

Exploring the Complex Interplay of Procrastination between Biological, Cognitive, Developmental, Social, and Psychological Factors

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Abstract. Procrastination is a common behavior that affects individuals in various aspects of life, with persistent procrastination having cumulative negative impacts. Through a literature review, a sizable percentage of adults worldwide are chronic procrastinators, which increases their chance of suffering from mental conditions, including melancholy, anxiety, depression, and low self-confidence. On top of these detrimental effects on people's mental well-being, procrastination has been shown to negatively impact one's physical health, social interactions, and productivity. This paper investigates the complex interplay between biological, cognitive, developmental, social, and psychological factors in procrastination. The main findings of this review paper were: 1) Biological and cognitive factors play a significant role in procrastination behavior, 2) Procrastination affects performance in various domains, including the workplace, academic, and social spheres, and 3) Utilizing modern technologies such as brain imaging and sentiment analysis can enhance our understanding of procrastination and its effects across different demographics. Future studies in this area can gain insight into the underlying mechanisms and a more thorough understanding of procrastination's manifestations and effects across different demographics. By doing this, psychologists can create more potent interventions and ways to lessen procrastination's many detrimental effects, enhancing people's quality of life in the academic, professional, and personal domains. Understanding and addressing procrastination is crucial, given its far-reaching impacts and prevalence in modern society.

Keywords: Procrastination; Domains; Effects; Correlation; Future Implications.

1. Introduction

The act of procrastination is a common experience that most people have grappled with at some point in their lives. However, it's worth delving into how and why this tendency affects individuals. While procrastination may not be a significant concern for some, for others, it can have adverse effects. Procrastination is a behavior that results from a lack of self-control that favors immediate rewards rather than benefits in the long run. Around a quarter of adults worldwide indulge in chronic, long-term procrastination, which leads to a variety of detrimental mental effects and symptoms. This includes low self-esteem, anxiety, ADHD, and even severe depression [1]. While occasional procrastination is a common experience, persistent and chronic procrastination should not be taken lightly, as it can significantly impact one's overall well-being. Given the wide-ranging consequences of procrastination, it's crucial to study and understand this behavior, especially because it affects a substantial portion of the population by lowering productivity levels and leading to higher stress levels [2]. Although arguments have sprung up about how procrastination can create space for greater creativity and more innovative ideas, the negative impacts greatly outweigh the positive effects. Therefore, people must know what procrastination is and its consequences so they can actively prevent themselves from procrastinating.

2. Overview of Five Domains of Psychology in Procrastination

The primary domains in psychology encompass biological, cognitive, developmental, social, personality, and mental and physical [3]. Procrastination, as a complex psychological phenomenon, exhibits intricate connections to all these domains, therefore necessitating a closer examination. Regarding biological psychology, scientists believe procrastination involves an interplay between the prefrontal cortex and the limbic system [4] because the prefrontal cortex manages thoughts and emotions. In addition, research indicates that there are distinct mechanisms in the brains of procrastinators compared to those who don't procrastinate, including differences in gray matter volume and cerebral cortex thickness [5]. Understanding the neurological principles underlying procrastination raises intriguing questions as to what extent procrastination is affected by biological factors and, in turn, what role cognitive factors play in this behavior.

Cognitive psychology reveals several factors contributing to procrastination, such as irrational beliefs, a distorted perception of time, and low self-confidence. Procrastination can also be a coping mechanism to protect self-esteem, as incomplete tasks can never fail [1]. Additionally, while cognitive treatments such as Cognitive Behavioral Therapy (CBT) have shown some effectiveness, critically examining their efficacy under different contexts will be enlightening.

In the realm of developmental psychology, it's observed that procrastination emerges early in preschool-aged children, and this tendency tends to increase as they grow older [6]. However, this is the extent of what's known in this domain. A significant gap exists in the need for longitudinal studies regarding procrastination, which presents an opportunity for further research considering the factors that might lead to this developmental trajectorial correlation.

In the context of social and personality psychology, procrastination can impact social interactions negatively. It often correlates with lower self-esteem, increased dependency on others, the tendency to provoke anger in others, a lack of conscientiousness in fulfilling commitments, and guilt after achieving success or positive events [7]. Furthermore, considering whether these personality traits are consequences or causal factors of procrastination is worth investigating.

Concerning mental and physical health psychology, procrastination has detrimental effects on both psychological and physical well-being. It is linked to higher stress levels, various anxiety disorders, acute health problems, and even sleep disorders. Studies on Korean university students during the COVID-19 pandemic found a connection between higher bedtime procrastination and more frequent sleeping disorders [8]. Additionally, a study with Swedish university students showed a correlation between procrastination and increased signs of anxiety, depression, as well as back and neck pain when followed up after nine months [9]. Understanding the mechanisms of how procrastination affects mental and physical health provides a basis for developing more targeted intervention and treatment methods.

3. Previous Research on Procrastination

This section will delve into a discussion of the underlying causes and potential effects of procrastination. Research indicates that the causes of procrastination can be summarized as self-regulatory failures [1]. First, a fundamental cause lies within what psychologist's term "present bias." When considering a trade-off between two future tasks, individuals tend to assign a higher value to tasks that offer immediate rewards, often deferring distant tasks until they become urgent. In addition, various mental health conditions can also cause procrastination, including depression and ADHD. Individuals experiencing these conditions tend to only initiate work out of desperation or apprehension. Furthermore, several self-regulating shortcomings, including low self-esteem and poor time management, strengthen procrastinating behavior [1]. Individuals who spend time contemplating whether they will accomplish their tasks out of fear may inadvertently engage in behavior classified as poor time management.

The consequences of procrastination can result in substantial issues, extending into multiple aspects of people's lives. Procrastinators frequently experience a surge of urgency as they attempt to

hastily address postponed tasks, resulting in diminished work quality, quantity, and overall productivity. Furthermore, putting off tasks can be harmful to one's health. In an effort to complete the tasks they've put off, procrastinators might push themselves to their limits, neglecting their own physical needs for rest. This will result in chronic stress that contributes to the development of various health problems, which can have a profound impact on people's well-being. From a social perspective, procrastination can make it difficult for people to build positive relationships with others because procrastinators cannot work efficiently. This can cause problems both personally and professionally because delayed tasks will disrupt collaborative efforts between people. Finally, procrastination can also spiral into an endless, self-perpetuating cycle. An example of this is that procrastination is linked to a higher reluctance to seek treatment for physical or mental health problems. Delaying taking care of health concerns will lead to further complications, and procrastinators will find themselves stuck in a vicious cycle that is challenging to escape.

4. Applications and Future Implications

As mentioned previously, procrastination has significant implications across various psychological domains. Therefore, it also has many potential implications and applications in the real world, warranting further research to address the associated problems. In academic situations, students frequently grapple with procrastination, which detrimentally affects their academic progress and sense of accomplishment. Although procrastination may temporarily alleviate stress, the adverse effects in the long term might include anxiety, low academic achievement, or even depression. Similar procrastination tendencies extend to the workplace, where employees often postpone tasks until deadlines loom. Studies indicate that workplace procrastination incurs substantial costs, amounting to \$8,870 per employee in lost revenue annually. This procrastination dynamic in professional settings mirrors the challenges students face, potentially leading to decreased productivity and job satisfaction [10]. Procrastination can also disrupt family and social relationships, particularly regarding chores or other household tasks. This type of behavior leads to arguments and conflict between family members. Further research on procrastination can help address or mitigate these problems to promote work productivity, financial efficiency, and peaceful social dynamics.

In terms of methods in future research, psychologists should consider incorporating advanced technologies into their studies. While many investigations on procrastination rely on observational methods, few harness functional magnetic resonance image (fMRI) or other types of brain imaging technology. Utilizing such technologies can provide deeper insights into the neural mechanisms underlying procrastination. Furthermore, it's worth noting that a substantial portion of procrastination research centers on college students and workplace environments. Hence, broadening the range of subjects in research can offer a more extensive understanding of the characteristics and influence of procrastinating behavior. Finally, psychologists can now utilize computer algorithms such as sentiment analysis to help them sort and analyze data in quantities never seen before. These technological tools can significantly enhance the efficiency and depth of procrastination research, offering a promising avenue for future investigations.

5. Conclusion

In conclusion, procrastination, the act of delaying tasks or decisions, is a common behavior that affects individuals across various aspects of life. While occasional procrastination might not have a significant detrimental impact on one's well-being, persistent procrastination might have a cumulative negative impact. According to research, a sizable portion of adults globally are chronic procrastinators, increasing their risk of developing melancholy, anxiety, ADHD, poor study habits, and low self-esteem. Since procrastination affects productivity, raises stress levels, and impedes personal and professional development, it is vital to recognize its widespread influence. Despite claims to the contrary, procrastination has been shown to negatively impact mental and physical health, social

interactions, and the capacity to seek timely assistance for connected problems. The complex network of biological, cognitive, developmental, social, and personality components that contribute to procrastination is the subject of extensive psychological research. Utilizing cutting-edge tools such as sentiment analysis and brain imaging offers intriguing opportunities for a deeper investigation of the underlying mechanisms. Future research should broaden its focus to include a variety of demographics, offering a more thorough understanding of its manifestations and repercussions to solve the various issues resulting from procrastination. By doing this, psychologists can pave the way for interventions and techniques that are more effective in mitigating the widespread negative consequences of procrastination, thereby improving the quality of life for people in all areas of life.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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