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The Era of Short Media Forms: A Neurobiological Perspective

Bachelor's Thesis in
COGNITIVE SCIENCE

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Summary

In recent years, there has been a rapid increase in the popularity of short-form videos, such as those offered by platforms like TikTok, YouTube (Shorts), and Instagram (Reels). These short, dynamic contents, typically lasting from a few seconds to a few minutes, have become the dominant form of communication in social media. This bachelor's thesis focuses on understanding the impact of short-form videos on the daily lives of users, particularly young adults. Based on a literature review, the neurobiological mechanisms of dopamine function and their relationship with compulsive use of short-form videos are discussed. The results of the conducted questionnaire revealed significant correlations between the amount of time spent watching short video forms and the subjectively assessed quality of sleep and the ability to concentrate. Additionally, social and psychological consequences, such as the impact on social relationships and increased stress levels, are discussed. The findings suggest the need for further research on the phenomenon and the implementation of measures to educate users about potential risks.

Keywords

short video forms, TikTok, dopamine, attention span, quality of sleep, mental health

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Introduction

Thematic Context

In recent years, there has been a significant rise in the popularity of short video formats (SVF), such as those offered by platforms like TikTok, YouTube (Shorts), and Instagram (Reels). These short, dynamic contents, typically lasting from several seconds to a few minutes, have become the dominant form of communication on social media. Their attractiveness stems from the immediate gratification they provide, leading to their mass consumption, particularly by younger generations. The popularity of these contents has drawn the attention of researchers, who have begun analyzing the impact of SVF on various aspects of users' lives, including mental and physical health, sleep quality, and the ability to concentrate.

Structure of the Work

Literature Review

This thesis is based on a comprehensive analysis of the scientific literature regarding the impact of SVF on users. It particularly focuses on neurobiological studies, which analyze how intense and short-term visual stimuli affect the dopaminergic system and reward mechanisms in the brain. It also examines psychological studies that focus on the consequences of SVF consumption for mental health, such as addictions, stress, and attention disorders.

Additionally, the work considers social studies that explore the influence of social media on interpersonal relationships and education. In the educational context, it analyzes studies concerning the impact of SVF on the ability to maintain long-term focus and academic performance.

Questionnaire

In addition to the literature review, this work includes an empirical study in the form of a questionnaire, conducted to test several hypotheses regarding the impact of SVF on selected aspects of young adults' lives. The questionnaire was designed to gather data on social media usage habits, sleep quality, concentration ability, and levels of physical activity. The results of this study will provide additional empirical data that complement the literature review and allow for a more comprehensive understanding of the phenomenon under study.

Significance of the Work

The significance of this work extends beyond academic interest, having real implications for public health and education. In the digital age, where social media plays an increasingly important role in daily life, understanding its impact on mental and physical health becomes crucial. This thesis provides valuable insights that can be used to develop effective strategies for managing the time spent on platforms offering SVF and to promote healthy digital habits among both young people and adults. Knowledge about the potential risks associated with excessive consumption of such content is essential for parents, educators, and public health professionals.

Objective of the Work

The objective of this thesis is to summarize and analyze the available research on the impact of SVF on users, with particular attention to young adults. The aim of this work is to understand how consuming such content affects key aspects of daily life, including sleep quality, the ability to concentrate, and other important areas of mental and physical health.

Objective of the Study

The objective of the questionnaire was to gather information about SVF viewing habits and their impact on sleep quality, concentration ability, and physical activity. Furthermore, the study aimed to identify potential negative consequences associated with excessive consumption of this type of content, including its impact on social and professional life.

In summary, this thesis aims to understand the complex interactions between SVF consumption and various aspects of users' lives. The results of the literature review and the empirical study will provide valuable insights that can help shape conscious and healthy use of social media.

CHAPTER 1

Neurobiological Foundations

1.1. The Dopaminergic System

The dopaminergic system consists of neurons that produce dopamine, a neurotransmitter that plays a key role in many bodily functions, including mood regulation, motivation, reward, learning, and movement. Dopamine is synthesized from tyrosine, and its action is terminated through reuptake or enzymatic metabolism [Henley, 2021].

1.1.1. Dopaminergic Pathways

There are several major dopaminergic pathways, each serving different functions:

- **Mesolimbic pathway** runs from the ventral tegmental area (VTA) of the midbrain to the nucleus accumbens and is associated with feelings of reward and motivation.
- **Mesocortical pathway** connects the VTA to the prefrontal cortex and is involved in cognitive functions such as planning and decision-making.
- **Nigrostriatal pathway** extends from the substantia nigra to the striatum and plays a key role in coordinating movement.
- **Tuberoinfundibular pathway** runs from the hypothalamus to the pituitary gland, regulating the secretion of prolactin [Niedźwiedzki, 2023; Smith, Darlington, 2013].

1.1.2. Components of the Dopaminergic System

The main components of the dopaminergic system include dopaminergic neurons located in the ventral tegmental area (VTA) of the midbrain, substantia nigra, and other less-defined brain regions. These neurons vary depending on their location, which influences their functions [Henley, 2021].

1. Midbrain

- **Substantia nigra (SNc) of the midbrain:** SNc is one of the main sources of dopaminergic neurons in the brain and plays a crucial role in controlling movements. Degeneration of neurons in this area leads to symptoms of Parkinson's disease, such as tremors, muscle stiffness, and slowness of movement [Sokołowska-Pituchowa, 2005].
- **Ventral tegmental area (VTA) of the midbrain:** The VTA plays a central role in the brain's reward system, influencing motivation, pleasure, and addiction. Dopaminergic neurons in this area are also involved in regulating emotions and cognitive processes [Narkiewicz et al., 1981].

2. Forebrain

- **Nucleus accumbens:** A key structure in the brain’s reward system, receiving dopaminergic projections from the VTA. The nucleus accumbens plays an important role in addiction processes, as well as in the regulation of motivation and pleasure.
- **Striatum:** Comprising the caudate nucleus and putamen, the striatum receives dense dopaminergic projections from the SNc. It is essential for coordinating movement and influences learning, reward, and motivation.
- **Prefrontal cortex:** Although not densely populated by dopaminergic neurons, the prefrontal cortex receives important dopaminergic projections from the VTA. These connections are crucial for executive functions such as decision-making, planning, and the regulation of emotions and impulses [Henley, 2021].

Dopaminergic neurons are distributed across various brain regions, where they play essential roles in regulating motor, emotional, and cognitive processes. Their distribution and functions underscore the complexity of dopaminergic systems and their importance for mental health and motor control. Understanding these systems is crucial not only for basic neurobiological research but also for developing therapies for dopamine-related disorders, such as Parkinson’s disease, various forms of addiction, and affective disorders.

1.1.3. Dopaminergic Receptors

Dopaminergic receptors are proteins located on the surface of nerve cells that bind dopamine, allowing it to exert its effects on the body. These receptors are key components in processes that regulate mood, motivation, pleasure, and motor control. Divided into two main families, D1 and D2, these receptors differ in structure, location, and function.

1. **D1 Receptor Family:** The D1 receptor family, including the D1 and D5 receptors, belongs to the group of Gs protein-coupled receptors. Their activation leads to an increase in cyclic AMP (cAMP) levels in the cell, which activates various signaling pathways affecting neuronal function. These receptors are primarily located in the cortex, striatum, nucleus accumbens, and hippocampus, where they modulate cognitive processes, motor control, and the reward system.
2. **D2 Receptor Family:** The D2 receptor family includes the D2, D3, and D4 receptors, which are coupled to Gi proteins, leading to a decrease in cAMP levels in the neuron. These receptors are found in various parts of the brain, including the striatum, midbrain, and prefrontal cortex. They play a crucial role in regulating dopamine release, mood modulation, social behaviors, and motor control. Their role in inhibiting neuronal activity makes them important targets for the treatment of psychiatric and neurological disorders, such as schizophrenia and Parkinson’s disease [Larry, 2013].

1.1.4. Pleasure System Homeostasis

The self-regulatory mechanisms of the pleasure system tend to compensate for large increases in dopamine levels. In such cases, the body's homeostasis not only returns dopamine to its baseline level but can also lower it below baseline, in proportion to the previous dopamine peak [Lembke, 2021]. Richard Solomon and John Corbit in the 1970s called this relationship between pleasure and pain the opponent-process theory: "Any prolonged or repeated deviation from hedonic or affective neutrality comes at a price" [Solomon, Corbit, 1978].

Phenomena Related to the Body's Pleasure-Pain Balance:

Hyperalgesia – The term "algesia" comes from Greek, meaning pain. The phenomenon of hyperalgesia was studied in animals that were administered opioids (strong painkillers) [Low et al., 2012]. It involves the chronic sensation of pain in response to opioids. The hypothesis is that the body defends itself through heightened activity of homeostatic mechanisms. In humans with hyperalgesia symptoms, pain subsided after the discontinuation of opioids [Frank et al., 2017].

Hormesis – A field of science that studies the beneficial health effects of mild pain stimuli. Edward J. Calabrese describes this phenomenon as "adaptive responses of biological systems to moderate challenges from the environment or self-imposed, allowing the system to improve its functionality and/or tolerance to more severe challenges" [Calabrese et al., 2017]. An example is a study in which worms exposed to a temperature 15 degrees higher than their natural level (20 degrees) for two hours lived 25% longer and were more likely to survive in a variable climate [Cypser et al., 2006].

1.1.5. Dopaminergic System Activation by Information

Research has shown that information-seeking is critical for goal-directed behavior and is strongly motivated by the reward system, particularly the dopaminergic system. This system encodes both instrumental and non-instrumental benefits of information. Instrumental benefits involve the direct, useful outcomes of obtaining information, such as making better financial decisions, while non-instrumental benefits stem from the act of seeking information itself, motivated by curiosity or novelty.

In a neurobiological context, the dopaminergic reward system can simultaneously process signals related to external rewards and additional benefits derived from exploration and curiosity. These signals are interpreted as value, facilitating decision-making about exploring new information versus relying on existing resources. These signals are particularly evident in brain areas such as the striatum and the ventromedial prefrontal cortex (VMPFC), which are traditionally associated with value assessment.

Additionally, fMRI experiments have shown that the subjective value of information (SVOI) is encoded in the same brain regions as more fundamental reward values. For example, in one study, participants made decisions about purchasing information to reduce uncertainty about the outcomes of monetary lotteries. These decisions were strongly correlated with activity in the striatum and VMPFC, supporting the hypothesis of a common neural currency.

These findings suggest that the dopaminergic reward system not only drives information-seeking through encoding non-instrumental benefits, such as curiosity, but also through assessments of instrumental benefits, enabling effective decision-making in the face of uncertainty. The integration of these motives in the reward system may be key to adaptive cognitive behaviors and decision-making [Kobayashia, Hsu, 2019].

1.2. Dopamine

Dopamine, known as the "pleasure" or "motivation" molecule, is one of the key neurotransmitters in the human brain. As an important component of the reward system, dopamine regulates our feelings of pleasure, motivation to act, and motor control. However, its role is not limited to positive aspects of functioning, as dopamine is also involved in various neurological and psychiatric disorders [Lembke, 2021]. Dopamine was identified in 1957 by two independent research teams, one led by Arvid Carlsson in Sweden and the other by Kathleen Montagu in London [Montagu, 1957]. Carlsson received the Nobel Prize in Medicine in 2000 for his groundbreaking discoveries in neurobiology regarding the molecular mechanisms of brain function [Lembke, 2021].

1.2.1. Chemical Structure

Dopamine belongs to a group of chemical compounds known as catecholamines, which contain a benzene ring with two hydroxyl groups and an ethylamine chain in their structure. It is synthesized in the body from the amino acid tyrosine through a two-step process, in which tyrosine is first converted to L-DOPA and then to dopamine. This biosynthetic pathway underscores the close relationship between dopamine and other neurotransmitters, such as norepinephrine and adrenaline, which are further synthesized from dopamine [Henley, 2021].

1.2.2. Mechanism of Action

The uniqueness of dopamine as a neurotransmitter lies in its ability to modulate neuronal activity through various types of dopaminergic receptors, which, as described earlier, are

divided into the D1 and D2 families. These receptors, located in different parts of the brain, are responsible for the diverse effects of dopamine, from influencing movement and emotions to cognitive processes and motivation [Larry, 2013].

1.2.3. Functions in the Body

- **Reward system:** Dopamine is a key element of the brain's reward system, motivating action in pursuit of rewards such as food, social interactions, or physical activities. Dopaminergic stimulation is associated with feelings of pleasure and satisfaction, encouraging the repetition of behaviors [Lieberman, Long, 2019].
- **Motor control:** In brain regions such as the substantia nigra, dopamine plays a crucial role in regulating movement. Its deficiency is the primary cause of Parkinson's disease symptoms, characterized by tremors, muscle stiffness, and slowness of movement [Iversen et al., 2009].
- **Cognitive and emotional functions:** Dopamine also significantly impacts cognitive functions, including attention, motivation, and learning. Disruptions in the dopaminergic system can contribute to conditions such as depression, schizophrenia, and various addiction disorders [Iversen et al., 2009].

Thanks to its complex structure and wide range of functions, dopamine is an extremely important neurotransmitter in the human brain. Its role in the reward system, motor control, and the regulation of emotional and cognitive states makes it central to understanding both the basic mechanisms of brain function and the pathogenesis of many neurological and psychiatric diseases.

1.3. Ascending Reticular Activating System (RAS)

The Ascending Reticular Activating System (RAS) is a fundamental component of the brain responsible for regulating attention, alertness, and transitions between states of consciousness. Its functioning is crucial for cognitive processes, including concentration and information processing. In the context of the growing popularity of applications like TikTok, questions arise about the impact of compulsive social media use on RAS functioning and potential related pathologies [Larry, 2013].

1.3.1. RAS Location and Structure

The RAS extends from the medulla through the pons to the midbrain and is an integral part of the limbic system. It consists of a dense network of neurons and neuronal pathways that integrate sensory stimuli from the environment with higher brain functions [Augustine, 2016].

1.3.2. Connections and Functions of the RAS

This system is connected to various areas of the brain, including the cortex, allowing for the regulation of states of consciousness, attention, and a role in regulating the sleep-wake cycle. The RAS filters sensory information, deciding which signals should be relayed to the brain and which should be ignored. This is essential for focusing attention and responding to changes in the environment [Augustine, 2016].

CHAPTER 2

Characteristics of Short Video Formats (SVF)

2.1. The Emergence of TikTok and the Wave of SVF

The wave of popularity of SVF, such as shorts, was initiated by the creation of the TikTok platform, an internet platform developed by the Chinese company ByteDance on September 20, 2016 [Wikipedia, 2024a].

The first version of TikTok allowed users to upload videos with a maximum length of only 15 seconds. However, the platform expanded its capabilities, increasing the maximum length of clips to one minute, three minutes, five minutes, and, in February 2022, up to ten minutes. The Chinese equivalent, Douyin (which is the original version of TikTok), allows videos as long as 30 minutes [MAC, 2023]. Despite these changes, the platform's core focus remains on videos under 60 seconds, which are the most popular.

Just over a year after the platform's inception, by the end of 2018, TikTok's user base reached 133 million. By September 2020, the number of users had risen to 2 billion [Iqbal, 2024]. Such rapid growth captured global attention. Major tech companies, such as Google and Meta, became highly interested in the SVF format. Thus, TikTok equivalents began to emerge as add-ons to other major websites and applications. In September 2020, YouTube introduced a feature called "YouTube Shorts" [Wikipedia, 2024b]. In the same year, Meta also joined the trend by launching its own TikTok equivalent, "Reels," on both Facebook and Instagram [Pacholczyk, 2020]. Copies and equivalents of TikTok continued to emerge in response to the immense popularity of the format. Even Spotify, which offers access to music and podcasts, launched a TikTok-like feature called "Clips" in 2023 [Maloy, 2023]. Ultimately, most major tech companies began offering SVF on their platforms, typically under 60 seconds in length, and the online market became dominated by this form of communication.

2.2. Characteristics of Typical TikTok-style Content

SVF, such as those found on TikTok, YouTube Shorts, and Instagram Reels, have revolutionized how content is created, consumed, and disseminated in the digital world. They are characterized by a unique content scheme that attracts a broad audience with quick and engaging formats. Exploring these aspects helps to better understand the phenomenon of these platforms and their impact on digital culture.

2.2.1. Content Scheme

SVF typically last from several seconds to a few minutes, offering a quick and condensed form of communication. The key to their success lies in their ability to immediately capture the viewer's attention, often achieved through humor, surprise, or directly addressing the audience. Interactive elements, such as the ability to comment, like, and share, are also essential to building a community around creators and their content [Jade, 2022].

2.2.2. Most Popular Themes

The themes of SVF are highly diverse, but several dominant categories can be identified. The most popular ones include [Conrad, 2023] [Prive, 2022]:

- **Entertainment and humor:** skits, memes, parodies, and videos with original humor.
- **Education and advice:** short tutorials and information on various topics, from cooking to the sciences.
- **Fashion and beauty:** makeup tutorials, fashion shows, and product reviews.
- **Fitness and health:** fitness advice, healthy recipes, and motivational stories.
- **Music and dance:** talent shows, dance tutorials, and singing popular songs.

These topics are often closely tied to current internet trends.

2.2.3. Popular Trends

Trends on platforms like TikTok change rapidly, but some gain immense popularity and become globally recognized. These include:

- **Challenges:** tasks where users attempt to complete specific actions, often involving dance moves or humorous situations.
- **Duets:** a feature that allows users to create videos alongside others, even if they are not physically together [TikTok, 2022].
- **Educational miniseries:** a series of connected educational videos that, together, form a larger whole [Leslie, 2023].
- **Reactions and commentary:** videos where creators react to other people’s content or current events.

The popularity of specific trends is often driven by platform algorithms, which promote content that generates high engagement, leading to viral spread.

SVF on platforms like TikTok have revolutionized the social media landscape by introducing a new format of communication that combines entertainment, education, and interaction. Understanding the content structure, most popular themes, and prevailing trends is essential for creators, marketers, and digital media researchers, enabling them to better reach audiences and tap into the potential of these rapidly evolving platforms.

2.3. Mechanisms and Algorithms of the Applications

One of the key factors that contributed to TikTok's explosive popularity is its advanced content recommendation algorithms and various mechanisms designed to keep users engaged on the platform. TikTok's mechanisms and algorithms are crucial for understanding how content is recommended to users and how the platform manages interactions between creators and viewers. TikTok utilizes advanced machine learning algorithms and artificial intelligence to personalize and optimize user experiences. These algorithms are continuously updated and refined to ensure that the most engaging content is delivered to users [Smith, 2021].

2.3.1. Content Recommendation Algorithm

The foundation of TikTok's operation is its content recommendation algorithm, which determines what videos are shown to users. This algorithm is based on various factors, including:

- **User interactions:** including likes, shares, comments, and watch time. The algorithm analyzes this data to understand the user's preferences and recommend similar content.
- **Video information:** such as title, tags, and sounds. Analyzing this data helps the algorithm classify content and match it to the user's interests.
- **Device information and account settings:** including language preferences and location. This information is used to tailor content to the user's specific environment and settings [bibliotekawszkole, 2023].

2.3.2. Discovery and Exploration System

TikTok allows users to discover new content through the "For You" page, which is the heart of personalization on the platform. The exploration system takes into account not only direct interactions with content but also more subtle signals, such as the amount of time spent watching a video. This allows users to discover new creators and trends, even if they haven't previously shown interest in similar topics [Lajki.io, 2022].

2.3.3. Feedback Loop

TikTok's algorithms are designed to create a feedback loop that allows for continuous improvement in recommendations. As users interact with content, they constantly provide data that is analyzed to improve the algorithms. This process enables TikTok to quickly respond to changing preferences and trends, offering users content that is most engaging for them [Faustino, 2023].

CHAPTER 3

The Impact of Short Video Format Consumption on Neural and Psychological Processes

The mere desire for something, driven by dopamine, appears to be a stronger motivator for action than the ultimate pleasure of achieving the goal [Adinoff, 2004]. Research has shown that genetically modified mice, unable to synthesize dopamine, do not seek out food, which ultimately leads to their death, even if food is placed nearby [Zhou, Palmiter, 1995].

3.1. Dopaminergic System Responses to SVF

3.1.1. Dopaminergic System Response

The dopaminergic system, located in various parts of the brain, including the ventral tegmental area (VTA) and the nucleus accumbens, plays a central role in the perception of reward and pleasure. SVF, with their rapid pace and high engagement, can lead to an immediate increase in dopamine release. This is a response to the perception of "reward" or "novelty," causing the user to experience momentary feelings of satisfaction or excitement [Henley, 2021].

3.1.2. Brain Processes

When a user watches SVF, the dopaminergic system activates to process the anticipation of reward. Dopamine is released, leading to increased attention and focus on the content [Kobayashia, Hsu, 2019]. This mechanism is similar to the response observed in other addictive behaviors, such as gambling or psychoactive substance use. The stimulus-reward dynamic reinforces the need to seek out further similar experiences, potentially resulting in a reward-seeking loop, where the user craves more stimuli to achieve a similar level of satisfaction.

3.1.3. Consequences for the User

Regular exposure to SVF and the resulting overstimulation of the dopaminergic system can lead to a range of consequences. In the short term, there is an increased risk of developing compulsive behaviors, such as uncontrolled video watching, which can affect daily functioning and quality of life. In the long term, this may lead to adaptive changes in the brain, similar to those observed in addiction, potentially increasing tolerance to stimuli and reducing the ability to derive pleasure from everyday, "normal" activities. Additionally, this could impact concentration, sleep quality, and overall mental health.

3.2. The Problem of SVF Addiction

3.2.1. The Influence of SVF Characteristics on Addictive Behaviors

One study, conducted by Xiaoxu Tian and his team (2022), focused on the mechanisms through which the characteristics of SVF influence addiction, using a theoretical framework based on the Opponent Process Theory (OPT). The study utilized data collected from 382 Chinese TikTok users and found that the characteristics of these short videos influence addiction by activating users' feelings of pleasure and deficiency. Users must repeatedly interact with SVF to maintain positive emotions or reduce negative ones. As a result, this leads to addiction, with procrastination moderating the relationship between the sense of deficiency and addiction [Tian et al., 2022].

Another study, by Mu and colleagues (2022), analyzed SVF addiction among Chinese youth from the perspective of the stress-coping theory. The study aimed to determine whether school burnout, social phobia, and parental neglect contribute to SVF addiction and whether this addiction leads to low levels of happiness, poor relationships with parents, and perseverance among youth. The results showed that school burnout and social phobia significantly influenced the development of SVF addiction, which later negatively and significantly affected the happiness of the youth, the quality of their relationships with parents, and their perseverance.

Both studies shed light on the complexity of the SVF addiction problem, stress, and the social and familial environment in shaping it. They also highlight the need for further research in this field to better understand the mechanisms of addiction and to develop effective prevention and intervention strategies [Mu et al., 2022].

3.3. Symptoms and Consequences of Dopamine Deficit

"Dopamine deficit" refers to a state in which there is a significant drop in dopamine levels in the brain, a neurotransmitter associated with feelings of reward, pleasure, and motivation. This is often a "hangover" effect after a period of high dopamine stimulation, such as prolonged social media use, gambling, or exciting events, like holidays. In the context of the fast and intense stimulation offered by SVF, the brain may experience temporary increases in dopamine followed by a sharp decline, leading to a dopamine deficit [Aspenridge, 2021; Oxfordscience, 2015]. Neurobiologist Nora Volkow and her colleagues found that prolonged dopamine stimulation ultimately leads to a deficit. "The decline in DA D2 receptors in drug users, combined with decreased DA release, resulted in a reduced sensitivity of the reward system to stimulation by natural stimuli" [Volkow et al., 2002].

3.3.1. Symptoms of Dopamine Deficit

Dopamine deficit can manifest through a range of physical and emotional symptoms, including: physical and emotional exhaustion, low self-esteem, changes in appetite, social withdrawal, sleep disturbances, anxiety, and depression [Aspenridge, 2021].

3.3.2. Consequences of Dopamine Deficit

Long-term exposure to situations that lead to dopamine deficits, especially as a result of compulsive SVF use, can lead to neural adaptations in the brain. Such changes can affect how the brain responds to dopamine, potentially reducing its natural release and negatively impacting the ability to derive pleasure from everyday activities. This may also increase the

risk of developing depression or other mental disorders and lead to a heightened susceptibility to addiction [Aspenridge, 2021].

3.4. Potential Psychological and Social Effects

3.4.1. The Relationship Between Stress and Addiction to Short Video Apps

A study conducted by Yinbo Liu and colleagues (2021) focused on understanding the impact of perceived stress on addiction to apps offering SVF. The study involved 896 Chinese students who were assessed on perceived stress, motivation for self-compensation, shyness, and their habits of using SVF. The results showed that perceived stress was positively correlated with SVF addiction ($r = 0.422$, $p < 0.001$) and with motivation for self-compensation ($r = 0.158$, $p < 0.001$). Motivation for self-compensation was positively correlated with SVF addiction ($r = 0.343$, $p < 0.001$). Additionally, shyness significantly moderated the direct relationship between perceived stress and SVF addiction ($\beta = 0.076$, $t = 2.554$, $p < 0.01$, $CI = 0.018 - 0.134$) [Liu et al., 2021].

3.4.2. Impact on Mental Health

A study by Lemmi (2023) found that TikTok’s algorithms can amplify content related to mental health issues, which has a dual effect on users. On the one hand, these algorithms can promote content supporting mental health by providing users with information and support from others facing similar problems. In this way, the platform can become a valuable source of education and support, helping users manage their mental health. On the other hand, excessive exposure to content related to mental health issues can deepen problems, causing stress and anxiety. The continuous delivery of such content by algorithms may lead users to constantly encounter negative information, which, instead of helping, may harm them [Lemmi, 2023].

3.4.3. SVF Addiction and Student Well-being: An Ecosystem Perspective

In a study conducted by Jian-Hong Ye (2022), the ecosystem theory was used to examine how SVF addiction affects learning motivation and overall well-being among Chinese vocational school students. The researchers applied an integrated model, accounting for both internal and external motivational factors, to understand how intense experiences with SVF affect students’ educational interests and perceptions of well-being in school life. The results showed that SVF addiction can significantly negatively impact students’ motivation to learn and their subjective sense of well-being, emphasizing the need for a holistic approach to media education [Ye et al., 2022].

These studies (Liu, 2021; Lemmi, 2023; Ye, 2022) illustrate the complexity of SVF addiction and highlight the need for further research on its psychological and social effects. They also point to the potential adverse consequences for users’ mental and social well-being, particularly among young people and students. The importance of conscious media use and the necessity of developing strategies to prevent the negative effects of excessive use are underscored.

CHAPTER 4

Cognitive Load in Short Video Formats

In the age of ubiquitous SVF, such as TikTok, our abilities to concentrate and maintain attention are undergoing transformation. Exposure to rapidly changing, short content can significantly affect the so-called "attention span"—the ability to focus on a single task for an extended period.

4.1. Impact on Attention and Concentration

SVF, characterized by dynamic changes in imagery and fast-paced narration, require viewers to continuously adapt their attention. This trains the brain to process information quickly, but it can also make it difficult to maintain focus on less stimulating tasks for a longer time. These characteristics, combined with unlimited access to new content, can lead to a reduction in the duration of attention span and a decline in the ability to process information deeply [Chiossi et al., 2023].

A study conducted by Chen and colleagues (2022) analyzed the impact of SVF addiction on users' attention. The experiment involved 44 students aged 19 to 24, who were divided into two groups: those addicted and not addicted to SVF, based on a questionnaire. The results showed significant differences between these groups in terms of interest, concentration, and reaction in attention-demanding tasks. Addicted users showed significantly lower interest and concentration levels while watching longer videos compared to non-addicted users. Notably, a higher number of distractions were observed in addicted users, particularly when watching medium and long-length videos. Eye-tracking metrics revealed that addicted users had shorter initial fixation times and more fixations of shorter average duration compared to non-addicted users. In the case of longer videos, addicted users struggled to focus on a specific goal. In the Stroop task, addicted users showed longer reaction times and lower accuracy compared to non-addicted users. Additionally, addicted users had more fixations and longer average fixation times on distracting stimuli. These findings suggest that SVF addiction negatively affects the ability to concentrate and process interference, resulting in longer reaction times and more errors in the Stroop task (a test that assesses the ability to control attention and inhibit automatic cognitive processes). The study shows that SVF addiction can lead to difficulties in maintaining interest and concentration, especially when watching longer content. Addicted users have greater difficulty maintaining attention and are more prone to distractions. The fragmentation of SVF shortens the effective duration of users' attention, leading to more fixations and shorter fixation times. Therefore, SVF addiction can negatively impact attention span and the processing of interference, as evidenced by longer reaction times and more errors in the Stroop task. The study provides important insights into the negative impact of SVF addiction on users' attention, suggesting the need for both individual and systemic efforts to mitigate this phenomenon [Chen et al., 2022].

4.2. Impact of SVF Viewing on the RAS

The short-term, intense visual and auditory stimuli typical of SVF can overstimulate the Reticular Activating System (RAS), leading to increased alertness and a focus on novelty. This constant overstimulation can affect the brain’s reward mechanisms, increasing dopamine release and contributing to the development of compulsive behaviors. Similar to other forms of addiction, compulsive use of apps can lead to neuronal adaptations in the RAS, increasing the propensity to seek new stimuli [Gazzaley, Rosen, 2016].

Adaptations in RAS functioning caused by compulsive SVF use can have widespread consequences, including attention disorders, difficulty concentrating, and reduced ability to process information deeply. Additionally, as the RAS plays an important role in regulating the sleep-wake cycle, excessive screen exposure, especially before bedtime, can negatively impact sleep quality, leading to disruptions in the natural circadian rhythm [Gazzaley, Rosen, 2016].

The role of the RAS in regulating attention and alertness makes it particularly sensitive to the influence of social media, such as TikTok. Compulsive use of such apps can lead to significant changes in the functioning of this system, which in turn can affect users’ mental and physical health [Gazzaley, Rosen, 2016].

4.3. The Rise of Attention Disorders

In recent years, there has been a significant increase in the diagnosis of attention deficit disorders (ADD) worldwide. Epidemiological data indicate a growing trend, drawing researchers’ attention to potential environmental factors contributing to this phenomenon. Among various theories, increasing interest is focused on the influence of SVF on cognitive functioning and users’ ability to concentrate [McKechnie et al., 2023; QuickStats, 2024].

Experts from various fields note that SVF, characterized by intense stimulation and rapid content changes, can significantly impact the brain’s attention mechanisms. Such stimuli, offering quick and often rewarding changes, may lead to adaptations in attention systems, favoring short-term focus on multiple tasks rather than prolonged focus on one task. This type of adaptation may have consequences in the form of increased susceptibility to attention deficit disorders [Baumgartner et al., 2018; Carr, 2010].

Research suggests that users of platforms like TikTok may experience changes in brain structures related to attention control and cognitive processes. Short, intense video stimuli can reduce the ability to maintain prolonged attention, one of the key symptoms of ADD. Such changes are particularly noticeable in younger users, whose brains are still developing and are more susceptible to external influences [Crispo, 2024].

4.4. Impact on Memory

4.4.1. Impact on Short-term Memory

A study conducted by Mengyu Zheng from the University of Bristol (2021) aimed to examine the impact of daily SVF viewing on visual short-term memory (VSTM). Participants were divided into two groups: the experimental group watched SVF, while the control group rested before performing a pattern recognition task. The study's results showed that participants' ability to remember patterns and respond quickly was significantly weakened by watching SVF. The average reaction time in the control group was 2.19 seconds, while in the experimental group, it was 2.44 seconds. Statistical analysis showed that these differences were statistically significant, suggesting that watching SVF impairs the ability to recognize patterns and extends reaction times [Zheng, 2021].

4.4.2. Impact on Prospective Memory

Research by Chiossi and colleagues (2023) showed that the use of SVF, such as those offered by TikTok, significantly impairs the ability to retain and carry out planned actions, known as prospective memory. The experiment involved participants performing a prospective memory task, with the task interrupted by SVF viewing. The results showed that interrupting the task with SVF viewing reduced participants' ability to recall and carry out intended actions. This effect was not observed with other types of interruptions, such as using Twitter or YouTube, suggesting that SVF, characterized by rapid context changes, has a particularly negative impact on prospective memory. SVF absorbs attentional resources that would normally be allocated to completing intended actions, resulting in reduced efficiency in information processing and slower evidence accumulation for decision-making. Consequently, participants had difficulty monitoring memory cues and made less informed decisions, which lowered their accuracy in prospective memory tasks [Chiossi et al., 2023].

4.4.3. How Much Information is Retained from SVF?

In research on the impact of SVF on cognitive processes, significant attention has been devoted to the issue of information retention conveyed through these media. Short videos, characteristic of platforms like TikTok or Instagram, raise questions about the effectiveness of information transmission in the context of long-term retention [Chiossi et al., 2023].

Scientific research in the fields of neurobiology and cognitive psychology indicates that the time needed to effectively process and retain new information is much longer than a few seconds. These processes require time for encoding information in working memory, integrating it with existing knowledge, and eventually transferring it to long-term memory [Craik, Lockhart, 1972]. Chandler's study (1991) highlights that effective information processing and retention require sufficient time for assimilation and knowledge integration, which is hindered by short, intense stimuli like SVF [Chandler, Sweller, 1991].

Additionally, in a publication by Mayer and Moreno (2010), the authors note that multi-media can overload working memory, making effective learning difficult. When video content is too short and intense, the risk of cognitive overload increases, which can negatively impact retention [Mayer, Moreno, 2010]. In the context of SVF, the fast pace and high stimulus volume may result not only in increased cognitive load but also in reduced ability to assimilate and retain information long-term.

Experiments conducted by Lang (2000) suggest that the human brain has a limited capacity for processing information, and in the case of short, intense stimuli, this can lead

to selective attention and limited retention [Lang, 2000]. In an environment where users are inundated with short, fast-paced content, these mechanisms can hinder the effective consolidation of memories.

CHAPTER 5

The Impact of Short Video Formats on Daily Life

5.1. Motivation to Undertake Challenging Tasks

In the context of the impact of SVF, such as TikTok content, on daily life, the issue of motivation to undertake challenging tasks becomes particularly interesting. The intense and short-lived stimuli provided by these media can lead to temporary increases in dopamine levels. However, after the pleasurable effects of this neurotransmitter subside, users may experience a "dopamine crash," characterized by reduced motivation and difficulty engaging in less stimulating but important long-term tasks [Almachnee, Cozzie, 2022].

In an article by Haynes (2018), the author argues that chronic stimulation of the dopaminergic system by social media can lead to its dysregulation [Haynes, 2018], resulting in a decrease in overall motivation to engage in activities that do not provide immediate dopamine rewards. This dysregulation can significantly impact the ability to achieve long-term goals, such as learning new skills or persisting in achieving professional and personal objectives, which require much more effort and are less "rewarding" in the short term [Dresp-Langley, 2023].

5.1.1. Physical Activity

In the context of motivation to undertake challenging tasks, one cannot overlook the impact of dopamine overload caused by excessive use of SVF on the willingness to engage in physical activity. This phenomenon reflects how digital habits can affect physical aspects of life, including regular sports participation. Dopamine overload can reduce motivation to engage in activities that do not provide immediate gratification, such as physical activity, which is often associated with initial fatigue and discomfort [Ruiz-Tejada et al., 2022].

On the other hand, regular physical activity can act as a natural regulator of dopamine levels, restoring balance after excessive stimulation by digital media [Ruiz-Tejada et al., 2022]. Exercising stimulates the production of endorphins, known as natural "happiness-inducing" substances, which can counteract dopamine overload and improve overall mental health [Schoenfeld, Swanson, 2021]. Additionally, physical activity increases the ability to tolerate discomfort and pain, which can contribute to better coping with life challenges, creating healthier reward and motivation mechanisms [Årnes et al., 2023].

5.2. Sleep and SVF

Studies suggest that excessive use of video content such as that available on platforms like TikTok can lead to overstimulation of the Reticular Activating System (RAS), which plays a key role in regulating the sleep-wake cycle [Ko et al., 2023]. Additionally, dopamine spikes triggered by fast-paced content can also negatively impact a healthy sleep rhythm [Oishi, Lazarus, 2017].

The RAS, as part of the brainstem, is crucial for maintaining wakefulness and processing sensory stimuli. Overstimulation of the RAS, caused by the continuous change of stimuli in SVF, can lead to difficulty falling asleep as the brain remains in a heightened state of readiness to process new information, even after the device is turned off.

Moreover, dopamine spikes resulting from positive reinforcement and engagement in social media can disrupt the natural sleep rhythm. Dopamine, a neurotransmitter associated with the brain's reward system, naturally increases in response to positive experiences and survival-related behaviors. However, excessive dopamine stimulation caused by social media can shift the natural neurochemical balance, affecting the ability to relax and wind down before sleep [Oishi, Lazarus, 2017].

Ultimately, both excessive RAS stimulation and uncontrolled dopamine spikes can lead to serious disruptions in the sleep-wake cycle, manifesting as difficulty falling asleep, reduced sleep quality, and feelings of fatigue and lack of refreshment upon waking. Healthy sleep is fundamental to proper cognitive, emotional, and physical functioning, making it important to understand and limit the negative effects of SVF on sleep as a matter of public health significance.

5.3. Learning and Education

Significant concerns have been raised regarding the impact of media like TikTok on attention span and the ability to engage in long-term cognitive processes such as learning. Additionally, the dopamine reward mechanism, which is inherently a positive motivational system in the brain, can be disrupted by the constant and immediate gratifications offered by social media content, negatively affecting motivation to learn [Hamid et al., 2015].

Studies conducted in China provide concrete data on the impact of intensive use of platforms like TikTok on academic performance. In a study published in the *Journal of Educational Psychology*, a research team monitored a group of high school students, observing their social media habits and academic outcomes. The results showed that students who spent more time on platforms like TikTok had, on average, lower test scores and grades, which researchers attributed to shortened attention spans and reduced ability to engage in deep intellectual work [Ettisa, 2023].

One of the key findings of these studies is that constantly switching attention between short, fast-paced content can lead to difficulties in maintaining focus on one task for an extended period, which is essential for learning. Additionally, the study highlighted that the dopamine reward mechanism, which is naturally designed to promote learning behaviors by rewarding achievements, can become "overloaded" by the constant and rapid dopamine stimuli offered by social media content. This "overload" can reduce overall motivation to tackle more challenging educational tasks that do not offer immediate rewards [Ettisa, 2023].

Another study conducted in China aimed to examine the impact of intensive use of platforms like TikTok on students' academic performance. The research team monitored the social media habits and academic performance of a group of high school students.

The study's results showed that students who spent more time on platforms like TikTok had, on average, lower test scores and grades. Researchers attributed this to shortened attention spans and reduced ability to engage in deep intellectual work. Additionally, the experience of "flow" (a state of full engagement and concentration, where a person is absorbed in the task at hand) in using SVF had a positive effect on addiction to this content, which in turn negatively impacted both intrinsic and extrinsic motivation to learn and well-being related to learning. The fast pace and high volume of stimuli in SVF can lead to cognitive overload, further hindering effective retention and acquisition of knowledge.

Moreover, the analysis of the results revealed several key correlations. First, the more time students spent watching SVF, the more their ability to maintain attention on longer educational tasks decreased. This indicated the development of interruption habits, leading to fragmentation of the learning process. Questionnaire results also revealed that students often neglected homework and study in favor of watching videos, further lowering their academic achievements.

Another important finding was that excessive use of social media led to decreased engagement in traditional forms of learning, such as reading books and participating in extracurricular activities. This phenomenon was particularly noticeable among students who showed a high level of addiction to apps like TikTok. The study also found that these students were more likely to experience symptoms of stress and anxiety, which further negatively impacted their ability to learn effectively.

In the social aspect of the results, the study showed that students who spent a lot of time on TikTok had fewer interactions with peers in an educational context. Instead of collaborating on projects or studying in groups, they chose to use social media individually, which limited their collaboration and interpersonal communication skills [Ye et al., 2022].

In conclusion, the impact of SVF on learning and education is complex and multidimensional. It should be noted that uncontrolled use of these platforms can lead to negative consequences for concentration, deep thinking, and motivation to learn.

5.4. Social Relationships

The modern digital landscape, dominated by platforms like TikTok, significantly impacts the shaping of social relationships, especially among young people. This trend brings both positive and negative consequences for social interactions, where traditional forms of building social bonds are increasingly being replaced by digital counterparts [Guo, 2022]. This phenomenon raises several questions about the influence of SVF on the perception of interpersonal relationships and the way social needs are being met.

5.4.1. Meeting Social Needs by Watching Strangers

TikTok, offering an endless amount of content from people around the world, allows users to virtually participate in the lives of others, often without reciprocal interaction. Meeting social needs in this way can have multiple effects. First, such behavior can lead to a sense of false closeness and satisfaction, where users feel connected to content creators despite having no direct contact with them. This can replace traditional social interactions, which, in the long term, may weaken real interpersonal relationships and lead to social isolation [Sacco, Ismail, 2014]. Prolonged engagement in observing others' lives can also cause social media addiction. The growing need to browse new content and keep up with the lives of observed individuals can lead to spending significant amounts of time on the platform, which can negatively affect productivity and the ability to focus on other important aspects of life.

Excessive use of apps like TikTok can lead to serious consequences for users' social relationships. Intense use of these apps is associated with higher levels of social anxiety and isolation, resulting in weakened quality of interpersonal relationships. People who experience anxiety in face-to-face interactions often use social media as a safer alternative, which may deepen their isolation. Additionally, users of SVF apps often exhibit a strong attachment to the platform, further intensifying their addiction and reducing motivation to form real, lasting relationships. This attachment to social media can lead to the neglect of real social contacts, negatively affecting the ability to build and maintain satisfying interpersonal relationships [Zhanga et al., 2019].

5.4.2. Unrealistic Views of Body Image

TikTok, like other social media platforms, often portrays idealized body images that are difficult, and sometimes impossible, for the average person to achieve. Filters and image editing allow users to present themselves in ways that can significantly deviate from their real appearance. Such portrayals can put pressure on other users to strive for unrealistic and often unhealthy beauty standards. Constant exposure to idealized images can lead to body image disorders, low self-esteem, and eating disorders [Górska et al., 2023; Pan et al., 2022].

CHAPTER 6

Empirical Study

To enrich this research, an online questionnaire was conducted, targeting a broad group of respondents. The aim of the study was to gain an in-depth understanding of the impact of SVF on various aspects of daily life and to assess their effects on users' cognitive functions. The questionnaire was designed to gather data on the time spent watching SVF, as well as subjective perceptions of sleep quality, concentration ability, and the desire to limit this activity. The survey results allowed for the identification of key correlations and the drawing of conclusions regarding the potential risks and benefits associated with SVF consumption.

6.1. Study Design

6.1.1. Method

The study was conducted using a Google Forms survey, which allowed for easy collection of responses anonymously. The form was available online, allowing access to a wide range of respondents (see Appendix 1).

6.1.2. Sample Characteristics

The questionnaire was conducted online with a sample of 100 respondents. The demographic structure was relatively balanced by gender, with 54

6.1.3. Ethical Procedure

The survey was fully anonymous. The introduction to the questionnaire included information about the purpose of the study, data anonymity, and the possibility of withdrawing from the survey at any time. Respondents were informed that their email addresses would not be visible to the author of the form, further enhancing their sense of security and privacy.

6.1.4. Questionnaire Design

The questionnaire was designed to collect the following data:

- Demographic: gender, age, and education level of the respondent.
- Viewing time: subjective assessment of how much time respondents spend watching SVF.
- Attempt to limit: whether the respondent has ever tried to limit watching SVF.
- Effectiveness of the attempt: how the respondent evaluates the effectiveness of their attempt to limit viewing.
- Negative professional impact: subjective assessment of whether SVF negatively affects the respondent's professional life or education.
- Negative social impact: subjective assessment of whether SVF negatively affects the respondent's social life.
- Average amount of sleep: estimated by the respondent as their average amount of sleep.
- Sleep quality: how the respondent rates the quality of their sleep.
- Regular physical activity: whether the respondent exercises regularly.
- Exercise time: how much time the respondent spends on physical exercise per week.
- Difficulty concentrating: whether the respondent feels they have difficulty concentrating.
- Concentration ability: how the respondent rates their ability to focus.

6.2. Data Preparation

In preparing the data for statistical analysis, several steps were taken to ensure consistency, accuracy, and the proper formatting of variables. Data analysis was conducted using the SPSS (Statistical Package for the Social Sciences) software. Before the analysis, the data were verified to ensure consistency and completeness:

- Checking for and removing missing or incorrect values.
- Configuring the type and format of variables.

Several variables initially entered as text were converted into numerical formats to enable analysis. For example: "Viewing time" was converted from textual descriptions (e.g., "1 to 3 hours per week") into numerical values (e.g., 2). Sample value labels are:

- 1: "I do not watch this type of content"
- 2: "No more than 3 hours per week"
- 3: "3 to 6 hours per week"
- 4: "6 to 9 hours per week"
- 5: "9 to 14 hours per week"
- 6: "More than 14 hours per week"

6.3. Research Methodology

A series of statistical analyses were conducted to examine the relationships between time spent watching SVF and various aspects of respondents' lives, including sleep quality, concentration ability, and other life impacts. Chi-square tests, Spearman's rank correlation, and linear regression were used for data analysis.

6.3.1. Chi-square Test

The chi-square test was applied to examine the relationship between the variable "Viewing time" and the variables "Negative professional impact," "Negative social impact," "Regular physical activity," and "Concentration ability," which are nominal variables with "yes" or "no" responses. The chi-square test helps assess whether there is a statistically significant relationship between the categories of qualitative variables and the "Viewing time" variable.

6.3.2. Spearman's Rank Correlation

Spearman's rank correlation was used to examine the relationships between ordinal variables. The analyses included correlations between "Viewing time" and the following variables:

- "Sleep quality"
- "Exercise time"
- "Concentration ability"
- the quantitative variable "Average amount of sleep"

6.3.3. Linear Regression

Linear regression analysis was conducted to examine the impact of the "Viewing time" variable on the "Average amount of sleep" variable. Linear regression allows for the assessment of how much the independent variable (time spent watching SVF) influences the dependent variable (the average number of hours of sleep).

6.3.4. Summary

The use of various statistical methods enabled a comprehensive analysis of the relationships between time spent watching SVF and various aspects of the respondents' lives. The chi-square test allowed for the examination of qualitative relationships, Spearman's rank correlation enabled the evaluation of monotonic relationships between ordinal variables, and linear regression facilitated a detailed analysis of the influence of one variable on another.

CHAPTER 7

Results

7.1. Main Section of the Questionnaire

The main part of the survey began with a question about how much time respondents spend weekly watching SVF, such as TikTok, Shorts, Reels. Respondents could choose one of six options:

- I don't watch such videos
- No more than 3 hours per week
- 3 to 6 hours per week
- 6 to 9 hours per week
- 9 to 14 hours per week
- More than 14 hours per week

To help respondents estimate their time, the following information was included in the question: "(Based on Oberlo 2024 data, the average active TikTok user spends nearly 7 hours per week on the platform)" [Singh, 2024]. The distribution of responses is shown in Figure 1.

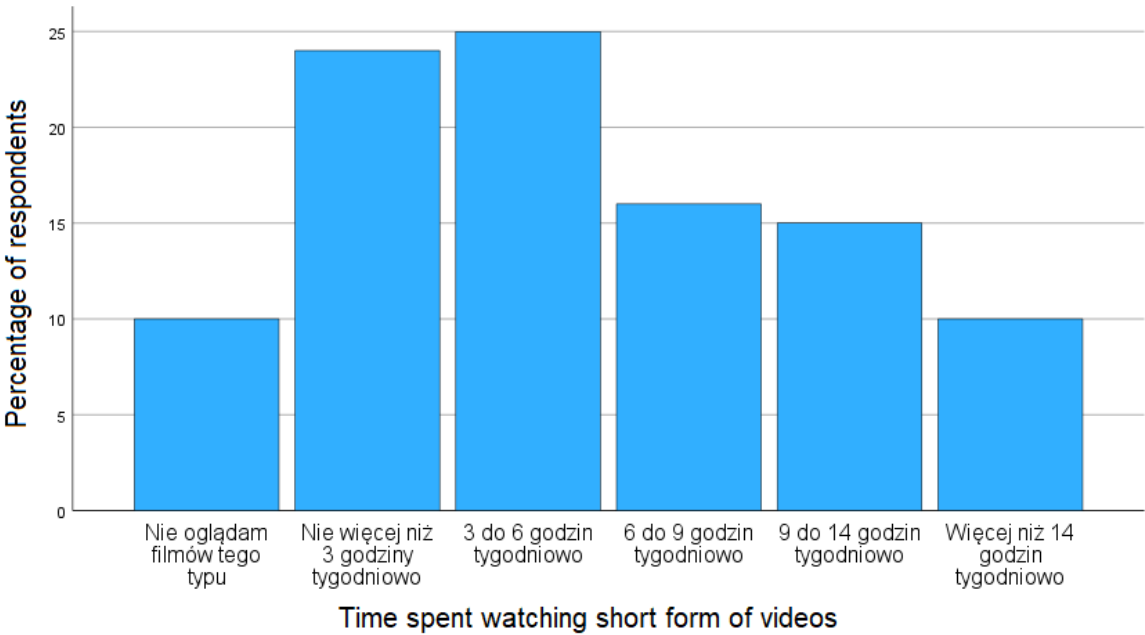


Figure 1: Chart showing the distribution of subjective assessments of average time spent watching SVF.

Questions Related to Attempts to Cut Back

The next part of the questionnaire asked whether respondents had ever tried to reduce their time spent watching short-form videos. Out of 90 respondents who answered this question, 57 stated that they had attempted to limit their viewing. Those who did not watch such videos skipped this question. The 57 respondents who had tried then rated how successful they were in reducing their viewing on a seven-point scale, where 1 meant "Not successful at all" and 7 meant "Completely successful." The dominant response on this scale was 4, which can be interpreted as "Somewhat successful." No one selected 1 ("Not successful at all"), while 50.9% of respondents rated their attempts positively (at levels 5 to 7), and 21.1% gave a neutral response (4), as shown in Figure 2.

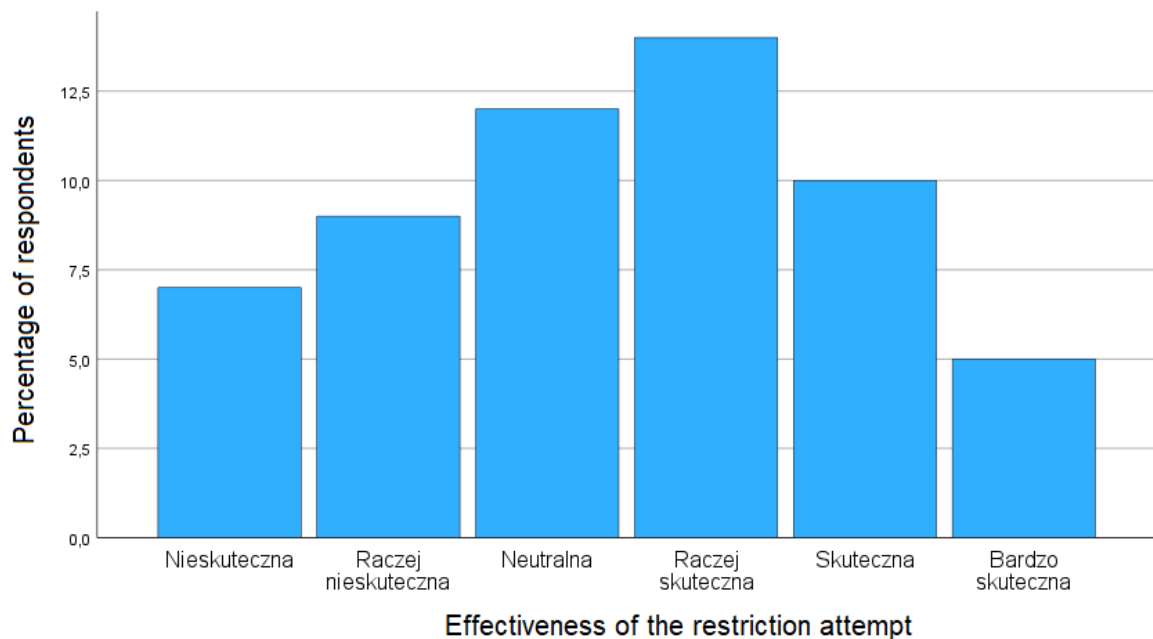


Figure 2: Chart showing the distribution of subjective assessments of the success of attempts to reduce viewing of SVF.

Questions About the Impact on Life

Respondents were then asked whether they believed that watching SVF negatively affects their professional or educational life and their social life. Of the 90 respondents:

- 37 stated that watching SVF negatively affects their professional or educational life.
- 34 stated that watching SVF negatively affects their social life.

Questions About Sleep

All respondents then answered questions regarding the quality of their sleep and the average duration of their sleep. On a seven-point scale, where 1 meant "Very poor sleep quality" and 7 meant "Very good sleep quality," the average rating was 4.9. The average declared sleep duration was 7.22 hours.

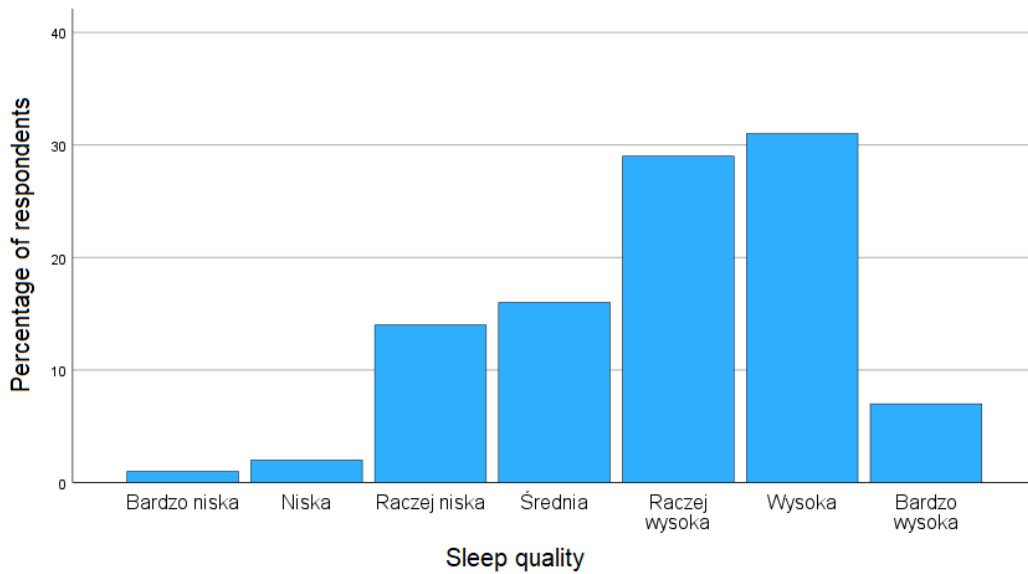


Figure 3: Chart showing the distribution of subjective assessments of sleep quality.

Questions About Attention Span

The final section of questions consisted of two questions regarding the ability to concentrate. Respondents were asked whether they noticed any issues with their attention span and how they generally rated their ability to focus. A total of 66% of respondents stated that they had trouble focusing. Despite this, the general ability to concentrate was dominantly rated at 4 on a six-point scale, meaning "Rather high" ability. This rating was given by 29% of respondents.

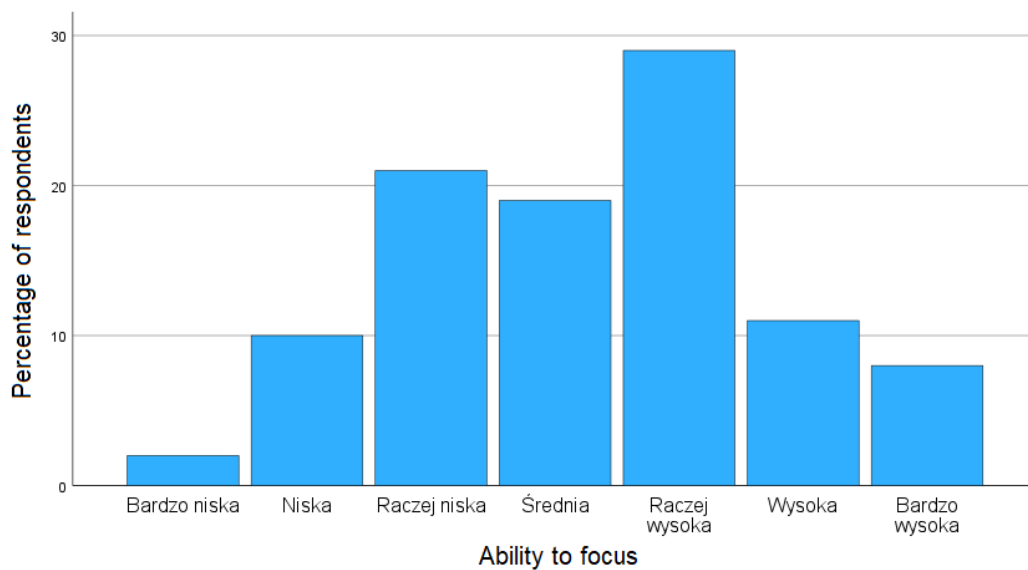


Figure 4: Chart showing the distribution of subjective assessments of one's ability to focus.

Questions About Exercise

The next general question asked whether respondents regularly engaged in any physical activity and how much time per week they spent on physical exercise. Among the respondents, 53% stated that they were regularly active. The most commonly selected time range for weekly physical activity was "1 to 3 hours," reported by 40% of respondents. Overall, 59% of respondents exercised for less than 3 hours per week.

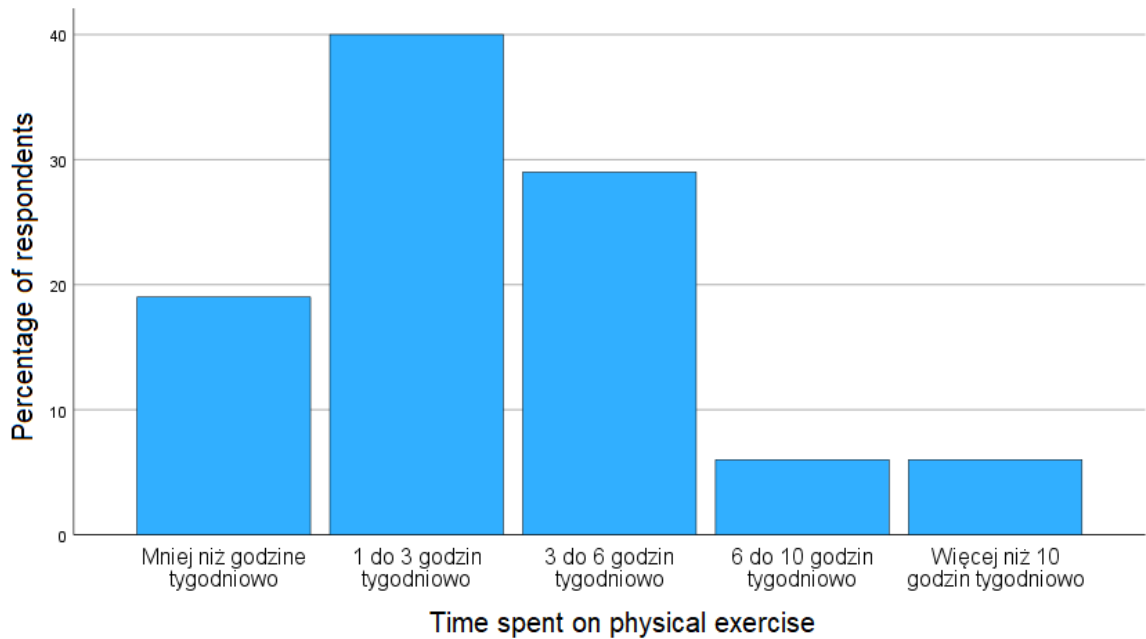


Figure 5: Chart showing the distribution of subjective assessments of average time spent on physical activity.

7.2. Statistical Tests

The chi-square test was conducted to determine if there was a relationship between the variable "Viewing time" and the binary variables "Attempt to reduce," "Negative professional impact," "Negative social impact," "Regular physical activity," and "Attention issues." All correlation significance coefficients were greater than 0.05, indicating no statistically significant relationship between these variables.

Time Spent Watching SVF and Time Spent on Physical Exercise

No statistically significant correlation was found between time spent watching SVF and time spent on physical exercise ($p = 0.205$). This suggests that in the sample studied, the amount of time spent watching SVF does not correlate with weekly physical activity levels.

Relationship Between Viewing Time and Ability to Focus

A statistically significant, albeit slight, negative correlation was found between time spent watching SVF and the ability to focus ($r = -0.202$, $p = 0.044$). This indicates that respondents who spend more time watching SVF rate their ability to concentrate as poorer.

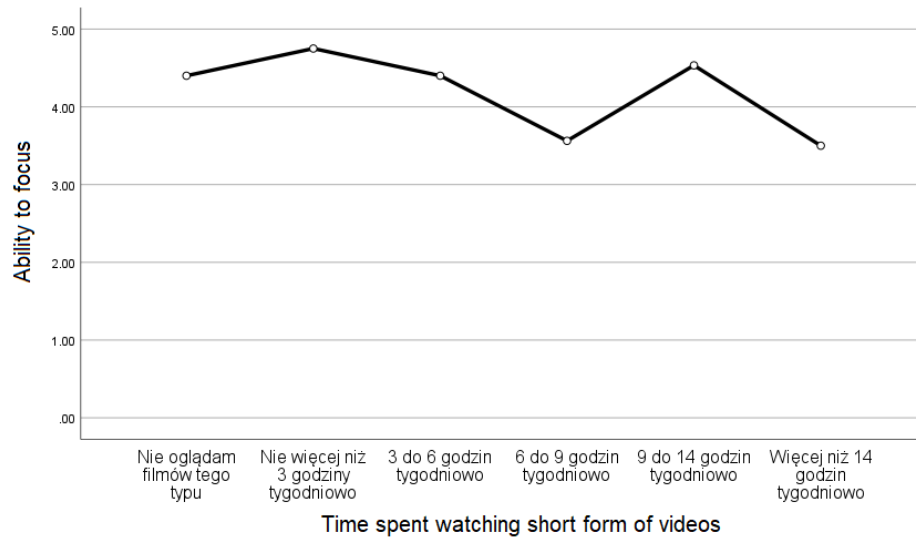


Figure 6: Chart showing the relationship between viewing time and ability to focus.

Viewing Time and Sleep Quality

There is a statistically significant, slight negative correlation between time spent watching SVF and sleep quality ($r = -0.252$, $p = 0.011$). This indicates that respondents who spend more time watching SVF rate their sleep quality as poorer.

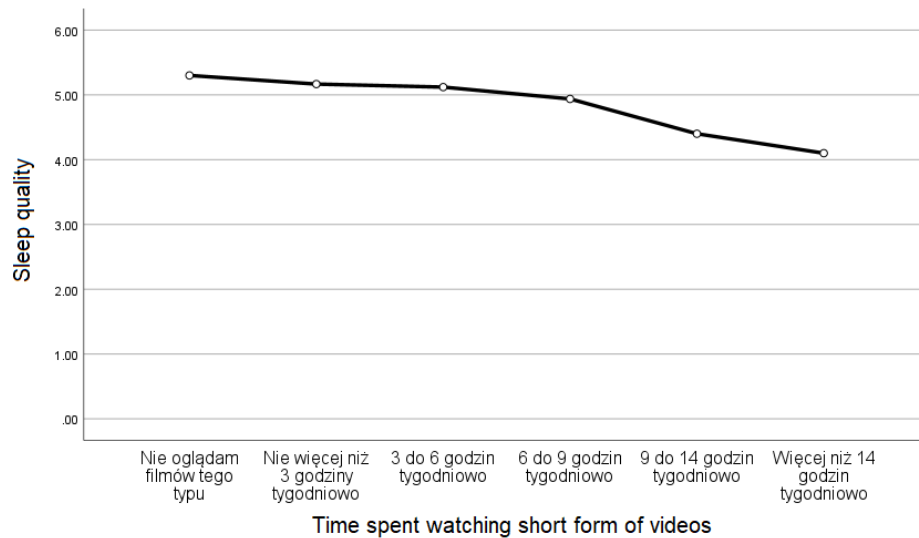


Figure 7: Chart showing the relationship between viewing time and sleep quality.

Viewing Time and Average Sleep Duration

A statistically significant, slight negative correlation was found between time spent watching SVF and average sleep duration ($r = -0.247$, $p = 0.013$). This suggests that respondents who spend more time watching SVF tend to sleep less on average.

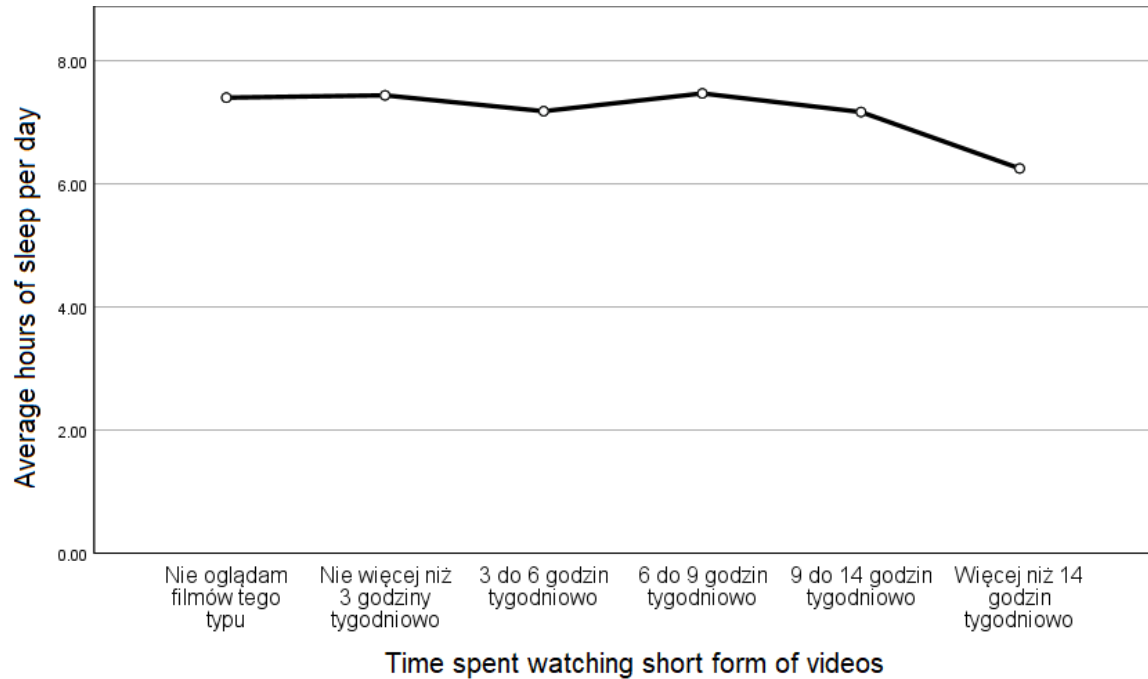


Figure 8: Chart showing the relationship between viewing time and average sleep duration.

The linear regression results also confirmed that time spent watching SVF has a statistically significant negative effect on average sleep duration ($B = -0.340$, $\beta = -0.234$, $p = 0.019$). Moving to the next time bracket for viewing hours is associated with a decrease in average sleep duration by 0.161 hours, according to respondents' answers.

Ability to Focus and Sleep Quality

Additionally, a statistically significant, slight positive correlation was found between the ability to focus and sleep quality ($r = 0.269$, $p = 0.007$). This suggests that respondents who rate their sleep quality higher also rate their ability to focus better.

7.3. Implications for Practice and Future Research

The results of the analyses indicate significant negative correlations between time spent watching SVF and both sleep quality and duration, as well as attention span. This suggests that excessive use of such platforms may lead to health and cognitive issues.

It is necessary to raise awareness of the potential negative effects of excessive use of SVF. It is important to introduce strategies for managing time spent on such platforms, particularly before sleep, to minimize their negative impact on health and cognitive functions.

Further research should focus on the mechanisms underlying these relationships and on interventions that could mitigate negative effects. Longitudinal studies should also be considered to assess the long-term effects of SVF use to better understand their impact on users' mental and physical health.

Discussion

Impact on Sleep Quality

One of the most significant findings from the study is the substantial effect that SVF has on the sleep quality of its users. Analysis of the results revealed a statistically significant relationship between the time spent watching such content and a decline in sleep quality. Users who spend more time consuming short video formats more frequently report sleep issues, including difficulty falling asleep, interrupted sleep, and feeling tired upon waking.

The underlying mechanism of this relationship can be explained through the excessive stimulation of the Reticular Activating System (RAS) and increased dopamine levels. The high intensity of visual and auditory stimuli, characteristic of SVF, leads to an overload of the nervous system, making it difficult to initiate the sleep process. Additionally, continuous dopamine stimulation can disrupt the body's natural circadian rhythm, causing issues in maintaining a regular sleep-wake cycle. Such sleep disorders can have wide-ranging negative consequences, including decreased cognitive function, weakened immune system, and an increased risk of mood disorders such as depression and anxiety [Blume et al., 2019; Walker et al., 2020].

The results of a recent survey conducted by Zhe Zhao (2024), involving 337 students, align with my findings on the correlation between time spent watching SVF and sleep quality. In the cited study, participants completed the following research tools:

- **Short-form Video Addiction Scale:** Consisting of 14 items covering four dimensions: withdrawal, avoidance, loss of control, and inefficacy.
- **Sleep Quality Scale:** Assessing sleep quality over the past month, where higher scores indicate worse sleep quality.
- **Physical Activity Scale:** Measuring intensity, duration, and frequency of physical activity.
- **Procrastination Self-Assessment Scale:** Consisting of 19 items, where higher scores indicate greater procrastination.

The study results showed that addiction to short-form videos was positively correlated with poorer sleep quality ($r = 0.456$, $p < 0.001$) and higher procrastination ($r = 0.278$, $p < 0.001$), and negatively correlated with physical activity levels ($r = -0.193$, $p < 0.001$). The correlation with sleep quality at 0.456 indicates a moderate strength of this relationship. In my study, a weaker correlation was obtained in this area, and no correlation with physical activity levels was found, which may be due to the larger sample size in Zhao's study. Additionally, Zhao's study found a positive correlation with procrastination self-assessment, suggesting a significant connection between SVF and the ability to focus, which will be further discussed in the next section [Zhao, Kou, 2024].

Impact on Ability to Focus

Another key finding from the study is the negative impact of SVF on the ability to focus. Various hypotheses suggest that there is a negative correlation between the time spent watching SVF and the ability to concentrate, which was confirmed by the survey conducted. Users who regularly consume such content report greater difficulties in maintaining focus on a single task for extended periods.

A survey conducted by Jin Xie and his team (2023), involving 1047 students from seven central universities in China, aimed to examine the relationship between SVF addiction and various academic abilities and tendencies. Respondents completed the following research tools:

- **Short-form Video Addiction Scale:** Based on the Internet Addiction Diagnostic Questionnaire (IADQ).
- **Attention Control Scale:** Consisting of two dimensions: attention focus and attention shifting.
- **Boredom Proneness Scale:** Containing two categories of stimuli: external and internal.
- **Academic Procrastination Scale.**

The study results showed that addiction to short-form videos was negatively correlated with attention control ($r = -0.23$, $p < 0.001$) and positively correlated with academic procrastination ($r = 0.17$, $p < 0.001$) [Xie et al., 2023]. My study focused on the relationship between time spent on SVF and addiction, but these variables are closely related. The correlation between SVF addiction and attention control found in the study is consistent with my survey results regarding the time spent on SVF and the subjective assessment of the ability to focus. The findings on the correlation with academic procrastination may also be indirectly related to the impact of SVF on attention span. My survey results are also consistent with the findings of a study conducted by Yuhan Chen (2022) on a group of 44 students, which was detailed in the subchapter "Impact on Attention and Concentration" above [Chen et al., 2022].

Positive Impact of SVF

SVF, such as those presented on social media platforms like TikTok, also have certain positive aspects that contribute to their growing popularity and educational value. While addiction to such content may lead to concentration problems and mental health issues, there are also benefits to their use.

Easy Access to Information

SVF allows for quick and easy access to information, which is particularly beneficial in today's fast-paced world. Due to their concise form, users can absorb essential information in a short amount of time, which is useful both in everyday life and in education. TikTok, for example, offers a wide range of educational videos that convey condensed knowledge on various topics, from language learning to self-improvement techniques. However, it is essential to note that users may not retain large amounts of information from this form of media [Lemmi, 2023].

Education Tailored to Youth

SVF are perfectly suited to the needs of young people, who prefer fast, visual, and interactive forms of communication. Platforms like TikTok promote educational initiatives that engage young people in the learning process through entertainment and interaction. In this way, young people are more likely to absorb new information and skills, which can positively impact their academic performance and personal development [Lemmi, 2023].

Sense of Community

One of the important social aspects of SVF is the building of a sense of community. Platforms like TikTok allow users to make new connections, share their interests and passions, and support one another. By creating and sharing their own videos, users can gain recognition and connect with people who share similar interests, which can positively impact their well-being and sense of belonging [Lemmi, 2023].

Stress Relief

SVF also serve an entertainment and therapeutic function, helping users relieve stress and tension. Watching funny videos, participating in dance challenges, or creating creative content can be an effective way to relax and improve mood. For many users, creating and watching SVF is a form of expression and a way to cope with everyday challenges [Lemmi, 2023].

Study Limitations

Sample Characteristics

Most of the participants were students, which could have influenced the results. Students often have specific habits related to watching videos and using technology, which may not be representative of the general population. Additionally, most of the participants were well-educated. Education can affect health awareness, sleep habits, and technology usage, which may also impact the results.

Data Collection Method

The study was conducted online, which may have affected the results. Conducting the research in a controlled, in-person environment would allow for better control over the conditions under which the responses were given, potentially reducing the influence of external factors on the results. Furthermore, an in-person study would allow for direct interaction with participants, which could increase the accuracy and reliability of the collected data.

Lack of Availability of Different Age Groups

The study did not include teenagers, who constitute one of the main user groups of SVF (short video formats). The habits and effects of using these platforms may significantly differ in this age group. Teenagers are particularly sensitive to the influence of social media on both their health and behavior, which would be an essential aspect to examine. The absence of this age group limits a full understanding of SVF's impact on various population segments, and including teenagers in future research could provide valuable insights into the specific risks and benefits associated with using such platforms.

Future Research Perspectives

Expanding the Sample Size

Conducting the study on a larger and more diverse sample could help obtain more representative results. Including individuals from various age groups, education levels, and professions would allow for a better understanding of how SVF impacts different aspects of life. An important next step would be conducting similar studies among teenagers. Understanding how SVF affects the health and behavior of this age group is crucial, as teenagers are often more vulnerable to the negative effects of excessive social media use.

Diversity of Data Collection Methods

It would be valuable to consider using objective measures of time spent watching videos and sleep quality, such as activity monitors or apps that track time spent on devices. This would allow for more precise data collection and reduce subjective errors in participants' self-assessment. More reliable data could be obtained through various biological markers, such as brain imaging or dopamine level monitoring. For example, studying brain reactions while watching SVF could lead to a better understanding of the neurobiological mechanisms behind the effects of short video formats on users' health and behavior.

Longitudinal Studies

Conducting long-term studies could provide valuable insights into the long-term effects of using SVF. Tracking the habits and health of participants over several years could reveal what long-term consequences excessive use of these media may have.

Concluding Remarks

The mechanisms of instant gratification and continuous stimulus change, characteristic of SVF, lead to brain adaptations that begin to favor short-term, intense stimuli. These adaptations can affect cognitive functioning, reducing the ability to maintain sustained attention. This process is particularly significant in the context of education and professional work, where concentration skills are critical for effective task performance.

SVF, through continuous dopamine stimulation, impact the brain's reward system, altering perceptions and expectations of more complex and time-consuming tasks. As a result, users may experience difficulties in engaging with activities that do not provide immediate gratification, leading to decreased motivation and productivity. These changes may have far-reaching consequences, affecting academic performance, career development, and overall cognitive abilities [Almachnee, Cozzie, 2022; Dresch-Langley, 2023].

The conducted survey provided important insights into the links between SVF usage and sleep quality, as well as the ability to focus, particularly among young adults. The research findings cited in this work also indicate significant correlations between time spent consuming SVF and various aspects of mental and physical health. The obtained data not only highlight the complexity of interactions between digital media use and daily functioning but also emphasize the potential risks associated with excessive use of such media formats.

Of course, excessive engagement in any behavior can lead to negative consequences. This paper focused on SVF due to their unique ability to trigger dopamine release. The high potential of SVF to induce satisfaction and pleasure makes them a potential candidate for

behavioral addiction. Such addiction can lead to excessive consumption of this content, consequently causing various negative impacts on different aspects of our lives.

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Appendix 1

Short Video Forms Questionnaire

I am a student of cognitive science at the Adam Mickiewicz University. Filling out this questionnaire will help me gather the data I need for my bachelor's thesis: The Era of Short Video Forms - A Neurobiological Perspective, under the supervision of Dr. Katarzyna Kryściak. The form is completely anonymous, filling out the questionnaire takes about 2 minutes, and you can stop and exit the form at any time. The email address of the respondent will not be visible to the form author.

* Indicates a required question

1. Gender *

Select only one answer.

- Female
- Male
- Other

2. Age (in years) *

--

3. Education *

Select only one answer.

- Primary
- Vocational
- Secondary
- Bachelor/Engineer
- Master
- PhD or higher

4. How much time do you spend on average watching short videos like TikTok, Shorts, Reels, Clips? (Based on Oberlo 2024 data, the average active TikTok user spends nearly 7 hours per week on the platform). *

Select only one answer.

- I don't watch this type of videos *Go to question 9*
- No more than 3 hours per week

- 3 to 6 hours per week
- 6 to 9 hours per week
- 9 to 14 hours per week
- More than 14 hours per week

5. Have you ever tried to stop or limit watching this type of video? *

Select only one answer.

- Yes
- No *Go to question 7*

6. How successful was your attempt to limit it? Rate on a scale from 1 to 7. *

Select only one answer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Completely unsuccessful - Completely successful

7. Do you think watching videos in this form negatively impacts your professional life or education? *

Select only one answer.

- Yes
- No

8. Do you think watching videos in this form negatively impacts your social life (family, partner, or friendships)? *

Select only one answer.

- Yes
- No

9. How many hours do you sleep on average per day? (in hours)

10. Rate the quality of your sleep on a scale from 1 to 7. *

Select only one answer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very poor sleep quality | Very good sleep quality

11. How much time do you spend on physical exercise on average? *

Select only one answer.

- Less than an hour per week
- 1 to 3 hours per week
- 3 to 6 hours per week
- 6 to 10 hours per week
- More than 10 hours per week

12. Do you regularly engage in any sport? (e.g., running, dancing, weightlifting) *

Select only one answer.

- Yes
- No

13. Do you notice any problems with focusing your attention? *

Select only one answer.

- Yes
- No

14. Rate your ability to focus on a scale from 1 to 7. *

Select only one answer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very hard for me to focus on one task - Very easy for me to focus on one task