Outdoor Physical Activity with Cognitively Engaging Tasks May Affect Students' Creative Thinking: A Pilot Study for an Innovative Didactic Approach in Educational Contexts

L'attività fisica *outdoor* basata su compiti cognitivamente coinvolgenti potrebbe influenzare il pensiero creativo degli studenti: Uno studio pilota per un approccio didattico innovativo nei contesti educativi

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ABSTRACT

Although creative thinking is described as an important factor of student's intellectual development and it is classified as one of the most valuable twenty-first century competences to achieve success and remarkable progress in academic, professional, personal, and social life, a limited amount of published research has explored how outdoor physical activity with cognitively engaging tasks may affects it. Therefore, the purpose of the present study is to explore the relationship between outdoor physical activity and creativity among students. 120 students (aged 13-14) participated in 12-week of either an outdoor physical activity program (60'/ 2 days per week) or a regular and easy-to-perform physical education class (60'/ 2 days per week). The findings from the present study support the idea that outdoor physical activity with cognitively engaging tasks may promote the development of students' creative thinking.

Sebbene il pensiero creativo sia descritto come un fattore importante per lo sviluppo intellettuale dello studente ed è classificato come una delle competenze più importanti del ventunesimo secolo per raggiungere il successo e notevoli progressi nella vita scolastica, professionale, personale e sociale, una quantità limitata di pubblicazioni ha indagato come l'attività fisica all'aperto con compiti cognitivamente coinvolgenti possa influenzare la creatività. Pertanto, scopo del presente studio è esplorare la relazione tra attività fisica all'aperto e creatività tra gli studenti. 120 studenti (13-14 anni) hanno partecipato a 12 settimane di un programma di attività fisica all'aperto (60'/ 2 giorni a settimana) o a un programma di attività fisica regolare e di facile esecuzione (60'/ 2 giorni a settimana). I risultati del presente studio supportano l'idea che l'attività fisica all'aperto con compiti cognitivamente coinvolgenti può promuovere lo sviluppo del pensiero creativo degli studenti.

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CONFLICTS OF INTEREST
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1. Introduction

Physical activity (PA) has always been known for its many health benefits. Children who participate in the recommended level of physical activity build their healthy bones and muscles, improve muscular strength and endurance, reduce the risk of developing chronic disease risk factors, improve self-esteem and reduce stress and anxiety (Janssen, & Leblanc, 2010). Beyond these known health effects, it is widely acknowledged that physical activity during childhood may be important for cognitive and brain health (Singh et al., 2019).

Physical activity among young people is important for individual's growth and development, particularly if it is practiced by disabled people (Wright et al., 2019). Indeed, in the educational context, it represents an essential means to encourage the physical growth, development of interpersonal relationships, as well as cognitive function and academic achievement (Donnelly et al., 2016). A great deal of scientific research published during the last decade has confirmed that PA is also positively associated with academic achievement among school-aged youth (Castelli et al., 2014; Donnelly et al., 2016; Sibley & Etnier, 2003; Singh et al., 2019; Vazou et al., 2016). This growing body of literature suggests that physical activity may have a significant influence on academic performance through a variety of direct and indirect physiological, cognitive, emotional, and learning mechanisms (Santana et al., 2017; Sibley et al., 2003). Engaging in high amounts of physical activity, especially if it is structured, constitutes an advantageous leisure activity for children, not only to improve their physical and mental health but also to build their self-concept and, finally, facilitate their academic performance (Dapp, & Roebers, 2019). The most recent scientific research on this topic indicates that cognitive development occurs together with motor development (Pluck et al., 2020). For example, it has been shown that higher levels of motor coordination in students are related to better performance in academic competence (Guillamón et al., 2020). Furthermore, evidence accrued over the past decade proposed that qualitative exercise interventions that are mentally challenging, lead to procedural and declarative skill development. Children participating regularly in enriched, various and diversified activities during physical activity program will reach more easily their genetic potential for motor skill control, as well as their cognitive performance (Myer et al., 2015).

In recent years, outdoor physical activity has been recognized as an important investment to promote active education among students. It aims to foster movements through the interactions between emotions, actions and thoughts, taking advantage from natural environment. Outdoor physical activity may be an integrative, complementary education approach that can offer students and teachers opportunities to be active using the experiences learned from stimulating situations. Available research suggests beneficial effects on cognitive and psychological domains, such us self-esteem (Ekeland et al., 2004), depression and anxiety (Larun et al., 2006). Moreover, outdoor PA is determinant to influence creativity this is explained thanks to perception of the positive stimuli that natural experiences can offer (Hyndman & Mahony, 2018). Therefore, the relationship between outdoor physical activity and cognition in school-aged children have a key role in scholastic achievement. In this context creativity have been classified as one of the most valuable twenty-first century competences to achieve success and remarkable progress in academic, professional, personal, and social life (Piya-Amornphan et al., 2020). It is described as a crucial factor by which individuals are able to generate, develop and transform their ideas (Fancourt & Steptoe, 2019). Thus, it is of paramount importance for personal development because it allows to face innovation and responding to unforeseen problems in a positive way (John Steiner, 2015).

Data from reviews and reports suggest that physical activity may influences creativity and thus academic performance (Latorre Román et al., 2017; Pedro Ángel et al., 2021). Over the years were two the currents of thought proposing to explain the relationship between physical activity and cognition: physiological mechanisms and learning/developmental mechanisms. The first one was based on physical changes in the body caused by exercise and included an increase in cerebral blood flow, alterations in brain neurotransmitters, structural changes in the central nervous system and modified arousal levels. While the learning/developmental mechanisms were built on learning experiences that become necessary for cognitive development (Sibley et al., 2003). Nowadays, advances in neuroscience have introduced significant progress in this area. In fact, the impact of PA on the health of children and adolescents is also associated with improved brain structure and cognitive function (Donnelly et al., 2016). The creative cognition is therefore affected by all these factors. Scientific findings indicate that qualitative programs of PA provide children opportunities to improve scholastic performance, and at the same time to promote a better physical and mental health (Alvarez Bueno et al., 2017). Moreover, in a recent review, Tomporowski et al. (2015), evaluated the effects of acute and chronic exercise training differentiating between those that adhere to a quantitative approach and based upon considerations of intensity and duration, and those that adhere to a qualitative approach and based on type and mental engagement. They concluded that both types of exercise, quantitative and qualitative, enhance the cognitive processing, highlighting the role of metacognitive processes and their regulation on children's behavior and academic performance.

Although physical activity has been reported to be associated with different aspects of cognitive development, there is a limited amount of published research regarding the association between outdoor physical activity, qualitative exercise, and creativity. Therefore, the purpose of the present work is to explore the relationship between physical activity with cognitively engaging tasks performed in natural environment and creativity among high-school students.

2. Method

2.1 Study design

A controlled study design that randomly assigned participants into an experimental group (EG=60) or a control group (CG=60) was employed to explore the impact of 12-week physical activity program on creative thinking and academic performance. Data were collected from 120 high school students in southern Italy, ranging in age from 14 to 15 years (M ±SD, 14.41 ± 0.49 years). Students were involved to attend either an outdoor physical activity program (60 minutes 2 days per week) intervention or a regular and easy-to-perform physical education class (60 minutes 2 days per week). Measurements and data collection were administered 1 week before training (pre-test) and directly after training (post-test).

2.2 Participants

The study was conducted on a sample of 120 students who participated in all training sessions during twelve weeks of implementation of PA program. Participation was on a volunteer basis and all healthy students were included in the study. Students with intellectual, skeletal or other physical disabilities were not selected to participate in the study. Each students completed all physical fitness test and creativity test. During this research (October-December) they did not practice any other kind of physical exercises. A Priori power analyses revealed that an n = 27 in each group was sufficient to power the study, detect a medium effect size (f= 0.25 or 0.4) given a coefficient of correlation p=0.80 with 95% power and the .05 level of significance (error). To account for possible drop-out larger samples were recruited. 124 students fulfilled the inclusion criteria and were invited to participate in the study. A negligible number of students declined the participation (n=4). Complete data collection was obtained on 100% (120) of the students who participated. Each participant was assessed two times: at the beginning (October), and the end (December) of the intervention. Parental written informed consents were obtained for the participants. The study was conducted in accordance with the Declaration of Helsinki and all data were collected anonymously.

2.3 Procedures

Testing intervention programs were performed in a school gym and all 24 lessons were carried out by two experienced physical education teachers, certified by Italian Ministry of Education.

At baseline and at the end of interventions, students completed a fitness test battery, and Torrance Test of Creative Thinking (TTCT) was carried out to analyze creativity. Because of the sensitive nature of this test, the students were asked to remain silent and show intense concentration and were put at ease to enable them to best express their creativity. The TTCT was administered as group test.

Both physical activity programs were done in the morning during the regular school days, twice a week, for twelve weeks. They began with warm up, continued with core training, and ended with cooling down. To avoid boredom, training activities were varied at each session. The participants wore clothing appropriate to physical activity and sport shoes throughout the intervention program.

Students were assessed individually. The researchers demonstrated all the motor tests beforehand, and the students were encouraged to perform as well as possible in every test. A standardized protocol was used to assess content, duration, and frequency of outdoor circuit training.

3. Measures

3.1 Motor tests

At baseline and after intervention, different aspects of physical fitness were assessed in order to explore student's starting level and evaluate the effects of the intervention program.

Prior to the testing sessions the students performed a typical warm-up. It consists of 5 min of low-intensity running and 5 min of general body-weight exercise, such as: marching in place, wide toe touch, leg swings, torso rotation, shoulder rotations. The evaluation included:

(i) 20-m shuttle run test, used to estimate aerobic fitness (Léger et al. 1988);
(ii) curl-up test, to determine abdominal strength (Knudson, 2001);
(iii) push-up test, for the upper-body muscle strength (Jackson et al., 1994);
(iv) Sit and reach test, administered to measure the flexibility of the lower back and hamstring muscles (Castro-Piñero et al., 2009). Both pre-test and post-test evaluations were performed for each subject and each participant performed the test three times.

3.2 Torrance Test of Creative Thinking (TTCT)

The TTCT (Torrance, 1990a; 1990b; Torrance et al., 1992) is the most widely valuable standardized test designed to identify and evaluate creative potential. It is composed of two parts: a Verbal test and a Figural test. The Verbal test contains five verbal activities (ask-and-guess, product improvement, unusual uses, unusual questions, and just suppose), while the Figural test has two parallel forms (A and B) and includes three subsets: picture construction, picture completion, and repeated figures of lines or circles. The operator can choose to use all of them, some specific or just one. For the purposes of this study, Authors decided to use only the TTCT-Figural form A, which can be administered to all education levels.

The TTCT-Figural form A, in Task I requires the subject to draw a picture using a pear or jellybean shape provided on the paper as a stimulus, while Task II requires to produce creative ideas (drawings) using as starting stimulus ten different "incomplete marks" include in the same number of boxes. Lastly, Task III is composed of three pages of lines or circles that the subject uses as part of the picture

The TTCT-Figural is a paper-and-pencil subtest and was administered as group test. It requires 30 minutes of working time. The score is evaluated on the basis of four criteria (Krumm et al., 2016):

(i) Fluency: the ability to create drawings and ideas (evaluated in tasks 2, 3);
(ii) Originality: the ability to produce responses that are out of the ordinary or unusual (evaluated in tasks 1, 2, 3);

(iii) Elaboration: the ability to improve and develop the idea (evaluated in tasks 1, 2, 3);
(iv) Abstractness of titles: the capacity to give good titles to the drawings (evaluated in tasks 1, 2);
v) Resistance to premature closure: the ability to not close the figures, making room for original ideas (evaluated in task 2).

In relation to scoring, the average of the five measures produces an overall indicator of creative potential. As recommended in the literature (Torrance et al., 1992), both pre-test and post-test evaluations were performed for each subject and each participant performed the test only once.

3.3 Training intervention

This outdoor physical activity program consists of outdoor body-weight exercise associated to the use of circuits specifically organized to improve coordination and overall mobility and function. It comprises multiple stations that target a specific coordination movement. In this program, the cognitive involvement was provided from both coordinative movements organized in a more complicated way and natural environment.

Each training started with a 10 minutes of cardiovascular warm-up session, followed by main physical activity sessions (40 minutes), lastly at the end of the session 10 minutes of cooldown activities such as static stretching was performed. The main component of the program changes with every training session and consists of multiple tasks of balance, control of balls, jumps, and bilateral body coordination. The following describes an example of the main exercise of outdoor circuit:

Main Exercise
– Running among the obstacles – Jumping on the bench – Walking on the balance beam – Jumping down – Dribbling the obstacles with a soccer ball – Reacting Side Squats – Facing the hoops with monopodalic alternated backers – Jumping mini hurdles and high hurdles – Passing the cones with changes of direction – Facing the mini hurdles with elongated steps – Control 5 times a basketball with the hands and throw it to the basket – Throwing a handball alternating with the left and right hand into a gymnastic hoop – Running inside the circles – Performing three consecutive flips on floor

Table 1. Example of main exercise session.

3.4 Statistical analysis

Descriptive statistics are presented as mean ± SD. Before statistical analysis, all variables were checked via Shapiro-Wilk test to ensure that they were normal distributed, and data were tested through Levene test for assumptions of homogeneity of variances. Differences between the study groups in all baseline variables were tested using an independent sample *t*-test. The two-way ANOVA analysis (group experimental/control) x time (pre/post intervention), with repeated measures on the time dimension was performed to identify significant differences from pre to post-test. When «Group x Time» interactions reached the level of significance a paired t-test were conducted to identify the significant comparisons. Differences between boys and girls in continuous variables were tested using Student's t-tests for independent samples.

Partial eta squared *($^{2}_{p}$)* was used to estimate the magnitude of the difference within each group and interpreted using the following criteria: small ($^{2}_{p}$< 0.06), medium (0.06 ″ $^{2}_{p}$< 0.14), large ($^{2}_{p}$ ≥ 0.14). Effect sizes (ES) for group differences were expressed as by Cohen's d. ES <0.40 represented a small difference, whereas ES 0.41–0.70 and >0.70 represented moderate and large differences, respectively (Cohen, 1992). P-values less than 0.05 were considered statistically significant. The reliability of the dependent measures was calculated using the Intraclass Correlation Coefficient (ICC). The value of the ICC below 0.5 indicates poor reliability, between 0.5 and 0.75 moderate reliability, between 0.75 and 0.9 good reliability, and value above 0.9 indicates excellent reliability (Koo, 2016). All data were analyzed using the statistical software program IBM SPSS Statistics, version 26.0 (2019 SPSS Inc., IBM Company).

4. Results

The average adherence (attendance) to intervention sessions was 99.58 % (23.9 of 24 actual sessions). Both the experimental and control groups received the treatment conditions as allocated and they did not differ significantly at baseline in age, anthropometric characteristics, as well as in scholastic level (p > 0.05). For descriptive purposes, the whole sample data are provided in Table 2.

	Experimental Group (n = 60)			**Control Group (n = 60)**		
	Baseline	**Post-test**	**Δ**	**Baseline**	**Post-test**	**Δ**
20m shuttle run test	5.93 (2.01)	8.48 (1.44) †*	2.55 (1.34)	6.56 (1.46)	5.51 (1.43)	-1.05 (0.76)
Push-up test	8.30 (2.04)	11.76 (2.78) †*	3.46 (1.76)	8.25 (1.90)	6.76 (1.96)	-1.48 (1.26)
Curl-up test	28.96 (2.04)	31.50 (2.16) †*	2.53 (0.72)	29.16 (2.14)	27.31 (1.86)	-1.85 (0.98)
Sit and reach test	18.85 (2.02)	20.90 (2.46) †*	2.05 (0.81)	19.63 (1.91)	17.41(2.51)	-2.21 (2.25)
TTCT Test						
Fluency	66 (3.18)	70.41 (3.44) †*	4.41 (0.49)	65.46 (2.89)	64.23 (3.11)	-1.30 (1.16)
Originality	69.80 (2.80)	71.40 (2.53) †*	1.60 (0.55)	70.28 (2.31)	68.96 (2.01)	-1.31 (0.92)
Elaboration	62.20 (2.40)	64.78 (2.78) †*	2.58 (0.64)	62.53 (2.12)	61.76 (2.17)	-0.76 (0.96)
Abstractness of titles	75.35 (2.56)	74.93 (2.74)	-0.41 (0.82)	75.20 (2.47)	74.84 (2.54)	-2.40 (1.25)
Resistance to premature closure	73.93 (2.07)	82.16 (3.00) †*	5.23 (2.04)	77.25 (1.68)	74.85 (2.54)	-2.40 (1.25)

Table 2. Changes after 12-week CPA intervention. ***Note:*** **values are presented as mean (± SD); : pre- to post-training changes; †Significant 'Group x Time' interaction: significant effect of the intervention (p < 0.001). *Significantly different from pre-test (p < 0.001).**

4.1 Motor tests

A two-factor repeated measures ANOVA found a significant 'Time x Group' interaction for the 20-m Shuttle Run test, ($F_{1,118}$ = 323.77, $p < 0.001$, η^2_p = 0.73, large effect size), Push-up test ($F_{1,118}$ = 312.10, $p < 0.001$, η^2_p = 0.72, large effect size), Curl-up ($F_{1,118}$ = 767.82, $p < 0.001$, η^2_p = 0.86, large effect size), and Sit and reach test ($F_{1,118}$ = 190.08, $p < 0.001$, η^2_p = 0.61, large effect size). Post hoc analysis revealed that the experimental group made significant increase from pre- to post-test in 20-m Shuttle Run test, (t = 14.97, $p < 0.001$, d = 1.94, large effect size), and an increase in Push-up test (t = 15.43, $p < 0.001$, d = 2.00, large effect size), Curl-up (t = 26.65, $p < 0.001$, d = 3.46, large effect size), and sit and reach test (t = 19.31, $p < 0.001$, d = 2.51, large effect size). Student's t-tests for independent samples showed significant differences between boys and girls in all the variables considered (20-m Shuttle Run test: t = 11.30, $p < 0.001$; Push-up test: t = 11.36, $p < 0.001$; Curl-up test: t = 11.33, $p < 0.001$; Sit and reach test: t = 7.66, $p < 0.001$). The test-retest reliability reported a high reliability for all the four motor tests and were: 20mSRT (ICC (r)= 0.991), Curl-up test (ICC (r)= 0.993), push-up test (ICC (r)= 0.999) and sit and reach (ICC (r)= 0.996), respectively. No significant changes were found for the control group.

4.2 Torrance Test of Creative Thinking (TTCT)

A significant 'Time x Group' interaction was found through the two-factor repeated measures ANOVA for the following variables: Fluency ($F_{1,118}$ = 976.15, $p < 0.001$, η^2_p = 0.89, large effect size), Originality ($F_{1,118}$ = 397.52, $p < 0.001$, η^2_p = 0.77, large effect size), Elaboration ($F_{1,118}$ = 409.27, $p < 0.001$, η^2_p = 0.77, large effect size), and Resistance to premature closure ($F_{1,118}$ = 464.41, $p < 0.001$, η^2_p = 0.79, large effect size). Post hoc analysis showed that the experimental group made significant increase from pre- to post-test in Fluency, (t = 68.81, $p < 0.001$, d = 8.88, large effect size), Originality (t = 22.19, $p < 0.001$, d = 2.86, large effect size), Elaboration (t = 31.00, $p < 0.001$, d = 4.00, large effect size), and Resistance to premature closure (t = 19.82, $p < 0.001$, d = 2.55, large effect size). Neither of the variable considered revealed differences between boys and girls in Student's t-tests for independent samples (Fluency: t = 1.00, $p > 0.005$; Originality: t = -0.58, $p < 0.005$; Elaboration: t = 0.74, $p < 0.005$; Resistance to premature closure: t = -0.20, $p < 0.005$). The test-retest reliability reported a high reliability for all the four motor tests and were: Fluency (ICC (r)= 0.996), Originality (ICC (r)= 0.991), Elaboration (ICC (r)= 0.998) Resistance to premature closure (ICC (r)= 0.996), respectively. No significant changes were found for the control group.

5. Discussion

The aim of this study was to evaluate the effectiveness of 12-week of school-based outdoor physical activity with more cognitive involvement on creativity among high-school students.

Physical activity indicators reported in this work suggest that outdoor physical activity is able to influence student's learning ability and cognitive performance confirming, in this way, the starting hypothesis of this research.

The main findings regarded the improvements of the students' ability to create original drawings and ideas and produce responses that are out of the ordinary, as well as improve and develop the idea using a starting stimulus. In fact, after physical activity intervention program, they showed a better performance in four of the five examined variables, namely fluency, originality, elaboration and resistance to premature closure. When people performing physical activity with cognitive involvement, they are able to reach the highest level of creativity because their mind is focused on the task, impacting not only the most elementary cognitive process but also those more complex. Moreover, physical activity activates and urges the left (analytical thinking) and the right part (emotional thinking) of the brain which supports the creative thinking that is the result of the connection of both halves. These results seem to be consistent with the previous studies which found that there is a positive correlation between creativity and specific physical activity with major cognitive involvement. After all, these activities, designed to enhance the experience of whole brain learning, stimulate all areas of the brain, allowing the access and reconnection of both the hemispheres of the brain simultaneously. (Blakemore, 2003; Hannaford 1995; Jensen 2000).

The other main finding regarded the students' ability to had better post-test scores in the fourth variable called Resistance to premature closure, that is the ability to not close the figures, making room for original ideas. This variable was evaluated with the TTCT-Figural -Task II. This subtest was chosen due to the theoretical background underlying its interpretation. As reported Torrance, Spini and Tomasello (1989), the presentation of incomplete figures creates tension that encourage individuals to complete them quickly and easily. In order to generate original solutions, individuals should necessarily have to control this attitude for a sufficient time to allow the change of their mind to break away from the obvious and stereotypes. Indeed, to allow this mental change, individuals are asked to "*make sure that figures tell a story*". As mentioned previously, physical activity has been reported is helpful in maintaining self-regulation, allow to be focused on the task and have a strong goal commitment. In addition, several academic papers, researchers mainly concluded that higher fit students exhibited greater allocation of attentional resources in relation to the tasks which were assigned to them (Castelli et al., 2007). Therefore, authors believe that the enhancement of the abovementioned variable was due to the fact that physical activity can facilitate individual's capacity to respond to new demands with behavioral adaptations (Álvarez-Bueno et al., 2020).

Nonetheless, the physical activity intervention has not been able to improve the *Abstractness of titles* variable. The failure of the physical activity program to impact this variable may be due because these scores reflect the students' scholastic competencies, especially those regarding lexical skills (Torrance et al., 1989).

Moreover, another important finding was that levels of creativity did not undergo any gender changes and were similar in both sexes. Significant differences were found between the sexes only in terms of physical fitness. In fact, boys showed better physical fitness but there were no sex differences in creativity. As reported Piya-amornphan, Santiworakul, Cetthakrikul and Srirug in 2020, the relationship between physical fitness and creativity, analyzed in different age groups, was positively correlated, and boys and girls did not show difference in creativity between genders.

Lastly, findings from this study allow to report that creativity and physical activity are positively associated with academic performance. There are multiple lines of empirical evidence to suggest that increasing physical activity has been linked to improv both cognitive function and academic achievement (Mavilidi et al., 2018).

Scientific findings indicate that PA with more cognitive involvement provides children opportunities to improve scholastic performance and at the same time promoting better physical and mental health (Colella, 2016). This happens because most trained children have more efficient brain activation during cognitive tasks, superior inhibitory control, better working memory, and greater attention span (Howie et al., 2015). An increase in physical activity can have both immediate and long-term benefits on academic achievement. Already after a few minutes, engaging in physical activity, pupils are better able to concentrate on classroom tasks, which can enhance learning. Over time, when children are constantly engaged in physical activity, their better physical fitness can have additional favorable effects on academic performance in some topics, especially those which implicate creative thinking (Rominger et al., 2022).

Although results were in line with other papers confirming that physical activity improves cognitive function, some limitations were present in this work. The first and most important limitation was that it would be necessary evaluate how possible confounding variables, such as teacher and student attitudes or emotional factors, may be responsible for academic performance in relation to physical activity. Another limitation was related to the lack of the evaluation the long-term effects. The last one regards the small sample size. Therefore, further study with randomized subjects should be conducted to better explore these conditions. Nevertheless, the strengths of this study were represented by the important implications that this strategy may have for students' academic achievement and physical health. Given that, it is of crucial importance to promote special didactic approaches to increase the opportunities that students have for physical activity.

6. Conclusions

It was widely recognized that physical activity has different benefit on cognitive development and academic achievement as well as on physical health. The results of the present work confirm and expand the concept that qualitative physical activity and creative thinking are linked in a positive way, and this association may have important implications for academic achievement.

Given that, legislators, principals, teachers, and parents should try to take these findings into account. Every school curriculum should provide multiple opportunities of qualitative movement within the school daily. Since physical activity has been reported is able to enhance learning, movements that support brain functions should be a part of each students' routine. Specifically, it would be desirable that Schools implement movement projects in the daily schedule and use this special didactic approach to enhance creativity ability in this generation.

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