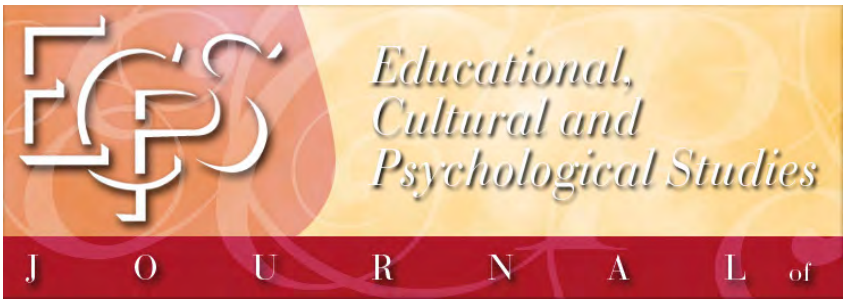

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Motor Creativity and Self-Efficacy in Young Gymnasts: Expertise Differences

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CREATIVITÀ MOTORIA E SELF-EFFICACY IN GIOVANI GINNASTE: CONFRONTO TRA DIFFERENTI LIVELLI DI ESPERIENZA

Abstract

The expression of original and functional motor actions (e.g. motor creativity) has been associated to various self-concept constructs such as self-efficacy (Richard et al., 2018). The aim of the present study was to investigate how motor creativity and self-efficacy could change according to gymnastics practice years. Thirty-five young gymnasts (N = 17 élite; N = 18 recreational) participated in the study. Gymnasts performed the motor creativity tests (Bertsch, 1983) and they were administered the self-efficacy in physical activities inventory (Morano et al., 2019). Analyses of variance showed significant differences in all creativity dimensions (i.e. fluency, flexibility and originality) with flexibility showing the lowest differences between groups. Furthermore, élite gymnasts showed higher values both in bench than in floor and hoop creativity tasks, than recreational group. Significant differences between groups emerged in self-efficacy levels too, with élite gymnasts showing higher values than recreational gymnasts. Finally, creativity and self-efficacy resulted more related in élite gymnasts than in recreational ones. Motor creativity interventions could help both élite and recreational gymnasts to perform a greater variety

and adaptability of movement solutions to achieve a task goal also in advancing technical expertise.

Keywords: Children; Expertise; Gymnastics; Motor creativity; Self-efficacy.

1. Introduction

Creativity is the ability to produce something which is both new/original and task/domain appropriate (Sternberg & Lubart, 1999). It has been identified as one of the differentiating skills that can support changes both in daily life and in societal issues to adapt to this ever-changing world and solve the problems (Glaveanu, 2018; Malinin, 2019). The on-going debate on whether creativity is a general ability or a set of abilities tailored to specific disciplines involves considerable implications for educational practices (Lubart & Guignard, 2004). In this regard, the Amusement Park Theory (APT) model by Baer and Kaufman model (2005) starts from general requirements for all creative achievements and moves thorough progressively more specific levels: general thematic areas (e.g., hands-on creativity), domains (e.g., motor or bodily-kinaesthetic creativity) and micro-domains or specific tasks (e.g., gross-motor or fine-motor tasks). In the last decade, creativity in motion or motor creativity has received a meaningful attention with a flourishing of research starting from a) the role of the body and action in individual development, particularly in cognitive and affective acquisitions and in changes through the life span (Adolph & Hoch, 2019; Marmeleira & Duarte Santos, 2019) and b) the holistic embodied conceptualization of creativity (Orth *et al*. 2017; Richard, Holder, & Cairney, 2021) where «the mind is not solely located in the brain but also involves the body and the body's situation in the environment» (Malinin, 2019, p. 2). Thus, the intertwined connections between the body, the mind, and the environment becomes critical in developing of enhancement creativity interventions.

Motor creativity reflects an individual's ability to perform a variety of functional and original movement solutions to achieve a task goal (Orth *et al*., 2017), and refers the potential that enables developing new motor patterns for either a solution to a pre-established problem or is a bodily expression of an idea or an emotion (Wyrick, 1968; Bournelli, Makri, & Mylonas, 2009).

Few studies have investigated whether motor creativity in children may be influenced by age-related stages of motor development (Tocci, Scibinetti, & Zelli, 2004; Zachopoulou & Macri, 2005). In particular,

findings by an Italian study (Tocci, Scibinetti, & Zelli, 2004) suggest that motor creativity in childhood might be influenced by age: six years old children were more creative in global motor tasks than in tasks involving more complex and fine coordination.

Other authors have utilized divergent movement ability (DMA) scores to investigate age and creativity relationship: DMA generates both quantitative and qualitative movement responses to a stimulus through the expression of two creativity dimensions namely fluency, (it refers to producing many different motor solutions), and flexibility (it denotes the capacity to generate solutions that pertain to other movement categories). In their research study, Zachopoulou and Macri (2005) showed that DMA scores increased with age; they argued that older children have «greater repertoire of movement» due to their background of movement experience compared to younger children. Other studies (Cleland & Gallahue, 1993; Domínguez, Diaz-Pereira, & Martinez-Vidal, 2015) have investigated divergent movement ability and motor proficiency in four, six, and eight years old children. Children's age was significantly correlated to their ability to produce divergent movement only between four and eight age (i.e., significant differences were not found between four and six and between six and eight years). Gross motor skills seem affect in a no-predominant way child's motor creativity. This means that age is a crucial factor for creative performance, especially when it is associated with motor experience years.

As consequence, according to an ecological-dynamic approach (Davids, Handford, & Williams 1994; Chow *et al.*, 2020), recent studies suggest relevance of using enriched movement activities to realize an individual's creative potential (Scibinetti, 2019; Richard, Holder, & Cairney, 2021; Tocci *et al.*, 2022). Particularly in early childhood education, movement-based creativity programs have been employed to foster not so much motor creativity per se, but creative behavior in the embodied and kinesthetic way that characterizes discovery learning and cognitive development in children (Grammatikopoulos, Gregoriadis, & Zachopoulou, 2012).

In the early years, motor creativity has also been positively associated with psychological well-being factors (Theodorakou & Zervas, 2003; Bournelli, Makri, & Mylonas, 2009). For instance, fostering creative movements in 11-12 years old children resulted in increased general self-esteem and led to more positive perceptions of scholastic, social, and athletic competences (Theodorakou & Zervas, 2003). Likewise, children exhibiting higher perceived social acceptance and physical competence scored higher in movement creativity tasks (Bournelli, Makri, & Mylonas, 2009). These findings pointed out the idea that motor creativity might contribute positively to psychological adaptability (Richard *et al.*, 2018),

where the degree of adaptation is a function of the difference between how one perceives the environment/task (e.g. challenging, threatening etc.) and how one perceives his/her own ability/capacity (i.e., self-efficacy). Self-efficacy refers to the individual's level of confidence in performing a given activity or behaviour (Bandura, 1997). In the context of physical education and sport, self-efficacy has been extensively examined (Feltz, Short, & Sullivan, 2008) and identified as an important correlate of physical activity and sport (McAuley & Blissmer, 2000).

People with high level of creativity seem to perceive the easier task, and to have greater possibility of making a good performance (Fleith, Renzulli, & Westberg, 2002; Sternberg, 2006); high assurance in own capabilities led to approach difficult tasks as challenges to be mastered rather than as threats to be avoided. In contrast, people who doubt their capabilities shy away from difficult tasks which they view as personal threats. Some authors (Beghetto, 2006; Dunton, Schneider, & Cooper, 2007; Ashford, Edmund, & French, 2010), have highlighted that some interventions enhancing personal self-efficacy including positive feedback on past or others' performance, cooperation, supportive climate, seem to be present in development programs of creativity too. On the other hand, in a virtuous circle of relationships self-efficacy can represent an important factor in creative solution to a motor task. Based on theoretical tenets, past performance experiences have proved to be the most influential source of efficacy information because they are based on one's own mastery experiences (Bandura, 1997). In particular, Bandura has argued that performance accomplishments on difficult tasks carry greater efficacy value than tasks that are easily accomplished. Gymnastic is an individual sport that involves the acquisition of difficult specific skills that often require strong motivation, courage and determination and high self-efficacy levels. A good confidence in own technical executions provides élite gymnasts a perception of behavioral control, which contributes to cope with threating situations (Scholz *et al.*, 2002). This is probably why some authors outlined that élite gymnast showed higher level of self-efficacy than recreational ones (Gomez-Paloma, Rio, & D'Anna, 2014) and suggest fostering it especially in élite gymnasts' programs (Ercis, 2018).

1.1. *The present study*

With the exception of the few studies cited above regarding the role of expertise on motor creativity expression, there is a paucity of studies in the specific closed-skills sport domain (Torrents *et al.*, 2010). The pre-

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sent study aims at examining motor creativity in young gymnasts and at evaluating whether different levels of motor competence could influence creative motor behavior. Starting from the developmental perspective by Plucker and Beghetto (2004), domain and task specificity of creativity become more pronounced with gaining in experience that, in turn, generally result from an extensive engagement to the domain and/or tasks of interest. Thus, we hypothesized that élite gymnasts were more creative than recreational ones. Furthermore, we hypothesized that high levels of motor creativity could affect self-efficacy levels.

2. Method

2.1. *Sample*

Participants were 35 young Italian females gymnasts (M = 6.8yrs; SD = .5yrs) divided into two groups: élite (N = 17) and recreational (N = 18). The first group had at least 2 years of previous training consisting of 3-h sessions, four times per week; the second one had never experienced gymnastics and now gymnasts train 1-h sessions, two times per week.

2.2. *Measures*

2.2.1. Motor creativity

Gymnasts' motor creativity was assessed by Bertsch test (1983). This test provides measurements of motor creativity by means of two separate versions (form A and B) composed of four tasks each to be performed on the floor, with a bench, a hoop or a ball, respectively. Form A provides no specific performance modality and form B partially defining it. In the present study, we selected form B in line with general recommendations by Torrance (1988) on how to study the creativity process. Furthermore, as the main purpose of this study we selected the tasks with the floor, bench and hoop as they express both gross motor (floor and bench) and fine motor (hoop) coordination demands.

Floor: two parallel lines delimited a 2.50 squared-meter area on the floor. The verbal instruction was: «Your task is to move from one line to the other. You are free to do anything you want between these two lines.

Show me all possible ways you know or that may come to your mind to do that». The task lasted 2 minutes and 30 seconds.

Bench: a bench was located in the middle of a room and two hoops were positioned at the two ends of the bench representing the starting and arrival point, respectively. The verbal instruction was: «You have to go from one hoop to the other and back, keeping a part of your body always in contact with the bench». The child was free to perform the task in any way he or she could think of. The task lasted 3 minutes.

Hoop: two parallel lines were put at a distance of 3.50 m. Children were asked to carry a hoop and move from one line to the other in whatever way they wanted. The verbal instruction was: «Your task is to move the hoop from one line to the other. You can let it go on its own or take it with you. Show me anything you can do that comes to mind». The task lasted 2 minutes and 30 seconds.

2.2.2. The self-efficacy in physical activities

The pictorial version of the self-efficacy in physical activities inventory (Morano *et al.*, 2019) was used to assess gymnasts' self-efficacy. Thanks to modified items represented with emoticons and pictograms, it renders the scale more easily understandable by younger children and helps them grasp the meaning of the items. Item scores ranged from 1, indicating low efficacy (e.g., «I run very slow») to 4, representing high efficacy (e.g., «I run very fast»). The total score of the self-efficacy questionnaire was obtained by the sum of the scores of the four items giving a possible range from 4 to 16 points.

2.3. *Procedure*

The internal ethical committee of the University of «Foro Italico» approved the protocol employed (66/2020). Students' parents were also informed by the principals about the approach, and they were asked to give their consent. All parents agreed and gave their permission.

The motor creativity test was administered following the standardized test instructions (Bertsch, 1983) by two trained research assistants. Each gymnast participated individually to the motor creativity tasks in randomized order during training for a total test duration of about 30 minutes. Gymnasts who stopped performing were encouraged to stay on task by prompting them again to follow the original instructions, ending with the common sentence: «Try to find ways that are original and that other

children may not think about». Each task of all gymnasts was recorded by a fixed camera for the further analysis. Data coding consisted in assigning scores on the three separate dimensions of fluency, flexibility, and originality. *Fluency* was scored in terms of the number of different behaviors displayed by the gymnasts during each motor task. *Flexibility* was calculated by the sum of the categories for which at least one behavior was observed; categories with two or more observed behaviors being counted only once. *Originality* was quantified assigning a score ranging from 0 (low originality) to 3 (high originality) to each behavior in each category on the basis of the Bertsch's normative sample. To obtain a total score for motor creativity, scores obtained from the three tasks were added.

Gymnasts individually completed the questionnaires, too. An investigator was present to provide assistance if required. After ensuring the confidentiality of the responses, the subjects were assured that there were no right or wrong answers.

2.4. *Data analysis*

For each dimension of the creativity that we scored (i.e., fluency, flexibility, and originality) was carried out a 3 × 2 mixed ANOVA considering as within-factor the type of task (i.e., floor vs. bench vs. hoop) and as between-subject factor the expertise of the gymnasts (i.e., élite vs. recreational). Importantly, we included in each ANOVA the weekly hours of training as covariate.

Furthermore, an additional ANOVA was carried out to evaluate the differences across élite and recreational athletes on their scores of self-efficacy. Even in this analysis we considered the weekly hours of training as covariate.

Finally, we calculated the correlation between the total score in creativity scores and the physical self-efficacy separately for recreational and élite gymnasts.

3. Results

Considering the fluency dimension of creativity, results showed a significant interaction between the expertise of the gymnasts and the type of the task [$F(2, 31) = 4.76$; $p = .016$; partial eta squared = .24]. Furthermore, as expected, the élite gymnasts showed significantly [$F(1, 32) = 20.24$;

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p < .001; partial eta squared = .388] higher score in fluency (marginal mean = 10.65; se = .89) than recreational gymnasts (marginal mean = 3.57; se = .93), independently of the type of task. Considering the type of the task, pairwise comparisons showed statistical significant differences across gymnasts for the bench [F(1, 32) = 16.269; p < .001; partial eta squared = .343], the floor [F(1, 32) = 16.48; p < .001; partial eta squared = .340] and the hoop trails [F(1, 32) = 6.72; p = .014; partial eta squared = .174]. However, as depicted in *Figure 1* and considering the effect size, the differences between élite and recreational gymnasts are less pronounced in hoop than in other two tasks.

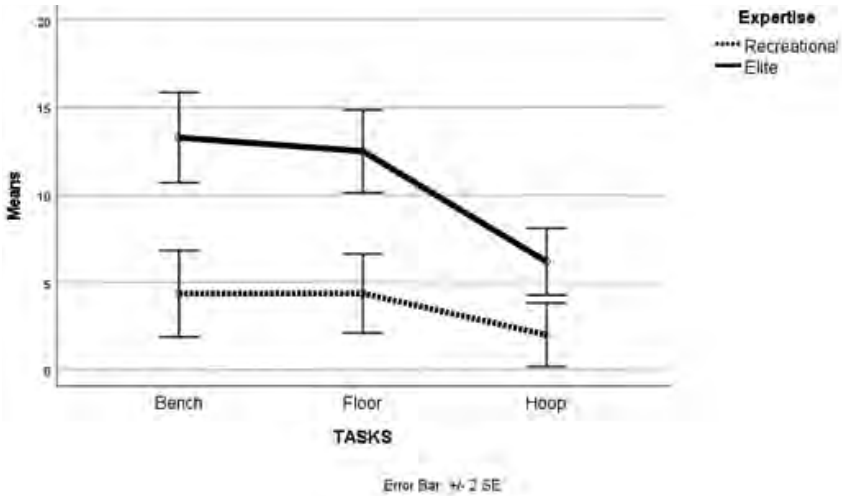

Figure 1. – Difference between recreational and élite gynnastics in fluency across the floor, bench and hoop tasks, respectively.

Considering the flexibility dimension of creativity, the results showed a non-significant interaction between the expertise of the gymnasts and the type of the task [F(2, 31) = 1.45; p = .25; partial eta squared = .086]. However, as expected, the élite gymnasts showed significantly [F(1, 32) = 13.00; p = .001; partial eta squared = .289] higher score in fluidity (marginal mean = 6.45; se = .58) than recreational gymnasts (marginal mean = 2.89; se = .56), independently of the type of task. Considering the type of the task, pairwise comparisons showed statistical significant differences across gymnasts for the bench [F(1, 32) = 9.09; p = .005; partial eta squared = .220], the floor [F(1, 32) = 8.99; p =.005; partial eta squared =

.219] and the hoop trails [F(1, 32) = 4.45; p =.043; partial eta squared = .122]. However, as depicted in *Figure 2* and considering the effect size of these three comparisons, as in fluency the differences in flexibility between élite and recreational gymnasts are less pronounced in hoop than in other two tasks.

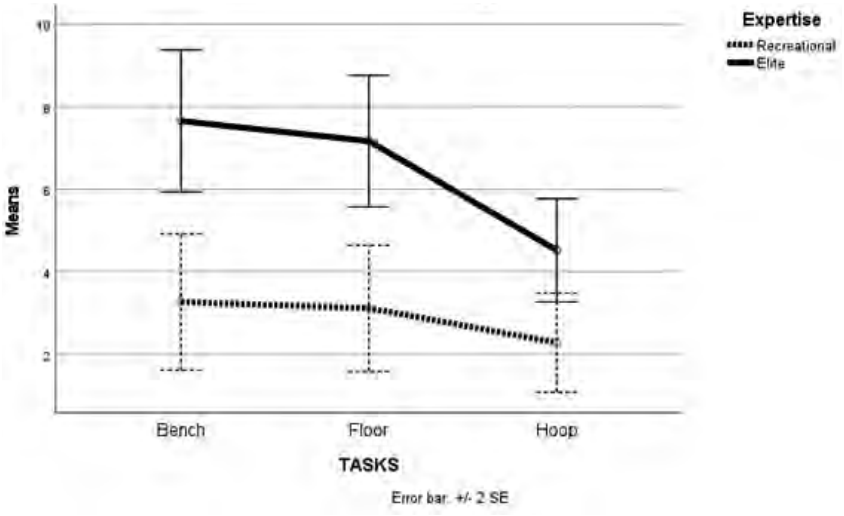

Figure 2. – Difference between recreational and élite gynnastics in flexibility across the floor, bench and hoop tasks, respectively.

Finally, considering the originality dimension of creativity, the results showed significant interaction between the expertise of the gymnasts and the type of the task [F(2, 31) = 4.21; p = .024; partial eta squared = .213]. Even for this dimension the élite gymnasts showed significantly [F(1, 32) = 28.87; p < .001; partial eta squared= .474] higher scores (marginal mean = 6.45; se = .58) than recreational gymnasts (marginal mean = 2.89; se = .56), independently of the type of task. Considering the type of the task, pair-wise comparisons showed statistical significant differences across gymnasts for the bench [F(1, 32) = 9.59; p = .004; partial eta squared = .231], the floor [F(1, 32) = 21.45; p < .001; partial eta squared = .40] and the hoop trails [F(1, 32) = 21.31; p < .001; partial eta squared = .400] (*Fig. 3*).

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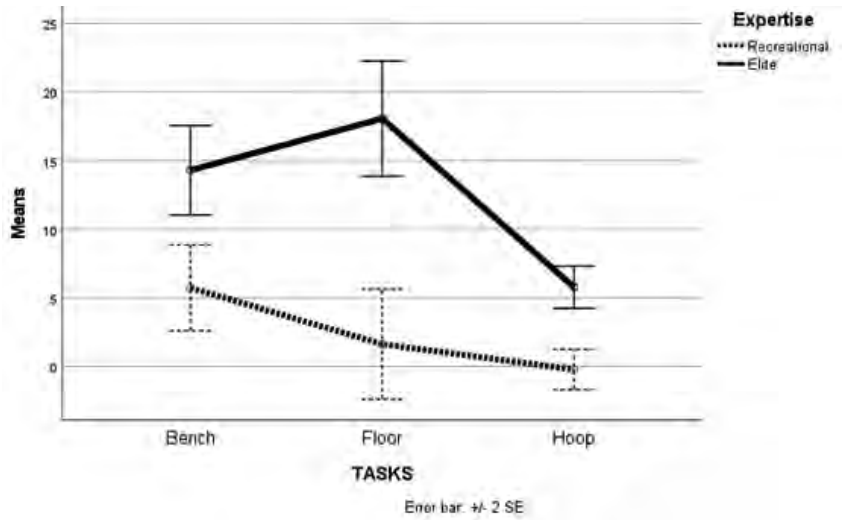

Figure 3. – Difference between recreational and élite gynnastics in originality across the floor, bench and hoop tasks, respectively.

In *Figure 4* are represented the all creativity dimensions in both groups.

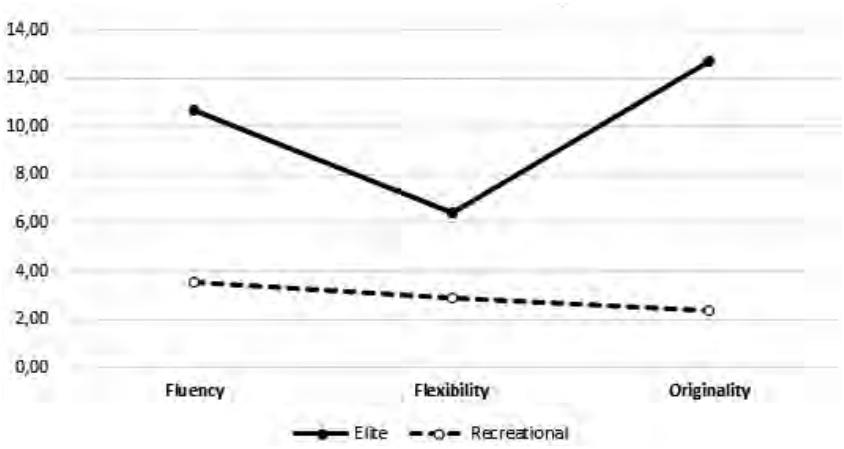

Figure 4. – Overall differences across élite and recreational athlete for the three different of creativity.

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As regard the self-efficacy levels, élite gymnasts showed significantly higher score (marginal mean = 12.35; sd = 1.87) than recreational gymnasts (marginal mean = 11.89; sd = 1.69) [$F(1, 32) = 8.24$; $p = .007$; partial eta squared = .205].

Finally, considering the association between creativity and self-efficacy, the two variables resulted more related in élite gymnasts ($r = .40$; $n = 17$) than in recreational gymnasts ($r = .16$; $n = 18$).

4. Discussion

The present study was designed to assess the relationship between motor creativity and self-efficacy in two different groups of Italian young gymnasts.

As such this study represents a novel effort in order to understand motor creativity behaviour in a micro-domain (e.g. artistic gymnastic). Considering the different psychomotor and cognitive demands of various sports, it is possible to assume that creativity is highly task-specific within this domain. The ability to produce creative movements may largely differ, for instance, when an individual is faced with the conditions characterizing closed skill (i.e. dance) (Torrents *et al.*, 2010), or open skills (i.e. team games) (Memmert, 2015; Santos & Monteiro, 2021).

Among closed-skills, gymnastics offers a great opportunity to enrich movement activity, to support for the curiosity, exploration and play: in this particular gymnastics-focused context, creativity can be interpreted as giving license to children's individual bent for putting an individual stamp on the work they produce (Price, 2008). This is the sport in which versatility in own motor competence is maximally required: gymnastics promotes, for example, a variety of responses to ways of moving, working at different speeds, using space also in relation to other children, making different body shapes, what different body parts can do in cooperation with other parts, balancing on different body parts. Own awareness of the potential for transferability of skill learning will enhance the overall knowledge and skills and, consequently, the possibility to solve a motor task in different original and unusual ways. Griggs and McGregor (2012) stated that a learning program would be always re-focused, tasks structured, and mediational approaches adapted to support more creativity in the teaching and learning.

Overall, the results give some support to our first hypothesis that expertise in gymnastics plays a fundamental role in motor creativity behaviour: in fact, élite gymnasts showed higher levels of motor creativ-

ity than recreational gymnasts. It is plausible to speculate that thanks to more years of training experience, for more hours on each training session they have had a greater possibility to enhance own motor vocabulary helping them in creative behaviour responses. Anyway, these results generate several considerations particularly regarding flexibility and originality dimensions and their expression in two different groups. Motor flexibility represents the creativity dimension in which the differences between élite and recreational groups are less pronounced. Young recreational gymnasts were able to use, explore and produce diversified movement solutions, shifting from one category behavior (body position, movement direction and type) to other, almost in the same way as élite group. This means that despite the lower level of motor competence, the recreational group expressed the ability to produce creative solutions in a divergent and flexible way. Perhaps, young recreational gymnasts can benefit, more than the élite group, from a teaching style mainly based on exploration, discovery and improvisation (Richard *et al.*, 2018; Scibinetti, 2019; Tocci *et al.*, 2022).

These methodological aspects based on ecological-dynamic approach are present in the introduction to artistic gymnastics and they are getting smaller with the increasing of the performance demands of this sport. In fact, it is possible to hypothesize that prescriptive and repetitive actions, that characterize the more advanced gymnastic training phases, can inhibit the variability of creative responses. Regarding originality, on the contrary of flexibility, the results showed the greatest level of differences between groups. In particular, élite gymnasts resulted high in originality because they mainly reproduced the complex gymnastics technique abilities that can be performed only if they are previously trained. Many of the original solutions expressed by the élite group have been counted with high originality scores because in Bertsch standardized sample (1983), these motor solutions were unique, especially in floor and bench tasks in which the role of competence was more evident. Thus, we can assume that novel and/or complex motor behaviors expressed by élite gymnasts have produced this gap.

Further consideration concern how creative motor solutions have been influenced by different motor tasks (i.e. floor, bench and hoop tasks). In both groups, motor creativity is more likely to emerge in tasks involving global motor control processes (i.e. floor and bench) rather than in task involving more complex fine coordination processes (hoop). These results suggest that motor creativity relies on the specific motor experiences and competence that young gymnasts may encounter or acquire by age (Tocci, Scibinetti, & Zelli, 2004).

Regarding self-efficacy levels, our findings are in line with literature (Gomez-Paloma, Rio, & D'Anna, 2014): the difference between the values of the two levels of gymnasts showed that the élite group is higher in physical self-efficacy in all items than the recreational group. In fact, the artistic gymnastic allows to experience, during training, feedback on personal success performance that are the most effective in increasing self-efficacy for physical activity (Ashord, Edmund, & French, 2010). Furthermore gymnastics is a sport in which these aspects of physical abilities are trained specifically (Gomez-Paloma, Rio, & D'Anna 2014): these data could suggest that the quantity of the trainings and, at the same time, the improvement of the quality of the performance increase the perceived self-efficacy. Furthermore, the results of the test are particularly high in all items in both groups and considering it globally, confirms that, in any case, the physical activities even if only practiced as recreational activity, produce positive effects on the self-efficacy levels.

Self-efficacy was positive correlate to motor creativity more in élite than in amatorial gymnasts. This is plausible because, as literature stated (Bournelli, Makri, & Mylonas, 2009; Theodorakou & Zervas, 2003; Richard *et al.*, 2018), people with high level of motor creativity seem to perceive the easier task, and to have greater possibility of making a good performance. Regarding the relationship between creativity and adaptation, creativity in motion seems to be a key factor that can allow enriching motor competence from an ecological view.

In conclusion, as unfortunately rigid linear environment still prevails in the motor e sport domain (Santos *et al.*, 2016), it could be very interesting to evaluate the effects of a creative gymnastics' intervention in line with the assumption that enriched physical activity may enhance the creative potential (Richard, Holder, & Cairney, 2021).

References

Adolph, K. E., & Hoch, J. E. (2019). Motor development: Embodied, embedded, enculturated, and enabling. *Annual Review of Psychology*, *70*, 141-164.

Ashford, S., Edmunds, J., & French, D. P. (2010). What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *British Psychological Society*, *15*, 265-288.

Baer, J., & Kaufman, J. C. (2005). Bridging generality and specificity: The Assessment Park Theoretical (APT) model of creativity. *Roeper Review*, *27*, 158-163.

Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York: Freeman.

Beghetto, R. A. (2006). Creative self-efficacy: Correlates in middle and secondary students. *Creativity Research Journal*, *18(*4), 447-457.

Bertsch, J. (1983). *Le créativité motrice. Son evaluation et son optimisation dans la pédagogie des situations motrices a l'école. Manuel de tests* [Motor creativity. Evaluation and optimization in the pedagogy of physical education. Test manual]. Paris: INSEP.

Bournelli, P., Makri, A., & Mylonas, K. (2009). Motor creativity and self-concept. *Creativity Research Journal*, *21*(1), 104-110.

Chow, J. Y., Davids, K., Shuttleworth, R., & Araújo, D. (2020). Ecological dynamics and transfer from practice to performance in sport. In A. M. Williams & N. Hodges (Eds.), *Skill acquisition in sport: Research, theory and practice*. London: Routledge.

Cleland, F. E., & Gallahue, D. L. (1993). Young children's divergent movement ability. *Perceptual and Motor Skills*, *77*(2), 535-544.

Davids, K., Handford, C., & Williams, M. (1994). The natural physical alternative to cognitive theories of motor behaviour: An invitation for interdisciplinary research in sports science? *Journal of Sports Sciences*, *12(*6), 495-528.

Domínguez, A., Díaz-Pereira, M. P., & Martínez-Vidal, A. (2015). The evolution of motor creativity during primary education. *Journal of Human Sport and Exercise*, *10*(2), 583-591.

Dunton, G. F., Schneider, M., & Cooper, D. M. (2007). An investigation of psychosocial factors related to changes in physical activity and fitness among female adolescents. *Psychology and Health*, *22*, 929-944.

Ercis, S. (2018). Prediction of élite male trampolines' performance based on the selected psychological capabilities. *Journal of Education and Training Studies*, *6*, 19-24.

Feltz, D. L., Short, S. E., & Sullivan, P. J. (2008). Self-efficacy in sport. *Human Kinetics*.

Fleith, D. S., Renzulli, J. S., & Westberg, K. L. (2002). Effects of a creativity training program on divergent thinking abilities and self-concept in monolingual and bilingual classrooms. *Creativity Research Journal*, *14*, 373-386.

Glăveanu, V. P. (2018). Educating which creativity? *Thinking Skills and Creativity*, *27*, 25-32.

Gomez-Paloma, F., Rio, L., & D'Anna, C. (2014). *Physical self-efficacy in women's artistic gymnastic between recreational and competitive level*. Catholic University Slovakia, Faculty of Education, Department of Physical Education and Sport.

Grammatikopoulos, V., Gregoriadis, A., & Zachopoulou, E. (2012). Acknowledging the role of motor domain in creativity in early childhood education. In

O. N. Saracho (Ed.), *Contemporary perspectives on research in creativity in early childhood education* (pp. 159-176). Charlotte, NC: Information Age Publishing.

Griggs, G., & McGregor, D. (2012). Scaffolding and mediating for creativity: Suggestions from reflecting on practice in order to develop the teaching and learning of gymnastics. *Journal of Further and Higher Education, 36*(2), 225-241.

Lubart, T., & Guignard, J. H. (2004). The generality-specificity of creativity: A multivariate approach. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 43-56). Washington, DC: American Psychological Association.

Malinin, L. H. (2019). How radical is embodied creativity? Implications of 4E approaches for creativity research and teaching. *Frontiers in Psychology*, *10*, 2372.

Marmeleira, J., & Duarte Santos, G. (2019). Do not neglect the body and action: The emergence of embodiment approaches to understanding human development. *Perceptual and Motor Skills*, *126(*3), 410-445.

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise and Sport Sciences Reviews*, *28*, 85-88.

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

Morano, M., Bortoli, L., Ruiz, M. C., Vitali, F., & Robazza C. (2019). Self-efficacy and enjoyment of physical activity in children: Factorial validity of two pictorial scales. *PeerJ*, *7*, e7402.

Orth, D., Van der Kamp, J., Memmert, D., & Savelsbergh, G. J. P. (2017). Creative motor actions as emerging from movement variability. *Frontiers in Psychology*, *8*, 1-8. doi: 10.3389/fpsyg.2017.01903

Plucker, J., & Beghetto, R. (2004). Why creativity is domain general, why it looks domain specific, and why the distinction does not matter. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 153-167). Washington, DC: American Psychological Association.

Price, L. (2008). Creativity and gymnastics. In J. Lavin, *Creative approaches to physical education* (pp. 71-94). New York: Routledge.

Richard, V., Lebeaua, J. C., Becker, F., Inglis, E., & Tenenbaum, G. (2018). Do more creative people adapt better? An investigation into the association between creativity and adaptation. *Psychology of Sport & Exercise*, *38*, 80-89.

Richard, V., Holder, D., & Cairney, J. (2021). Creativity in motion: Examining the creative potential system and enriched movement activities as a way to ignite it. *Frontiers in Psychology*, *12*, 690-710. doi: 10.3389/fpsyg.2021.690710

Santos, S., Memmert, D., Sampaio, J., & Leite, N. (2016). The spawns of creative behavior in team sports: A creativity developmental framework. *Frontiers in Psychology*, *7*, 1-14.

Santos, S., & Monteiro, D. (2021). Uncovering the role of motor performance and creative thinking on sports creativity in primary school-aged children. *Creativity Research Journal*, *33*, 1-15. doi: 10.1080/10400419.2020.1843125

Scholz, U., Doña, B. G., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a universal construct? Psychometric findings from 25 countries. *European Journal of Psychological Assessment*, *18*(3), 242.

Scibinetti, P. (2019). *Creatività motoria. Come svilupparla in età evolutiva e anziana* [Motor creativity. How to promote it during development and aging]. Perugia: Calzetti & Mariucci.

Sternberg, R. J. (2006). The nature of creativity. *Creativity Research Journal*, *18*, 87-98.

Sternberg, R. J., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. *Handbook of Creativity*, *1*, 3-15.

Theodorakou, K., & Zervas, Y. (2003). The effects of the creative movement teaching method and the traditional teaching method on elementary school children's self-esteem. *Sport, Education and Society*, *8*(1), 91-104.

Tocci, N., Scibinetti, P., & Zelli, A. (2004). Age and gender differences in motor creativity among Italian elementary school children. *Journal of Human Movement Studies*, *46*(1), 89-104.

Tocci, N., Scibinetti, P., Mazzoli , E., Mavilidi, M. F., Masci, I., Schmidt, M., & Pesce, C. (2022). Giving ideas some legs or legs some ideas? Children's motor creativity is enhanced by physical activity enrichment: Direct and mediated paths. *Frontiers in Psychology*, *13*. doi: 10.3389/fpsyg.2022.806065

Torrance, E. P. (1988). *Torrance tests of creative thinking*. Bensenville, IL: Scholastic Testing Service.

Torrents, C., Castaner, M., Dinusova, M., & Anguera, M. T. (2010). Discovering new ways of moving: observational analysis of motor creativity while dancing contact improvisation and the influence of the partner. *Journal of Creative Behaviour*, *44*, 45-61.

Wyrick, W. (1968). The development of a test of motor creativity. *Research Quarterly for Exercise and Sport*, *19*, 756-765.

Zachopolou, E., & Makri, A. (2005). A developmental perspective of divergent movement ability in early young children. *Early Child Development and Care*, *175*, 85-95.

Riassunto

La creatività motoria è stata associata in letteratura a diversi costrutti legati alla percezione di sé come l'autoefficacia. Questo studio ha voluto indagare le eventuali differenze nella creatività motoria e nella self-efficacy in relazione al differente livello di esperienza motoria. Allo studio hanno partecipato 35 giovani ginnaste (N = 17 professioniste; N = 18 amatoriali) alle quali sono stati somministrati i test di creatività motoria di Bertsch (1983) e il questionario di self-efficacy nelle attività motorie (Morano et al., 2019). Dall'analisi della varianza sono emerse differenze statisticamente significative in tutte e tre le dimensioni della creatività (fluidità, flessibilità, originalità); nella dimensione della flessibilità le differenze tra i gruppi sono le meno evidenti. Nelle tre prove (corpo libero, panca e cerchio), le ginnaste di élite mostrano livelli più alti rispetto alle ginnaste amatoriali. Simili differenze emergono anche nei livelli di self-efficacy. Inoltre, la creatività motoria risulta maggiormente correlata con la self-efficacy nelle ginnaste d'élite, rispetto alle amatoriali. Programmi d'intervento di creatività motoria potrebbero aiutare sia le ginnaste professioniste che le amatoriali a produrre una maggiore varietà e adattabilità di soluzioni motorie.

Parole chiave: Auto-efficacia; Bambini; Creatività motoria; Esperienza motoria; Ginnastica.

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