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PATHWAYS AND EVIDENCE OF SPORTS INTERVENTION IN COLLEGE STUDENTS' SHORT VIDEO ADDICTION: AN INTEGRATIVE REVIEW BASED ON INTERNET AND MOBILE ADDICTION RESEARCH

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Pathways and Evidence of Sports Intervention in College Students' Short Video Addiction: An Integrative Review Based on Internet and Mobile Addiction Research

Abstract. With the widespread penetration of short video applications among Chinese college students, the resulting addiction issues have become a serious public health challenge. To systematically explore the potential and pathways of sports intervention in addressing college students' short video addiction, this study first constructed a dual-pathway theoretical model integrating neural and psychological mechanisms, "exercise-addiction," and then conducted a systematic review and evaluation of relevant empirical evidence in China. The results found that structured exercises such as aerobic exercise and dance can effectively improve addiction symptoms and mental health in the short term through neural and psychological mechanisms; however, their long-term effects and optimal dosage remain unclear. Future research urgently needs to incorporate innovative paradigms such as micro longitudinal designs and intelligent adaptive interventions to build precise, dynamic, and sustainable sports intervention models.

Key words: short video addiction, physical exercise, college students, theoretical model, systematic review, intervention paradigm.

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Пути и доказательства воздействия спортивных мероприятий на зависимость студентов колледжа от коротких видеофильмов: комплексный обзор на основе исследований зависимости от интернета и мобильных устройств

Аннотация. В условиях широкого распространения приложений с короткими видео среди китайских студентов проблемы зависимости, вызванные этим, стали серьезной проблемой общественного здравоохранения. Чтобы систематически изучить потенциал и пути вмешательства с помощью физической активности для решения проблемы зависимости от коротких видео среди студентов, данное исследование сначала построило теоретическую модель с двумя путями воздействия, интегрирующую нейронные и психологические механизмы – «физические упражнения – зависимость», а затем провело систематический обзор и оценку соответствующих эмпирических данных в Китае. Результаты показали, что структурированные упражнения, такие как аэробные нагрузки и танцы, могут эффективно улучшать симптомы зависимости и психическое здоровье в краткосрочной перспективе посредством нейронных и психологических механизмов; однако их долгосрочные эффекты и оптимальная дозировка остаются неясными. Будущие исследования настоятельно нуждаются во внедрении инновационных парадигм, таких как микродизайны и интеллектуальные адаптивные вмешательства для построения точных, динамичных и устойчивых моделей вмешательства с помощью физической активности.

Ключевые слова: зависимость от коротких видео, физические упражнения, студенты, теоретическая модель, систематический обзор, парадигма вмешательства.

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Колледж студенттерінің қысқаша видеотәуелділігіне спорттық араласудың жолдары мен дәлелдері: интернет және мобильді тәуелділікті зерттеуге негізделген интегративті шолу

Анатпа. Қытайдың жоғары оқу орындарының студенттері арасында қысқа бейнелерді тарататын қосымшалардың кеңінен таралуына байланысты пайда болған тәуелділік мәселелері қоғамдық денсаулықтың ауыр проблемасына айналды. Студенттердің қысқа бейнелерге тәуелділігін шешудегі спорттық араласудың елеулеті мен жолдарын жүйелі түрде зерттеу үшін бұл зерттеу алдымен «дене шынықтыру — тәуелділік» нейрологиялық және психологиялық механизмдерді біріктіретін қос жолды теориялық моделін құрды, содан кейін Қытайдағы сәйкес эмпирикалық дәлелдерге жүйелі шолу және бағалау жүргізді. Нәтижелер аэробтық жаттығулар мен би сияқты құрылымдалған жаттығулардың нейрологиялық және психологиялық механизмдер арқылы қысқа мерзімдік перспективада тәуелділік белгілері мен психикалық денсаулықты тиімді жақсарту алатынын көрсетті; дегенмен, олардың ұзақ мерзімді әсері мен онтайлы дозалары әлі де анық емес. Болашақ зерттеулер нақты динамикалық және тұрақты спорттық араласу модельдерін құру үшін тездетіп кіші дизайнер және интеллектуалды бейімделген араласулар сияқты инновациялық парадигмаларды енгізуді қажет деп санайды.

Түйін сөздер: қысқа бейнелерге тәуелділік, дене шынықтыру, студенттер, теориялық модель, жүйелі шолу, араласу парадигмасы.

Introduction. The characteristics of short videos in college students' lives, such as fast information acquisition and strong entertainment value, have become increasingly prominent. According to the China Online Audio-Visual Development Research Report (2025), by December 2024, the number of China's short video users will reach 1.04 billion, accounting for 93.8% of internet users, with mobile terminals being almost universally adopted. China's college students are even more the core user group.

Excessive engagement with short videos may lead to various negative consequences, including compulsive viewing, behavioral disorders, difficulty concentrating, interpersonal challenges, and academic adaptation issues [1]. Given these findings, implementing sports intervention programs for students addicted to short videos through physical exercise can effectively alleviate such addiction, which holds significant practical value.

Physical exercise, as a form of intervention that harmonizes body and mind, can not only improve students' physical fitness but also enhance their psychological control and mental health status. It provides certain inspiration for addressing various undesirable behaviors among college students in the digital age [2].

Purpose of the study. Based on existing relevant literature, this review attempts to summarize and analyze the formation reasons, harms, and evaluation methods of short video addiction among Chinese college students, while also outlining the theoretical foundations and experimental research progress of sports intervention, hoping to offer insights for future studies.

Materials and methods.

Study Design. This study adopted an integrative review design to systematically synthesize the theoretical foundations and empirical evidence regarding sports intervention for short video addiction among Chinese college students. Following the methodological framework proposed by Whitemore and Knafl, the review proceeded through four phases: (1) problem identification; (2) literature search; (3) data evaluation; and (4) data analysis and synthesis. The objective was to summarize the mechanisms, pathways, and effectiveness of exercise-based interventions in mitigating digital addictive behaviors—particularly short video addiction—and to construct a dual-pathway theoretical model integrating neurophysiological and psychosocial mechanisms.

Literature Search Strategy. To comprehensively collect studies related to sports interventions for digital addiction (short video addiction, smartphone

addiction, and internet addiction), searches were conducted in the following major databases: - China National Knowledge Infrastructure (CNKI), - WanFang Data, - VIP Database, - PubMed, - Web of Science, - Scopus.

Search Terms. A combination of keywords, linked with Boolean operators (AND/OR), was used. Keywords included: "short video addiction", "smartphone addiction", "internet addiction", "physical exercise / physical activity", "sports intervention", "college students",

Example search string: ("short video addiction" OR "smartphone addiction" OR "internet addiction") AND ("physical exercise" OR "sports intervention") AND ("college students").

Reference lists of retrieved articles were also manually screened to avoid omissions.

Inclusion and Exclusion Criteria.

Inclusion Criteria.

Studies were included if they met the following requirements:

Population: Chinese college students or youths exhibiting digital addiction tendencies.

Intervention: Physical exercise or structured sports programs (e.g., aerobic exercise, ball games, Tai Chi, Baduanjin).

Study Type: Randomized controlled trials (RCTs), quasi-experimental studies, cohort interventions, or controlled exercise intervention studies.

Outcome Indicators: Addiction symptoms, self-control, mental health, or related physical/psychological measures.

Language: Chinese or English.

Exclusion Criteria.

Review articles, theoretical papers, or studies without empirical data.

Studies without exercise-based intervention components or with unclear intervention descriptions.

Studies whose participants did not match the characteristics of college students.

Duplicate publications or studies with incomplete data.

Data Extraction and Quality Assessment. A standardized data extraction form was used to record major variables from each included study:

- Author and publication year;
- Type of addiction;
- Sample size and group allocation;
- Intervention type and exercise modality;
- Intervention duration and frequency;
- Measurement tools used;
- Main findings and effect size estimations.

Quality assessment followed the Joanna Briggs Institute (JBI) critical appraisal tools for intervention studies, evaluating:

- Clarity of intervention description;
- Use of control groups;
- Randomization procedures (if applicable);
- Reliability and validity of measurement instruments;
- Reporting of statistical significance;
- Inclusion of follow-up assessments;
- Studies with major methodological deficiencies (e.g., no baseline comparison, unclear intervention protocols) were excluded.

Data Synthesis Method. Given the substantial heterogeneity across studies regarding intervention types, duration (4-16 weeks), and measurement indicators, a narrative synthesis was employed. Effect sizes were classified based on reported statistics or estimated according to sample size and pre-post differences:

- Small effect;
- Moderate effect;
- Large effect.

Through the comprehensive analysis of the results of the research □

- General patterns of exercise intervention effectiveness;
- Differences in effectiveness among various exercise modalities;
- Evidence supporting the proposed dual-pathway model (neurophysiological vs. psychosocial);

Major gaps in existing research, such as limited mechanistic measures, lack of long-term follow-up, and unclear exercise dosage.

This synthesis directly informed the construction of the “Exercise-Addiction Dual-Pathway Model” presented earlier.

Results.

The Conceptual Definition and Psychological Mechanism of Short Video Addiction.

Current research lacks a unified definition of “short video addiction”. Qin Haoxuan [3] posits that it arises from repeated exposure to short videos, leading individuals into a state of obsession with strong dependency. Dong Wei [4] defines it as prolonged, high-intensity use of short video apps, characterized by uncontrollable frequency and duration that negatively impacts physiological, psychological, and behavioral aspects. Xie Xingzheng et al. [5] characterize it as improper usage involving frequent, long-term app consumption with difficulty in controlling usage frequency and duration, causing adverse effects on

physical/mental health and behavior. Dai Bao [6] identifies it as problematic usage resulting from excessive reliance on instant gratification from short video content, impairing self-control over viewing habits and compromising daily functioning. This study adopts Dai Bao’s definition.

From the mechanism, the addiction of short video comes from the imbalance of the brain reward system and the cognitive control system.

Overactive reward system: Short video platforms use algorithm-driven, unpredictable instant rewards (e.g., novel content, like notifications) to continuously stimulate the release of dopamine in the mesolimbic system, creating intense pleasure [7, 8]. This “abnormal stimulation” heightens the brain’s sensitivity to short videos while reducing responsiveness to daily activities (e.g., studying, exercising), thereby elevating the reward threshold.

Impaired cognitive control: The prefrontal cortex, which governs impulse inhibition, decision-making, and long-term planning, shows reduced functionality. Individuals with addiction exhibit diminished impulse control and delayed discounting (a tendency to prioritize immediate small rewards over delayed larger ones) [9]. This makes it difficult for them to quit binge-watching even when aware of the risks.

This neurocognitive imbalance manifests as behavioral characteristics including attentional deficits, mood regulation, tolerance, withdrawal symptoms, conflict, and relapse [10], collectively forming the complete psychological mechanism of short video addiction.

The current situation and assessment tools of college students’ addiction to short videos in China.

In recent years, survey results from multiple regions have shown that Chinese college students exhibit severe short video addiction. Data indicates that there are over 1 billion short video users nationwide, with college students being the primary demographic. A questionnaire survey conducted by China Youth Network among tens of thousands of Chinese college students revealed that over 80% of respondents frequently watch short videos, with 26.48% spending 2-5 hours daily on short videos, and 8.05% spending more than 5 hours daily. Over 70% of respondents believe that watching short videos can easily lead to addiction [11]. Existing studies have shown that the short video addiction rate among college students exceeds 21.63%. For example, Xiao Shuang et al. conducted a mobile phone addiction test on 3,122 college students in Henan Province, with a result of 17.8%. Additionally, the frequency and duration of physical exercise showed a negative correlation with

addiction tendencies, indicating that the addiction to short videos is gradually worsening [12].

Short video addiction exhibits distinct group variations. Yan Menghua et al. found significant differences in addiction rates across majors: art students (38.2%) had the highest rates, followed by STEM students (29.5%), while humanities students (22.1%) showed the lowest. The severity correlates with daily usage duration and content preferences [13]. This indicates short video addiction is not limited to specific demographics but a widespread issue, suggesting the need for tailored strategies based on students' academic backgrounds. Overall, approximately 31.99% of undergraduates exhibit mild dependence or risk of addiction, severely impacting academic education and student management [14].

Currently, no specialized cognitive tools exist for assessing short video addiction. When evaluating college students' short video addiction, researchers typically refer to existing smartphone/internet addiction scales or develop customized questionnaires. Established reliable and effective scales are used to determine whether students exhibit short video addiction. For instance, the Mobile Phone Addiction Tendency Scale (MPATS) developed by Xiong Jie et al. contains 16 items and is commonly used to measure smartphone addiction levels among college students [15]. The Chinese Internet Addiction Scale (CIAS) created by Professor Chen Shuhui from Taiwan comprises 26 items and demonstrates high reliability and validity for college students [16]. Commonly used internet addiction diagnostic scales both domestically and internationally include the Young Diagnostic Questionnaire (YDQ) [17]. For short video addiction assessment, the Qin Haoxuan's College Students 'Short Video Addiction Questionnaire (14 items) is widely adopted, categorized into two factors: loss of control and withdrawal [2]. Alternatively, the Short Video Addiction Scale (SVAS) developed by Bai Ziyu et al. (41 items) includes six dimensions such as significance, withdrawal, and health issues [18]. These assessment scales can differentiate individuals with varying degrees of short video addiction, typically using cutoff scores (e.g., a total score above 48 on MPATS indicates addiction). Overall, college students' short video addiction is primarily evaluated through a combination of self-rating scales and questionnaires across multiple dimensions to assess behavioral patterns and psychological symptoms.

The dangers of short video addiction.

Short video addiction adversely affects college

students' physical and mental health as well as their social functioning. Frequent consumption of short videos disrupts normal daily routines, leading to physical fatigue and poor sleep quality. Research indicates that individuals addicted to short videos may develop various health issues, including sleep disorders, anxiety, and depression, along with complications such as eye strain, myopia, cervical spine disorders, and lumbar spine problems [19].

Physical health issues have become more prominent in specialized studies. A 2016 survey by Liu Fangmei in Guangdong Province's universities revealed that only 62.3% of internet-addicted students passed physical fitness tests, significantly lower than the 85.7% rate among non-addicted students. Key indicators like endurance and flexibility showed marked differences. Prolonged sedentary behavior and disrupted sleep patterns caused by short-video addiction have worsened students' physical conditions, causing lasting adverse effects on cardiopulmonary function and bone development [20].

Short video addiction significantly impacts college students' academic performance and interpersonal development. Academically, excessive screen time consumes valuable study hours, causing distraction and procrastination that leads to declining grades, reduced learning efficiency, and even academic misconduct. Research indicates that individuals addicted to short videos generally exhibit weaker self-control and lack motivation, while their values and worldview are easily influenced by vulgar, violent, and materialistic content on platforms [21]. Socially, addicts often immerse themselves in virtual worlds, reducing real-world interactions, which intensifies loneliness, deteriorates relationship quality, and weakens self-efficacy [22]. Overall, short video addiction creates a negative cycle of "physical/mental health → academic performance → social interaction," potentially progressing to internet addiction syndrome and jeopardizing students' psychological and social adaptability. These health, academic, and social harms highlight the urgent need for effective interventions. Physical exercise, with its potential to address these issues, emerges as a promising intervention approach.

Theoretical Basis of Sports Intervention: Constructing a Dual Pathway Model of "Exercise-Addiction".

Based on the addiction mechanisms described above, we propose a dual-pathway theoretical model of sports intervention for short video addiction (Figure 1), systematically outlining its efficacy pathways.

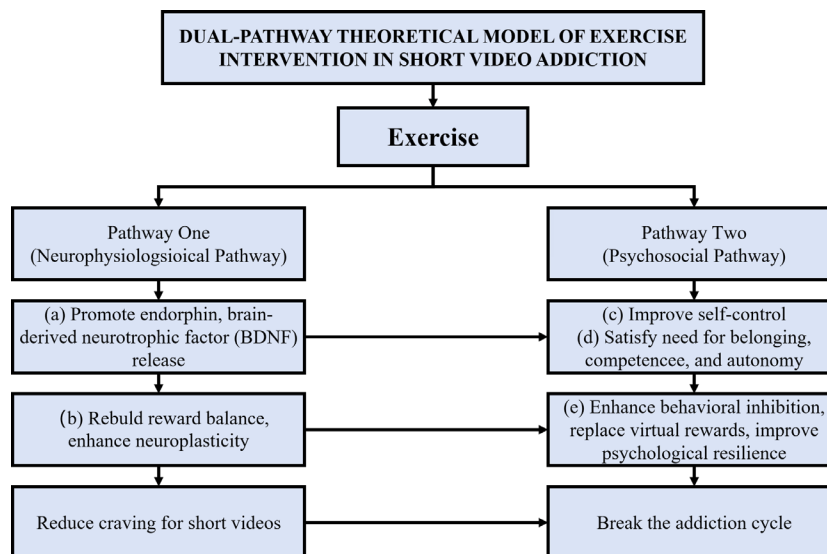


Figure 1 – Dual-pathway Theory Model of Sports Intervention for Short Video Addiction

1. Neurophysiological pathways: remodeling of brain reward and control circuits.

Regulating the reward system: Long-term aerobic exercise (e.g., jogging for over 30 minutes) has been shown to normalize dopamine D2 receptor availability [23], reducing susceptibility to addictive substances or behaviors. Simultaneously, exercise-induced endorphin release generates natural euphoria (the “runner’s high”), satisfying reward needs in a healthy manner and thus competing with short videos as a substitute [24].

Enhancing prefrontal cortex function: Physical exercise, particularly complex coordinated sports like dance and ball games, significantly boosts prefrontal cortex activity associated with cognitive control, working memory, and impulse inhibition. Liu Chong et al. [25]’s structural equation modeling study provides empirical evidence, revealing that self-control acts as a key mediator in reducing smartphone addiction (path coefficient 0.32). BDNF (brain-derived neurotrophic factor) plays a pivotal role in this process, functioning as “brain fertilizer” that supports neuronal survival and connectivity, thereby strengthening the neural foundation of the “braking system”.

2. Psychosocial pathway: Empowering individuals and rebuilding connections.

Enhancing self-control and self-efficacy: Overcoming difficulties and fatigue during exercise is a process where individuals continuously practice and strengthen their willpower [26]. Each completed training session boosts self-efficacy, and this ‘I can

do it’ belief transfers to resisting the temptation of short videos.

Meeting fundamental psychological needs: According to self-determination theory, team sports directly fulfill three core needs—belonging (through teammate interactions), competence (through skill mastery), and autonomy (through participation choices)—effectively addressing the psychological void that drives individuals to retreat into virtual spaces [27, 28]. Zhou Huiyu et al. [29] demonstrated through their research chain that social support and self-esteem play pivotal roles in enhancing life satisfaction and reducing internet addiction.

Expanding positive emotional resources: According to the theory of positive emotion expansion and construction, the positive emotions generated by exercise can broaden an individual’s cognitive and behavioral scope, encouraging them to discover healthier alternatives to video scrolling. This process also builds lasting personal resources (such as improved social skills and enhanced resilience), thereby fundamentally undermining the survival foundation of addiction [30].

Systematic Evaluation of Empirical Evidence: From Effective Phenomena to Mechanisms of Action.

China has conducted multiple empirical studies exploring the intervention effects of sports on college students’ internet/mobile/short video addiction. We have systematically reviewed domestic empirical studies on sports intervention for internet/mobile/short video addiction (as shown in Table 1).

Table 1 – Systematic review of empirical studies on sports intervention in college students with digital addiction (Sort by year)

Author (Year)	Addiction type	Sample and group	Intervention method	Intervention period	Main Results and Estimation of the Effect Size
Gao Jun (2012) [31]	Internet addiction	69; experimental/control	physical exercise	8 weeks	The total score of addiction decreased significantly ($P<0.01$), and the effect was better in mild and moderate cases. The effect size was estimated as medium to large.
Wang Kai (2016) [32]	cell phone addiction	73; experimental/control	Sports intervention	12 weeks	The scores of addiction were significantly lower in the experimental group than those in the control group ($P<0.01$), and the improvement of male students was better than that of female students.
Fu Yunsheng (2016) [33]	Internet addiction (Korean)	84; intervention/control	Football training	16 weeks	The addiction score decreased significantly ($P<0.05$). The effect size was estimated as moderate.
Yang Cuiying (2017) [34]	Internet addiction	52; Tai Chi/Control	taijiquan	16 weeks	The addiction score decreased, and the effect size was estimated to be small to moderate.
Song Xin (2019) [30]	addiction to online games	500	physical exercise	4 weeks	The effect size is estimated to be small due to the large sample size.
Zhao Yuxia (2021) [36]	cell phone addiction	148; three groups	Exercise + Psychological Counseling	intervention and 3 months follow @-@ up	The best effect was the comprehensive intervention, and the effect size was estimated as medium to large.
Xiao et al. (2021) [35]	cell phone addiction	96 persons; three groups	Basketball / Baduanjin	follow@-@ up after 12 weeks	Both exercises were effective, and the effect size was estimated as moderate.

Discussions.

Systematic review summary:

Consensus: The majority of studies (7/7) reported positive intervention effects of physical activity, indicating that it is a promising intervention.

Heterogeneity: The intervention duration varied significantly from 4 to 16 weeks, with exercise types including aerobic activities, ball games, and mind-body exercises (e.g., Tai Chi, Baduanjin). This suggests that while multiple exercise modalities may be effective, their specific mechanisms of action may differ (for instance, Baduanjin may primarily focus on emotional regulation and impulse control).

Limitations and gaps:

Mechanism black box: Most studies remain at the 'effectiveness' level, failing to employ

physiological and cognitive neuroscience tools (e.g., fMRI, ERP, salivary cortisol testing) to uncover the intervention process's 'black box' and validate the dual-pathway model.

Dose-response ambiguity: optimal exercise intensity, frequency and duration remain unknown, and there is a lack of dose-response studies.

Personalization is missing: failure to answer the question "what type of exercise is most effective for what type of addiction" (e.g. considering addiction severity, gender, personality traits).

Long-term effects are questionable: Only a few studies have included follow-up, and there is insufficient evidence for the sustainability of exercise effects.

Innovation and Deepening of Future Research Paradigm and Intervention Program

Based on the gaps identified in the systematic review, we propose the following innovative and actionable research and intervention directions:

1. Innovative Research Paradigms.

1 Microscopic longitudinal design: Using diary method or ecological instantaneous assessment, students' daily exercise, emotional state, self-control depletion and short video usage time were intensively tracked during the intervention period. This can dynamically reveal the short-term psychological mechanism of exercise benefits and help determine the "exercise protection window period" for preventing relapse.

2 Multimodal Mechanism Detection: Before and after intervention, functional near-infrared spectroscopy (fNIRS, a portable brain imaging technique) was used to measure prefrontal cortex activity, cognitive tasks (e.g., Go/No-Go paradigm) were employed to assess inhibitory control, and cortisol and other stress hormone levels were analyzed from saliva samples. This multidimensional and objective approach verifies neurophysiological and psychological pathways.

3 Personalized Intervention Exploration: Using precision medicine principles, we designed a 2x2 factorial study. For example, we compared high-intensity interval training versus moderate-intensity continuous training, and group versus individual exercise, to evaluate their effects on college students with addiction who exhibited different baseline characteristics (e.g., high impulsivity vs. high social anxiety), aiming to develop personalized exercise prescriptions.

2. Operational Intervention Plan.

2.1 Building a "step-by-step" comprehensive intervention system:

Universal prevention (first step): Promote the "exercise sign-in points system" on campus, where students accumulate points by participating in any form of extracurricular exercise and redeem rewards, fostering a positive sports culture.

Selective intervention (second step): For students identified as at risk of addiction, structured exercise programs such as the 21-day Mindful Running Program (combining running and mindful breathing) or social dance groups are offered, with a psychological education module embedded to explain how exercise can help overcome addiction.

Targeted intervention (third step): For students with addiction, a combined "physical-mental" approach is implemented. Following Zhao Yuxia's [36] model, this integrates personalized exercise prescriptions (e.g., combat aerobics for impulsive types, yoga for anxious types) with cognitive-behavioral therapy groups, addressing both behavioral and cognitive dimensions.

2.2 Intelligent adaptive support tool: A mobile app integrating exercise plan recommendations, short video usage monitoring, mindfulness practice guidance, and peer support community. When the app detects users exceeding short video usage limits, it automatically pushes a 5-minute indoor fitness video as behavioral substitution intervention.

Conclusion. Short video addiction is a behavioral disorder stemming from an imbalance between reward systems and control mechanisms. The "exercise-addiction" dual-pathway model developed in this study systematically elucidates how physical exercise exerts intervention effects through both neurophysiological and psychosocial pathways. While systematic evaluations of existing empirical evidence confirm the short-term efficacy of exercise interventions, they also highlight gaps in mechanism exploration, dosage optimization, and personalized approaches. Moving forward, by adopting innovative research paradigms such as micro longitudinal studies and developing stepwise, intelligent comprehensive intervention programs, we can transform physical exercise from an "effective phenomenon" into a precise, in-depth, and sustainable clinical and non-clinical practice. This advancement will enable more effective responses to the public health challenge of short video addiction among college students.

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