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ORIGINAL

THE INFLUENCE OF ATHLETIC ACTIVITY ON COGNITIVE FUNCTION IN YOUTH: NEUROBIOLOGICAL PERSPECTIVES

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ABSTRACT

Young individuals need to practice sports to do better in all areas of their lives. This study should to determine how playing sports affected cognitive functions (inhibitory control) and academic achievement (report card), considering the maturational stage. A total of 50 adolescents, both male and female, between the ages of 10 and 14, were examined and split into two groups: group I (non-sporty), which participated solely in physical education classes at school, and group II (sporty), which participated in extracurricular sports activities. The research study was based on primary data analysis to determine the research used quantitative software and generate results. The 5-digit (FDT) and Go/No-Go tests were used to evaluate inhibitory control. The bone age equation was used to estimate maturity, and grades from school report cards were used to evaluate scholastic achievement. Age at maturity, scores on cognitive tests, and report card grades did not significantly correlate with academic success. The overall result found a direct and significant link between athletic activity and cognitive function in youth. The cognitive tests showed a notable difference between the two groups. It is concluded that systematic sports practice positively impacts young people's cognitive abilities regardless of the relationship between maturational development, cognitive aspects, and academic performance since athletes demonstrated higher cognitive performance than non-athletes.

KEYWORDS: Athletic Activity (AA), Cognitive Function (CF), Youth Neurobiological Perspectives (YNP)

1. INTRODUCTION

Neurobiology refers to the particular study of neurons, their structure, function, way of transmission of nerve impulses, and other aspects. Athletic activity refers to special training and exercises for athletes, which are important for enhancing their performance. The cognitive function is related to the thinking of human beings, which enables them to make decisions in a better way, along with being responsible for the imaginative aspect of human thinking. In this introduction, we will discuss the major influence of athletic activity on cognitive functions related to neurobiological perspectives. The influence of athletic Activity is not only confined to improving physical health but is also related to Brain development in terms of cognitive function. Various neurobiological perspectives are related to cognitive function, which we will discuss here(Doherty & Forés Miravalles, 2019; Quan et al., 2023). The first neurobiological perspective is the aspect of neuroplasticity. This term is very important in medical science because it is related to the brain's ability to recognize a new aspect, adapt it, and show a response to any new experience, any new environment, or any other change that can be related to learning. If we talk about the influence of athletic Activity on neuroplasticity, we may say that the ability to adapt of the brain increases through consistent exercises; these exercises also enhance the cognitive ability of human beings, thus promoting the aspect of flexibility and learning related to the human brain(Christiansen et al., 2019). The other important neurobiological perspective is the blood flow and oxygenation of the brain. As we know, the main function of blood is to transport oxygen and nutrients to the whole body, so when there is better blood flow, there will be effective oxygenation and nutrients supply to cells. It has been proved that exercise may help boost blood flow to the brain, and this improved blood flow makes oxygenation and the supply of nutrients effective. Another important neurobiological perspective related to the influence of athletic activity is the aspect of neurotrophic factors. These are a few important factors related to hormonal production, which are responsible for the improved growth of neurons(Somerville & Casey, 2010). Exercise in athletes may promote or enhance the production of these neurotrophic factors, helping improve neural growth. This better neural growth is also helpful in increasing cognitive function in athletes. The other important neurobiological perspective related to the influence of athletic Activity is the stress reduction in athletes(Ford et al., 2012). As we know, athletes have a higher risk of stress than laymen because of various factors. These factors may include excessive training, disturbed sleep awake cycle, fear of failure, anxiety related to performance, and others. So, there is a need for suitable ways to reduce stress levels in athletes. Recent studies have proved that exercise may help to reduce stress levels in athletes and thus lower the cortisol level in the blood(Martín-Rodríguez et al., 2024). The reduced stress level may also help enhance the cognitive function of athletes. It has been seen that there are important applications of athletic Activity in cognitive domains as well. There aren't some important aspects that athletes need to learn for better

performance. These aspects are planning decision-making, and problem-solving. The aspects may be learned by experience and, with time, get improved. We know that proper planning is mandatory for athletes because, without proper planning, they cannot utilize their time better (Kraft, 2012). This aspect of planning is also mandatory for managing activities other than athletic Activities. The importance of decision-making is inevitable for athletes. During performance, an athlete has to make a few important decisions to have sharp cognitive skills for swift decisions. The other aspect is problem-solving, which is also related to the cognitive skills of athletes. Recent studies have proved that exercise may enhance these aspects very effectively (Vazou et al., 2019). An athlete may have better planning, decision-making, and problem-solving Skills through regular exercises and training programs. The other important influence of athletic activity on cognitive skills is the aspect of athletes' memory. As we know, there are two types of memory in human beings, which are termed short-term memory and long-term memory. For athletes to perform better, both types of memory should be improved. Recent medical studies have convinced us that exercise may help to enhance both short-term and long-term memory. This sharpened memory will help enhance the performance of athletes and prevent injuries as well. The other important influence of athletic Activity on cognitive skills is the aspect of attention in athletes. Attention is mandatory for learning from any new or previous experience (Dustman et al., 1994). When there is a lack of attention to athletes, there will be poor learning and a risk of injury as well. It is mostly seen that lack of attention results in injuries in athletes because of poor cognitive skills. However, with the help of athletic activity, attention also improves in athletes. The enhanced attention level will improve athletes' learning and injury prevention. The other important influence of athletic Activity on cognitive skills is the aspect of processing speed (Valkenborghs et al., 2019). We know that whenever receptors receive a stimulus, there is processing time which decides the body's response speed. This processing period consists of sending impulses to the brain and then receiving impulses to respond to a stimulus. Recent medical studies have proved that exercise has also an important Impact on processing time in athletes. The speed of response to specific stimuli increases, which is also helpful in increasing the performance of athletes. The other important influence of athletic activity on the cognitive functions of athletes is the aspect of cognitive flexibility with the help of resistant training. As we know, training has an important role in enhancing Cognitive flexibility in athletes. These training are not only necessary for physical health but also positively impact mental health (Lubans et al., 2016).

1.1 Research objective

The main objective of this research is to understand the influence of athletic Activity on cognitive functions in athletes related to a neurobiological perspective. After an overview of these studies, we can say that athletic Activity positively influences the development of cognitive functions in athletes.

2. Literature Review

This study aims to explore alleged neurophysiological components that connect more extended actual work mediations to emotional wellness & mental results involving riffled-dominated preliminaries in kids, teenagers & youthful grown-ups. Most considerations account for development in emotional well-being & cognizance results by pursuing more extended actual work mediations that agree with neurophysiological changes, particularly myelogram modifications in actuation & biophysical boundaries in front-facing regions (Heinze et al., 2021). Studies determined that neurology employed to engine movement is a developing region that means to figure out the impacts of engine action upon the designs & elements of the Focal Sensory method. As per this audit, & in accordance with the contemporary neuropathologic technique into the connections between engine exercises & mental capabilities, it's feasible to guarantee that bradykinesia will generally repress erudition. Subsequently, it appears more effective than at any time in recent memory to notice the necessity to present a functioning proposition that coordinates cerebrum engine movement schemes toward the academy's educational plan(Latino & Tafuri, 2024). Studies suggest that it is generally acknowledged that actual activity may be utilized as an instrument toward the counteraction & therapy of different illnesses or problems. The activity comprehension connection will be checked on the two according to the conduct viewpoint & out of the neurobiological components. Ultimately, actual activity mediation schemes planning to increment mental execution in researcher & working Environment conditions gonna be audited(Ferrer-Uris et al., 2022). Scholars talk about the quantifiable (for example., period, force) & subjective (for example., variety) qualities of active work that might have direct impacts. The following segment centres around the neurophysiological, psycho-social & conduct instruments liable toward the impact of PA on leader capabilities. Studies close by featuring the restrictions of the current proof basis & giving proposals to prospective examination(Lubans et al., 2021). This survey is widely centred around improving mental capabilities whilst executing activities sorted toward cardiac practices, obstruction preparing, hand-to-hand fighting, battledore athletics, prancing & mental-physical works out. Studies reasons that utilizing operative around-infrared spectrometry conquers specific impediments of operative magnetic reverberation tomography. Moreover, the impacts of active work on a different assortment of the populace, from dynamic kids to elderly individuals, are examined(Srinivas et al., 2021). The findings of this study show that it is legitimate to additionally investigate the job of rebuilding & active work as arbiters in the relationship among initial-vitality external exposures & emotional well-being/mental turn of events. It's significant to contemplate the youngster's viewpoint & explicit strategic cautions. Specified the developing calculated explanations/execution, Equivalent vitality will endeavour to occupy a basic hole in the writing(Dzhambov et al., 2023). The purpose study's purpose is to investigate the connection among engine ability forms & their turn of events & the mental advantages of kids & teenagers. Engine

expertise mediations that's unassuming, vital & successive are greater compelling. Ecological boosts, relational connection, deftness, teamwork, & cardiopulmonary wellness might be considered characteristic mediators of coordinated movements to further develop insight(Shi & Feng, 2022). Researchers reveal that according to a utilitarian perspective, physical activity is a natural component upgrading mental capacities, like chief capabilities, remembrance & handling hasten. This survey depicts the present status of exploration regarding the effects of active work & practice on mental capabilities, presenting a potential unique area of examination toward upgrading the administration of Mucoviscidosis(Elce et al., 2020). This study intends to sum up the writing on kid & juvenile active work, wellness, & mental execution by interpreting experimental exploration to School & local area contexts. Extensive methodologies beyond numerous contexts, oblation valuable chances to take part in actual work, have the main capability toward improving mental well-being among youngsters & teenagers(Castelli, 2022). Scholars suggest that prospective myelogram reviews surveying the impacts of physical activity, work, & and consuming wellness at different formative phases in every copulation & research contemplating the qualities (for example., recurrence, force, kind) & societal setting of physical activity & workout are imperative to more readily figure out the two large scale & small-scale components whereby these ways of behaving & traits might work with psychological well-being strength through juvenile turn of events(Belcher et al., 2021). This research indicate that conflicting proof subsists toward constant actual work-associated impacts on mental, scholastic, & cerebrum results. The study desires to combine its endeavors into further developing review peculiarity, straightforwardness of detailing & spread, & is encouraged to separate among intercession attributes toward its discoveries to genuinely affect strategy(Wassenaar et al., 2020). Researchers examine the job of development variables, neurochemicals & metabolites, also upgrades in mitochondria-targeted digenesis & cell reinforcement movement, & in what way they cultivate practice execution & profound well-being. Ultimately, physical activity has a different effect on mind well-being & and home prosperity. The powerful interchange among physical activity & neurophysiological cycles flags an auspicious road toward prospective examination, along with the possibility of presenting imaginative, helpful methodologies for profound issues(Chen & Nakagawa, 2023). Studies elaborate that customary active work might significantly affect the improvement of the useful neuroanatomy, & might be basic for working on the negative impacts of unfortunate load on mental well-being(Brooks et al., 2021). Studies claim that vigorous activity in the cerebrum & mental stores system is considered a defensive way of life component ready to prompt constructive outcomes on the two-mind design & capability. The examinations dissected hither showed that every one of the contemplated sorts of exercises has a helpful impact on mental/conduct capabilities & upon the hidden cerebrum neurophysiological cycles. Specifically, the fundamental impacts noticed include the mental areas of remembrance & chief

capabilities(Serra et al., 2022). This current review gave neuropsychiatric proof of crustal hemorheology & mental capability in the abrupt rest populace. Besides, that's what scholars' discoveries demonstrated: in more youthful grown-ups with abrupt rest, greater temperate-to-energetic physical activity was related to more terrible mental execution. Abrupt rest youthful grown-ups have to increment rest period, as opposed to further temperate-to-energetic physical activity, to accomplish the best mental capability(You et al., 2023). Scholars explain that unified athletics football preparation can emphatically influence functioning remembrance in teenagers with scholarly handicaps by further developing enactment of the right frontopolar region, yet whether it actuates the right lateroventral preneural cortex is dubious. These outcomes demonstrate that the unified athletics football training scheme guarantees upgrading leadership capability in youths with Identification, & working on personal satisfaction in this populace(Xiao et al., 2024). Studies show that suicidism is a certain main source of demise among young grown-ups in the US & addresses a huge medical condition around the world. Along these lines, studies pattern coordinates discoveries according to a few points of view in suicide-related & endeavours to make sense of the connection among different neurophysiological, hereditary, & detached perceptions in self-destruction study, oblation a far-reaching speculation to work with comprehension of this complicated result(Vargas-Medrano et al., 2020). Studies give a short survey of the writing connecting actual activity & insight, along with a particular spotlight on the mental turn of events. It addresses parts of the activity that seem to impact this connection, like activity procedures & movement estates. Past the common pattern connecting actual activity to cerebrum capability & comprehension, different explorations have additionally investigated what fluctuating parts of activity mean for its effect on the cerebrum and psyche(Moreau, 2021). Expanding on discoveries that functioning remembrance is upheld by the engine framework, researchers feature the responsiveness of various functioning remembrance parts to intense & extended haul practice in kids & youths. Studies survey proposes extended haul instead of intense advantages of activity toward youngsters & youths' functioning remembrance, that are greater articulated & explicit for practice with elevated compatible requests(Ludyga et al., 2022). The general objective of this study is to give illustrative examinations of actual well-being estimates in the Juvenile Intellectual Mental Development learn at benchmark, involving yet not restricted to rest, active work & athletics contribution, & corpulence ratio. This original copy will also give significant data to Juvenile Intellectual Mental Development clients & assist with directing examinations exploring actual well-being involving the latest boulevards toward well-being dissimilarity study in accordance with juvenile & youthful grown-up improvement(Palmer et al., 2021). Studies explain that expanded mindfulness toward the administration & restoration of mental side effects in athletic-associated concussion is required in whole detached nervous system specialists processing proficient & beginner competitors. Researchers suggest mental preparation as a proactive

rehabilitation device to ease the seriousness of mental side effects & as a reconstructive instrument to further develop mental recuperation after a wound(Hallock et al., 2023). This study features the significant effect of athletics on emotional well-being, underlining its job in close to sentimental guidelines, versatility, mental capability, & processing mental circumstances. It subtleties in how athletics actuate neuropeptide alterations, upgrade mind capabilities such as remembrance & erudition, & help opposed mental deterioration. This survey additionally noticed the advantages of ordinary practice in mindset enhancement, management of stress, & interactive ability upgrade, especially when joined with care rehearses(Martín-Rodríguez et al., 2024). Scholar studies reveal that correspondence among consideration & normal-manner cerebrum meshes interceded the valuable impact of performing soccer. Significantly, practice alleviates the unfavorable impacts of mental hereditary dangers on psychological wellness. Scholars provide a refined comprehension of activity consequences for juvenile emotional well-being to advance customized workout-founded mediations in young people(Yu et al., 2023). Studies discoveries sustain earlier relationships of group athletics cooperation with diminished psychiatry in adolescents over extra examinations that show particularity, portion reaction, & soundness beyond two degrees of science. Lengthwise examinations that additional explain causative connections might legitimize transcatheter investigations of group athletics toward elevated-danger young people(Kunitoki et al., 2023). The discoveries of this study propose a little to-direct definite relationship among engine skill & chief capabilities in kids and young people. The modest lot of exploratory examinations remembered for this survey sustain the statement that mediations focusing on kids' engine skill might be an encouraging system to work on their leader capabilities; although, further exploration is expected to affirm these discoveries(Bao et al., 2024).

Table 1: Result of Bayesian Estimates of Coefficients

BAYESIAN ESTIMATES OF COEFFICIENTS^{A,B,C,D}					
PARAMETER	POSTERIOR			95% CREDIBLE INTERVAL	
	Mode	Mean	Variance	Lower Bound	Upper Bound
ATHLETIC ACTIVITY 1 = STRONGLY AGREE	1.475	1.475	.009	1.288	1.661
ATHLETIC ACTIVITY 1 = AGREE	1.450	1.450	.026	1.130	1.770
ATHLETIC ACTIVITY 1 = NEUTRAL	1.333	1.333	.176	.507	2.160
A. DEPENDENT VARIABLE: Cognitive Function 1					
B. MODEL: Athletic Activity 1					
C. REGRESSION WEIGHT VARIABLE: Cognitive Function 2					
D. ASSUME STANDARD REFERENCE PRIORS.					

The above result of the Table 1 demonstrate that Bayesian estimates

analysis related to the coefficient values the result describe those posterior values of mode, mean and variance. The outcome also indicates that the lower and upper bound levels of each parameter were included in the 95% credible range. Athletic activity 1 is the initial parameter, and the highly agree result indicates that its mean value is 1.475. The variance value is 0.009, and the results above indicate that there is a positive lower and upper bound between the athletes' activity (1.288 and 1.661, respectively). Athletic activity 1 is the second parameters, and the agreement levels with cognitive functions result indicates that its mean value is 1.450. The lower limit level is 1.130 and 1.770, respectively, while the variance value is 0.026. The results also indicate that there is a 95% credible interval between 2.160 and 0.507.

2.1 Cognitive functioning

Processing thoughts is referred to as cognitive functioning. Its definition is "the capacity of an individual to carry out the several mental tasks most directly linked to learning and solving problems. Verbal, spatial, psychomotor, and processing-speed abilities are a few examples." The term "cognition" mostly relates to abilities like speaking, remembering, and learning new knowledge. The brain is normally able to form individual ideas and worldviews as well as acquire new abilities in the above listed domains, generally in early infancy. Cognitive decline brought on by ageing and illness can result in memory loss and difficulty coming up with words to write or say ("drawing a blank"). For example, multiple sclerosis (MS) might eventually result in verbal fluency loss, memory loss, and difficulty understanding new ideas or facts. Almost everyone is capable of learning or remembering things since humans have a great potential for cognitive functioning from birth. IQ tests and other assessments are used to measure intelligence, albeit their completeness and accuracy have problems. These tests measure a variety of cognitive capabilities, including consciousness, memory, awareness, problem-solving, motor skills, analytical ability, and other related concepts. Patients may be given a series of questions to answer or be required to complete activities. The brain is most pliable in the early years, allowing it to adapt to activities that are relevant to an individual's surroundings (Fig 1).



Figure 1: Cognitive Enhancement Functions

Table 2: Result of Anova^a

ANOVA ^A						
MODEL		SUM OF SQUARES	DF	MEAN SQUARE	F	SIG.
1	Regression	.181	2	.091	.242	.786 ^b
	Residual	17.976	48	.374		
	Total	18.157	50			

a. Dependent Variable: Cognitive Function 2

b. Predictors: (Constant), Athletic Activity 2, Athletic Activity 1

The above result in the Table 2 demonstrate that ANOVA test analysis result describe sum of square values, the mean square values, the F statistic also that significant values of each model included regression and residual. Regression is the first model. The total of square value is 0.181, as can be seen. The F statistic rate is 0.242 and the mean square value is 0.091. Additionally, the regression model's positive and 78% significant rate is demonstrated by its significant value of 0.786. Similarly, the residual model indicates that 17.976 is its sum of square values. The average square rate between them is 37%, as indicated by the mean square value of 0.374. Originally, the term was used to describe athletic contests in general or sporting events that mainly emphasized human physical strength. In Europe, competitive running, walking, leaping, and throwing were among the sports for which the term "athletics" was first used in the 19th century. This idea is still commonly applied in the United Kingdom and the former British Empire. Related terminology is also shared by speakers of Germanic and Romance languages. Athletics is generally valued in various parts of North America, including sports in general, in accordance with its historical definition. It is uncommon to use the word "athletics" in this context to specifically refer to the sport of athletics. Although "track and field" is the common term used in the US and Canada to refer to athletics activities, which include race-walking and marathon running, cross-country running is typically categorized as a different sport (Fig 2).



Figure 2: Athletic Activities

Table 3: Result of Coefficients

COEFFICIENTS						
MODEL		UNSTANDARDIZED		STANDARDIZED	T	SIG.
		COEFFICIENTS		COEFFICIENTS		
		B	Std. Error	Beta		
1	(Constant)	1.809	.304		5.954	.000
	Athletic Activity 1	-.075	.159	-.069	-.474	.638
	Athletic Activity 2	-.068	.162	-.061	.417	.679

a. Dependent Variable: Cognitive Function 2

The above result in the Table 3 show how unstandardised coefficient values, such as beta and standard error, are described by linear regression analysis results. The outcome also explains the t statistic and the significant values of the independent and dependent variables. The results of the primary independent variable, athletic activity 1, show that its beta value is -0.075 and its t statistic value is -0.474. Its significant value of 0.638 indicates a negative relationship with cognitive performance, however its significant relationship is 63%. The second sports activity demonstrates an encouraging but statistically significant 67% relationship between them and cognitive performance. According to the results, the error rate with cognitive functions is 15%, the standard error value is 16%, and the beta value is -0.061.

Table 4: Result of Correlations

CORRELATIONS					
		ATHLETIC	ATHLETIC	COGNITIVE	COGNITIVE
		ACTIVITY 1	ACTIVITY 2	FUNCTION 1	FUNCTION 2
Athletic	Pearson Correlation	1	.177	.083	-.080
	Sig. (2-tailed)		.213	.562	.577
	N	51	51	51	51
Athletic	Pearson Correlation	.177	1	.080	-.073
	Sig. (2-tailed)	.213		.577	.610
	N	51	51	51	51
Cognitive	Pearson Correlation	.083	.080	1	-.218
	Sig. (2-tailed)	.562	.577		.124
	N	51	51	51	51
Cognitive	Pearson Correlation	-.080	-.073	-.218	1
	Sig. (2-tailed)	.577	.610	.124	
	N	51	51	51	51

The above result in the Table 4 show how a correlation coefficient analysis defines Pearson correlation values, significant values, and how many observations rates each variable, including dependent and independent variables, has. The correlation rate between the two sports activities, which is

17%, has a significant value of 8% between them. The favourable and strong relationship between the two cognitive functions is demonstrated. The Ancient Olympic Games in 776 BC are considered to be the cradle of organised sports. The rules and organisation of modern sporting events were developed in Western Europe and North America in the late 19th and early 20th centuries, and they later spread to other parts of the world. Most of today's top competitions are approved by one of the member continental or national federations of World Athletics, the international body that regulates athletics, or by World Athletics itself. The athletics competition is the biggest attraction of the Summer Olympics. The top international athletics tournament is the World Athletics Championships, which feature track and field, race walking, and marathon running. Two additional top-tier athletics competitions are the World Athletics Road Running Championships and the World Athletics Cross Country Championships. Athletes with physical limitations compete in two events: the Summer Paralympics and the World Para Athletics Championships.

Table 5: Result of Test Statistics

TEST STATISTICS				
	ATHLETIC ACTIVITY 1	ATHLETIC ACTIVITY 2	COGNITIVE FUNCTION 1	COGNITIVE FUNCTION 2
CHI-SQUARE	35.412 ^a	23.059 ^a	20.588 ^a	17.412 ^a
DF	2	2	2	2
ASYMP. SIG.	.000	.000	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.0.

The above result of table 5 demonstrate that test statistic values result shows chi square analysis also the significant value of each variable. the chi square rate of athletic activity 1 and 2 shows 35.412 and 23.059 respectively. The cognitive function 1 and 2 shows that positive chi square rate its value is 20.588 and 17.412 its shows that positive chi square value between them. the overall significant rate is 0.000 shows that 100% significant levels between them.

2.2 Athletic Activity

Today's physical activity levels are significantly lower than those associated with genetic propensity. According to estimates from the US Department of Health and Human Services (1996), fewer than 30 minutes of moderate-intensity physical exercise are received by at least 70% of the country's population each day. Therefore, the mismatch between our genetic makeup and physical activity levels may have a role in the incidence of several metabolic disorders, including obesity, as well as related metabolic dysfunctions including type II diabetes, hypertension, and cardiovascular disease. Furthermore, as this article discusses, metabolic dysfunction can serve as the

initial cause of a number of neurological conditions that lead to prolonged cognitive function. Recent research demonstrates the connection between synaptic plasticity and energy metabolism, which may offer an explanation for how exercise might impact mental health. The latter theory seems to be supported by the observation that exercise lowers the risk of a number of psychiatric diseases linked to aberrant metabolism. Athletics is the group of sports that includes competitive walking, throwing, running, and leaping. The most popular sports competitions are road running, cross-country running, track and field and racewalking. In racing events, the winner is the participant who completes a sequence of jumps and throws with the highest or furthest measurement; nevertheless, finishing position (or time, if measured) decides the outcome. Due to the simplicity of the competitions and the lack of expensive equipment, athletics is one of the most popular sports in the world. Athletics is mostly an individual sport, with the exception of relay races and sports like cross country where players combine their accomplishments for a team score (Fig 3).



Figure 3: Athletic Activities for children

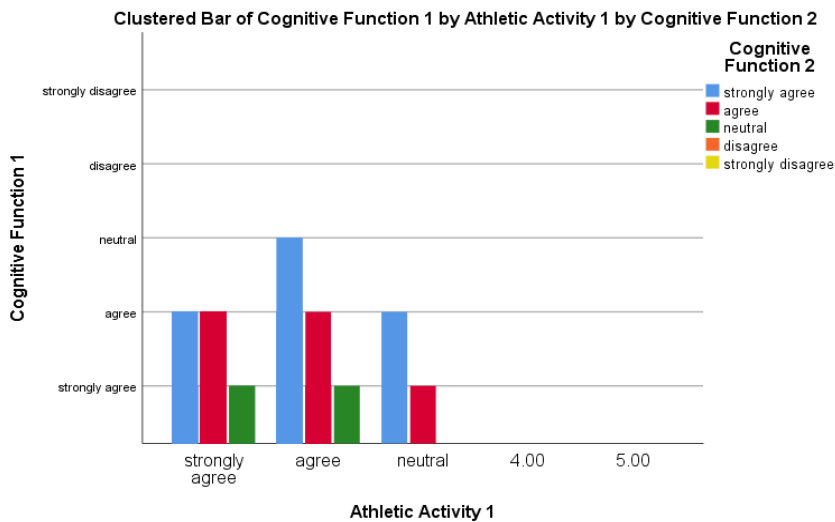


Figure 4: Graph Histogram Analysis

The above graph of figure 4 present that histogram analysis result shows that vertical side present cognitive function included strongly agree, agree, neutral disagree and strongly disagree. The horizontal side shows levels the above lines present that relation between the athletic activity and cognitive functions.

3. Conclusion

Scientific studies employing neuroimaging methods have demonstrated in the last 10 years the advantages of physical activity for improving cognitive health at every stage of life. Aerobic exercise enhances the performance of higher-order brain regions involved in the control of cognition, while also guarding against age-related loss of brain tissue. Individuals who engage in greater physical activity or who are fitter may pay closer attention to their environment and digest information more quickly. These results suggest that aerobic fitness enhances cognitive functions that enable an individual to successfully complete a task and respond to a challenge. On the other hand, studies conducted on animals have shown that physical activity has a beneficial effect on the neurological system's flexibility and overall health. Recent studies have shown that exercise impacts molecular mechanisms regulating energy metabolism and synaptic plasticity, both of which have an impact on cognition. Brain-derived neurotrophic factor is an essential starting point for the molecular processes that exercise triggers; it operates at the interface of metabolism and plasticity. Recent studies have shown that physical activity affects the biological underpinnings of cognition via interacting with other aspects of lifestyle. In particular, several dietary components function similarly to exercise and can even amplify its benefits under specific circumstances. Therefore, it would appear that managing one's diet and degree of exercise is a beneficial and non-invasive strategy to treat neurological and cognitive disorders. So far, studies have shown that engaging in physical activity improves people's cognitive performance. The idea that exercise can modify cognitive capacity by influencing biological processes through epigenetic pathways is supported by a number of animal studies. Our early ancestors' busy lifestyle, which involved foraging and mobility, may have required the development of cognitive skills in order to survive. It appears that the innate capacity of locomotion to participate in energy exchanges at the cellular level and chemical modifications supporting cognitive function emerged at the same time. It is more crucial than ever to understand how dependent the brain is on exercise and a good diet in the present day, when industrialization has drastically changed lifestyle.

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