Physical Education Theory and Methodology
Теорія та методика фізичного виховання

ISSN 1993-7989 (print)
ISSN 1993-7997 (online)
ISSN-L 1993-7989

Original Scientific Article

Understanding the Relationship between Self-esteem and Motor Creativity in Ecological PE Contexts at Adolescence

Thomas Frachey[1ABCDE], Alexandre Oboeuf[1AD] and Luc Collard[1AD]

[1]Université Paris Cité

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Corresponding Author: Parasuraman T, e-mail: parasuramt@hindustanuniv.ac.in
Accepted for Publication: December 26, 2025
Published: January 30, 2026

DOI: 10.17309/tmfv.2026.1.09

Abstract

Background. In current studies, it is generally admitted that creativity is an important asset in performing in sports and Physical Education (PE). Based on the multivariate framework, authors have also investigated the influence of motivation, intelligence and cognitive abilities on creative motor performance. However, data surrounding self-esteem and its association with motor performance in ecological domains is scant.

Objectives. This study aimed to understand the relationship between self-esteem and motor creativity, focusing on ecological motor contexts in PE at adolescence.

Materials and Methods. The experiment population comprised three groups of 20 children in total (N= 60), with 31 girls and 29 boys aged 12 years old. First, self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSES), which demonstrated excellent internal consistency in the sample (Cronbach's α = .94). Subsequently, participants engaged in a 20 minute ecological game task called "Sitting ball". Rooted in the multivariate framework, the study measured motor fluency and flexibility by using praxic communication as key indicators of creativity. Once the data was gathered, a factorial analysis was put into place using the Trideux.cloud tool to establish the relationship between self-esteem and motor creativity.

Results. The factorial map indicates that self-esteem levels are correlated to motor creativity scores in ecological situations. Analysis conducted at the individual level (N = 60) using a Pearson correlation calculation confirmed these results, associating self-esteem and ecological motor creativity positively with r = .734. Moreover, the findings are statistically significant as the 95% confidence intervals (CI) for self-esteem were between 21.55–25.81 and 48.43–57.90 for ecological motor creativity. The intervals are sufficiently narrow to indicate good precision of the estimated means and results.

Conclusions. This study revealed that creative motor abilities seem to be highly related to self-esteem. Low self-esteem levels tend to be strongly linked to weaker motor creativity performances and strong self-esteem levels relate to increased motor creativity. The present novel ecological framework underlines the pedagogical importance of assessing and understanding such intrapersonal characteristics in order to favor motor development and well-being in PE.

Keywords: creativity, physical education, motor performance, self-esteem, adolescents.

Introduction

Nowadays, creativity is considered to be a desirable asset in sports and Physical Education (PE) to improve performance (Büning et al., 2020; Oboeuf et al., 2024). Indeed, creativity is often described as the skill to perform new, original work in a meaningful environment (Runco & Jaeger, 2012). Moreover, it is the ability to express numerous and different answers (divergence) while being capable of selecting the optimal one (convergence) to solve a problem (Hatchuel & Weil, 2009; Zhang et al., 2020). In line with these definitions of creativity, creative motor performance refers to the capacity of one or several individuals to produce a solution that is both novel and appropriate in a motor situation (Oboeuf et al., 2020). In PE, motor "productions" are carried out "in real life", requiring in-situ interaction with the physical and social environment (Besançon & Lubart, 2011). Consequently, creative performance in PE is strongly linked to the task and domain of activity in which the individual is immersed

(Memmert, 2015). For instance, performing creatively in team sports such as football requires different cognitive, emotional or motor abilities than in boxing or track and field (Lubart et al., 2015).

Therefore, ecological environments—being unstable, complex and changing environments with social, physical and technical constraints—are optimal to develop motor creativity (Bonnardel et al., 2023; Memmert, 2015). Nonetheless, not all students engage in the same way in PE, especially in ecological settings where decision-making and motor skills are continuously disrupted by social interference from teammates or opponents. Therefore, if findings have shown that intrapersonal characteristics such as motivation, empathy levels, ego or risk-taking also influence motor creativity (Kokkonen, 2018; Versace et al., 2018), the importance given to self-esteem on creative motor performance in ecological settings is meager.

Indeed, self-esteem—described as overall feelings of self-worth and well-being (Harter, 2012)—can also be narrowed to a representation of one's value in areas as broad as academic, social, physical or creative domains (Kaufman, 2012). The "image" that the individual has of oneself can fluctuate and evolve, impacting performance in a given domain. For instance, studies have shown that successfully completing physical tasks and engaging in motor development can enhance motivation, catalyse positive emotions, thus, increasing self-esteem and well-being (Rubeli et al., 2020). On the other hand, physical experiences associated with negative emotions or trauma could lower self-esteem and inhibit the expression of motor skills (Rinaldi, 2023). Therefore, important stakes appear to be at play surrounding self-esteem in PE (Bailey, 2006), especially at adolescence, where self-esteem is in decline (Schaffhauser, Allemand, & Schwarz, 2017).

If there seems to be a link between the physical experiences of individuals and the development of self-esteem, the knowledge regarding the impact of self-esteem on creative motor performance in PE is scant, with only few studies taking interest in this matter (Barbot, 2018; Deng & Zhang, 2011). Consequently, we wish to address this gap by exploring the research question: What is the impact of self-esteem on creative motor performances in ecological contexts in PE? To answer this question, we will be quantifying self-esteem of adolescents. Supported by the multivariate framework (Palmiero et al., 2019) we will then assess motor creativity performance in an ecological setting.

Adolescence: A crossroads in developing self-esteem and creative motor performance

It is during adolescence—marked by pubertal changes—that creative skills can take shape and crystallise themselves in various domains (Barbot & Lubart, 2012). In the same way, self-esteem—which has no distinguishable facet in childhood—will also spread and nurture itself in various and specific domains at this period of age (Barbot & Heuser, 2017). In this way, adolescence could be a lever for developing motor creativity and self-esteem, because of the individual's willingness to transgress certain rules, to oppose adults and to prove themselves in the face of peers (Lubart & Besançon, 2015). Nonetheless, this period of change and uncertainty can also be a creative inhibitor, as the gaze of others can prove unbearable at times, also negatively impacting self-esteem in case of failure (Scharmann, 2011). This ambiguous relationship between individual assertion and the gaze of the group is therefore particularly significant. It constitutes a crucial period in the development of creativity and self-esteem for adolescents (Besançon & Lubart, 2011).

Further, if self-esteem and motor creativity stakes are salient during puberty Barbot & Heuser, 2017; Rothenberg, 1990), pedagogical choices from teachers could strongly improve or downgrade creative performance and self-esteem. Indeed, research like the Creative Habits Of Mind (CHOM) framework show that implementing collaborative work, imaginative tasks or collective games at school could enhance creativity in adolescents (Fakhour & Ghareeb, 2020). On the other hand, in situations where they are repeatedly unsuccessful, where they feel anguished or mocked, students can physically disengage themselves from PE. Indeed, low confidence and negative motor experiences could nurture decreased motor performances and habits for students, which would limit motor adaptability in ecological situations (Barker et al., 2023). Therefore, taking into account individual self-esteem in relation to creative performance in ecological environments could lead to a better understanding of motor and social behaviour of students. Consequently, gathering data on self-esteem and creative motor performances in ecological domains could lead to improved pedagogical choices from PE teachers, to lead learners towards personal and academic success.

Nonetheless, what do empirical studies show regarding the relationship between self-esteem and performance?

Self-esteem and creative motor performance: an undervalued relationship?

Even though scientific literature surrounding movement and motor learning has increased in recent years (Barker et al., 2023), creative motor performance and self-esteem have received meagre attention. Moreover, the studies that have provided some data have given heterogeneous results (Barbot & Heuser, 2017). Some authors have found a positive link between self-esteem and physical performance (Noordstar et al., 2016). While it seems to be the dominating consensus, other works outline the absence of a significant relationship between self-esteem and physical activity (Baumaster et al., 2018), therefore, leading to inconclusive results. One of the explanations to this lack of clear knowledge is that self-esteem and creativity are generally explored in non-motor domains. Indeed, even if intrapersonal functions have spun interest, authors have studied self-esteem in fields as broad as work, school or creative thinking (Orth & Robins, 2022). Nevertheless, authors have pointed out that the relationship between self-esteem and motor abilities has rarely been discussed (Barbot & Heuser, 2017). More, while the multivariate theories assert the importance of complex and unstable environments to develop and study creative motor skills, motor creativity performances are often focused on psychomotor settings—being stable environments without social interaction (Parlebas, 1999)—rather than ecological settings (Lee et al., 2023). Indeed, if some data has shown a positive correlation between self-esteem and motor creativity (Bournelli et al., 2009), studies are rarely undertaken in dynamic social and physical

environments. While acknowledging the insights gathered from the studies in psychomotor environments, our study wishes to endeavour a novel approach. With a broader and more holistic perspective using the multivariate framework, we wish to establish a new scope for the understanding of creative motor performances in PE.

Praxic communications and divergent indicators: tools for creative motor performance assessment in ecological situations

In France, Bertsch (1983) was one of the first to include divergent indicators to measure creative motor performance in PE, based on the works of previous authors such as Guilford (1967) or Torrance (1981). These divergent indicators are fluency (number of overall motor responses), flexibility (diversity of the motor responses) and originality (rarity of the motor response). These indicators are strongly valued in assessing motor creativity performances (Buning et al., 2020; Mendez-Martinez & Fernandez-Rio, 2018). Nonetheless, they are still rarely used to assess creativity in ecological settings at school—noticeably because PE evaluation and teaching strongly relies on technique. Indeed, authors have shown that PE teaching in France is still strongly sport-centred, where pleasure, collaborative work, exploration and curiosity have a minor role to play (Bordes, 2020; Lubart & Besançon, 2015). The lack of emphasis on motor creativity in PE and a rather normative pedagogy through sports are limiting factors in understanding and including motor creativity at school (Beghetto, 2010). Indeed, PE teachers often assess performance as a result of physical, technical, and tactical criteria (Clemente et al., 2016; Coutts, 2014). While these traditional indicators are necessary conditions for performance, they are not sufficient to be fully accountable for it (Furley & Memmert, 2018). To address this issue, and to surpass Bertsch's study that was set in a psychomotor setting, authors have used praxic communications as ways of assessing creative motor performances in ecological settings (Oboeuf et al., 2020). Praxic communications refer to the communications and interactions that are expressed by players during an ecological task, such as in collective games or sports (Parlebas, 1999). The communications that are observed between players have been divided in various categories such as direct communications (essential motor actions without which the game cannot be played such as shooting or passing for example) and praxemes (behaviours that surround and add to the direct communications such as a call for the ball or feints) (Bordes, 2020; Oboeuf et al., 2024). Therefore, the normative frame in which the player evolves—generated by the rules of the game, the game objectives, as well as physical and social constraints—will catalyse different behaviours and communication channels during the game. In consequence, to assess a player's creative motor performance during a specific ecological setting, it is crucial that the spectrum of motor possibilities and praxic communications are clearly identified. In other words, a roster of game-specific communications must be established to meaningfully assess creative motor performance. In football for instance, a call for the ball is a praxeme. If a player does a sudden run in an opponent-free area, the behaviour (running) is the signal that conveys the message (calling for the ball) to the teammate ball-bearer. In handball, 75 % to 85 % of overall praxic communications are indirect channels such as praxemes. This illustrates the importance of properly coding and identifying the various communications for each ecological activity. As an example in table 1, here are the registered praxic communications in football (Oboeuf et al., 2020).

Table 1. Example in football: List of direct communications and praxemes

Type	Description
Interception	When an opponent stops the ball from reaching its destination by cutting the pass line or shot.
Tackle	Defensive physical act that aims to recover the ball when the opposing player is in possession.
Contact	Shoulder-to-shoulder contact between two players who wish to take the ball.
Pass	Technical action that aims to transmit the ball to a teammate.
Shot	Direct ball attempt aimed at the opponent's goal.
Praxeme	**Motor Action Description**
Body feint	A motor action that makes opponents believe the player will move in one direction while moving in another.
Passing feint	A motor action that makes opponents believe a pass will be made, while another action is performed.
Shooting feint	A motor action that suggests a shot but leads to a different action.
Returning run	The run of a player who just lost the ball and returns quickly to a defensive position.
Tracking run	A player follows a direct opponent to reduce maneuvering space.
Holding run	The player behind the bearer runs to offer a pass solution.
Supporting run	The player in front of the bearer runs to offer a pass solution.
Focusing run	A run toward the rival bearer to limit their maneuvering margin.
Cross run	A player crosses in front of a teammate to destabilize the opposing defense.
Recolocation	Movements to occupy a suitable position relative to teammates, opponents, and the ball.
Ball call	A player accelerates toward the goal to anticipate a pass.
Ball countercall	A player accelerates in another direction to create free space.
Fixation	A run into an area defended by two opponents to create a numerical advantage.
Slip	A movement in which a player from behind or the side of the bearer creates space for the next action.

Across the various studies that have been conducted, evaluating creative motor performance in ecological settings relies on the identification of divergence, being the number

of praxic motor communications (fluency) and the diversity of the praxic motor communications (flexibility) (Memmert, 2015; Orth et al., 2022). Therefore, if we have shown that methods and indicators exist to assess motor creativity performance, it isn't designed to explain or interpret creative motor performance disparities within students. By embracing the multivariate theory framework, we feel that understanding the dynamics between self-esteem and creative motor performance is an important step in allowing a more thorough motor knowledge for adolescents in PE.

Materials and Methods

Rooted in the multivariate framework, our study wishes to establish relationships between self-esteem and creative motor performance in ecological settings. Below, the full description of the experiment will give information about the participants, the material and the procedure that allowed us to obtain quantitative results. This section includes a consideration of ethics for this study.

Recruitment and Context

The main author, who is a PE teacher, conducted the experiment in a French middle school in collaboration with the PE teachers that were assigned to each studied class group. The first phase of the experiment began on the first day of school, when students and parents were informed of the upcoming study. Parental authorizations were sent out by e-mail, filled in by the legal tutors and collected by the main author for safekeeping. An e-mail detailing the study was also sent to the parents, explaining the objectives of the study, its duration, as well as the withdrawal rights (possibility of withdrawing from the study at any time). Elements relating to video rights and data confidentiality (anonymization, right to obtain study results etc.) were also included. Only the students who were willing and able to take part in the creativity tests, and those who had authorizations to do so, were included in the study.

Participants

The data collected for this study involved 60 adolescents aged 12, including 31 girls and 29 boys, all coming from the same school. The 60 students were assigned to their usual class groups (three different groups in total) and were not mixed during the study. Adolescents excluded from the test were those who were unable to participate in physical activities at the time of the experiment, and those who did not have parental authorization to participate. A total of 64 individuals were initially enrolled in the study. Of these, 2 did not provide consent and 2 more couldn't participate in the ecological creativity test and were therefore also excluded. The final sample consisted of 60 participants who completed all study measures appropriately.

Prior to the empirical test, our protocol — listed under No. 2024-82 — was approved by the Comité d'Ethique de la Recherche (CER), enabling us to conduct the experiment within the framework of legal and institutional regulations. Finally, let us note that the data collected is anonymised and stored securely, in compliance with the latest RGPD (Règlement général sur la protection des données) regulations (EU 2016/679).

Table 2. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Participation and authorization	Participation document signed by parents	Authorization documents unreturned or refusal of participation
Image rights	Image authorization signed by parents	Children without returned image authorization
Attendance	Child present for the entire study	Absence during any part of the assessments
Physical condition	Physically fit to practice at the time of the experiment	Unfit to practice physical activity at the time of the experiment

Measure Procedures for Self-esteem

To evaluate self-esteem, we used the Rosenberg (1965) Self-Esteem Scale (RSES) which was also validated by other recent studies (Hafekost et al., 2017; Jurado et al., 2015). We used self-rated Likert scales, where the adolescent evaluated his self-esteem, from 1 being low and 4 being high (Rosenberg, 1979) for a total of 10 items. Therefore, the maximum score would be 40 points and the minimum 10. This method and grading scales have proven to be effectively used to collect data about self-esteem for adolescents (Gnambs et al., 2018). The form was sent out to each adolescent during PE class in paper format. The main author and the PE teacher of the class supervised the self-esteem evaluation, making sure that students understood the questions and the instructions. Each form was filled individually with no time pressure or limit. When all the forms were completed, the main author collected them. This was repeated in the same way for each class group. Subsequently, the main author gave a self-esteem score for each adolescent, based on the answers they had given. The Rosenberg Self-Esteem Scale demonstrated excellent internal consistency in our sample (Cronbach's $\alpha = .94$).

Table 3. Self-esteem questionnaire

Question	Scale
On the whole, I am satisfied with myself	1 2 3 4
I feel I have a bad opinion of myself.	1 2 3 4
I feel that I have a number of good qualities	1 2 3 4
I am able to do things as well as most other people	1 2 3 4
I feel I do not have much to be proud of	1 2 3 4
I certainly often feel useless	1 2 3 4
I feel that I am not a person of worth	1 2 3 4
I have respect for myself	1 2 3 4
All in all, I am inclined to think that I am not successful	1 2 3 4
I take a positive attitude toward myself	1 2 3 4

Procedures for assessing creative motor performance
Ecological creativity assessment

The second phase of our experiment, the assessment of creative motor performance in ecological settings, took place the week after the self-esteem task. To measure ecolog-

ical motor creativity performance, we chose to use the game "sitting ball", as several studies have identified a wide variety of praxic indicators which will facilitate the construction of the coding and analysis grid for observers (Oboeuf et al., 2010; Bordes, 2020). The aim of this game is to eliminate the other participants by throwing a ball at them in a defined area. If one player is hit, he must sit down and wait for a chance to catch the ball. If so, he can come back into the game. The game stops when only one player remains or if there is no time left. Authors have shown that assessing ecological motor abilities in games is optimal, as these non-normative settings provide more risk-taking, more freedom and less inhibitors compared to culturally gendered activities. Sports such as football for instance, tend to hinder the creativity of some practitioners (Vigneron, 2006). Therefore, instead of a technical, fragmented and cloistered view on physical activity, we wished to take motor development into account in a more global and holistic way.

For the assessment, each class group was divided in half. Therefore, for each class group, two subgroups were constituted, making it a total of six different groups for our study. For each assessment, ten players were filmed and played for 20 minutes on a 100m2 mat area. The awaiting participants were in a separate space with a PE teacher from the school. This was meant to limit external disruptions, thus limiting behavioral bias and interference during the assessment. Participants entered and exited through different doors to limit bias prior to the assessment. The groups were always mixed and heterogeneous in gender and motor ability to limit cluster effects.

The objective was to assess the creative motor performance and divergent abilities of the students by scoring the fluency and flexibility of the praxic communications (direct communications and praxemes) expressed during the game (Oboeuf et al., 2024).

In table 4, are listed the known direct communications and praxemes for the game "sitting ball".

Motor fluency was operationalized as the total number of responses generated by each participant, including redundant behaviors. In other words, fluency reflects the sum of all praxic communications provided by a participant within the task period.

Motor flexibility was measured by taking into account the sum of distinct praxic communication categories expressed during the game. For instance, a shot an interception and a dodge run would lead to a total score of three in flexibility.

To assess the motor behaviours, trained observers were recruited to establish a significant and reliable scoring system. Based on a previously developed protocol (Oboeuf et al., 2024; Oboeuf & Frachey, 2025), students in the field of sports education or PE teachers were recruited. In concordance with the past uses of the protocol, the observers selected all had at least five years of training in collective games or sports. Further, they had at least five years of French sports faculty (STAPS) experience and were experts in the motor and physical education field. Finally, to ensure proper direct communication and praxeme identification, all must have followed a six-hour theoretical training in praxic communications. In the table below, the content (Oboeuf et al., 2020; Oboeuf et al., 2022; Oboeuf et al., 2024) of the training is presented.

In order to assess sociomotor creativity in the most efficient and objective way, the observations made by the selected experts were conducted by viewing footage of the recorded games. For each player, the assessment was led by two experts, each separately assessing the different praxic communications expressed by a player. This dual approach was designed to enhance inter-rater reliability by balancing situated expertise with methodological neutrality. Also, to

Table 4. Direct Communications for the Game of Sitting Ball

Type	Description
Shot	Offensive action aiming at scoring or hitting a target.
Pass	Transmission of the ball to a teammate.
Interception	Stopping the ball from reaching its intended destination.
Ball recovery	Regaining possession of the ball after loss.
Praxeme	**Motor Action Description**
Call for the ball	A player signals for the ball with a hand gesture and body positioning toward the bearer.
Dodge run	Sudden change of rhythm or direction to become harder to target.
Replacement run	Slow repositioning steps to find a favorable location.
Supporting run	Running toward the ball bearer to offer a pass option.
Positioning step	Steps or jumps allowing the bearer to adjust before shooting.
Body feint	Misleading movement suggesting false intentions.
Pass feint	Pretending to pass while executing a different action.
Shooting feint	Pretending to shoot to gain advantage or switch action.
Dodge	Quick body movement to avoid a shot.
Elusive run	Fast run indicating clear space for receiving a pass.

Table 5. Training content

Format and Course Title	Objectives
Lecture 1 – Theoretical Foundations of Motor Communication	i) Contextualize motor communication within interactional analysis; ii) Distinguish motor communication and counter-communication; iii) Introduce motor signs.
Lecture 2 – Praxems, Gestems, and Indices: A Semiotic Approach	i) Define expressive mediations; ii) Illustrate use in team sports; iii) Explore tactical scope and ambiguity.
Lecture 3 – Observing, Coding, and Interpreting Motor Behaviours	i) Tools for reliable observation; ii) Present Lince software and coding grids; iii) Interpretative biases and challenges.

ensure the reliability of the data (Marquéz Jiménez & Martinez de Santos, 2014), inter-rater reliability and validity tests were performed using Pearson and Spearman correlation coefficients. In previous studies, values consistently exceeded .96, indicating strong inter-observer agreement (Oboeuf et al., 2020; Oboeuf et al., 2022; Oboeuf et al., 2024). In our study, we made sure that inter-rater reliability scores were consistently above .90. If the score was below this value for a player, a new paired-review was put into place to assess the participant. This choice was made to ensure high reliability for the creativity assessment. After viewing the entire game footage, each adolescent was given a fluency (number of praxic communications) and flexibility (diversity of praxic communications) score.

Motor creativity performance interpretation

If each student has a fluency and flexibility score, how can we identify or circumscribe the different creativity levels? In other words, how can we identify a player's motor performance as creative or non-creative? It is worth mentioning that a creative or non-creative performance level can only be quantified within the sample in which it was observed. Indeed, a player can be very adaptive or creative while in one group, but his creative performance score can evolve in another group and be more or less remarkable. Therefore, in our sample, a low-creativity student would have expressed 45 praxic communications or less during the 20-minute game time span, while a participant between 45 and 65 communications would demonstrate average creativity performance. Finally, a student with a score above 65 praxic communications expressed would be considered highly creative and adaptive.

Results

The Factorial Analysis Measurement

Results for self-esteem were collected by adding the total points that were obtained for each item, with a total perfect score being 40. Then, for each participant, creative motor performance was scored by using the praxic communications (direct communications and praxemes) and divergent indicators (fluency and flexibility). The gathered data were then encoded by the observers after they quantified the praxic communications empirically expressed during the game, using an Excel grid. After, a factorial analysis calculation was applied. To study the link between self-esteem and creative motor performance, we used the factorial analysis Trideux.cloud tool. This tool was used to calculate the correspondences and correlations between the data we collected and encoded. It was used to establish whether or not self-esteem was related to creative motor performance. The calculation then resulted in a figural representation that enables the interpretation of the data.

To understand the results, it is important to clarify our coding system. The estimcrea– value represents the students below the average self-esteem score (below 21 points in this case), while the estimcrea+ value represents students with the highest self-esteem values (between 30 and 40 points). The creasociom < 45 value indicates creative motor performance scores that are the weakest (below 45 points), the 65 > creasociom < 45 represent the average performance score while creasociom > 65 represents the students with the best motor scores (above 65 points). These score brackets each represent 1/3 of the total data distribution, which explains the choice of these values. It is important to note that these creative motor performance values are specific to this group, and that a student can be deemed highly creative in this group while being average in another. Therefore, creative motor performance scores are necessarily anchored in a specific context and aren't necessarily stable within other settings or groups.

Factorial analysis result graphic

Our factorial analysis visualises the relationship between individuals and variables in terms of distance, producing clouds of points (Cibois, 2018). The distance between each point is based on how similar they are in their distribution. The proximity between encoded variables indicate the strength of their correlation, while the size of an encoded variable represents its relative importance or influence on the overall results. Moreover, the cosine of the angle between variables shows the correlation between the two corresponding variables (Clarke et al., 2021). Thus, a small angle between two variables indicates that the two variables are highly correlated. If two variables form an angle of 90° or greater than 90° then corresponding variables are uncorrelated or negatively correlated. The principal component analysis yielded two dominant axes that together account for 82.92% of the total variance. The eigenvalue of F1 are 0.4014, (explaining 51.10% of total variance) while the eigenvalue of F2 represents 0.3500, (accounting for 31.82% of the variance). These values provide a compact and reliable representation of the data structure. The horizontal axis (F1), here designated as the "intrapersonal valence factor" captures a clear contrast between lower and higher levels of self-esteem. Categories associated with high self-esteem and high creativity scores load positively on this axis, whereas low self-esteem values load negatively. The vertical axis (F2) that we will refer to as the "performative magnitude factor" differentiates the mid-range group from both the lowest and highest creative categories. Therefore, the distribution of categories across the figural map suggests a coherent distribution between self-esteem and motor creativity performance, with the strongest creative profiles clustering within the positive sector of self-esteem, while lower or more heterogeneous profiles occupy the opposite side.

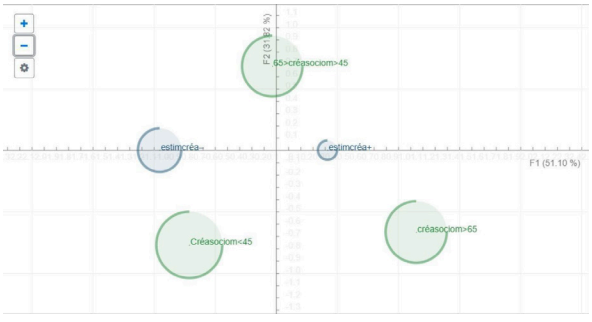

Fig. 1. Two-dimensional factorial analysis plot of variables and individuals

Indeed, as we can see from the results graphic, the highest creative motor performances (creasociom> 65) are clearly represented on the same side as the students with the highest self-esteem results (estimcrea+) and are close to one another. In addition, the angle formed between the sociomcrea>65 and esimcrea+ vectors is narrow, underlining the correlation between the two. In the same way, the lowest creative motor performances (Creasociom< 45) are related to the low self-esteem students (estimcrea–), as we can see from their proximity and narrow angles. However, the average creative motor performance scores (65>creasociom<45) seem to be insignificantly impacted by either self-esteem levels, as the angles formed between estimcrea+ and estimcrea- are of 90°.

Moreover, the estimcrea– circle is bigger than the estimcrea+, showing that low self-esteem is even more impactful on low motor performance than high self-esteem levels are on the best creative motor performances. Therefore, we can express the idea that indeed, self-esteem could be related to creative motor performance in ecological settings.

Additional statistic analysis

To reinforce the validity and rigor of our results, a Pearson correlation analysis conducted at the individual level (N = 60) also revealed a positive association between self-esteem and motor creativity where r = .734. This confirms the factorial analysis results, showing a significant relationship between self-esteem and ecological motor creativity.

Moreover, the self-esteem variable showed a mean score of 23.68. The standard deviation (SD) = 8.42 while the 95% confidence interval (CI) = 21.55–25.81. The motor creativity variable had a mean value of 53.17. The SD calculation showed that SD = 18.71 while the 95% CI = 48.43–57.90. We can see that the self-esteem variable displayed moderate dispersion, whereas the motor creativity variable showed a wider variability showing disparity in motor creativity scores. Nevertheless, the confidence intervals are sufficiently narrow to indicate good precision of the estimated means.

Discussion

Consistencies and Novelties of the Study

Our results indicate that higher self-esteem values were associated with high creativity scores, which is consistent with prior self-esteem and creativity studies in non-motor (Barbot, 2018) or psychomotor domains (Noordstar et al., 2016). However, this study is one of the first to offer a direct insight on the relation between self-esteem and creative motor performances in ecological settings.

The correlation between self-esteem and motor creativity in our study was first proven significant by the factorial analysis map which displayed a coherent distribution of self-esteem and motor creativity performance. The strongest creative profiles (creasociom>65) cluster within the positive sector of self-esteem (estimcréa+), while lower profiles (Creasociom<45) cluster on the opposite side. Moreover, the Pearson correlation analysis conducted at the individual level (N = 60) confirms the figural results of the factorial analysis, correlating self-esteem and ecological motor creativity positively with r = .734. The findings are statistically significant as the 95% confidence intervals for self-esteem were located between 21.55–25.81 and 48.43–57.90 for ecological motor creativity. These intervals are sufficiently narrow to indicate good precision of the estimated means and results.

Consequently, our study tends to show that self-esteem is related to motor creativity in ecological motor domains, hence indicating that intrapersonal singularities strongly affect ecological motor behaviour, habits and performance (Barker et al., 2023). In such changing and disruptive social environments, self-esteem seems to impair creative motor expression even more than in other domains. This highlights the fact that teaching and developing motor skills in ecological fields could be highly dependent on intrapersonal characteristics (Barker et al., 2023) such as self-esteem. The psychomotor environments which motor creativity studies tend to focus on (Lee et al., 2023) engage students in fewer emotional and cognitive disturbances (Memmert, 2015). Therefore, our data contributes to new empirical material which demonstrates that self-esteem could be an important predictor of motor performance in ecological settings. In contrast with existing studies which have studied intrapersonal characteristics such as motivation in individual motor contexts, our study encompasses a more complex and holistic environment.

Pedagogical implications

By using existing methods such as the RSES measure for self-esteem and divergent indicators paired with praxic communications for motor performance, we wish to put forward that accessible tools can be empirically used by PE teachers to recreate our protocol for pedagogical purposes. Indeed, the RSES, which demonstrated very good internal consistency, (Cronbach's α = .94) ,could be of pedagogical use early in the learning sequence to identify the more fragile students in a proactive way, as psychological and intrapersonal characteristics are strongly related to motor behaviour (Barker et al., 2023). Identifying fragile students with lower self-esteem could allow teachers to adapt their tasks, activities and instructions during class to favour their physical investment and risk-taking, thus allowing better motor development. The results highlight that if self-esteem is linked to motor performance in ecological situations, pedagogical settings that encourage collaborative work and tolerance of mistakes could increase self-esteem (Fakhour & Ghareeb, 2020).

While our data shows that ecological settings could strongly affect the motor behaviour of low self-esteemed students, focusing on cooperative tasks could increase their motor abilities and performance (Ruiz-Ariza et al, 2017). Therefore, our study contributes to underlining the importance of elaborating specific ecological tasks for fragile adolescents in developing motor habits and performance. By fostering self-esteem, PE teachers would strive towards better motor development for all students, which could also, in a mutual and systemic relationship, increase self-esteem.

Limitations and perspectives

While this study provides important insight on the association of self-esteem and creative motor development, some limitations can be underlined. First of all, users of such

methods must be advised that in order to reveal the adaptive performance of players, it is essential that a rigorous list of sport-specific praxic communications is established, as it has been done in our study for the game of sitting ball. Moreover, all the possible praxic communications must be included in the in-situ game, without changes or constraints made to the original setting so the players are able to express the global communication panels. Nonetheless, it is worth acknowledging that the theoretical training of the observers that are able to read these communications can be time-consuming, and that some specific training and background are necessary for the observers, which also explains the limited student sample provided for the study (N=60), which can also be seen as a limit. However, these requirements are necessary to study and assess motor development in an ecological environment thoroughly.

An additional limitation resides in the fact that the sample was drawn from a single educational context, which restricts the representativeness of the results. It is important to acknowledge that this study is rooted in a European and French school context, with a certain cultural history of PE and physical activity. Replication of our experiment in other cultural settings could also give a deeper understanding of the relationship between self-esteem and motor creativity. Similarly, participants were nested within classes, creating potential clustering effects. If the analysis conducted at the individual level was significant, the nested design may introduce intra-class correlations that could bias results. In addition, potential confounding variables such as socioeconomic background, academic performance or motivation were not measured, but could also partly account for the observed associations. If we advocate for self-esteem being a relevant lens to predict motor performance, it cannot be isolated or self-sufficient from other intrapersonal and interpersonal parameters (Kokkonen et al., 2018). By embracing the multivariate framework, a more global profiling of students would be needed for optimal understanding of creative motor performance, and is the subject of further research we are undertaking. Finally, it is worth mentioning that the self-report method to measure self-esteem could be prone to some constraints such as social desirability biases, that could influence the measurement. Despite this, the RSES scoring showed excellent internal consistency in our sample (Cronbach's $\alpha = .94$) showing that self-esteem was quantified in a significant manner.

Conclusion

In this study, by aligning with the multivariate framework (Versace & Vallet, 2018), we have suggested the importance of assessing self-esteem and creative motor performance in ecological settings for PE teachers. Indeed, by using a factorial analysis tool and a Pearson correlation calculation, we have shown that self-esteem and creative motor performance are related, with $r = .734$. Moreover, by discussing this relationship in terms of teaching practices for PE, the paper provides insight on available tools for identifying both self-esteem and creative motor levels in ecological settings. Further, we believe that our experiment underlines the importance of identifying fragile students with lower self-esteem, as they are less prone to engage and interact with their social and physical environment. Despite this, more studies regarding the intrapersonal parameters and their relationship with creative ecological motor performances would strengthen our data, hence being the perspective of our further research.

Ethics Approval

The study was approved by the French Research Ethics Committee (CER) and registered under IRB No. 00012024-82.

Informed Consent

Written informed consent was obtained from all participants and from their parents or legal guardians prior to participation in the study.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

AI Transparency Statement

The authors declare that no artificial intelligence (AI) tools were used in the collection, analysis, or interpretation of the study data. AI-assisted tools were used solely for language editing and grammatical refinement during manuscript preparation. All scientific content, study design, statistical analyses, and interpretation of results were performed solely by the authors.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare no conflicts of interest.

References

Büning, C., Jürgens, L., & Lausberg, H. (2020). Divergent learning experiences in sports enhance cognitive executive functions and creativity in students. *Physical Education and Sport Pedagogy, 26*(4), 402–416. https://doi.org/10.1080/17408989.2020.1812056

Oboeuf, A., Nefil, I., & Buffet, J. (2024). La pratique des jeux traditionnels: Un enjeu pour le développement de la créativité ? *Revue Corps,* (22), 103–118. https://doi.org/10.3917/corp1.022.0103

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal, 24*(1), 92–96. https://doi.org/10.1080/10400419.2012.650092

Hatchuel, A., & Weil, B. (2009). C-K theory: A new framework for design reasoning. *European Journal of Operational Research, 197*(2), 634–647. https://doi.org/10.1016/j.ejor.2008.05.001

Zhang, Y., Zhou, X., & Lu, J. (2020). Cognitive flexibility and creative performance in physical activity contexts. *Frontiers in Psychology,* 11, 513. https://doi.org/10.3389/fpsyg.2020.00513

Oboeuf, A., Henneton, S., Buffet, J., Fantoni, C., & Labiadh, L. (2020). Influence of traditional sporting games on the development of creative skills in team sports: The case of football. *Frontiers in Psychology,* 11. https://doi.org/10.3389/fpsyg.2020.611803

Besançon, M., & Lubart, T. (2011). Differences in the development of creative competencies in children schooled in diverse learning environments. *Learning and Individual Differences, 21*(5), 569–573. https://doi.org/10.1016/j.lindif.2011.04.007

Memmert, D. (2015). *Teaching tactical creativity in sport: Research and practice.* Routledge.

Lubart, T., & Besançon, M. (2015). *La créativité de l'enfant*. Mardaga.

Bonnardel, N., Girandola, F., Bonetto, E., & Lubart, T. (2023). *La créativité en situations, théories et applications.* Dunod.

Kokkonen, J., Yli-Piipari, S., & Quay, J. (2018). Effectiveness of a creative physical education intervention on elementary school students' leisure-time physical activity motivation and overall physical activity in Finland. *European Physical Education Review, 25*(3). https://doi.org/10.1177/1356336X18775009

Versace, R., Brouillet, D., & Vallet, G. (2018). *Cognition incarnée: Une cognition située et projetée (Collection PSY-théories, débats, synthèses).* Mardaga.

Harter, S. (2015). *The construction of the self: Developmental and sociocultural foundations.* Guilford Publications.

Kaufman, J. C., & Baer, J. (2005). *The amusement park theory of creativity.* In J. C. Kaufman & J. Baer (Eds.), Creativity across domains: Faces of the muse (pp. 321–328). Lawrence Erlbaum.

Rubeli, B., Oswald, E., Conzelmann, A., Schmid, J., Valkanover, S., & Schmidt, M. (2020). Promoting schoolchildren's self-esteem in physical education: Testing the effectiveness of a five-month teacher training. *Physical Education and Sport Pedagogy,* 25, 1–15. https://doi.org/10.1080/17408989.2020.1712348

Rinaldi, R. (2023). La cognition incarnée ou quand la pensée vient du corps. Sciences Humaines, Hors-série 14, 28–33.

Bailey, R. (2006). Physical education and sport in schools: A review of benefits and outcomes. *Journal of School Health,* 76, 397–401. https://doi.org/10.1111/j.1746-1561.2006.00132.x

Schaffhauser, K., Allemand, M., & Schwarz, B. (2017). The development of self-representations during the transition to early adolescence: The role of gender, puberty, and school transition. *The Journal of Early Adolescence,* 37, 774–804. https://doi.org/10.1177/02724316156248

Barbot, B. (2018). Creativity and self-esteem in adolescence: A study of their domain-specific, multivariate relationships. *Journal of Creative Behavior,* 54. https://doi.org/10.1002/jocb.365

Deng, X.-P., & Zhang, X.-K. (2011). Understanding the relationship between self-esteem and creativity: A meta-analysis. *Advances in Psychological Science,* 19, 645–651. https://doi.org/10.3724/SP.J.1042.2011.00645

Palmiero, M., Nori, R., Piccardi, L., & D'Amico, S. (2019). Creativity and its multifaceted nature: A multivariate framework. *Frontiers in Psychology,* 10, 1588. https://doi.org/10.3389/fpsyg.2019.01588

Barbot, B., & Lubart, T. (2012). Adolescence, créativité et transformation de soi. *Enfance,* 299–312. https://doi.org/10.3917/enf1.123.0299

Barbot, B., & Heuser, B. (2017). *Creativity and identity formation in adolescence: A developmental perspective.* In M. Karwowski & J. C. Kaufman (Eds.), The creative self: Effect of beliefs, self-efficacy, mindset, and identity (pp. 87–98). Academic Press.

Scharmann, G. (2011). Rejets d'école à l'adolescence. *Enfances & Psy, 52*(3), 78–88. https://doi.org/10.3917/ep.052.0078

Rothenberg, A. (1990). Creativity in adolescence. Psychiatric Clinics of North America, 13, 415–434. https://doi.org/10.1016/S0193-953X(18)30351-4

Fakhrou, A., & Ghareeb, S. (2020). Habits of mind and their relationship with creativity among students of excellent academic achievement at Qatar university during the covid 19 crisis. *International Journal of Education, 12*(4), 73-92. https://doi.org/10.5296/ije.v12i4.18047

Barker, D., Larsson, H., & Nyberg, G. (2023). How movement habits become relevant in novel learning situations. *Journal of Teaching in Physical Education,* 43. https://doi.org/10.1123/jtpe.2022-0272

Noordstar, J., Van der Net, J., Jak, S., & Helders, P. (2016). Global self-esteem, perceived athletic competence, and physical activity in children: A longitudinal cohort study. *Psychology of Sport and Exercise,* 83–90. https://doi.org/10.1016/j.psychsport.2015.06.009

Baumeister, R. F., Tice, D. M., & Vohs, K. D. (2018). The strength model of self-regulation: Conclusions from the second decade of willpower research. *Perspectives on Psychological Science, 13*(2), 141–145. https://doi.org/10.1177/1745691617716946

Orth, U., & Robins, R. W. (2022). Is high self-esteem beneficial? Revisiting a classic question. *American Psychologist, 77*(1), 5–17. https://doi.org/10.1037/amp0000922

Parlebas, P. (1999). *Jeux, sports et sociétés.* INSEP Éditions.

Lee, Y.-S., Iodice, P., & Komar, J. (2023). Creativity is contextual: A narrative review of motor creativity tests from an ecological perspective. *Motor Control, 27*(4), 717–735. https://doi.org/10.1123/mc.2022-0092

Bournelli, P., Makri, A., & Mylonas, K. (2009). Motor creativity and self-concept. *Creativity Research Journal, 21*(2–3), 104–110.

Bertsch, J. (1983). *La créativité motrice.* Revue EPS, 181, 46–48.

Guilford, J. P. (1967). *The nature of human intelligence.* McGraw-Hill.

Torrance, E. P. (1981). Empirical validation of criterion-referenced indicators of creative ability through a longitudinal study. *Creative Child & Adult Quarterly, 6*(3), 136–140.

Mendez-Martinez, E., & Fernandez-Rio, J. (2019). Design and validation of an instrument to assess motor creativity in adolescents. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte,* 19, 535–550.

Bordes, P. (2020). Communications par gestes et pratiques sportives. Analyse des codes gestémiques. *STAPS, 127*(1), 45–60. https://doi.org/10.3917/sta.127.0045

Beghetto, R. A. (2010). Creativity in the classroom. In J. C. Kaufman & R. J. Sternberg (Eds.), *The*

Cambridge handbook of creativity (pp. 447–463). Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.027

Clemente, F. M., Martins, F. M. L., & Mendes, R. S. (2016). Developing creative and tactical behavior in team sports: A constraint-led approach. *International Journal of Sports Science & Coaching, 11*(3), 340–349. https://doi.org/10.1177/1747954116642223

Coutts, A. J. (2014). Evolution of football match analysis research. *Journal of Sports Sciences, 32*(20), 1829–1830. https://doi.org/10.1080/02640414.2014.985450

Furley, P., & Memmert, D. (2018). The role of working memory in sport. *International Review of Sport and Exercise Psychology, 11*(1), 171–194. https://doi.org/10.1080/1750984X.2016.1244206

Oboeuf, A., Nefil, I., & Buffet, J. (2024). La pratique des jeux traditionnels : Un enjeu pour le développement de la créativité ? *Revue Corps,* (22), 103–118. https://doi.org/10.3917/corp1.022.0103

Hafekost, K., Boterhoven de Haan, K., Lawrence, D., Sawyer, M. G., & Zubrick, S. R. (2017). *Validation of the adolescent self-esteem questionnaire: Technical report. Telethon Kids Institute and the Graduate School of Education,* The University of Western Australia. https://doi.org/10.1177/0004867415617836

Jurado Cárdenas, D., Jurado Cárdenas, S., López, K., & Querevalú, B. (2015). Validez de la escala de autoestima de Rosenberg en universitarios de la Ciudad de México. *Revista Latinoamericana de Medicina Conductual, 5*(1), 18–22.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton University Press.

Rosenberg, M. (1979). Conceiving the self. Basic Books.

Gnambs, T., Scharl, A., & Schroeders, U. (2018). The structure of the Rosenberg self-esteem scale: A cross-cultural meta-analysis. *Zeitschrift für Psychologie,* 226, 14–29. https://doi.org/10.1027/2151-2604/a000317

Obœuf, A., Gérard, B., Lech, A., & Collard, L. (2010). Empathie socio-affective et empathie sociomotrice dans deux jeux sportifs : Le football et la « balle assise ». *Les Cahiers Internationaux de Psychologie Sociale, 86*(2), 297–320. https://doi.org/10.3917/cips.086.0297

Vigneron, C. (2004). *La construction des inégalités de réussite en EPS au bac entre filles et garçons* (Doctoral dissertation). Université de Bourgogne, UFR Sciences humaines, IREDU.

Oboeuf, A., & Frachey, T. (2025). *Assessing socio-motor creativity in team sports: An ecological framework for identifying creative potential.* Gifted Education International. https://doi.org/10.1177/02614294251379617

Oboeuf, A., Collard, L., & Buffet, J. (2022). Exploration des systèmes de signes dans quatre jeux sportifs : Analyse comparative du football, du handball, de la balle assise et du jeu des trois camps. *Semiotica,* (248), 53–75. https://doi.org/10.1515/sem-2022-0083

Márquez Jiménez, D., & Martínez de Santos, R. (2014). Fiabilidad y validez de instrumentos de observación en ciencias del deporte. *Retos: Nuevas Tendencias en Educación Física, Deporte y Recreación,* 25, 68–72.

Cibois, P. (2018). Prendre les données au sérieux et rêver d'une sociologie autre. *Bulletin of Sociological Methodology/ Bulletin de Méthodologie Sociologique, 137*(1), 70–93. https://doi.org/10.1177/0759106318761474

Clarke, I., McEnery, T., & Brooks, G. (2021). Multiple correspondence analysis, newspaper discourse and subregister: A case study of discourses of Islam in the British press. *Register Studies, 3*(1), 144–171. https://doi.org/10.1075/rs.20024.cla

Ruiz-Ariza, A., Suarez-Manzano, S., & Martinez-Lopez, E. (2017). The effect of cooperative high-intensity interval training on creativity and emotional intelligence in secondary school: A randomised controlled trial. *European Physical Education Review, 25*(2). https://doi.org/10.1177/1356336X17739271

Розуміння взаємозв'язку між самооцінкою та руховою творчістю в екологічних контекстах фізичного виховання в підлітковому віці

Томас Фраше[1ABCDE], Александр Обеф[1AD], Люк Коллар[1AD]

[1]Університет Париж Сіте

Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 11 с., 5 табл., 1 рис., 55 джерел.

Обґрунтування. У сучасних дослідженнях загальновизнано, що креативність є важливим чинником результативності у спорті та фізичному вихованні (ФВ). На основі багатовимірної моделі автори також дослідили вплив мотивації, інтелекту та когнітивних здібностей на творчу рухову активність. Однак існує недостатньо даних щодо самооцінки та її зв'язку з руховою активністю в екологічних сферах.

Цілі. Мета цього дослідження полягала у розумінні взаємозв'язку між самооцінкою та руховою творчістю, зосередивши увагу на екологічних рухових контекстах у фізичному вихованні підлітків.

Матеріали та методи. Експериментальна популяція складалася з трьох груп загальною кількістю 20 дітей (N = 60), з них 31 дівчинка та 29 хлопчиків віком 12 років. На першому етапі дослідження самооцінку вимірювали за допомогою

шкали самооцінки Розенберга (RSES), яка продемонструвала відмінну внутрішню узгодженість у зазначеній вибірці (α Кронбаха = .94). Потім учасники взяли участь у 20-хвилинній ігровій задачі з використанням гімнастичного м'яча під назвою "Sitting ball", що ілюструє концепцію взаємозалежності в екосистемі. Ґрунтуючись на багатовимірній моделі, у дослідженні оцінювали моторну плавність і гнучкість, використовуючи праксичну комунікацію в якості ключових показників креативності. Після збору даних проведено факторний аналіз за допомогою інструменту Trideux.cloud з метою встановлення взаємозв'язку між самооцінкою та руховою творчістю.

Результати. Факторна мапа показує, що рівні самооцінки корелюють з показниками рухової творчості в екологічних ситуаціях. Аналіз, проведений на індивідуальному рівні (N = 60) з використанням розрахунку кореляції Пірсона, підтвердив ці результати, встановивши позитивний взаємозв'язок між самооцінкою та екологічною руховою творчістю з r = .734. Крім того, результати є статистично значущими, оскільки 95% довірчі інтервали (ДІ) для самооцінки становили 21.55–25.81, а для екологічної рухової творчості — 48.43–57.90. Інтервали є достатньо невеликими, щоб вказувати на високу точність оцінених середніх значень і результатів.

Висновки. Це дослідження виявило, що творчі рухові здібності, судячи з усього, тісно пов'язані з самооцінкою. Низькі рівні самооцінки, як правило, сильно корелюють зі слабкими показниками рухової творчості, тоді як високі рівні самооцінки пов'язані із підвищеною руховою творчістю. Представлена нова екологічна модель підкреслює педагогічну важливість оцінки та розуміння таких внутрішньоособистісних характеристик для сприяння руховому розвитку та здоров'ю на заняттях фізичного виховання.

Ключові слова: творчість, фізичне виховання, рухова активність, самооцінка, підлітки.

Information about the Authors:

Frachey, Thomas: Thomasfrachey@gmail.com; https://orcid.org/0009-0006-4571-5837; Institut des Sciences du Sport-Santé de Paris, Université Paris Cité, 85 boulevard Saint-Germain, 75006 Paris, France.

Oboeuf, Alexandre: alexandre.oboeuf@u-paris.fr; https://orcid.org/0000-0001-6769-2302; Institut des Sciences du Sport-Santé de Paris, Université Paris Cité, 85 boulevard Saint-Germain, 75006 Paris, France.

Collard, Luc: luc.collard@u-paris.fr; https://orcid.org/0000-0002-8353-3579; Institut des Sciences du Sport-Santé de Paris, Université Paris Cité, 85 boulevard Saint-Germain, 75006 Paris, France.

Cite this article as: Frachey, T., Oboeuf, A., & Collard, L. (2026). The Understanding the Relationship between Self-esteem and Motor Creativity in Ecological PE Contexts at Adolescence. *Physical Education Theory and Methodology, 26*(1), 98-108. https://doi.org/10.17309/tmfv.2026.1.09

Received: 20.11.2025. Accepted: 26.12.2025. Published: 30.01.2026