

Literature Review of the Relationship Between Physical Fitness, Physical Activity, Cognitive Functioning and Academic Success

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Abstract

The objective of this paper is to provide an extensive literature review of academic papers written in English about The Relationship Between Physical Fitness, Physical Activity, Cognitive Functioning and Academic Success. The research is showing that there are more and more benefits of physical fitness and physical activity on students cognitive (executive functions) and academic success, and it has been implemented into many different educational systems already. Usually, we can find many literatures review where authors compare how either physical fitness or physical activity benefits cognitive or academic success, but approach in each culture or education system is quite different. The studies reviewed suggest that physical activity and physical fitness are positively affecting academic performance and cognitive development, but it has been rarely compared how all 4 items are affecting each other and more research should be done from that perspective. Physical fitness and physical activity are definitely proven to be beneficial for students thinking and solving academic exams, but there is further investigation to be done to see how more beneficial physical activity and physical fitness can be regarding cognitive functioning (executive functions) and academic success.

Keywords: Cognitive Development, Executive Functions Physical Fitness, Physical Activity Benefits

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Introduction

The benefits of every day including in physical action in childhood have been broadly examined, appearing reverse connections between physical movement and cardiovascular chance, and with advantageous impacts on a few mental wellbeing results (Bull et al., 2020, p. 1451-1462; Penedo & Dahn, 2005, p. 189-193). Moreover, physical movement has demonstrated to be an vital figure in corpulence and malady avoidance in children (Janssen & LeBlanc, 2010; Strong et al., p. 732-737). There's too prove proposing that physical action is related with a few angles of brain work and cognition (Elleberg & St-Louis-Deschênes, 2010, p. 122-136; Fedewa & Ahn, 2011, p. 521-535; Hillman et al., p. 58-65). In this way, both intense and unremitting direct to incredible physical movement intercessions might deliver changes in brain structure and work in children matured 6 12 a long time, as well as cognition, and scholarly results (Erickson et al., 2019, Greef et al., p. 501-507). These changes may progress cognitive capacities such as concentration, consideration, official work, and working memory (Donnelly et al., 2016, p. 1197-1222; Hillman et al., 2008, p. 58-65) tha are significant for academic success (Fedewa & Ahn, 2011, p. 521-535). For occurrence a few controlled ponders have affirmed that physical action can improve scholarly substance learning such as language (Barnett et al., 2008, p. 299-313) or mathematics (e.g., Cecchini & Carriedo, 2020, p. 121-125). Subsequently, changes in these cognitive capacities as a result of expanded PA might, in turn, make strides children s scholastic accomplishment (Gonzalez-Sicilia et al., 2019, p. 135-141; Mullender-Wijnsma et al., 2016; Zeng et al., 2017). In this regard, the association between physical activity and physical and cognitive health outcomes is more consistent and consistent across higher and lower intensity physical activities. (Poitras et al., 2016, p. 197-239). This ponder pointed to look at the affect of students s physical movement on making strides their official capacities and accomplishing way better scholastic comes about. Preparatory center of this investigate will be to look at and degree in which arrange, integration of English, science and science into physical instruction lessons moves forward understudies cognitive and scholastic execution. It is proposed that the physical instruction profession essential concern ought to be for advancement of health related physical wellness, characterized as a state characterized by a an capacity to perform day by day exercises with vigor, and show of characteristics and capacities that are related with moo chance of untimely improvement of the hypokinetic infections. In expansion, physical wellness and engine execution are terms which will have utility for proficient physical teachers, in case agreement can be built around exact exacting and operational definitions(Pate, 2012, p.174-179; Rauschenbusch, 2013,p. 49-51). Both physical action and physical wellness produce normal inspiration, make enduring conditions of challenge, and minimize the affect of components repressing official capacities stretch, boredom, need of rest, and oxygen (Diamond and Ling, 2016). Number of thinks about reported positive joins between physical action and cognitive execution in preschool age children (Sibley and Etnier, 2003; de Greeff et al., 2018, p. 501-508). Advance, past inquire about pointed on critical connection between physical movement and physical wellness (Latorre-Román et al., 2016, p. 450-455). Hence, the degree of physical wellness in preschoolers may well be candidate altogether related to the degree of cognitive or official capacities (Visier-Alfonso et al., 2020). Indeed in spite of the fact that, later considers bolster this suspicion the part of physical wellness and its certain components a solid and b engine component in improvement of official capacities abilities is still open issue.

However, in all those considers, there's need of discoveries with respect to how really integration of other subjects into physical instruction course influences students cognitive capacities and how overhauling coordinates physical instruction Educational programs seem

influence understudies cognitive and scholastic execution. The relationship between physical activity, physical fitness and benefits on cognitive functioning and academic success is proved more than several times in this literature review and below there is detailed description where authors are combining one or two items and showing its benefits to cognitive functioning and development.

Terminology

Physical activity, exercise, and physical wellness are terms that portray distinctive concepts. In any case, they are frequently befuddled with one another, and the terms are in some cases utilized traded. This paper proposes definitions to recognize them. Physical movement is characterized as any real development delivered by skeletal muscles that comes about in vitality use. The vitality consumption can be measured in kilocalories. Physical movement in way of life can be categorized into occupational, sports, conditioning, family, or other exercises. Exercise may be a subset of physical action that's arranged, organized, and tedious and has as a last or a middle of the road objective the change or upkeep of physical wellness. Physical wellness may be a set of qualities that are either wellbeing or skill related. The degree to which individuals have these qualities can be measured with particular tests. These definitions are advertised as an interpretational system for comparing ponders that relate physical action, work out, and physical wellness to wellbeing (Dishman et al., 1985). According to Green (1996) Cognitivism comes from cognitive physiology to other measurements like social physiology, identity, psychotherapy, improvement, and indeed assist. Word cognitive is regularly utilized as a synonymous with mental or mental. In this case, cognitive working co related with physical wellness and physical action appears us how critical physical action and physical wellness really is and how it creates official capacities which are portion of cognitive working and at the same time moving forward understudies' scholarly victory.

Relationship Between Physical Fitness, Physical Activity, Cognitive Functioning and Academic Success

Many authors are emphasizing the truth that physical wellness and physical action ought to not as it were center on wellness and don't improvement but or maybe to consider human needs and values (Ryan & Ryan, 2020, p. 16–26). Our primary objective will be to characterize positive perspectives on understudies cognitive and scholarly execution utilizing one wear school considering to current angles of physical instruction. This inquire about will allow us answers how physical action and physical wellness can effectively create official capacities and help understudies accomplish way better scholastic comes about. Inquire about points to show that physical movement and physical wellness in wear school is exceptionally critical in open schools and on the off chance that it is utilized through certain period of a long time, it'll appear impacts on creating students official capacities in a way that recreations on English dialect they are playing amid physical instruction coordinates classes are unwittingly moving forward their official capacities. That being said, it is anticipated that due to continually utilizing English dialect amid coordinates physical instruction classes and taking after English dialect manual through physical instruction recreations, understudies will memorize it speedier and have superior understanding of English lexicon and language structure and accomplish way better scholarly English dialect comes about comparing to understudies in other open schools which are not utilizing English dialect amid physical instruction classes.

Benefits of Physical Fitness and Physical Activity

Executive function appears to be more sensitive to aerobic exercise than other aspects of cognition. (Colcombe & Kramer, 2003, p. 125-130). Executive function is the control of cognitive functions to achieve a goal and is mediated by circuits in the prefrontal cortex. Planning and executing the sequence of actions that constitute goal-directed behavior requires the allocation of attention and memory, the selection and inhibition of responses, goal setting, self-monitoring, self control, and the skillful and flexible use of strategies. (Eslinger, 1996, p. 367-395; Lezak, Howieson, & Loring, 2004). The executive function hypothesis was proposed based on evidence that aerobic exercise selectively improves older adults' performance on executive function tasks and leads to a corresponding increase in prefrontal cortical activity. (Colcombe et al., 2004, p. 3316-3321; Kramer et al., 1999, p. 418-419). Children's cognitive and neural advancement may be touchy to physical movement (Diamond, 2000, p. 44-56; Hillman, Erickson, & Kramer, 2008, p. 58-65; Kolb & Whishaw, 1998, p. 43-64). Hypothetical accounts of the joins between engine behavior and cognitive improvement amid childhood have extended from hypothesized brain systems to the development of perception action representations (Rakison & Woodward, 2008, p. 1209-1213; Sommerville & Decety, 2006, p. 179-200). According to Tomporowski, Bryan and McCullick 2015 children are profoundly persuaded by problem solving recreations, and the cognitive abilities they create whereas locked in in these diversions can be interpreted into their scholastic victory. Current issue understudies are confronting in English, science and science is classroom environment and not being able to imagine genuine utilization of those subjects.

Summary of the Literature and Key Findings by Relevant Authors

A review of previous studies relevant to this study may provide a basis for understanding how physical fitness and physical activity affect cognitive function and academic performance. We can compare the amount of daily exercise in different cultures and countries and how active they are when we talk about physical fitness and physical activity. This article focuses on the relationship between physical fitness and physical activity and how they affect cognitive and executive functions and how this impacts students' academic success.

Author	Research Focus	Key Findings
Marttinen et al., (2017)	Physical activity and academic performance	Positive effects on academic performance
Rauschenbach, (2013)	Physical education and general activity of students	Physical activity helped students in their daily duties
Bull et al., (2020)	Physical activity and mental health outcomes	Physical activity helps improve mental health
Penedo & Dahn, (2005)	Physical activity and mental health outcomes	Physical activity helps improve mental health and executive functions
Elleberg & St-Louis-Deschênes, (2010)	Executive functions and physical activity	Physical activity positively affecting development of executive functions (cognitive functioning)
Fedewa & Ahn, (2011)	Executive functions and physical activity	Physical activity improved daily usage of executive functions
Erickson et al., (2019)	Executive functions and Physical fitness	This study shows the positive aspects of physical training in relation to cognitive performance and improved executive function.

Donnelly et al., (2016)	Physical activity, fitness, cognitive function, and academic achievement in children	One of the rare types of research that connects all four points. Research has shown that physical fitness and physical activity have a major impact on academic performance.
Hillman et al., (2008)	Exercise effects on brain and cognition.	This study shows effects on the brain and cognition. The results showed that getting enough exercise had a more positive effect on brain activity and cognitive function than those who did less or no exercise.
Barnett et al., (2008)	Educational effects of the tools of the mind curriculum: A randomized trial.	The results suggest that a developmentally appropriate curriculum with a strong emphasis on play can promote learning and development and improve both social and academic performance of young children.
Cecchini & Carriedo, (2020)	Effects of an interdisciplinary approach integrating mathematics and physical education on mathematical learning and physical activity levels.	Integrating physical activity into learning environments such as math has been shown to help develop tools that improve math learning (e.g., subtraction. Likewise, this interdisciplinary approach has proven useful in increasing children's physical activity throughout the day.
Gonzalez-Sicilia et al., (2019)	Prospective associations between participation in leisure-time physical activity at age 6 and academic performance at age 12.	The study shows that higher levels of leisure time physical activity at age 6 were associated with better teacher ratings in language and mathematics (0.075 and 0.102, respectively and self-ratings in language 0.103). and also with higher academic engagement (0.077) at age 12. Regression coefficients are standardized. All associations were significant (p < 0.05). Promoting leisure time physical activities can be an effective way to encourage children to exercise and help them improve their academic performance, leading to broader long-term benefits.
Mullender-Wijnsma et al., (2016)	Physically Active Math and Language Lessons Improve Academic Achievement: A Cluster Randomized Controlled Trial	Study result: Physically active school lessons significantly improved the performance of elementary school students in mathematics and spelling and is therefore a promising new way of learning.
Zeng et al., (2017)	Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A	The results support causal evidence for the effects of physical activity on both motor skills and cognitive development in preschool children. Given the lack of

	Systematic Review	available research, future studies with larger, representative samples are needed to examine the associations between physical activity and cognitive domains and to strengthen and confirm the evidence for dose response responses in early childhood.
Visier-Alfonso et al., (2020)	Executive functions mediate the relationship between cardiorespiratory fitness and academic achievement in Spanish school children aged 8 to 11 years	Children who scored higher in both CRF and executive function performed better in math and language. The results showed that a significant portion of the positive effects of CRF on academic performance were mediated through improvements in inhibition and cognitive flexibility. Thus, this study supports the hypothesis that improving CRF may contribute to improved academic performance not only through a direct mechanism but also through improved executive function.

Conclusions

We took the following 15 research as our core to investigate effects on main research. In 5 out of 15 research we see positive aspects of physical activity and academic development (Marttinen et al., 2017, p. 37–49., Rauschenbach, 2013, p. 49-51., Bull et al., 2020, p. 1451-1462; Penedo & Dahn, 2005, p. 189-193). Most research are proving positive aspects physical activity and fitness has on executive functions and cognitive development (Elleberg & St-Louis-Deschênes, 2010, p. 122-136; Fedewa & Ahn, 2011, p. 521-535; Hillman et al., p. 58-65., Erickson et al., 2019, Greef et al., p. 501-507., Donnelly et al., 2016, p. 1197-1222; Hillman et al., 2008, p. 58-65., Fedewa & Ahn, 2011, p. 521-535., Barnett et al., 2008, p. 299-313., Cecchini & Carriedo, 2020, p. 121-125., Gonzalez-Sicilia et al., 2019, p. 135-141; Mullender-Wijnsma et al., 2016; Zeng et al., 2017., Maurer and Roebbers, 2019, p. 607-620; Visier-Alfonso et al., 2020).

As we can see from literature review there are not too many research about relationship between physical activity, physical fitness, cognitive functioning and academic success. Those we have shows significant connection between Physical activity, Physical Fitness and it's positive aspects on Cognitive functioning (executive functions) and automatically on Academic success.

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