



Analysis of the relationship between physical exercise and psychological stability in the context of digitalization of society

Zakhar Azatian*

BeHard, Inc., San Francisco, US

* Corresponding author: zakhar.azatian@behard.co

OPEN ACCESS

Citation:

Zakhar Azatian (2026). Analysis of the relationship between physical exercise and psychological stability in the context of digitalization of society. *Am. Impact Rev.* 10.66308/air.e2026055

Received: January 20, 2026

Accepted: February 11, 2026

Published: February 27, 2026

DOI:

10.66308/air.e2026055

ISSN: 3071-124X

Copyright:

© 2026 Zakhar Azatian. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0).

Abstract

The article presents a thorough analysis of the connection between regular physical activity and the level of mental stability of an individual in the context of the overall digitalization of contemporary society. The significance of the research stems from the fact that the extensive implementation of digital technologies, the shift to remote work and study formats, as well as continuous exposure to the information environment, lead to an escalation of chronic stress, digital exhaustion, emotional burnout, and physical inactivity, which drastically diminishes the adaptability of the body. The work delves into the physiological and mental processes through which physical activity mitigates the detrimental effects of living in a "screen-based" lifestyle: from restoring neurochemical equilibrium and reducing stress hormones to stimulating neuroplasticity and enhancing cognitive abilities. Special attention is paid to the role of sports and fitness as an effective behavioral strategy to cope with the effects of information overload and digital isolation. A review of modern scientific research shows that integrating physical activity into our daily lives is not only important for maintaining physical health but also fundamental for maintaining psychological resilience and emotional stability in today's digital age.

Keywords: digitalization of society, psychological stability, physical exercise, information stress, digital fatigue, neuroplasticity

Relevance of the study

The relevance of the research is due to the rapid pace of digitalization of all spheres of modern society. This process radically changes daily practices, ways of communication, and professional activity, which, in turn, leads to a decrease in motor activity and chronic information stress.

With the widespread introduction of digital technologies, increasing screen time and blurring the boundaries between work and personal space, there is a growing trend in the number of people suffering from digital fatigue, emotional burnout, anxiety disorders, and a critical decrease in the adaptive resources of the psyche [2]. In such circumstances, traditional methods of maintaining mental health are not effective enough, which underscores the need to find new, accessible, and scientifically based behavioral strategies to combat stress.

Physical exercise is a natural and powerful way to regulate your mental and physical state and compensate for the negative effects of a sedentary lifestyle and information overload. However, in order to understand exactly how it affects the formation of psychological stability in a digital environment, it is necessary to conduct in-depth scientific research. That is why this work has high theoretical and practical significance.

The purpose of the study

The aim of this study is to thoroughly analyze and empirically support the relationship between regular physical activity and the psychological stability of individuals experiencing constant exposure to digital stressors.

To accomplish this goal, we consistently address a number of related tasks aimed at identifying the specific physiological and psychological mechanisms through which exercise levels the negative effects of digital environments on the nervous system and cognitive functions.

In addition, the study aims to evaluate the effectiveness of various types and intensities of physical exercise as a means of preventing emotional exhaustion and mental fatigue, as well as to develop scientifically based, practically applicable recommendations for including optimal exercise regimes in daily life to increase stress tolerance and maintain psychological well-being in the era of technological progress.

Materials and research methods

The research materials and methods are based on an extensive database of modern domestic and foreign scientific papers on digital psychology, occupational psychophysiology, and sports medicine. The study also used the results of an original empirical survey, which included a representative sample of respondents whose professional and educational activities are closely related to the active use of digital technologies.

The methodological basis of the work was the principle of unity of theoretical and empirical knowledge. This made it possible to apply an integrated approach, including theoretical analysis, synthesis, and generalization of scientific literature to conceptualize key concepts.

The obtained quantitative and qualitative data were carefully processed using correlation and regression analysis methods. This made it possible to accurately determine the presence and degree of the relationship between motor activity and indicators of psychological stability. The most effective types of physical exercises that can be used to purposefully overcome digital stress have also been identified.

The results of the study

In the era of digitalization, approaches to studying the relationship between physical activity and psychological stability have changed significantly. We have moved from traditional subjective questionnaires to more high-tech, objective, and comprehensive methods.

A special place is occupied by methods of continuous physiological monitoring, which allow you to track changes in the body in real time. With the help of wearable devices and smart technologies, we can monitor important parameters such as heart rate variability (HRV), cortisol levels, sleep patterns, and physical activity. This gives us a more complete understanding of how physical activity affects the response of the autonomic nervous system to digital stress [4].

At the same time, neuroimaging techniques, such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG), are actively used. These methods allow scientists to observe structural and functional changes in the brain. For example, they can show how aerobic exercise stimulates neurogenesis and strengthens the prefrontal cortex, which, in turn, compensates for cognitive exhaustion caused by multitasking and frequent attention shifts when using gadgets.

One of the innovative tools is the Ecological Momentary Assessment (EMA) method, which is carried out using specialized smartphones. This method allows you to collect data on the emotional state and stress level

of respondents at the time of their interaction with the digital environment. The data obtained are compared with objective indicators of the respondents' physical activity [1].

Modern researchers are increasingly using big data analysis and machine learning techniques to discover hidden links between users' online behavior, physical activity, and mental health.

This relationship is particularly evident in studies on professional groups that actively use the digital environment, such as IT specialists and remote workers [6]. For example, empirical evidence shows that regular aerobic exercise, such as running or swimming, can be a powerful means of preventing "technostress" and burnout among programmers.

During the experiments, it was found that specialists who include cardio training in their daily routine demonstrate significantly higher rates of heart rate variability and subjective well-being after many hours of work at the monitor. This is due to the fact that physical activity accelerates the metabolism of stress hormones, which accumulate due to deadlines and information overload [9].

Another striking example is the study of the impact of physical exercise on students in the context of widespread distance learning. Research shows that replacing passive "digital recreation" (for example, browsing social media between online lectures) with short sessions of high-intensity interval training (HIIT) or mindful movement practices (yoga, stretching) leads to a significant reduction in visual and mental fatigue, improved concentration, and reduced anxiety [5].

Especially effective is the so-called "green fitness" - a combination of physical activity and outdoor activities. This approach makes it possible to provide cognitive relief and restore involuntary attention resources that may be depleted by digital content (Table 1). **Table 1 - Combination of physical activity with outdoor activities** [3, 7]. Combination of physical activity with outdoor activities [3, 7]

Table 1. Combination of physical activity with outdoor activities [3, 7]

Type of activity	Description and examples	Psychological effects	Compensating for digital stress
Ecotherapy (forest walks)	Slow hiking along forest trails, parks, and nature reserves	Reduced cortisol levels by 16%, reduced anxiety, improved mood, increased concentration	Restoration of depleted involuntary attention, reduction of sensory overload from screens, normalization of circadian rhythms
Trail running (cross-country running)	Running on nature trails, hills, mountain routes with natural terrain	Release of endorphins, increase self-esteem, develop stress tolerance, improve cognitive flexibility	Actively switching attention from digital tasks to navigating the terrain, physically overcoming obstacles
Outdoor Yoga	Practice asanas, pranayama, and meditation in parks, beaches, and gardens	Deep relaxation, decreased muscle tension, improved emotional regulation, increased awareness	Complete disconnection from digital devices, synchronization with the natural rhythms of nature, restoration of mental balance
Cycling in nature	Cycling along park paths, forest trails, suburban routes	Improving mood, increasing vitality, reducing symptoms of depression, developing spatial thinking	Replacing passive scrolling with active exploration of the area, reducing visual tension from monitors
Gardening and horticulture	Gardening, growing plants, gardening, landscaping	Feeling of achievement, reducing stress, improving self-efficacy, developing patience	Tactile contact with the earth and plants, visual observation of natural growth, delayed gratification
Water activities in nature	Swimming in open waters, kayaking, SUP-surfing, diving	Deep relaxation, meditative state, decreased anxiety, improved sleep	The sounds of water and tactile sensations create a powerful sensory contrast with the digital environment, completely immersing yourself in the moment
Nordic walking in parks	Walking with special sticks along natural routes using 90% of the body's muscles	Improved mood, increased stamina, social interaction (during group activities), reduced fatigue	Rhythmic movements and outdoor activities, the ability to communicate without digital devices
Mountaineering and rock climbing on natural terrain	Natural rock climbing, mountain hiking with elements of climbing	Developing determination, overcoming fears, increasing self-confidence, developing a focus of attention	Complete disconnection from technology, the need to focus on every move, trust in a partner

It is worth noting examples of a successful combination of digital technology and physical exercise. Digitalization can not only be a source of stress but also become a tool for increasing psychological stability through the gamification of fitness. Augmented reality apps, virtual workouts, and fitness trackers that support social interaction turn routine activities into an exciting process. They stimulate the production of dopamine not through passive consumption of content, but through achieving real physical goals, which significantly increases motivation [8].

Research in the field of "exergaming" (active video games) and VR fitness confirms that such formats not only increase commitment to regular exercise in people with a sedentary lifestyle but also effectively reduce the level of depressive symptoms and loneliness characteristic of digital isolation (Fig. 1).

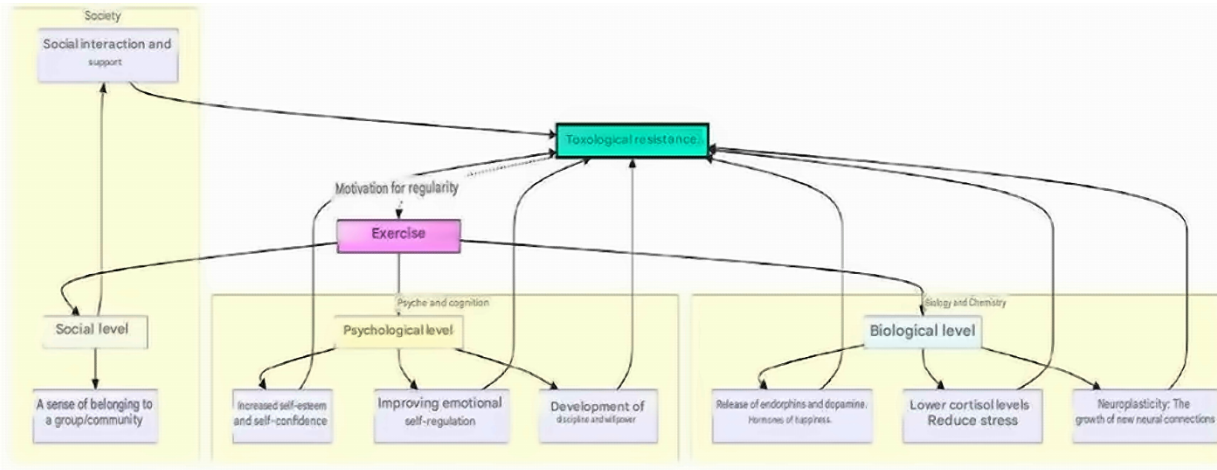


Figure 1. the relationship between physical exercise and psychological stability

It should be noted that, despite the growing number of scientific studies confirming the positive effects of physical activity on mental health, the study of the relationship between exercise and psychological stability in the age of digitalization faces a number of significant methodological, conceptual, and practical difficulties.

One of the main methodological problems is the difficulty of isolating variables and establishing precise cause-and-effect relationships. This is due to the fact that digital stress is constant and diffuse; that is, it is constantly present in our lives and is inseparable from it. It is extremely difficult for researchers to accurately control the level of "digital stress" in the natural environment, and the use of subjective reports from respondents often leads to distortions due to cognitive biases and people's inability to adequately assess their digital fatigue [10].

Although the use of wearable devices and fitness trackers allows us to obtain objective data on physical activity and sleep, these technologies themselves generate a huge amount of unstructured data. Complex machine learning algorithms are required to interpret them. In addition, these devices are not always able to adequately record subtle changes in the psycho-emotional state.

Furthermore, there is a severe lack of long-term, longitudinal research in modern science. Most of the research is cross-sectional, making it impossible to accurately track how regular physical activity builds up a cumulative effect on psychological resistance to digital stress over months and years. Instead, it provides only short-term relief from stress.

Another major issue is the conceptual and practical contradiction of "digitalizing fitness itself," which creates new risks to psychological well-being. To increase motivation for exercise, society has turned to digital tools like tracking apps, smartwatches, gamified platforms, and virtual workouts.

However, this leads to the fact that, in order to combat the negative effects of excessive screen time, people are forced to continue using screens, which can lead to increased digital fatigue, eye strain, and sensory overload. Additionally, excessive focus on quantitative indicators (such as steps, calories, and activity scores) can lead to new forms of neurotic behaviors and anxiety, including orthorexia and dependence on validation from social media and fitness communities.

In this situation, physical activity no longer serves as a tool for psychological relief but rather becomes another area of digital pressure and achievement. Paradoxically, this reduces rather than enhances the

overall psychological stability of individuals. Researchers face a challenge: how to incorporate technological advancements for health monitoring while avoiding turning the process of taking care of one's body into an additional source of digital stress.

One of the most significant socio-psychological and behavioral issues is the phenomenon of "digital poverty," which is exacerbated by digital environments. Total digitalization blurs the lines between work and leisure time, making individuals available 24/7. This leads to chronic cognitive fatigue and the exhaustion of executive functions of the brain.

In such circumstances, individuals often lack the mental resources and motivation to engage in regular physical activity, despite understanding its benefits. The digital world offers instant and easy rewards in the form of dopamine from consuming content, while physical exercise requires delayed gratification and significant willpower. This imbalance makes it extremely challenging to establish healthy behaviors.

Additionally, the issue is exacerbated by information overload in the fitness industry: the plethora of conflicting recommendations, idealized body image standards on social media, and marketing noise can cause an unprepared individual to experience analysis paralysis and a sense of inadequacy, leading them to abandon their fitness routine altogether.

Finally, a serious challenge for researchers and practitioners is the risk of physiological and psychological misalignment when choosing inappropriate formats of physical activity. In situations where the human nervous system is already exhausted from continuous multitasking and information overload, improperly dosed or excessive physical activity (such as exhausting CrossFit workouts or high-intensity interval training) can act as a stressor rather than a hardening factor. This can lead to overtraining, increased cortisol levels, sleep disturbances, and a further decline in psychological stability, ultimately leading to burnout.

The problem lies in the absence of personalized, scientifically based protocols that take into account not only a person's physical state but also their current level of digital fatigue and cognitive load, in order to choose the right types and amounts of physical activity for recovery, rather than further depleting the body's adaptive resources.

Conclusions

In summary, based on the analysis, we can conclude that in the context of the total digitalization of society, physical exercise is not just a means to maintain physical health but has become a crucial tool for maintaining psychological stability and mental well-being.

Regular physical activity acts as an effective buffer against the detrimental effects of inactivity, information overload, and chronic digital stress. It helps to normalize neurochemical balance and restore depleted cognitive resources, contributing to overall mental well-being.

However, the integration of fitness into the digital world presents a number of challenges. On the one hand, technological tools like gamification and wearable devices can enhance motivation. On the other hand, relying on trackers and screens can lead to increased stress and turn body care into another area of competition and achievement.

In addition, cognitive fatigue caused by the constant flow of digital information objectively reduces the willpower needed to form and maintain healthy habits. Therefore, it is essential to develop personalized physical activity strategies based on scientific research that take into account not only physiological indicators but also the individual's current level of digital exhaustion.

A conscious, balanced approach that includes using physical activity as a form of digital detox and psychological relief will maximize the benefits of sports and protect the psyche from the negative effects of

technology.

References

1. Bakeshin K.P., Morozova A.D. interrelation of special physical exercises and individual psychological qualities OF A PERSON // StudNet. - 2024. - Vol. 7. - No. 1.
2. Guo J. The dual impact of physical exercise on university students' mental health: the chain mediating effects of mindfulness and psychological resilience // Frontiers in Psychology. - 2025. - Vol. 16. - p. 1545370. <https://doi.org/10.3389/fpsyg.2025.1545370>
3. Husain H. et al. A systematic literature review on the impact of participation in sport and physical activities on psychological resilience // International Journal of Public Health Science (IJPHS). - 2024. - Vol. 13. - No. 4. - p. 1727. <https://doi.org/10.11591/ijphs.v13i4.24345>
4. Kim D.H., Kim J.H., Park K.J. The impact of regular exercise, competition experience, and physical self-efficacy on psychological resilience // Revista de Psicología del Deporte (Journal of Sport Psychology). - 2023. - Vol. 32. - No. 3. - pp. 1-19.
5. Li N. et al. The association between physical exercise behavior and psychological resilience of teenagers: an examination of the chain mediating effect // Scientific reports. - 2024. - Vol. 14. - No. 1. - p. 9372. <https://doi.org/10.1038/s41598-024-60038-1>
6. Lisovskaya E.E. The relationship between physical fitness and psychological stability of military personnel // Bulletin of the Chelyabinsk State University. Education and healthcare. - 2022. - No. 2-3 (14-15). - pp. 68-71.
7. Moskatova V.V., Marchukova V.A., Shvachun O.A. Activation of mental activity and creative independence of students through physical exercises // Prospects for the development of student sports and Olympism. - 2020. - pp. 428-432.
8. Paklina O.A. The relationship between physical activity and psychological stability during adulthood // A step into science. - 2026. - No. 2. - pp. 82-86.
9. Silverman M.N., Deuster P.A. Biological mechanisms underlying the role of physical fitness in health and resilience // Interface focus. - 2014. - Vol. 4. - No. 5. - p. 20140040. <https://doi.org/10.1098/rsfs.2014.0040>
10. Stukalova O.V., Volkova E.A. The role of physical education in the formation of psychological stability in children and adolescents // Theory and practice of modern science. - 2024. - No. 6 (108). - pp. 133-142.