

# Mechanism of Rehabilitation through Physical Exercise for Adolescents Addicted to Social Media

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**Abstract:** Social media addiction is characterized by excessive use of social media, which has a negative impact on the normal life of individuals. Previous research has mainly focused on the causes of social media addiction, while research on treatment strategies and specific mechanisms of SMA treatment is insufficient. We reviewed the internal mechanisms of social media addiction and evidence of effective exercise intervention therapy, and proposed a conceptual model for effective intervention of social media addiction at the neurophysiological, psychological, and social levels, indicating that exercise can be an effective means of SMA treatment. Our intention is to use conceptual models as the basis for further research in the field of SMA, providing a basis for the formulation of successful treatment strategies for SMA.

**Keywords:** Social media addiction; Exercise Intervention

## 1. Introduction

Social media, including social networking sites (SNS), is the online interaction of social relationships. The difference from face-to-face (offline) interaction is that users can remain anonymous, process information asynchronously, manage nonverbal cues, and express themselves. [1] Through social media, teenagers can interact with real friends online, while also meeting strangers based on common interests on social networks. [2] According to the A systematic negative review, the number of adolescents using social media has increased dramatically over the past two decades. [3] When they continue to use social media to the point of becoming unadapted to it, they exhibit compulsive seeking and using social media, and eventually develop typical behavioral addiction symptoms, such as withdrawal, prominence, tolerance, emotional change, conflict, and recurrent episodes. [4] Scholars have long debated whether social media addiction should be considered a genuine addictive behavior. It is undeniable that social media addiction (SMA) meets the definition criteria for addiction proposed by Griffiths. The components of social media addiction behavior do include saliency, emotional regulation, tolerance, withdrawal symptoms, conflict, and outburst. [5] Obviously, any type of addictive behavior can have adverse effects on individuals, as can social media addiction. Social media addiction (SMA) can lead individuals to ignore real-life relationships and work education conflicts, affect mental concentration, evade reality, generate negative emotions, tolerate, and conceal addictive behaviors. [6] According to a meta-analysis, the prevalence of social media addiction is 24%, with a prevalence rate of 35% in the youth sample, which is well above the average. Up to now, there are almost no papers on the treatment of social media addiction, but some studies have pointed out that the purpose of treating social media addiction is not to completely quit, but to be able to control its use. [7] Gupta, Arora, and Gupta (2013) believe that corrective strategies for social networking addiction include content control software, counseling, and cognitive behavioral therapy. [8] However, based on experience in the treatment of Internet addiction, personalized psychotherapy is difficult to design and time-consuming, and if medication is used, its side effects may affect physical and mental health. The best option is exercise based intervention.

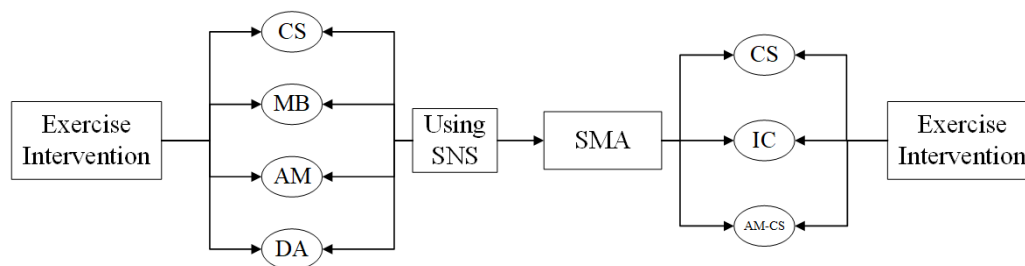
As an alternative or adjuvant therapy for Internet addiction, exercise can reduce depression, anxiety, anger, and improve mood. At the same time, exercise can also improve physical fitness and enhance nervous system functions. Research has shown that during exercise, measurements of smoking addiction, withdrawal symptoms, and negative effects rapidly decrease and continue to decrease within 50 minutes; After exercise, the craving for cigarettes and withdrawal symptoms have decreased. Many scholars believe that exercise is one of the effective ways to improve SMA. [9] Boke's research found that social networking addiction is negatively correlated with exercise. [10] Chen's research shows that regular exercise can regulate perceived health among individuals with low levels of social media addiction. [11]

Therefore, exercise based interventions may be an effective way to alleviate or even eliminate social network addiction. However, the specific mechanism of exercise intervention in social network addiction is still unclear. Researchers have proposed a conceptual model of exercise intervention in social network addiction from a biological, psychological, and social perspective to develop treatment strategies for social network addiction.

## 2. Neurobiological Evidence for Exercise Intervention in Social Media Addiction

"Internet addiction can alter the neurophysiological mechanisms of individuals, including activation of the sympathetic and parasympathetic nervous systems of the autonomic nervous system (ANS) (specifically, Internet addiction involves confrontation between the sympathetic and parasympathetic nervous systems), the dysfunction of the Hypothalamic-Pituitary-Adrenal (HPA) Axis, morphological changes in the central nervous system (CNS), and functional abnormalities in brain regions.", Significant reductions in glial cell derived neurotrophic factor (GDNF) levels and dysfunction of the dopamine system, as well as changes in genes and telomeres. [12] During this process, when addicts stop using the Internet, they will experience tolerance and withdrawal symptoms (mainly manifested as anxiety like symptoms or high levels of irritability) accompanied by physical discomfort. Internet addiction includes computer addiction, information overload, network compulsion, online sexual addiction, and network relationship addiction. [13] Due to its nature as an addiction to online social relationships, social media addiction is likely to have the same neurophysiological mechanism as online addiction. Research has shown that praising, or expressing likes, in social media as a feedback tool for shaping reinforcement learning can activate an individual's brain circuitry and release a large amount of dopamine. [14] Some neurophysiological changes can also occur in the brain of social media addicts, including a decrease in the volume of gray matter in the amygdala striatum system, an increase in the volume of anterior cingulate gyrus, and a decrease in the volume of bilateral posterior insular gray matter in the insular cortex. [15]

Exercise can also alter the neurophysiological mechanisms of the body, including altering the dopamine circuits in the substantia nigra and striatum of the midbrain and those involved in emotional assessment, activating and regulating the hypothalamic axis, promoting the growth of the prefrontal cortex and functional connections between the frontal and parietal executive networks of the brain, regulating the levels of neurotrophic factors such as GDNF to develop and maintain midbrain dopaminergic neurons, repairing axons, and promoting the plasticity of the striatum, Stabilizing and prolonging telomeres. [16] Exercise intervention can effectively improve the striatum (CS) of social media addicts, and to some extent, repair abnormal insular cortex (IC) and amygdala striatum system by repairing neurotrophic factors, axons, and functional connections in brain regions. At the same time, exercise can intervene in social media addiction by replacing, intervening, and inhibiting the striatum (CS), midbrain (MB), amygdala (AM), and dopamine (DA) systems activated during social media liking. As shown in figure 1.[17]



CS: Corpus Striatum MB: Midbrain AM: Amygdala DA: Dopamine IC: Insular cortex  
AM-CS: Amygdala-Striatal system

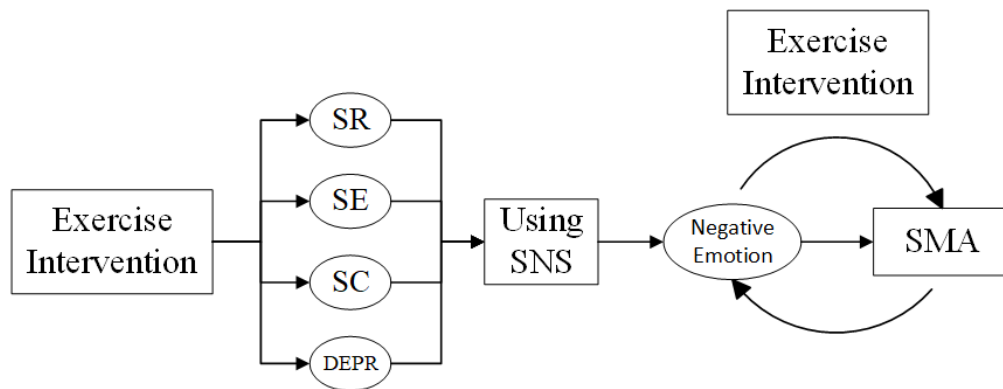
Figure1: How exercise-based interventions may influence the neurobiology of social media addiction.

## 3. Psychological evidence of sports intervention in social media addiction

The psychological characteristics of individuals can well predict the use of social media. For example, low self-esteem, extroversion, lack of responsibility, fear of missing out (FOMO), low self-efficacy, depression, motivation for recreation and self-existence, and poor self-control are significant predictors

of social media use. Among them, extroversion, low responsibility, fear of missing out (FOMO), recreation, and self-existence motivation also predict social media addiction.[18] However, when individuals gradually devote a large amount of time and energy to social media, using social media as an important mechanism for individuals to alleviate stress, loneliness, and depression, and using social media to escape relationships and conflicts in reality, as well as regulate negative emotions, it ultimately leads to individuals' social media addiction. When individuals are excessively immersed in social media, they will experience a brief emotional experience in a high arousal state of mind and physiology, which will also lead to more and more real-life problems. The emergence of these problems will lead them to further participate in social media to alleviate anxiety, negative emotions, and escape from reality. If individuals want to receive SMA rehabilitation, they must break this vicious cycle, and exercise intervention is an effective method.

Therapists arrange or individuals spontaneously exercise to gradually permeate their personal lives. Through further formation of regular training programs, exercise may ultimately be able to disrupt the psychological cycle of SMA by improving self-esteem, self-efficacy, self-control, alleviating depression, maintaining their emotional health, and based on emotional experience (figure 2). [19]



SC: Self-Control SR: Self-Respect SE: Self-Efficacy DEPR: Depression

Figure 2: How exercise-based interventions may influence the psychology of social media addiction.

#### 4. Social level evidence of exercise intervention in social network addiction

From figure 3, research has found that social background, school, parents, and friends can promote risky behavior among adolescents, while interpersonal interactions, social activities, social capital (strong relationships that provide intimacy, trust, and social support), and psychosocial issues can affect the formation of addiction. [20] The more active an individual's social activities are, the more likely they are to become addicted to social media. Dingle et al. believe that addiction is a process of identity loss, in which addicts become socially isolated individuals. Through the establishment of new identities in learning, work, and family roles, they have transformed from addicts into restorers. In this process, social factors are the motivation and obstacle for the rehabilitation of addicts. [21]

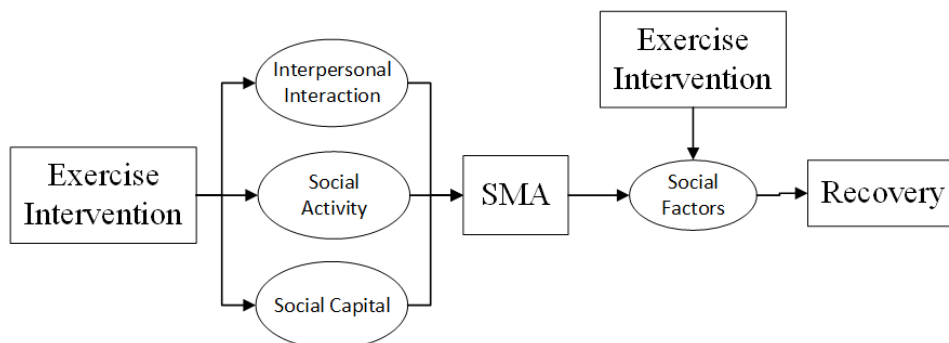


Figure 3: How exercise-based interventions may influence the society of social media addiction.

Research has found that youth participation in physical education courses and activities can provide

opportunities to make friends, develop interpersonal networks, and reduce social isolation, [22] which is also a favorable condition for the development of social capital. At the same time, sports activities provide individuals with a sense of belonging, providing them with the opportunity to interact face-to-face with others, which also supports them in shifting their social activities from offline to online. [23] Therefore, sports can well replace social media in solving individual social and communication problems. Research has proven that exercise intervention, especially group exercise, is a better alternative intervention treatment measure. [24]

## 5. Conclusion and Limitations

In this study, we explain the specific mechanisms of social media addiction in adolescents with exercise intervention through conceptual models at the neurophysiological, psychological, and social levels, and we argue that, in accordance with the specificity of the therapeutic goal of social media addiction treatment, we do not want to completely prohibit social media use, but rather to be able to control it to the extent that we can without compromising normal life. In this way, evidence from neurophysiological, psychological, social aspects and the model we have constructed indicate that exercise intervention is a well-established approach. In our study, exercise was able to partially suppress and repair the detrimental effects that social media can bring to individuals from neurophysiological, psychological, social levels. Campaigns have also been able to address the issue of SMA in terms of reasons for abnormal social media use, overuse. Meanwhile, moderate exercise can also partially replace the function of social media, allow people to use social media normally, and enjoy its convenience and pleasure.

At present, as the research on the mechanism of addiction on social media is still insufficient, for example, the part of the research that we use to explain it at psychological and social levels is cross-sectional and cannot state causality, which limits our interpretation. At the same time, we believe that exercise is not yet sufficient to fully address an individual's social media addiction, for example, at the neurophysiological level, exercise does not address increased anterior cingulate volume, so exercise intervention also needs to be paired with other therapeutic interventions to develop treatment strategies for SMA. Alternatively, because of the possibility of substitution for addiction, campaign interventions may run the risk of converting from social media addiction in adolescents to campaign addiction. [25] This also requires attention in developing therapeutic strategies.

## Data sharing agreement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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