Weak Self-Regulation Skills and Its Impact on Technology Addiction and Adolescents' Academic Procrastination

Mahathi Srivatsan

Abstract

This research paper explores the relationship between technology use and its influence on academic procrastination among adolescents. The study delves into the psychological impacts of technology-driven procrastination, shedding light on how constant connectivity and digital distractions contribute to heightened stress, reduced self-regulation, and diminished focus. By analyzing the effects of technology-related procrastination, the paper highlights the subsequent decline in academic performance, revealing a direct correlation between increased screen time and decreased productivity. Additionally, the paper investigates the underlying behavioral mechanisms that link technology use to procrastination tendencies, offering insights into the role of instant gratification. Through a comprehensive examination of technology's impact on adolescents, this paper emphasizes the urgent need for strategies to mitigate the negative consequences of excessive digital engagement on academic success and overall well-being.

Keywords: academic procrastination, adolescent, internet, social media, technology, anxiety, stress, executive functioning, self-regulation

Around 83% of secondary school students procrastinate more than an hour daily (Klassen & Kuzucu, 2009). Academic procrastination is the act of intentionally delaying an academic task unnecessarily, mostly due to negative feelings surrounding the academic task (e.g., stress; Xu, 2021). Adolescents procrastinate more when they find a task to be difficult or boring and also put off tasks that are easier because they find the task not to be worth the effort (Nordby et al. 2017). Most of the time, this, unfortunately, leads to stress again, as there is less time to complete the task after putting it off. According to an old study, most students who procrastinate feel more anxiety than those who do not (Ferrari, Johnson, & McCown, 1995). This feeling of stress may then stir up avoidance again and encourage adolescents to procrastinate. There are many ways to procrastinate, but adolescents favor using technology (the internet and social media) more to delay doing their academic tasks. Recently, adolescents aged 13-17 are particularly heavy social media users, with 87% having access to a computer (Lenhart, 2015). Research has also indicated a link between social media use and psychological problems. A systematic review of 11 studies measuring social media use and depressive symptoms in children and adolescents showed a small but statistically significant positive relationship (McCrae, Gettings, & Purssell, 2017). A meta-analysis of 23 studies also showed a positive correlation between problematic Facebook use and psychological distress in adolescents and young adults (Marino, Claudia, et al. 2018). Previous articles have focused on the relationship between technology and adolescent procrastination and also how self-regulation impacts procrastination, but there is a lack of articles exploring the link between all three topics. Therefore, the question proposed in this paper is: Do weak self-regulation skills further impact

excessive technology use among adolescents, impacting their academic procrastination habits, and contributing to its related symptoms?

Self-regulation and Its Effect on Procrastination

Self-regulation is the ability to control one's thoughts and actions when reacting to certain situations and external factors (Casey, 2020). This includes controlling one's emotions and actions in certain situations. Self-regulation is a continuous process that grows through the active monitoring of behavior and actions. Self-regulation involves a multitude of different skills, such as focus, being able to limit and ignore distractions, and effectively following instructions. (Gestsdottir & Lerner, 2008) There are different forms of self-regulation, including behavioral and emotional self-regulation. Behavioral regulation is being able to manage one's behavior and actions in certain situations. It also includes being able to not rely on activities that make one feel bad to avoid a task one needs to do or an emotion one feels, such as drinking to avoid feeling negative emotions or watching excessive amounts of TV to procrastinate on an assignment (Berkley Well Being Institute). Emotional self-regulation is “a person’s ability to effectively manage and respond to an emotional experience” (Rolston & Lloyd-Richardson, 2017). Everyone goes through emotional experiences, but emotional regulation is an important skill to have to healthily deal with particular situations. People use various emotional regulation strategies to help them cope with an emotional event. Poor emotional regulation also includes but is not limited to, goal setting, time management, and self-control. Academic procrastination is the avoidance of doing a certain task and postponing the task for a while by using other means of distraction in some cases. This shows poor time management issues and a lack of self-control (Center on the Developing Child at Harvard University, 2020).

Table 1, Healthy vs. Unhealthy Emotional Regulation Coping Strategies (Examples taken from Cornell’s Research Program on Self-Injury and Recovery)

Healthy Emotional Regulation Strategies	**Unhealthy Emotional Regulation Strategies**
Mindfulness- Helps to overcome rumination over event and automatic negative thoughts because of the event. [Automatic Negative Thoughts, also known as ANT, are thoughts that are negative, unrealistic thoughts based on a previous event. Such as saying, “I’m a terrible student, I will not get into college,” after failing a single history test. These are negative over-exaggerations of the event and tend to negatively “predict” the future. Mindfulness encourages individuals to focus on understanding one’s triggers, and emotions, and how to respond to them effectively. In turn, it helps individuals to evaluate how their negative thoughts encourage them to view the event as negative. By instead, of shifting their	Self-injury- This form of emotional regulation usually arises after feelings of negative self-worth, guilt, etc. It is unhealthy since it could leave permanent impressions on people. It is only a short-term solution and usually ends up making people feel worse.

thoughts to be more positive through reevaluating, it helps to reframe the event in a more positive light.	
Talking with a trusted friend or therapist- Talking with someone, especially a trusted person or a qualified professional, can help individuals effectively deal with emotional events. Therapists can talk through certain feelings and help individuals come up with coping strategies to better manage one's emotions during this time.	Avoid the situation- Taking a moment to step away from the situation and process emotions that arise is okay. However, completely avoiding the event is harmful most of the time. Avoiding the situation most of the time entails disregarding the feelings tied to the situation. Consequently, the feelings aren't dealt with healthily and just stay there, which can build negative feelings towards the event over time.
Journaling- Journaling is a wonderful way to process emotions independently and think about how the event impacted them, as well as how they responded or plan to respond. It can also be helpful in reframing ANTs by answering journaling prompts, which are questions that reframe the event to better process one's feelings.	Excessive Social Media Usage- When individuals use social media excessively, they tend to ignore their other daily responsibilities. The individual is also not processing the emotions they feel in a healthy way, and instead using distractions to not feel it.

Executive functioning and self-regulation run parallel to each other. Executive functioning relates more to the self-control and focus exhibited when completing tasks, whereas self-regulation is more general self-control of thoughts, emotions, and actions. However, both depend heavily on each other.

Executive Functioning

Executive functioning is a group of skills that helps us self-regulate in order to set goals, and plan and carry out tasks efficiently (Australian Education Research Organisation, 2021). Executive functioning allows us to multitask, focus, and exert self-control. These skills are something that we are not born with but can develop over the years, especially in our younger ages. There are many skills involved in executive functioning, such as organizing and finishing tasks. However, failing to do the aforementioned shows challenges within executive functioning (Center on the Developing Child at Harvard University, 2020). These include having trouble managing time and finishing tasks that have been started, which are common in procrastination. Executive functioning has a direct link to procrastination. A past study found that procrastinators show lower levels of executive functioning skills than non-procrastinators do. They do not have as developed executive functioning skills like planning and goal setting, both of which are

beneficial (Gustavson et al., 2014). If one has never learned the skills to deal with huge emotional problems or situations, they would want the quickest fix to their problem. To deal with tasks that cause unpleasant feelings, one wants a quick fix to temporarily get rid of that negative emotion because they are unprepared to deal with it, and that is where procrastination comes into play.

Executive Functioning and Adolescents

The prefrontal cortex is the part of the brain responsible for executive functions and self-regulation. The prefrontal cortex does not fully develop until around the age of 25 years old (Arain, Mariam., et al., 2013). Therefore, adolescents do not have a fully developed pre-frontal cortex, leading to inefficient executive functioning skills. Executive functioning skills, such as motivational skills and emotional skills, also tend to develop later during adolescence. Proper emotional skills are needed to successfully plan and complete tasks, and not avoid doing them (Arain; et al, 2013). The prefrontal cortex also deals with managing emotions, which is why the stress before doing a task may be felt more strongly as an adolescent. This strong feeling of stress can lead to putting off the task, furthering the cycle of academic procrastination.

Academic Procrastination and Its Psychological Symptoms

The cycle of academic procrastination is difficult to break, and once someone decides to procrastinate, it is hard to stop. The first step in the cycle is feeling overwhelmed or stressed by the academic task at hand. This then causes adolescents, in this case, to delay or postpone the task in an attempt to avoid completing it. (Sirois, & Pychyl, 2016). To get a diversion from the task, they knowingly and sometimes unknowingly use technology because they receive instant satisfaction from it. Technology use has been linked to a decrease in delaying gratification and a reliance on instant gratification (Wilmer, Henry H., et al., 2017). Notifications and constant signals and signs of phones being near us have made it so that we are constantly aware of their presence, and we have the desire to use them. We crave the gratification we get from constantly using our phones, and when we use the phone when we immediately want to, it provides a greater sense of gratification (Alsop, 2014). This sense of immediate gratification is damaging to our reward and habit system. Because of this use of technology, we find tasks too overwhelming or too easy (Wilmer, Henry, et al., 2017). The tasks do not seem to hold the student's attention as well as technology does. Afterward, when it comes closer to the time the task has to be completed, there is a feeling of guilt and worry. The task has not been completed yet, and when the student rushes to complete it, there is a feeling of more stress. The student feels relieved because they completed the assignment on time. They think they are rewarded for this behavior because there are no long-term consequences for starting their task late. So the cycle begins again.

2.1.1 What Specific Symptoms Are Caused by Academic Procrastination?

Going through this cycle of academic procrastination can lead to multiple symptoms, such as anxiety and depression. Anxiety often arises from feeling overwhelmed by the academic task at hand. There is a feeling of not knowing how to do the task or thinking one cannot do it. This leads to feelings of doubt and anxiety (Sirois, 2013). Tasks can also be put off because of perfectionism, and this can also cause anxiety (Sederlund, Allison P., et al., 2020). Perfectionism is when someone wants the result of their work to be perfect or flawless; sometimes they want no mistakes in their work. When adolescents are overwhelmed and doubt their ability to make their work flawless, they put off starting. This makes them feel anxious as the deadline approaches. However, according to a study that examined both procrastination and perfectionism, the relationship between them depends on a variety of factors including the type

of procrastination being considered and the type of perfectionism being considered (Brignardello, Marcela Paz González, et al., 2023). There are two types of procrastination that are vital in examining this claim, passive and active procrastination. Active procrastination involves purposefully delaying actions to leverage the pressure of impending deadlines as motivation for productivity, often resulting in positive outcomes like enhanced academic achievement. In contrast, passive procrastination, on the other hand, stems from an inability to act promptly, leading to negative consequences such as diminished performance and heightened stress. In situations involving procrastination, and perfectionism, there is a correlation to passive procrastination, due to the inability to act (Choi, 2005). The type of perfectionism also plays a significant role and further complicates this relationship. Adaptive perfectionism, which is when a person sets high standards without fostering harsh self-criticism, is vastly different from maladaptive perfectionism which is when unrealistically high standards are set, and harsh self-criticism is felt (Bieling, Israeli, & Antony, 2004).This relationship between perfectionism and procrastination is not simple, and has many facets, such as type of procrastination, and type of perfectionism, etc. Knowing this helps to more comprehensively understand the link between academic procrastination and its various symptoms and acknowledge that this relationship has many factors that still have to be explored to their full extent.

How the Internet Negatively Affects Academic Procrastination

As mentioned earlier, overuse of technology has various negative impacts on the psychological symptoms of adolescents. When adolescents constantly rely on technology to escape the overwhelming nature of academic tasks, instead of building a habit where an individual consistently works, they build a habit of using technology. This can eventually turn into using technology whenever faced with a difficult task. making it difficult to finish the task. People develop habits related to their media use as their self-regulation habits decrease. This happens as their media consumption becomes more frequent and automatic and less susceptible to self-control (Du, Jie, et al., 2018). According to a study on the impact of social media on the mental health of adolescents, researchers found that 11% of participants were significantly addicted to social media (Ciacchini et al., 2023) The prefrontal cortex, which handles executive functioning and self-regulation skills, also deals with problem-solving and thinking through the consequences of one's actions. This is especially noteworthy with procrastination, because adolescents who procrastinate don’t think through the long-term consequences of procrastination (Crossfield, 2020). When they don’t think through their actions, this leads to more guilt and procrastination down the road, which becomes a never-ending cycle (Fiore, 2007). Adolescents use technology, especially social media, to avoid tasks, due to it being an easy distraction. This shows diminished self-regulation as they are distracting themself from the emotions they feel when a task arises. According to a study conducted by undergraduate students, procrastination tendencies increase when self-regulation skills concerned with online learning decrease (Karakaya Özyer & Altınsoy, 2023). This study also proposed that self-regulated learning skills were a mediator between increased internet use and academic procrastination. The increased gratification and constant stimuli that the internet provides lead to reduced self-control, and this causes over-dependency on the internet, which leads to further procrastination on academic tasks.

Operant conditioning also plays a heavy role in the correlation between technology use and academic procrastination. Operant conditioning is a method of learning where certain rewards and punishments are employed for certain behaviors (Karakaya Özyer, & Altınsoy,

2023). Our brain makes an association between a behavior and a positive or negative consequence for that behavior that we face. Operant conditioning is shaped by the learning we do in our natural environments every day. In terms of academic procrastination and the internet, as previously mentioned, internet use gives immediate rewards. When individuals engage in scrolling on social media, they experience a continuous influx of videos. Each time another video pops up when they scroll, they feel a sense of accomplishment. This feeling of small accomplishment comes from the new information, updates, and new content they get. This increases dopamine, a feel-good chemical released by our brain that is associated with rewards. This chemical, dopamine, signals to our brain that we need to satisfy or reinforce this feeling next time by replicating this positive experience (i.e., doing an activity similar to scrolling). This cycle of motivation, reward, and reinforcement is known as the “dopamine loop” (Wahome, 2023). This encourages us to keep on doing the thing that positively reinforces our ‘feel good’ feeling or dopamine. This eventually leads to less time spent on other activities because our brain is so focused on getting this reward by scrolling in this case. When less and less time is spent on other activities and on relationships, that can lead to decreased grades, relationship strains, etc. To get away from that bad feeling, people naturally use social media scrolling to experience that ‘feel good’ feeling back again, further procrastinating or delaying their tasks and relationships. Therefore, by the articles explored in this paper, the link between the internet and academic procrastination seems to have a negative correlation. The link between int

In general, this paper aims to summarize the information surrounding academic procrastination within adolescents, executive functioning, and the internet. According to other researchers, stress leads to procrastination, which leads to relying on devices as a distraction. Using technology can negatively impact procrastination, again repeating the cycle. Academic procrastination can stem from not having proper self-regulation or executive functioning skills. As mentioned earlier, in adolescents, the lack of executive functioning is more apparent due to the underdevelopment of the prefrontal cortex, or the part of the brain that controls executive functioning-related skills. Not all adolescents have this tendency to procrastinate. By slowly building good academic habits that support good executive functioning, such as managing time, setting goals, and immediately finishing tasks, procrastination can be combatted.

Results & Discussion

Due to failure of executive functioning skills or an unwillingness to complete a certain task due to stress or other reasons, adolescents procrastinate. Sometimes they procrastinate because technology grabs their attention more than their tasks do. Adolescents spend a lot of time on technology (social media and the internet every day). The technology is instantly gratifying, an easy distraction, and extremely addictive, and the notifications build a habit of checking it at all times (Siebers et al., 2022). This may also lead adolescents to procrastinate on tasks such as schoolwork.

Academic procrastination can be a very overwhelming topic to deal with. There are multiple reasons for not wanting to start a task and multiple consequences for not starting it. To avoid these consequences, here are ways to overcome procrastination or just certain challenging aspects of it. One common way is known as just starting the task. This seems counterintuitive, as the student doesn’t want to start the task in the first place. But, this is known as The Zeigarnik Effect (Zeigarnik, 1938). When anyone starts working on a task, and they don’t complete it, the assignment keeps coming back to their memory. They keep thinking about it and how they never finished the task. Eventually, they have no choice but to finish the assignment. How does this work? Short-term memory is fickle. There is only so much

information adolescent brains in general can remember. Through repeated revision, the information can stay in our brain but it takes a lot of time and effort. The Zeigarnik Effect is one trick our brain uses to help us remember more in our short-term memory. Some researchers attribute this to the fact that the brain feels cognitive tension when a task is not completed. Incomplete tasks make the brain confused, as the brain wants to complete the task but the task is not finished yet (Seifert, & Patalano, 1991). The person is not currently doing the task but is thinking about finishing it. Because the brain feels discomfort, this causes the brain to push the activity to the front of the person's mind so that they remember to finish the task. Because this activity is continually pushed to the forefront of the brain, it makes the person realize they need to take action toward finishing the task. This is so they can get rid of their cognitive tension and their brain constantly trying to remind them of the unfinished task. So, because of this effect, most of the time a task that is unfinished midway will eventually be finished quicker.

The other way, proposed in this paper is a multi-step process that helps to combat and overcome the urge to procrastinate. First, one should write down immediate tasks that need to be done. They should make sure not to pile a bunch of tasks, and keep them to a reasonable amount, around 2-5 tasks. The next part is to split the task one needs to do into small, detailed, actionable tasks. The amount of actionable tasks can be modified per person. Some people prefer very detailed steps to do the task well and not get confused. Others prefer a looser breakdown, so they are not overwhelmed. Then they should delegate a deadline to get chunks of the task done, which is a good amount of time before the actual deadline. One should make sure this deadline is enough time to complete the task or chunks of it, but should not heavily underestimate or overestimate the time it takes to complete the task. This is because of a law known as Parkinson's Law which states that work expands to fill in its allotted time (Shantz, 2008). Why is this the case? When one has a deadline that is a good amount of time away and one's task does not take too much time, they know that there is more than enough time for them to do the task. So they just procrastinate the task knowing that there is time later to do it. However, when they can trick their brain into accepting an earlier deadline, they finish the task earlier. This gives them enough time to review the job they did on their task and whether they have to fix anything. If proposing a new deadline does not help, they should set a timer with the allotted time for the task or a chunk of the task. Doing these two steps together helps them not feel overwhelmed by the entire task at hand and also helps them complete it a good amount of time before the task's deadline.

Conclusion

Academic procrastination is a habit that affects many adolescents in this day and age and tends to cause negative psychological symptoms within adolescents. Among the various factors that have increased procrastination, increased use of technology has made procrastination more prevalent among adolescents (Karakaya Özyer, & Altınsoy, 2023). Furthermore, the cause of the cycle of technology and academic procrastination is a lack of self-regulation further weakened by technology.

Strategies, like the one suggested in this paper, can be used to lessen the effects of procrastination. For example, setting a deadline to complete the task beforehand is beneficial due to Parkinson's law, as discussed earlier. By doing this, the time allotted to complete the task is shorter, but still enough time to efficiently finish the task.

Limitations include the lack of articles surrounding the interaction between academic procrastination in adolescents in technology, especially in the US. Future research should aim to consider more of how location and cultural differences affect the link between academic

procrastination in adolescents and technology. Furthermore, additional strategies concerning limiting procrastination among adolescents should be developed.

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