatigue than those who were not (Bachleda & Darhiri, 2018). SMD, which is a subtype of IA, can have analogous consequences. Further, individuals with SMD constantly multitask between their phones and lectures that leads to fatigue and exhaustion (Stanley, 2021). As a result of all this, the academic performance of such students is directly affected by compromised cognitive abilities like memory, attention, and decision-making. Academic procrastination may also result from students delaying their work and instead choosing to engage in less cognitively demanding activities due to their lack of motivation and focus (DeArmond et al., 2014; Kandemir, 2014).Thus, given that SMD can lead to fatigue, and fatigue leads to procrastination, this pathway needs to be further examined.

Significance of the Study

As individuals become more immersed in the virtual world, the risk of developing SMD increases, highlighting the need to understand the factors that mediate its impact on vulnerable populations, such as college students. Specific developmental and emotional factors inherent to this stage of life, such as reward-seeking behaviour, peer pressure, FOMO, and heightened sensitivity to social validation, make them more susceptible to SMD. Furthermore, the emergence the SMD poses specific challenges in India, where social and familial expectations are frequently associated to academic achievement. Academic challenges play a big role in the alarmingly high dropout rates among Indian college students today, and academic procrastination is a major contributing factor to this problem (Perchinunno et al., 2021; Subedi, 2022). In India's cutthroat educational landscape, addressing procrastination is consequently essential to raising retention rates and guaranteeing academic success. To examine the direct and indirect effect Social Media Disorder (SMD) will pose on academic procrastination when intrusive thinking and fatigue are mediating factors. As a result of relevant literature, we propose the following hypothesis:

Hypothesis 1: Social Media Disorder is significantly related to academic procrastination
Hypothesis 2: Social Media Disorder is significantly related to intrusive thinking
Hypothesis 3: Social Media Disorder is significantly related to fatigue
Hypothesis 4: Intrusive thinking is significantly related to academic procrastination
Hypothesis 5: Fatigue is significantly related to academic procrastination
Hypothesis 6: Intrusive thinking is significantly related to fatigue
Hypothesis 7: Intrusive thinking and fatigue mediate the relationship between Social Media Disorder and academic procrastination

LITERATURE REVIEW

Theoretical Framework

The Dual Systems Model of Adolescent Risk-Taking and Temporal Motivation Theory (TMT) serve as the theoretical foundations for this investigation. The imbalance between the reward-sensitive limbic system and an underdeveloped cognitive control system throughout adolescence is highlighted by the Dual Systems Model (Steinberg, 2010), which explains why adolescents are more susceptible to SMD. This imbalance makes them extremely susceptible to compulsive engagement and intrusive thinking by amplifying reward-seeking behaviours like excessive social media use. Temporal Motivation Theory (Steel & König, 2006) offers a different viewpoint on academic procrastination by

suggesting that procrastination results from a preference for short-term benefits (like social media interactions) over long-term goals (like academic success), particularly when tasks are viewed as unpleasant or don't provide instant gratification. It integrates elements of numerous theories, including expectancy theory, cumulative prospect theory, need theory and hyperbolic discounting. By integrating these frameworks, the present study situates SMD and AP within a developmental and motivational context, accenting how intrusive thinking and fatigue mediate their interaction and cause maladaptive academic behaviours.

Adverse Effects of Academic Procrastination

Procrastination in educational setting is considered an increasingly common problem that has a detrimental impact on students' academic performance (Kim & Seo, 2015; Lakshminarayan et al., 2013). Research has demonstrated that apart from the lack of time management and self-regulation skills (caused from SMD), evaluation anxiety, the perception of the task as unpleasant, fear of the outcomes, low self-esteem, irrational beliefs, depression, anxiety, and perfectionism can all contribute to academic procrastination. It is obvious that SMD can be a root cause of developing these characteristics that ultimately leads to AP (Ferrari, 2010). Also, AP is frequently accompanied by fear and anxiety of examinations, poor preparedness, stress, absenteeism, examination failure, and dropping out (Bäulke et al., 2019; Bäulke & Dresel, 2023; Ferrari, 2010). As a matter of fact, researchers have disclosed that AP is the primary cause of students' failure (Schouwenburg, 1992). Students choose instant gratification that social media can offer which also outweighs the long-term benefits of academic commitment (Meier et al., 2016). Further, it is not just a behaviour that appears to be a barrier to students' academic success, but also lowers life satisfaction as it is associated with negative emotions like feeling of helplessness, increased stress reactions, and low self-esteem and confidence (Eerde, 2003; Moon & Illingworth, 2005).

SMD and Academic Procrastination

Students who spend a substantial amount of their time online, particularly on social media, struggle to complete their school work, carry out their daily obligations, and even meet their basic needs (Eksi et al., 2019; Yeboah & Ewur, 2014). In his research, Üztemur (2020) discovered that social media addiction is positively correlated with academic procrastination and negatively correlated with academic achievement. Similar empirical research has demonstrated a positive correlation between social media addiction and academic procrastination (Can & Zeren, 2019; Chandni et al., 2024; Eksi et al., 2019; Hinsch & Sheldon, 2013; Kaleem et al., 2023; Kandemir, 2014).

A study by Durdu (2019) with secondary school students revealed a positive correlation between the students' procrastinating behaviours and their attitudes towards Facebook. Furthermore, Gupta et al. (2024) conducted a study

with senior and senior secondary school students and discovered a positive correlation between academic procrastination and social media addiction. The study also disclosed that there was no significant difference with the level of procrastination between the two genders. However, Chen (2019) discovered in his study, that female students had a higher addiction to social networking than did their male counterparts which lead to more procrastination. Thus, a reservoir of studies indicate that abusive social media consumption is allied to higher academic procrastination and distraction, and thereby a decline in productivity, negatively impacting overall academic performance. However, few studies found that social media addiction did not have a direct positive effect on academic procrastination among students (Gustavson et al., 2015; Lam & Zhou, 2019; Yakut & Kuru Sönmez, 2020). Thus, we conclude that though majority of the literature point towards a positive correlation between SMD and AP, there is still a lack of consensus.

SMD and Intrusive Thinking

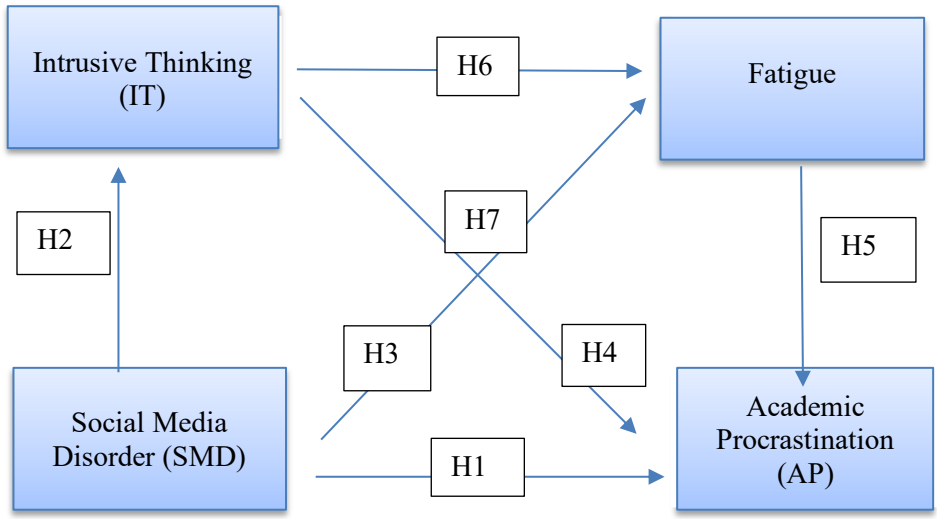
Intrusive thoughts were positively linked with problematic social media use, according to a study by Rozgonjuk et al. (2020) comprising 748 individuals. These intrusive thoughts frequently took the shape of recurring cravings to check social media, which caused cognitive distraction and made it difficult for the participants to concentrate on school work. Sohn et al. (2019) included 41 reviews in their systematic review and found that excessive social media use predicted greater levels of intrusive thoughts. The results implied that SMD might interfere with academic focus by generating a loop of obsessive checking and ruminating about social media activities.

SMD and Fatigue

In a study involving 2698 social media users, Dhir et al. (2018) discovered a substantial correlation between increased fatigue and obsessive social media use which decreased the students' ability to concentrate on their academic work. In a study conducted by Lian et al. (2018) on 1085 undergraduate students in China, a positive association between social network site addiction, fatigue, and unreasonable procrastination of academic chores was noted. When students are fatigued, their ability to concentrate on academic work is diminished, making it more difficult for them to start or complete assignments, said Okano et al. (2019). Additionally, a meta-analysis conducted by Marino et al. (2018) with data from 23 individual studies totaling 13,929 participants showed a strong positive connection between psychological distress and problematic social media use (r =.34, 95% CI [.28,.39]). The meta-analysis concluded that fatigue and cognitive overload were common signs of this over usage which might lead to AP.

Thus, the following research structural equation model (SEM) was developed considering the published literatures

Figure 1: Proposed SEM of the Study



Research Gap

Due to their significant free time availability, flexible schedules, and the need for regular use of the internet (often with little external regulation), college students (higher education) are more likely than other groups to develop SMD (Whelan et al., 2020). Despite the paucity of research on SMD in adolescents, it is a serious problem that requires urgent care (Ergun & Alkan, 2020). Furthermore, there is still a great deal to learn about the intricate mechanisms behind these interactions. Specifically, the majority of research has looked at these factors separately, falling short of offering a thorough model that incorporates SMD, AP, intrusive thinking, and fatigue. Moreover, not many studies have been done on the individual and combined effects of fatigue and intrusive thinking as mediators in this interaction.

RESEARCH METHOD

Sample and Study Area

The survey was undertaken in June and July, 2024 on 412 Undergraduate college students using convenient sampling across three states i.e. West Bengal (20%), Odissa (55%) and Jharkhand (25%). According to Fritz and MacKinnon (2007), a sample size of 400+ provides appropriate statistical power for detecting medium to small effect sizes for most statistical studies, including mediation models. The only two criteria for participation were a) they possess smartphones and b) users of social media platforms. The students' free time, including breaks between

lectures and after school hours was used to undertake the survey. Prior to providing the link to the survey, each participant was informed verbally that the survey was anonymous, they were under no obligation to fill it out, and their information would only be used for scientific research purposes. Following the participants' and their teachers' verbal consent, the link of the survey questionnaire was shared. Out of the 412 participants, 159 were males and 253 were females; and the average age of the participants was 21.5 years old, varying from 18 to 25 years.

Measurements

Social Media Disorder- The Social Media Disorder (SMD) scale validated in the Indian context by Choudhury et al. (2024) was employed . The original version by Van den Eijnden et al. (2016), was rooted in the diagnostic framework of Internet Gaming Disorder since both the constructs have similar dimensions. The validated scale comprises nine dimensions and 27 items. The reliability of the scale, indicated by the Cronbach's alpha coefficient α =0.945 ensures its consistency and validity in gauging SMD among the Indian population.

Intrusive Thinking- Developed by Rassin in 2003, the White Bear Suppression Inventory (WBSI) is a psychological scale intended to quantify an individual's propensity to conceal unpleasant thoughts. The 15 items make up three subscales: thought suppression (4 items), attention diversion (3 items), and intrusive thinking (IT) (8 items). Here, the IT subscale was used, and responses were recorded on a Likert scale of 1 to 5, with "strongly disagree" and "strongly agree" being the extremes. The scale has an internal consistency coefficient (α) of 0.87, which was re-examined in the Indian context (α=0.858) before adopting here.

Fatigue- To quantify fatigue, Michielsen et al. devised the Fatigue Assessment Scale (FAS) in 2003. Each of the ten items on the questionnaire has a 5-point Likert scale, with 1 denoting never to 5 denoting always. Higher scores on the test indicate higher levels of subjective fatigue. This self-reporting tool was adopted here by the investigators. Cronbach's alpha of the original scale was α =0.758; here, the researchers re-examined it in the Indian context and found α= 841, proving its suitability.

Academic Procrastination- Based on the theoretical foundation of procrastination as a self-regulation failure, the Academic Procrastination Scale was developed by Mccloskey and Scielzo (2015). It is made up of 25 items and is rated on a Likert-type scale of 1 to 5, with 1 denoting disagreement and 5 denoting agreement. The Cronbach's alpha coefficient of original scale α =.94 indicates strong internal consistency. When evaluated in the Indian setting, the Cronbach's alpha coefficient was 8.36, indicating that it is appropriate for measuring this construct in India.

Statistical Analysis

For statistical analysis, the SPSS software for Windows was used. Descriptive statistics examined the demographic factors, as well as the SMD, IT, fatigue, and AP scores. We used model seven of Dr. Andrew F. Hayes' PROCESS macro v4.0 for SPSS to evaluate the multiple mediation model (Hayes, 2017). This method is centred on the bias-corrected bootstrapping technique and ordinary least squares (OLS) regression. Hayes and the majority of mediation analysis experts have embraced the stance that says the mere correlation between dependent and independent variables is no longer a prerequisite for mediation analysis, and is neither a necessary nor sufficient condition of causation. Additionally, 10,000 bootstrap bias-corrected 95% confidence intervals *(BC CI)* have been suggested by Hayes (2017) as a gauge of indirect effect in place of ratio of the indirect effect to the total/direct effect. Further, if there isn't a zero, the indirect effect is deemed substantial because it is contained in the confidence intervals. In contrast to the traditional path analysis technique, like the Sobel approach, or Baron and Kenny's (1986), bias-corrected boot- strapping technique is more widely applicable based on the non- presumption of variable distribution and is applicable to both large and small sample sizes. Furthermore, the Hayes technique has the maximum statistical power in comparison to multiple other confidence interval analyses (MacKinnon et al., 2004). In our study, the independent variable was Social Media Disorder (SMD); Dependent variable was Academic Procrastination (AP); and the two mediating variables were intrusive thinking (IT) and fatigue.

RESULTS

1. **The Baseline Situation of Social Media Disorder (SMD), Fatigue, Intrusive Thinking (IT) and Academic Procrastination (AP) across Gender (demographic variables)**

Table 1: Comparison of Demographic Characteristics of all Variables (M ±SD) by t-test (*N*=412)

Variables	Male (n=159)	Female (n=253)	t
SMD	67.14±20.756	61.60±19.550	2.734**
Fatigue	24.77±7.019	24.73±7.458	.057
IT	21.91±6.277	22.49 ± 6.646	-.882
AP	58.77± 11.678	59.81 ± 11.076	-.915

Note. SMD= Social Media Disorder, *AP*= Academic Procrastination and *IT*= Intrusive Thinking; **p < 0.01.

The result displayed in Table 1 compares the mean scores of the demographic characteristic gender across all the four variables. The t-test result indicates a statistically significant difference in SMD scores between both the genders with males (M = 67.14, SD = 20.756) scoring higher than females (M = 61.60, SD = 19.550) with a t-value of 2.734 which meets the $p < 0.01$ threshold value. This means males in this sample might experience more SMD symptoms compared to the females. For the variable fatigue, the mean scores for males (M = 24.77, SD = 7.019) and females (M = 24.73, SD = 7.458) are almost similar with a t-value of 0.057 and was not statistically significant. This means both the genders reported similar levels of fatigue. Similarly, for IT, the scores for males (M = 21.91, SD = 6.277) and females (M = 22.49, SD = 6.646) do not differ significantly, as reflected by $p > 0.01$. Thus, indicating that IT might affect both the genders similarly in this context. Lastly, the difference in AP between males (M = 58.77, SD = 11.678) and females (M = 59.81, SD = 11.076) yielded non-significant p value. This explains that the tendency to procrastinate are similar between both the genders in the sample. On the whole, the only significant difference was observed in SMD among the two genders, where males reported higher levels than females.

2. Correlation Analysis

Table 2: Correlation Matrix Between Social Media Disorder (SMD), Fatigue, Intrusive Thinking (IT) and Academic Procrastination (AP) (*N*=412)

Variables	M ± SD	SMD	Fatigue	IT
SMD	63.74 ± 20.180	-		
Fatigue	24.75 ± 7.283	.477**	-	
IT	22.26 ± 6.504	.472**	.426**	-
AP	59.41 ± 11.310	.375**	.338**	.459**

Note. **p < 0.01.

The correlation matrix in Table 2 explores the relationships between the four variables under examination. The results highlight several significant correlations among these variables. Looking at SMD with a mean score of 63.74 (SD = 20.180), it shows a positive and statistically significant correlation with fatigue ($r = 0.477$, $p < 0.01$), indicating that higher levels of SMD are associated with higher feelings of fatigue. SMD also has a positive and significant correlation with IT ($r = .472$, $p < 0.01$), suggesting that individuals who experience higher SMD tend to have more IT. Additionally, SMD is positively correlated with academic procrastination and is statistically significant ($r = .375$, $p < 0.01$), meaning that higher SMD is linked

to higher levels of procrastination of academic tasks. As for fatigue, with a mean score of 24.75 (SD= 7.283), there is a positive and statistically significant correlation with IT ($r = .426$, $p < 0.01$), implying that individuals who are more fatigued are likely to experience more IT. Likewise, fatigue also has a positive and statistically significant correlation with academic procrastination ($r = .338$, $p < 0.01$), indicating that higher fatigue levels are associated with higher levels of academic procrastination. Intrusive thinking, which has a mean score of 22.26 (SD = 6.504), has a positive and statistically significant correlation with academic procrastination ($r = .459$, $p < 0.01$), suggesting that higher levels of IT are related to higher levels of academic procrastination. On the whole, Table 2 reveals positive and significant relationships among the four variables i.e., higher levels of social media disorder, fatigue, and intrusive thinking are associated with higher levels of academic procrastination. The strongest correlations are observed between SMD and IT, & SMD and fatigue, showcasing the strength of the interconnection. These results provided the basis for undertaking mediation analysis.

3. Mediation Effect Test Across Three Models

Regression analysis approximates the relationship between a dependent variable (AP) and one or more independent variables (here, SMD, IT and fatigue) and it can help identify predictive relationships. When this is followed by mediation analysis (a form of regression analysis), the causal relationship between the independent variables and the dependent variable are established. Thus, when a significant mediation effect is obtained, it supports the case for a causal mechanism. Table 3 showcases the regression analysis for a mediation model assessing the relationship between SMD, IT, fatigue, and AP. Three models are used to show the effects of the variables.

Table 3: Regression Analysis of Variable Relationships in the Mediation Model (*N*=412)

Variable	B	Std. Error	R	R^2	F	β	t	Sig.
				Model 1				
SMD	.152	.014	.4721	.2229	117.592	.4721	10.844	.000
Dependent Variable: IT								
				Model 2				
SMD	.128	.017	.5282	.2790	79.1275	.3547	7.4482	.000
IT	.289	.053				.2582	5.8208	.000
Dependent Variable: Fatigue								

				Model 3				
SMD	.0902	.0290	.5031	.2531	46.0833	.1609	3.1103	.002
IT	.5763	.0874				.3314	6.5959	.000
Fatigue	.1872	.0782				.1205	2.3918	.017
Dependent Variable: AP								

Note. All the four variables were standardized in the model before being adopted into the equation

In model 1, the relationship between SMD and IT was examined. The results indicate that SMD significantly predicts IT, with a positive coefficient of 0.4721 and significant p value of < 0.001. The R-squared value of 0.2229 suggests that SMD accounts to approximately 22.29% of the variance in IT. Thus, this suggests that higher levels of SMD are associated with increased IT.

In model 2, both SMD and IT were assessed for their influence on fatigue. The results show that SMD and IT together explain 27.90% of the variance caused in fatigue and the model is statistically significant ($p < 0.001$) for both. Looking at each variable, SMD has a positive and significant effect on fatigue ($\beta = .3547$) with a high t-value of 7.4482. Likewise, it is also evident that IT positively and significant predicts fatigue ($\beta = .2582$) with a high t value of 5.8208.

The model 3 examines the relationship of SMD, IT, and fatigue on AP. The R-squared value of 0.2531 explains 25.31% of the variance caused on AP by the three variables. SMD has a significant positive effect on AP ($\beta = .1609$, $p=0.002$) with a t-value of 3.1103, indicating that higher levels of SMD are associated with increased AP. Similarly, IT has a strong and significant impact on AP ($\beta = .3314$, $p <0.001$) with a t-value of 6. 5959, suggesting that as IT increases, so will AP. Likewise, fatigue also displays a significant positive impact on AP ($\beta = .1205$, $p=0.017$) with a t-value of 2.3918. This implies that increased fatigue is associated with increased AP.

4. Mediation Effect Test

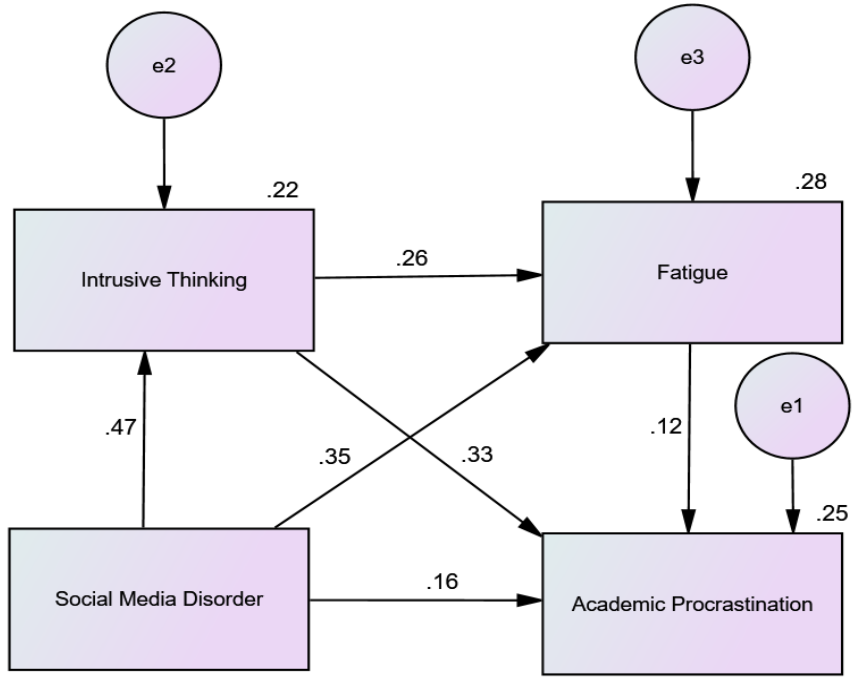
The results as displayed in Table 4 show that the total effect of SMD on AP is 0.2100 and is significant with BootStrap 95% CI (.1596, .2605). Further, the direct effect of SMD on AP is 0.0902 and is significant with BootStrap 95% CI (.0332, .1471), which simply means that SMD still has a direct influence on AP even when considering the mediators. Looking at the total indirect effect (0.1199), which is again significant, IT and fatigue have a significant mediating effect between SMD and AP, with an effect of 0.1199. It suggests that the relationship between SMD and AP is influenced through one or more intervening variables, which are likely the mediators.

Precisely, the mediating effect was created through three mediating chains: First, the indirect effect 1 which is SMD→ IT→AP (0.087) consisting of intrusive thinking as the mediating factor and the Bootstrap 95% CI (0.0571, 0.1217) did

Table 4: Mediation Effect Test Results (*N*=412)

Path Between Variables	Effect Size	Bootstrap SE	Bootstrap (95% CI)
Total effect	.2100	.0257	[.1596, .2605]
Direct effects	.0902	.0290	[.0332, .1471]
Total indirect effect	.1199	.0190	[.0839, .1589]
Indirect effects1 (SMD→IT→AP)	.0877	.0168	[.0571, .1217]
Indirect effects 2 (SMD→ Fatigue→ AP)	.0240	.0113	[.0044, .0482]
Indirect effects 3 (SMD→ IT → Fatigue→ AP)	.0082	.0042	[.0015, .0175]

Figure 2: Diagram of Multiple Mediation Model



not contain 0, indicating that intrusive thinking significantly mediates the relationship between SMD and AP; Second, the indirect effect 2 which is SMD→ Fatigue→ AP (0.024) composed fatigue as the mediating factor and the Bootstrap 95% CI (0.0044, 0.0482) did not include 0, indicating that fatigue significantly

mediates the relationship between SMD and AP; Third, the indirect effect 3 which is SMD→ IT→Fatigue→AP (0.008), and the Bootstrap 95% CI (0.0015, 0.0175) did not contain 0, indicating that both IT and fatigue had a significant mediating effect. Here, it is evident that IT has a stronger indirect effect than fatigue. Also, the serial mediation path as displayed as SMD→ IT → Fatigue→ AP is significant, translating that SMD can lead to an increase in IT, which in turn will increase fatigue and eventually cause academic procrastination. Both parallel and serial mediation are visible.

DISCUSSION AND CONCLUSIONS

The present study aimed to explore the intricate relationship between SMD and AP in college students while focusing on the mediating roles played by intrusive thinking and fatigue. Based on the findings from correlation, regression, and mediation analysis, multiple valuable insights on how the four variables interact have been witnessed. This confirms several of the hypotheses proposed at the beginning of the study and the key findings are discussed here:

The findings align with Hypothesis 1, which proposed *a significant relationship between SMD and AP* (Table 2 & 3). The results of correlation and regression analyses indicate that students with greater levels of SMD are more likely to put off completing academic tasks. The current internet and social media era, where a lot of information is obtained from, are designed to be engaging and captivating. The majority of students procrastinate starting and finishing academic tasks and studying for examinations because they get carried away, are easily distracted, and have poor time management skills. This result supports previous research by Anierobi et al. (2021), Hayat et al. (2020), Nwosu et al. (2020), and Üztemur (2020). However, this result differs from the results disseminated from the studies undertaken by Yakut and Kuru Sönmez (2020) and Gustavson et al. (2015), which stated that there was no relationship between the two variables. This divergence may stem from our focus on Indian adolescents, whose academic and social environments vary significantly from western contexts.

Hypotheses 2 and 3 are also confirmed by the results which showed *significant correlations between SMD and the two mediating variables i.e. IT and fatigue* (Table 2 & 3). SMD is a strong predictor of both IT and fatigue, according to the regression analysis. This research emphasises the negative psychological and cognitive effects of excessive social media use, as students encounter unwelcome and persistent thoughts in addition to physical and mental fatigue. The findings align with earlier investigations, including those conducted by Dhir et al. (2018), Lian et al. (2018), Okano et al. (2019), Rozgonjuk et al. (2018), and Sohn et al. (2019).

Similarly, Hypotheses 4 and 5, which proposed *a significant relationship between fatigue and intrusive thinking with academic procrastination* has been supported (Table 3). Students who experience intrusive thinking find it difficult to concentrate and interact with academic material, and fatigue lowers their motivation and cognitive capacity, both of which lead to procrastination**.** The results are aligned with the studies of DeArmond et al. (2014) and Rebetez et al. (2018). However, the results differ from the findings of Ben Alaya et al. (2021) and Steel (2007) which again can be attributed to cultural and contextual differences, as this study focusses on Indian students who are faced with distinct academic constraints and cultural expectations that magnify the significance of intrusive thought in procrastination. Furthermore, methodological changes, such as the use of context-specific tools here, could have resulted in a more nuanced understanding of this link.

Additionally, hypothesis 6 was also validated, since the findings indicated *a strong positive correlation between IT and fatigue*. This implies that fatigue may be exacerbated by the cognitive strain that intrusive thoughts entail. It might result from the energy needed to deal with the bothersome thoughts that deplete cognitive reserves. In addition, the emotional anguish brought on by intrusive thoughts—such as worry or anxiety—can intensify the tiredness that students are experiencing and make it more difficult for them to focus on their educational responsibilities. This result is similar to the study by Papageorgiou and Wells (2003), and Sullivan et al. (2020). Lastly, Hypothesis 7 that stated *intrusive thinking and fatigue mediate the relationship between SMD and AP* has also been accepted (Table 4). This suggests that SMD influences intrusive thinking and fatigue, which in turn cause academic procrastination both directly and indirectly. The multiple mediating effect test showed SMD affects AP through two independent pathways and one serial pathway. The investigators know of no similar research that has been done earlier employing these two mediating factors. By underlining these mediating mechanisms, this study presents novel insights into how SMD impacts academic behaviours, thereby tackling a critical literature gap.

This study offers insights that are especially relevant to Indian students by examining the mediating roles of intrusive thinking and fatigue between social media disorder and academic procrastination. This research adds richness to our knowledge of the ways in which social media over use affects learning outcomes, and will assist educators, parents and policymakers in creating focused interventions to reduce the academic risks associated with it.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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