Effectiveness of SKY Yoga on Emotional Regulation, Executive Function, and Self-Control in Reducing Internet Gaming Disorder among Adolescents

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***Abstract*—Internet Gaming Disorder (IGD) has emerged as a significant behavioral addiction among adolescents, characterized by impaired emotional regulation, reduced executive functioning, and diminished self-control. Emerging evidence suggests that mind–body interventions such as yoga may enhance cognitive and emotional processes implicated in addictive behaviors. However, limited research has examined the effectiveness of Manavalakalai (Simplified Kundalini Yoga SKY) in addressing psychological mechanisms underlying IGD in adolescents. Focuses on specific psychological mediators (emotional regulation, executive function). Aligns with current RCT trends emphasizing mechanism-based interventions. Enhances scientific clarity and measurability. Suitable for journals in behavioral addiction, adolescent psychology, or integrative medicine.**

Objective: The present study aimed to evaluate the effectiveness of Manavalakalai (SKY) Yoga in improving emotional regulation, executive function, and self-control, and thereby reducing symptoms of Internet Gaming Disorder among adolescent student to reduce internet gaming addiction among adolescents by:

- **Improving emotional regulation**
- **Strengthening executive function**
- **Enhancing self-control**
- **Reducing impulsivity**
- **Improving sleep and mental clarity**

***Index Terms*—Manavalakalai Yoga, Simplified Kundalini Yoga (SKY), Internet Gaming Disorder, Adolescents, Emotional Regulation, Executive Function, Self-Control, Impulsivity Mental clarity**

I. INTRODUCTION

The COVID-19 pandemic significantly transformed the educational landscape worldwide, accelerating digitalization and dramatically increasing internet accessibility among students. With the closure of schools and the shift to online learning platforms, adolescents began relying heavily on smart phones, tablets, and computers for academic purposes. While digital access ensured continuity of education, it simultaneously expanded exposure to online entertainment, particularly mobile gaming. Prolonged screen time, unsupervised internet use, and easy availability of immersive multiplayer games have contributed to a sharp rise in problematic gaming behaviors among adolescents. Developmentally, adolescence is a critical period marked by heightened emotional sensitivity, identity formation, and ongoing maturation of executive brain functions. Excessive gaming during this vulnerable stage can disrupt attention span, impair emotional regulation, reduce academic engagement, and negatively influence sleep patterns and social relationships. Emerging evidence suggests that uncontrolled gaming may over stimulate reward pathways in the brain, potentially leading to compulsive use patterns characteristic of Internet Gaming Disorder (IGD).

Internet Gaming Disorder has been increasingly recognized as a behavioral addiction associated with poor self-control, impaired executive functioning, increased impulsivity, and emotional regulation. Adolescents who struggle with managing gaming habits often experience mood swings, irritability, anxiety, social withdrawal, and reduced academic performance. The excessive use of mobile devices not only affects cognitive development but also interferes with healthy psychosocial growth, family bonding, and real-world social interactions. As digital dependence becomes more prevalent in the post-pandemic era, there is a pressing need for non-pharmacological, school-based interventions that

address the underlying psychological mechanisms contributing to gaming addiction. Mind–body approaches such as Manavalakalai (Simplified Kundalini Yoga – SKY) offer a promising avenue by enhancing self-awareness, strengthening executive control, promoting emotional balance, and improving self-regulation capacities. By targeting these foundational psychological variables, SKY Yoga may serve as a preventive and therapeutic strategy to mitigate Internet Gaming Disorder among adolescents in the digital age.

II. YOGA AN INTRODUCTION

Yoga is an ancient mind–body discipline that originated in India over 5,000 years ago. Its earliest references are found in the Vedas and were later systematically organized in the Yoga Sutras of Patanjali (around 200 BCE), where yoga was defined as "Yogas chitta vritti nirodhah," meaning the regulation or stilling of the fluctuations of the mind. Traditionally, yoga was not limited to physical postures but encompassed ethical principles, breath control (pranayama), meditation (dhyana), and self-discipline aimed at achieving mental clarity and inner balance. Over centuries, various schools such as Hatha Yoga emphasized physical postures and breath practices as tools to prepare the body and mind for meditation. In modern times, yoga has evolved into a globally practiced system for promoting physical health, psychological well-being, and cognitive focus
The calming effect of yoga is largely attributed to its ability to regulate the autonomic nervous system and reduce stress responses. Slow breathing techniques and meditative practices activate the parasympathetic nervous system, lowering heart rate, reducing cortisol levels, and promoting relaxation. Regular practice enhances mindfulness, improves emotional regulation, and strengthens attention control by training individuals to observe thoughts without reacting impulsively. Neuro-scientific research suggests that yoga and meditation improve prefrontal cortex functioning, which is responsible for focus, decision-making, and self-control. By harmonizing breath, body, and awareness, yoga cultivates mental steadiness, enhances concentration, and fosters a balanced state of mind qualities that are especially beneficial for adolescents facing cognitive and emotional challenges in the modern digital era

III. VIDEO GAMING AN INTRODUCTION

Video gaming began in the early 1970s with simple arcade games such as Pong, later evolving into home console systems like Atari and Nintendo. By the 1990s and early 2000s, technological advancements led to highly immersive, interactive, and multiplayer online games. With the rise of smartphones and high-speed internet particularly after the COVID-19 pandemic video games became more accessible than ever before. Adolescents, who are naturally drawn to novelty, competition, and social interaction, became one of the largest user groups. Modern games are designed with reward systems, levels, achievements, and real-time social connectivity, which can increase engagement and prolonged usage. While gaming can offer cognitive benefits such as improved hand–eye coordination and problem-solving skills when used moderately, excessive and uncontrolled gaming has raised concerns among psychologists and educators.
During adolescence, the brain is still developing, particularly the prefrontal cortex, which governs decision-making, impulse control, and emotional regulation. Excessive gaming can over stimulate the brain's reward circuitry, leading to heightened dopamine release and reinforcing compulsive playing behaviors. This may contribute to reduced attention span, mental restlessness, confusion in priorities, sleep disturbances, mood swings, and academic decline. Prolonged exposure to intense visual stimuli and fast-paced virtual environments can also affect concentration and real-world social interaction. When gaming replaces physical activity, face-to-face communication, and structured routines, adolescents may experience emotional imbalance, irritability, and difficulty distinguishing between virtual achievements and real-life responsibilities. Thus, while video gaming itself is not inherently harmful, uncontrolled and excessive use during this sensitive developmental period can negatively influence mental clarity and psychological well-being.

IV. LOST IN THE VIRTUAL WORLD: HOW VIDEO GAMES CONFUSE THE TEENAGE MIND

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V. HOOKED ON THE CONTROLLER: HOW VIDEO GAMES TURN ADOLESCENTS INTO DIGITAL SLAVES

Adolescents become vulnerable to excessive video gaming primarily due to developmental, psychological, and environmental factors. During adolescence, the brain's reward system (linked to dopamine release) is highly sensitive, while the prefrontal cortex responsible for impulse control and rational decision-making is still maturing. Video games are intentionally designed with instant rewards, achievement levels, social competition, and continuous challenges, which strongly stimulate this reward circuitry and create repeated engagement. Additionally, adolescents often seek identity, peer acceptance, and emotional escape; online gaming platforms provide virtual recognition, social belonging, and a sense of accomplishment that may be lacking in real life. Academic pressure, family stress, loneliness, and easy smartphone access further increase dependency. Over time, this combination of neurobiological sensitivity, emotional needs, and constant digital availability can lead some adolescents to develop compulsive gaming patterns, making them feel psychologically dependent or "enslaved" to gaming behavior.

VI. ILL EFFECTS OF VIDEO GAMING

1. Emotional Instability

Emotional Instability refers to difficulty in managing and responding appropriately to intense emotions such as stress, frustration, sadness, or anger. Adolescents often experience heightened emotional fluctuations due to hormonal and developmental changes. When they lack healthy coping strategies, video gaming becomes a convenient escape from negative feelings. Games provide temporary relief, distraction, and a sense of control. Over time, this reliance on gaming as an emotional coping tool can contribute to compulsive use and addiction-like behaviors.

2. Impulsivity

Impulsivity is the tendency to act quickly without careful thought about consequences. During adolescence, the brain regions responsible for self-control and long-term decision-making are still developing. This makes teenagers more likely to engage in instant-gratification behaviors such as prolonged gaming. Fast-paced games with immediate rewards further stimulate impulsive tendencies. As a result, adolescents may struggle to stop playing even when they are aware of academic or personal responsibilities.

3. Low Self-Control

Self-control is the ability to regulate thoughts, emotions, and behaviors in pursuit of long-term goals. Adolescents with low self-control may find it difficult to set limits on screen time. Gaming platforms are

designed to encourage continuous engagement through levels, rewards, and social competition. Without strong internal regulation, students may prioritize gaming over studies, sleep, or family interaction. Persistent lack of control can gradually lead to dependency and problematic gaming patterns.

4. Low Self-Esteem
Low self-esteem involves negative self-perception and lack of confidence in one's abilities. Adolescents who feel inadequate academically or socially may turn to video games where achievements are more attainable and measurable. Online games offer recognition, status, and appreciation from peers, which can temporarily boost confidence. This virtual success may become more rewarding than real-life accomplishments. Consequently, adolescents may increasingly prefer the gaming world over real-world challenges.

Social Anxiety or Loneliness
Social anxiety and feelings of loneliness can push adolescents toward online gaming communities. Virtual environments allow interaction without face-to-face pressure, reducing fear of judgment. Multiplayer games create a sense of belonging and teamwork that may be missing in real life. For socially withdrawn teenagers, gaming becomes a primary source of connection. However, excessive reliance on virtual relationships can weaken real-world social skills and increase emotional isolation.

VII. FIVE PHYSIOLOGICAL FACTORS LINKED TO TEEN GAMING

1. Dopamine Reward System Activation
Video games strongly stimulate the brain's reward circuitry by triggering the release of dopamine, the neurotransmitter associated with pleasure and reinforcement. Each achievement, level completion, or in-game reward provides a surge of satisfaction. During adolescence, the dopamine system is particularly sensitive, making teenagers more responsive to rewarding stimuli. Repeated stimulation can condition the brain to crave gaming experiences. Over time, this may lead to compulsive use similar to other behavioral addictions.

2. Sleep Disturbances
Excessive gaming, especially during nighttime, disrupts normal sleep patterns. Exposure to blue light from screens suppresses melatonin production, a hormone essential for sleep regulation. Adolescents who play late into the night often experience reduced sleep duration and poor sleep quality. Sleep deprivation negatively affects memory, concentration, and emotional stability. Chronic sleep disturbance can further intensify irritability and reduce academic performance.

3. Autonomic Nervous System Imbalance
Intense and competitive games increase physiological arousal by activating the sympathetic nervous system, commonly known as the "fight or flight" response. This can elevate heart rate, blood pressure, and stress hormone levels. Prolonged exposure to such stimulation may lead to chronic physiological stress. Adolescents may feel restless or anxious when not gaming due to this heightened arousal state. Over time, imbalance in the autonomic nervous system can affect emotional regulation and overall well-being.

4. Visual Strain and Neurological Fatigue
Continuous focus on digital screens places strain on the eyes and brain. Rapidly changing images, flashing lights, and high visual intensity can cause headaches and eye discomfort. Extended gaming sessions demand sustained attention, leading to mental fatigue. Neurological overload may reduce cognitive efficiency and concentration in academic tasks. Persistent visual strain can also contribute to irritability and decreased overall productivity.

5. Reduced Physical Activity and Sedentary Lifestyle Effects
Long hours spent gaming often replace physical activity and outdoor play. A sedentary lifestyle can affect blood circulation, posture, and metabolic health. Reduced physical movement limits oxygen flow and energy levels, which are important for optimal brain functioning. Physical inactivity is also linked to mood disturbances and low motivation. Over time, the lack of exercise may negatively influence both physical health and cognitive development in adolescents.

VIII. METHODOLOGY

Work Plan: SKY Yoga Intervention for Reducing Gaming Addiction
Total Duration: 8 Weeks Frequency: 5 Days per Week Session Duration: 45–60 Minutes per Session Setting: School-based / Community-based group session

IX. WEEKLY STRUCTURE OVERVIEW

Phase 1: Foundation (Weeks 1–2)
Focus: Body awareness & calming the nervous system

- Simplified Physical Exercises (15 min)
  - Joint loosening exercises
  - Stretching for neck, shoulders, spine
  - Eye relaxation exercises (important for screen users)
- Kayakalpa Exercise (5 min)
  - Energy conservation & hormonal balance
- Breathing Practices (Pranayama) (10 min)
  - Deep abdominal breathing
  - Alternate nostril breathing
- Agna Meditation (10 min)
  - Focus at eyebrow center
  - Improves concentration and reduces impulsivity
- Short Introspection (5 min)
  - Awareness of gaming habits
  - Self-observation journaling

Phase 2: Emotional Regulation (Weeks 3–5)
Focus: Managing urges & emotional triggers

- Simplified Physical Exercises (15 min)
- Kayakalpa (5 min)
- Nadi Shuddhi / Rhythmic Breathing (10 min)
- Shanti Meditation (15 min)
  - Promotes inner calm and emotional balance
- Introspection Practices (10 min)
  - Analysis of desire
  - Moralization of desire
  - Awareness of consequences of excessive gaming

Phase 3: Self-Control & Cognitive Strengthening (Weeks 6–8)
Focus: Strengthening executive function

- Physical Exercises (15 min)
- Kayakalpa (5 min)
- Advanced Breathing Awareness (10 min)
- Thuriyam Meditation (15 min)
  - Deep mental silence
  - Enhances focus & clarity
- Blessing Meditation (5 min)
  - Reduces anger & social withdrawal
- Structured Reflection (5 min)
  - Set weekly screen-time goals
  - Track reduction progress

X. EXPECTED PSYCHOLOGICAL OUTCOMES

SKY Component	Target Psychological Variable	Expected Benefit
Physical Exercises	Hyperactivity & restlessness	Nervous system balance
Breathing Practices	Emotional dysregulation	Reduced stress & impulsivity
Agna Meditation	Poor concentration	Improved executive function
Shanti Meditation	Anxiety & irritability	Emotional stability
Introspection	Low self-control	Behavioral awareness
Kayakalpa	Hormonal imbalance	Energy regulation

XI. EXPECTED LONG-TERM IMPACT

- Reduced gaming urge
- Improved academic focus
- Better sleep cycle
- Emotional maturity
- Strengthened self-discipline

XII. CONCLUSION

In conclusion, the rapid expansion of digital access particularly following the COVID-19 pandemic has significantly increased adolescents' exposure to online gaming, contributing to rising concerns about Internet Gaming Disorder and its psychological and physiological consequences. Excessive gaming during this critical developmental stage can impair emotional regulation, executive functioning, self-control, sleep patterns, and overall mental well-being. Addressing this issue requires holistic, non-pharmacological approaches that strengthen internal regulation rather than merely restricting external behavior. Manavalakalai (SKY) Yoga, through its integrated practices of simplified physical exercises, breathing techniques, meditation, and introspection, offers a

structured pathway to calm the mind, enhance cognitive clarity, and restore emotional balance. By targeting the underlying mechanisms of impulsivity, reward dependency, and stress reactivity, SKY Yoga may serve as an effective and sustainable intervention to help adolescents regain focus, self-discipline, and psychological resilience in the digital age

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