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The Influence of Martial Arts Training on Academic Performance and Student Success: A Review of the Literature

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Abstract

This literature review examines the effects of martial arts training on academic performance and student success. Existing research indicates that students participating in martial arts frequently achieve superior outcomes in core subjects such as mathematics and linguistics, which is attributed to improved cognitive processing and self-regulation. (Gordon, 2023) The primary objective of studies in this area is to evaluate how structured martial arts training, including Karate, Taekwondo, and Mixed Martial Arts (MMA), fosters self-discipline, responsibility, and a proactive approach to challenges, thereby influencing academic achievement, executive cognitive functions, and overall physical fitness (Pinto-Escalona et al., 2024). Significant improvements have been reported in cardiorespiratory fitness, speed, agility, strength, flexibility, coordination, and balance. (Stamenković et al., 2022)

Keywords

Martial Arts, Physical Fitness, Academic Performance, Student Success

1. Introduction

Martial arts training serves as cognitive training that enhances executive functions, behavioral discipline, and mental resilience. These improvements establish a foundation for increased academic achievement. Empirical studies demonstrate that students who participate in martial arts often outperform their peers in core subjects such as mathematics and linguistics, a result attributed to enhanced cognitive processing and self-regulation.

The World Health Organization (WHO) has identified schools as essential environments for promoting physical activity among children. Schools offer an op-

timal setting for implementing physical activity interventions during childhood. Participation in school-based physical activity supports both physical and emotional development and may also provide broader institutional benefits. Additionally, recent research has investigated the positive effects of extracurricular sports on academic outcomes. Evidence demonstrates that involvement in sports improves concentration, cognitive performance, and overall academic achievement (Becker et al., 2018; Errisuriz et al., 2018; Gu et al., 2019; Pancar, 2020). The proportion of children achieving the World Health Organization (WHO) recommended levels of physical activity (PA) remains low, with estimates ranging from 2.0% to 14.7% for European girls and 9.5% to 34.1% for boys (Bull et al., 2020; García-Hermoso et al., 2020; Nilsen et al., 2020). Multiple studies demonstrate that PA enhances various aspects of physical fitness in children, including cardiorespiratory fitness, muscle strength, coordination, and fundamental motor skills (García-Hermoso et al., 2020; Nilsen et al., 2020). Additionally, PA is associated with improvements in cognition, academic performance, and social and psychological outcomes, such as self-esteem, behavioral conduct, and peer relationships (Andermo et al., 2020; Erickson et al., 2019; Gao et al., 2013).

Martial arts in education highlight the link between mental and physical well-being (Moore et al., 2020). This approach creates a broad model of student growth that goes beyond the usual academic domain (Yu et al., 2025). Martial arts benefit various aspects of students' lives and support their personal growth and academic success (Gordon, 2023). Regular physical activity positively influences both mental and physical health. It fosters resilience, well-being, and cognitive abilities (Moscatelli et al., 2016). Brain health is the foundation for essential life domains. It enables individuals to thrive and supports global goals such as the Sustainable Development Goals (World Health Organization, 2018). Given the significant consequences associated with poor brain health, preventive measures are essential (World Health Organization, 2018). Integrating martial arts into higher education highlights the interdependence of mental and physical well-being. It promotes a holistic model of student development, enhancing personal growth and achievement.

Advancements in science and technology have led to decreased physical activity and increased sedentary behavior, negatively affecting children's physical development (Boguszewski & Socha, 2011). The proportion of children meeting the World Health Organization's recommended physical activity (Bull et al., 2020) levels remains low: according to referenced studies, between 2% and 14% of European girls and between 9% and 34% of European boys meet these standards. Participation in martial arts significantly enhances conative characteristics such as determination, consistency, and motivation through structured training, which directly improves physical fitness (Fuller, 1988). Recent literature indicates that martial arts training significantly influences academic performance and student success by enhancing cognitive functions, emotional regulation, and self-discipline. (Harwood-Gross et al., 2021) Research highlights a strong

brain-body connection, as the physical and mental demands of martial arts promote neuroplasticity and strengthen the prefrontal cortex. (Duru & Balcioglu, 2018) Martial arts training has been shown to improve executive functions, such as working memory, cognitive flexibility, and inhibitory control. (Pujari, 2024) Empirical studies, including a one-year school-based karate intervention, report significant benefits for academic achievement in mathematics and reading comprehension.

Martial arts practice cultivates self-discipline, responsibility, and a proactive approach to challenges. (Gordon, 2023) This development of discipline enables students to manage study schedules, meet deadlines, and resist distractions in academic contexts. (Zhang, 2024, pp. 155-159) Mindfulness techniques and physical exertion in martial arts promote emotional balance and provide a structured outlet for stress. (Miyata et al., 2020) These elements contribute to increased mental resilience, which is essential for meeting the psychosocial demands of higher education. (Zhang, 2024, pp. 155-159) Mastery of complex movements and adherence to precise instructions in martial arts training enhance sustained concentration. This kinesthetic instructional method is particularly effective for students who experience difficulties in traditional classroom environments (Zhang, 2024).

Martial arts share conceptual similarities with mindfulness and yoga. These similarities may contribute to improvements in attentional control. (Bremer et al., 2016, pp. 899-915) Existing research primarily focuses on school-aged children (Diamond & Lee, 2011). For example, participation in three weekly taekwondo sessions over an academic year has been associated with enhanced working memory and attention. Parents also reported improvements in concentration and behavioral inhibition (Lakes et al., 2013). It found that martial arts, mindfulness, and Montessori approaches provided broader executive control benefits for children compared to other interventions. These findings suggest that martial arts and related activities play a significant role in developing executive functions, particularly among children. (Li, 2026)

The review indicated that martial arts interventions are particularly effective for children with the lowest cognitive test scores and those from lower socio-economic backgrounds, who often have limited cognitive control. Neurotypical young adults generally perform well on attentional tasks and report fewer cognitive gains, although they may experience sensory-motor improvements, such as increased corticospinal or motor cortex excitability with extended martial arts practice (Moscatelli et al., 2016). For adults, martial arts may support impulse control, stress management, and problem-solving through combined mental and physical training, underscoring the need for further study. In students, regular martial arts participation has been linked to up to 30% longer attention spans, higher mathematics and reading grades, greater self-control, stress management, and goal-setting, as well as reduced classroom disruptions. The structured environment fosters self-discipline, enabling students to better manage homework and follow rules. Memorization and sequencing activities strengthen memory and

support academic retention. Improved self-esteem from martial arts empowers students to manage academic stress and face challenging subjects.

2. Literature Review

Literature reviews indicate that martial arts training significantly enhances academic performance and overall student success by fostering cognitive, behavioral, and physical development. This comprehensive growth is often attributed to the open-skilled nature of martial arts, which requires practitioners to adapt to dynamic and unpredictable environments.

Cognitive Enhancement and Executive Functions: Martial arts training functions as a form of brain training that strengthens the prefrontal cortex, which is responsible for higher-order thinking. Regular practice improves core executive skills, including working memory, cognitive flexibility, and inhibitory control. These gains frequently exceed those observed in traditional physical education or closed-skill activities such as running. Research demonstrates that martial arts can enhance attentional processes by up to 30%, helping students filter out distractions and maintain focus during academic tasks. The complex, cross-lateral movements involved in martial arts stimulate neuroplasticity and reinforce connections between brain hemispheres, thereby improving overall cognitive integration.

Behavioral Outcomes and Self-Regulation: The structured environment of the dojo cultivates character traits that transfer to academic settings. Martial arts programs promote personal accountability and encourage proactive responses to challenges. International studies have shown that structured interventions, such as school-based karate, significantly reduce conduct problems, including aggression and fighting, by enhancing emotional regulation. Students also develop resilience and self-efficacy by learning to manage setbacks and persist through physical challenges, which fosters the mental resilience required for academic achievement.

Impact on Specific Academic Areas: Studies have reported measurable gains in core academic subjects, often within three to six months of initiating martial arts training. Enhancements in spatial reasoning and sequential processing, which are critical for geometry and multi-step problem solving in mathematics, are closely associated with martial arts practice. Improved attention to detail and greater comprehension of complex instructions contribute to better reading and writing skills. For neurodivergent students, martial arts may serve as a non-pharmacological intervention, significantly improving focus and reducing impulsivity. Psychological Well-being and Stress Management: Martial arts provide a structured outlet for stress relief, which is critical for maintaining student performance. Training helps regulate the body's stress response (HPA axis), mitigating the chronic stress that can impair memory formation and learning. Many traditional styles incorporate mindfulness and meditative training, promoting inner calmness and improved social adaptability. The process of earning belts and mastering new techniques builds self-esteem, making students more comfortable participating actively in class.

Martial Arts is a fundamental component in fostering students' holistic development, encompassing the physical, mental, emotional, and social domains. Conventional perspectives often limit physical activity to sport performance and physical fitness training; however, contemporary movement education demonstrates that physical activity contributes to students' comprehensive development (Barbara, 2024). As an educational tool, university-level Physical Education cultivates not only physical movement but also emotional resilience, social skills, and cognitive engagement (Huang, 2024). Physical development remains a central priority within academic institutions. Physical education encourages healthier lifestyle decisions by improving cardiovascular health, muscular strength, flexibility, and overall physical condition. These benefits are particularly significant for universities, which routinely address high rates of student inactivity (Lines et al., 2021). Well-designed physical exercise programs can elevate students' energy levels, enhance immune function, and boost overall well-being and academic achievement, as described below:

Martial arts have historically emphasized *self-regulation*, resulting in a strong association with self-control and discipline (Nanay, 2010). Self-control is defined as the capacity to inhibit, repress, and manage automatic responses while generating deliberate actions through focused attention and reasoning. In martial arts, practitioners focus on a primary target, such as an opponent, while also distributing attention across multiple features (Nanay, 2010). Moreover, martial arts and other open-skill sports require dynamic movement and adaptation to unpredictable situations, thereby fostering goal-directed behavior. Research demonstrates that children who regularly practice karate exhibit superior cognitive functioning in visual selective attention, verbal working memory, and reaction time. These cognitive abilities contribute to enhanced karate performance and differentiate experienced athletes from novices (Singh et al., 2018). Effective karate performance requires high levels of cognitive engagement and executive function, including updating and monitoring information in memory, shifting attentional resources between tasks, and inhibiting automatic thoughts and behaviors. Karate also promotes goal-directed behaviors in response to changing situations and movements.

Martial arts education is notable for its ability to cultivate a robust personality, offering a unique approach to developing healthy character traits that other disciplines cannot replicate. The primary goal of university physical education is to enhance student health. Health is defined not only by physical well-being but also by mental health, social adaptability, and moral development. In this context, true health is achieved through the harmonious and coordinated development of both body and personality (Pierceall & Keim, 2017).

Martial arts instruction fosters *self-efficacy.* This quality is a critical determinant of the effort individuals invest in tasks. Individuals with high self-efficacy are more likely to persist in the face of challenges. Those with low self-efficacy, by contrast, may withdraw or avoid such situations. For example, a student lacking

confidence in mathematics may choose not to enroll in advanced math courses. This pattern highlights the significant influence of beliefs. As Mahatma Gandhi asserted: "Your beliefs shape your thoughts, which in turn shape your words, actions, habits, values, and ultimately your destiny." (Zhang, 2024, pp. 155-170) The Achievement Motivation Theory, explains the factors that drive individuals' efforts and persistence in academic achievement. (Maehr & Sjogren, 1971). According to this theory, motivation and achievement are closely linked. Individuals engage in tasks based on their expectations of success and the value they assign to outcomes (Wigfield & Eccles, 2000, pp. 68-81). In academic contexts, researchers, achievement motivation theorists, and policymakers examine the factors that determine students' motivation to excel (Myers, 1964). By analyzing factors like achievement motivation, goal orientation, and perceptions of success and failure, educators can design interventions. These efforts help create environments that promote positive motivational beliefs and behaviors among students.

Combat martial arts are characterized by a progressive structure in which participants continually strive to master new techniques and reach personal milestones (Park & Gerrard, 2013). This incremental progress cultivates ongoing self-improvement, boosts self-confidence, and enhances overall life satisfaction (Kim & Cruz, 2021). Mastery of complex techniques or advancement to new belts provides a tangible sense of accomplishment, fueling intrinsic motivation and sustaining commitment to training (Rusticus & Dumoulin, 2023). Ongoing engagement in this structured process delivers cumulative benefits, including improved mood regulation and a heightened sense of purpose (Zheng et al., 2026). Empirical evidence shows that individuals participating in structured, goal-driven physical activities derive greater psychological benefits than those engaging in less structured exercise.

The Broaden-and-Build Theory (Fredrickson, 2001) shows that positive emotions expand thought-action repertoires and create lasting psychological resources. Emotions like joy, satisfaction, and accomplishment drive adaptive behaviors and strengthen well-being (Fredrickson, 2001). Combat martial arts promote these emotions by helping participants achieve goals, master techniques, and build social ties. For example (Oh et al., 2025), overcoming a tough technique or advancing in belt ranks builds competence (Moore et al., 2020, pp. 402-412) and fulfillment (Rusticus & Dumoulin, 2023). These emotions increase self-confidence, improve mood, and encourage steady participation in health-promoting activities.

Stress reduction is another key connection between physical activity and well-being. Combat martial arts eases stress both physiologically and psychologically. Physiologically, intense training triggers the release of endorphins, elevating mood and reducing stress. (Martínez-Díaz & Carrasco, 2020) Physical activity also lowers cortisol, easing chronic stress symptoms such as tension and fatigue. (Moyers & Hagger, 2023) Psychologically, structured martial arts training anchors attention in the present, enhancing mindfulness and mental clarity (Acebes-

Sánchez et al., 2021). Focusing on refined movements or techniques can provide a temporary escape from external stressors.

The *Broaden-and-Build Theory* (Fredrickson, 2001) posits that positive emotions foster enduring psychological resources, such as ego-resilience. Consistent engagement in combat martial arts promotes self-discipline and a sense of accomplishment, enhancing adaptive capacity for managing adversity.

Ego-resilience enables emotional stability and adaptation to challenges. International students facing language barriers, academic demands, and new social settings draw on this trait to navigate uncertainties. Combat martial arts cultivate persistence and reframe challenges as opportunities for growth. This mindset promotes optimism and reframes adversity to bolster well-being. Such coping skills help international students address cultural and academic challenges with confidence.

Taken together, engagement in combat martial arts sharpens long-term well-being by fostering resilience through persistent goal-setting, overcoming challenges, and skill mastery. This structured progression cultivates discipline and persistence, which are essential for sustained well-being (Dunkel et al., 2021; Lundqvist, 2011). Unlike activities offering immediate gratification, martial arts rely on gradual improvement, which strengthens commitment and resilience (Rusticus & Dumoulin, 2023). Through this process, practitioners enhance both physical fitness and psychological growth, gaining confidence in their ability to meet objectives (Dunkel et al, 2021; Lundqvist, 2011). Amassing these successes builds ego-resilience, supporting lasting satisfaction and emotional stability.

3. Discussion and Conclusion

The impact of martial arts training on student success encompasses cognitive enhancement, behavioral discipline, and emotional resilience. Empirical studies indicate that these benefits carry over from the training hall to the classroom, often leading to measurable improvements in academic performance and school conduct within a few months of consistent participation.

Martial arts programs improve physical fitness and support student success. Analysis shows that fitness, speed, agility, strength, flexibility, coordination, and balance improve most through martial arts. These results can help promote budo martial arts and influence children's and parents' sports choices. Still, more research is needed to overcome study limitations. One main issue is the reliance on end-of-term school grades to assess academic performance. Direct tests of reading, writing, and arithmetic are recommended.

This study guides educational practices, policies, and support for students' holistic growth and higher education experiences. Investigate how martial arts benefit student development by analyzing their impact on psychosocial behavior and academic performance. Based on findings, take these steps: 1) Boost academic success through martial arts by focusing on discipline, positive settings, and goal setting. Use feedback to track strategy effectiveness. 2) Improve psychosocial fac-

tors by emphasizing enjoyment, intention, social interaction, and escapism in martial arts programs.

This review assessed the health effects associated with hard martial arts training. The evidence demonstrates that such training improves balance and postural control and positively influences cognitive and psychological health. Studies included in the review reported improvements in balance and cognition among students who were new to martial arts. These results indicate that the benefits of hard martial arts training are attainable regardless of the age at which training commences. In addition, martial arts training has been shown to enhance academic performance and student success by improving cognitive functions such as memory, attention, and executive function, as well as fostering psychological traits including discipline, self-control, and confidence. Structured, high-intensity training enables students to develop greater focus, reduce stress, and improve behavioral outcomes, thereby contributing to higher academic achievement. Students who participate in martial arts often exhibit increased attentiveness, improved impulse control, and fewer classroom disruptions, thereby creating a more effective learning environment. Furthermore, martial arts students frequently achieve higher scores in mathematics and linguistics, likely due to enhanced planning skills and working memory, as reported in multiple studies. Ego-resilience is fundamental to sustained well-being because it enables individuals to maintain emotional stability and adapt to novel challenges. Students frequently encounter stressors, including language barriers, academic demands, and unfamiliar social environments. For these students, ego-resilience serves as a critical resource for managing uncertainty and overcoming obstacles. Participation in combat martial arts can enhance ego-resilience by promoting persistence and encouraging students to perceive challenges as opportunities for personal growth. This perspective fosters optimism and enables students to interpret adversity as a means to achieve future success. Consequently, students are better equipped to navigate cultural and academic challenges with increased confidence and psychological stability.

The conclusion regarding the influence of martial arts training offers a comprehensive approach to enhancing academic performance by combining physical fitness with cognitive development. Empirical studies consistently indicate that sustained participation, especially in structured programs such as Karate or Taekwondo, leads to measurable improvements in academic achievement, classroom behavior, and executive functioning. Martial arts training should be regarded not only as an extracurricular sport but also as a specialized form of cognitive development. Its effectiveness is demonstrated by its capacity to cultivate a growth mindset, enabling students to understand that consistent effort and discipline result in mastery, a concept transferable to academic achievement. Integrating martial arts into educational curricula or student routines provides educators and parents with a distinctive, evidence-based approach to developing individuals who are both academically proficient and emotionally resilient. Targeted training activities can enhance performance in specific academic domains. For example,

learning complex katas (forms) develops sequential processing and spatial reasoning, which are essential for geometry and multi-step problem-solving. The precision and attention to detail required to master techniques may also improve reading comprehension and writing skills. Furthermore, the trial-and-error process involved in perfecting a technique closely parallels the scientific method, including hypothesis testing and systematic observation.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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