Effects of an eight-week creative dance and movement program on motor creativity and motor competence of preschoolers

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Abstract:

Introduction: Both motor creativity and motor competence are important features of children's personality that should be cultivated and enhanced in early years. Creative dance and movement are a valuable educational means; however, research on the outcomes of the implementation of this educational means on young children is limited and has several methodological shortcomings. **Purpose:** In this study, the effects of an eight-week creative dance and movement program on motor creativity and motor competence of preschoolers were investigated. **Methods:** A total of 57 preschoolers (49–73 months of age) participated in a controlled trial, with 29 children in the experimental group (EG) and 28 in the control group (CG). Pre-post assessments were conducted using the Thinking Creatively in Action and Movement Test (TCAM; Torrance, 1981) and the Bruininks-Oseretsky Test of Motor Proficiency-2 (BOT-2; Bruininks & Bruininks, 2005). Analyses of covariance (ANCOVAs), with age and pre-test scores as covariates, were utilized on children's total post-TCAM and BOT-2 scores. **Results:** Regarding motor creativity, a statistically significant superiority of EG ($p < 0.001$, $\eta_p^2 = 0.36$) was revealed; whereas, in motor competence no statistically significant differences were detected between CG and EG, in spite of the improvement of children's scores. Age was significantly associated with both motor creativity and motor competence scores ($p < .001$). **Conclusion:** This study indicates that a creative dance and movement program may substantially boost preschoolers' creative potential; however, it appears that this type of movement programs, focusing mainly on locomotor activities, does not provide children with enough opportunities to develop a wide range of their motor skills. Moreover, during preschool years, a few months age difference may considerably affect the creative and motor potential of children. This should be taken under consideration when measuring children's motor creativity and motor competence.

Key Words: creative movement; motor skills; TCAM; BOT; early childhood education

Introduction

The definition of creativity is still negotiated and many interpretations have been given from ancient to modern years. The last 70 years are marked as the democratic era of creativity, as anyone is considered able to create from anything (Kampylis & Valtanen, 2010). Thus, creativity seems to have a catholic character and can be emerged everywhere, as an everyday phenomenon. On the verge of the twentieth to twenty-first century, creativity promotion entered educational circles dynamically as a necessity. A decade ago, the findings of a curricula content analysis study in Europe confirmed that creativity and synonymous terms appeared in the school curricula of most European countries (Heilman & Korte, 2010), reflecting that educational policies have aimed at promoting creativity in schools. Moreover, a current international action research in 11 countries from OECD attests that there is a worldwide consensus about the importance of creativity in education, as most curricula in OECD countries include, in some form, the term creativity as an expected learning outcome for students (Vincent-Lancrin et al., 2019).

Indeed, although students undoubtedly need memorization skills (thus, achieving codified knowledge acquisition), they also need the 21st century skills (Trilling & Fadel, 2012) such as creativity. Creativity is considered as a skill, like 'creative thinking' or 'creative problem solving' that helps children and young people be successful learners, confident individuals, responsible citizens and effective contributors; thus, it is thought as a required skill that should be encouraged and developed in all subjects within curriculum (Heilman & Korte, 2010). Vincent-Lancrin et al. (2019, p. 20) taking into account that creativity is crucial for living and surviving in the modern societies and economies, mention that "...schools should help students become independent thinkers rather than merely transmit knowledge".

In the content analysis of school curricula in Europe conducted by Heilman and Korte (2010), Physical Education (PE) was among the top three school subjects with the higher occurrence of the term creativity and its synonyms. This means that PE is perceived as a creativity fostering school subject and many PE curricula in EU27 countries included, and attempted to promote, creativity. Indeed, PE, offering a wide variety of activities that allow creative potential to emerge (e.g., team games, practicing sports skills, fundamental movement

activities, motor improvisation, and dance) (Konstantinidou et al., 2011), is one of the most appropriate and fertile school subjects in order for children to experiment, observe and cultivate their creative potential through movement. In PE, young children express their creativity in various ways, such as by modifying traditional team games and their rules, creating new ones, discovering alternative ways of movements, improvising during drama and music/movement activities and displaying divergent movement in sports skills (Konstantinidou et al., 2011).

Apart from motor creativity, PE has been found to significantly contribute to children's motor development (suggestively: Aivazidis et al., 2019; Karachle et al., 2017; Marouli et al., 2016;). Numerous studies well document that the level of motor competence (i.e., the proficiency of an individual to execute a wide range of motor skills) in childhood is vital, not only for the participation in physical activity both in the short (Castelli & Valley, 2007; Kambas et al., 2012) and long term (e.g., Lloyd et al., 2014; Venetsanou & Kambas, 2017), but also for several health aspects (Robinson et al., 2015). Taking into account the importance of timely enhancement of motor competence, it is obvious that implementing developmentally appropriate PE programs in early childhood would be beneficial, since this period is considered as a "window of opportunity" for the development of fundamental motor skills (Gallahue, Ozmun, & Goodway, 2012).

Several studies provide support for the important role of creative movement and creative dance activities included in PE on children, as they evidenced the improvement in many domains of children's personality, meaning psychomotor, cognitive/perceptual, psychological, affective, social (Bournelli, 1998; Geršak et al., 2020; Giguere, 2006, 2011; Leandro et al., 2018; Lykesas et al., 2014; Neville & Makopoulou, 2020; Richard et al., 2018; Sanders, 1988; Simpson Steele et al., 2016; Sowden et al., 2015; Steinberg & Steinberg, 2016). Nevertheless, this body of research with creative movement and creative dance interventions covers mainly its effects in primary school settings. Moreover, as Konstantinidou and Patsalidou (2021) mention in their systematic search and review on creative dance programs and interventions in primary school children, the interest of researchers has been focused on the intellectual and psychological development of children. From the 19 studies included in this review, only five investigated aspects related to the physical domain. Among those five, only two, which implemented experimental designs with inferential statistics, revealed that creative dance interventions improve children's motor competence, though not to a great extent (Anjos & Ferraro, 2018; Rudd et al., 2021). Specifically, in the study of Anjos and Ferraro (2018), the EG group that received a seven-month creative dance program, significantly surpassed their CG peers in post-test; however, they did not maintained their significant motor competence improvement in the follow-up measurement. After six to eight months, the motor development of CG children was similar to that of their EG counterparts, attaining this way the natural evolution of motor development. In the study of Rudd et al. (2021), after the implementation of an eight-week intervention, the participants in the creative dance program did not show any significant improvement in their motor competence; whereas, a small significant improvement was found only in children of the CG, who followed a program with choreographed dance/steps, indicating that repetitive steps and routines in dance may improve more the motor development of young children.

Studies focusing on the effects of creative movement and dance interventions in preschool education are limited. The study of Chen and Cone (2003) explored the development of critical thinking skills in a mixed sample of kindergarten and primary school-aged children, while the studies of Pavlidou et al. (2018) and Lobo and Winsler (2006) mainly investigated the social skills of preschoolers. Also, the academic performance in language skills was studied by Greenfader and Brouillete (2013, 2017) and Greenfader et al. (2015), in a mixed sample of preschool and primary school children. In terms of motor domain and development, very few studies with a creative movement and/or dance intervention have been implemented in preschoolers. Some researchers studied the effect of such interventions in preschoolers' motor creativity (Wang, 2003; Zachopoulou et al., 2006) and some others in their motor competence (Tsapakidou et al., 2014; Tsompanaki, 2019; Wang, 2004). Starting with motor creativity, although the research results indicate the significant improvement of the EG, some crucial factors have been left behind in data analysis. For example, adjustments for initial differences in children's motor creativity at pre-test were taken into account in Wang's study (2003) and preschoolers of three different age categories were equally classified into both study groups (EG and CG). However, the statistical analysis did not take age into account; thus it is not clear if there were any differences due to the age of the participants. Additionally, Zachopoulou et al. (2006) did not adjust their results, either for potential initial differences in children's motor creativity or for possible age differences between EG and CG, despite the one year variance in participants' age. In a like manner, the same important factors were left behind in other studies investigating the effects of creative movement and dance interventions in motor competence of preschool children (Tsapakidou et al., 2014; Tsompanaki, 2019; Wang, 2004). As Konstantinidou and Patsalidou (2021) mention, there is a need for better research designs, with pre-post and follow-up tests and the inclusion of mediating variables with appropriate statistical analysis" in the field of creative dance interventions.

To summarize, it is well documented that both motor creativity and motor competence are important features of children's personality. That is why the cultivation of both attributes should be among the main objectives of a qualitative PE in early childhood. Creative dance and movement seems to be a valuable educational means; however, research regarding the outcomes of the implementation of this educational means on young children is limited and presents several methodological shortcomings. Thus, the purpose of this study was to investigate possible changes in preschool children's motor creativity and motor competence after the

implementation of a creative movement and dance program, taking under consideration the potential effect of age, gender, and possible initial differences of the participants in the main dependent variables of the study.

Material & methods

Participants

The sample of the study consisted of 57 preschool children (33 boys and 24 girls), aged 49 to 73 months, ($M=61.96$, $SD=6.26$), full-time enrolled in three private kindergartens in the southern suburbs of Athens. The control group (CG) consisted of 28 children, 17 boys and 11 girls ($M=59.86$, $SD=6.96$ months old), while the experimental group (EG) comprised of 29 children, 16 boys and 13 girls ($M=64$, $SD=4.78$ months old). The principal investigator was the instructor of the intervention program. She has received a Bachelor's degree from the School of Physical Education and Sport Science of the National and Kapodistrian University of Athens, Greece, and she is experienced in teaching young children. Ethics approval was sought and obtained by the University's Human Research Ethics and Bioethics Committee (No: 1036/14-02-2018). Signed informed consents were obtained from parents (or legal guardians) to fulfill the ethical requirements of their children's participation to the study. Children were informed about their right to withdraw from the activities, though none of the children seemed to feel reluctant to participate and continue in lessons.

Instruments

The Thinking Creatively in Action and Movement test (TCAM; Torrance, 1981), adapted for Greek population (Zachopoulou et al., 2009) was used for the assessment of motor creativity. The TCAM includes four activities: The first, third and fourth activity measure motor fluency and originality, whereas the second one measures imagination. Fluency is assessed on the basis of the number of motor responses that the examinee provides. For the assessment of originality, the motor responses the child gives to the examiner take a point score, ranging from 0 to 4 (the more original the response, the higher the score), according to the standard scoreboard of the TCAM. Imagination involves six pretend situations of children (children pretend to do six different things) and it is assessed based on the TCAM model, where 1 is equal to no movement and 5 is equal to perfect imitation.

The short form of the Bruininks-Oseretsky Test of Motor Proficiency-2 (BOT-2 SF; Bruininks & Bruininks, 2005) was utilized to assess children's motor competence. The BOT-2 SF consists of the following 14 items assessing both fine and gross motor skills: drawing lines through a crooked path; folding paper; copying a square; copying a star; transferring pennies; dropping and catching a ball; dribbling a ball; jumping in place same sides synchronized; tapping feet and fingers; walking forward on a line; one-legged stationary hop; standing on one leg on a balance beam; knee push-ups; sit-ups. According to the BOT-2 manual (Bruininks & Bruininks, 2005) children's performance on each item is recorded as a raw score (e.g., time needed to complete a task, number of correct executions of the skill, number of errors) and then, is converted into a point score. By adding these 14 point scores together, a total point score (ranging between 0 and 88) is provided. Apart from the point scores, standard scores, percentile ranks and descriptive scores can be derived using BOT-2 normative data. In the present study, the total BOT-2 SF point score was used. Regarding the BOT-2SF psychometric characteristics in the Greek population, there is enough evidence supporting both its validity and reliability (Venetsanou et al., 2016).

Procedure

Pre-and-post assessments with the TCAM and the BOT-2 SF were conducted in both groups, EG and CG, in indoor facilities of the kindergartens. Children were tested individually, according to the manuals of the two assessment tools, barefooted and wearing light clothes. Each tool was administered in a separate day. The duration of each assessment was approximately 20 minutes.

Intervention program

Children of the CG participated in unstructured physical activities that were provided in their kindergartens; whereas, those of the EG took part in the intervention program. This program was based on creative dance and movement activities as described by Abigador (2011), Pavlidou (2012), Theodorakou (2013), and Venetsanou (2014). These activities were chosen as they progressively build on the enhancement of the elements of movement (body, space, dynamics and relationships) in preschoolers, as illustrated by Davies (2003), whose theory was based on Laban's work (1948). A total of 16 lessons were designed (Appendix 1), specifically for the purpose of the study, meaning to foster the motor creative potential of children, and were implemented twice per week for a total of two months (February and March). Each lesson lasted about 40 to 45 minutes and consisted of an introduction (5 min), a main part (30-35 min) and a synopsis (5 min). The primary objectives on each lesson were: the nurturing of creative thinking in movement, the promotion of children's ability to solve kinetic problems and the development of motor skills. In order to achieve these objectives, various efforts were made to incorporate free and guided improvised movement and dance experiences, with basic movements, fundamental motor skills, and simple movement games, while exercising the elements of movement (body, space, quality, relationships) with or without music, sounds (percussion instruments and body percussions), visual, verbal, and kinesthetic stimuli. Also, particular attention has been given to present positive challenging verbal instructions (Konstantinidou et al., 2005) and provide inspirational and provoking instructional techniques, such as sequential open-ended tasks and learning cues and instructional scaffolding

with verbal instructions, suggestions or cues and body demonstrations (Chen & Cone, 2003) to generate divergent and original movement and dance responses.

Data analysis

Firstly, descriptive statistics were computed and age differences between EG and CG were observed. Thus, a t-test was utilized, revealing statistically significant differences between the two groups [$t(55)=2.626$, $p=.011$, $d=1.15$]. Initial 2(group: EG vs. CG) X 2(gender: boys vs. girls) analyses of covariance (ANCOVAs) were conducted to examine potential differences in children's TCAM and BOT-2 total scores before the implementation of the program, using age as the covariate variable. To detect the effect of the intervention, one-way (group) ANCOVAs were computed on the TCAM and BOT-2 total post-test scores, using age and the respective pre-test scores as covariates (gender was found not to significantly associate with children's pre-test scores in either TCAM or BOT-2). For the above statistical analyses, the SPSS 24 for Windows statistical package was used and the level of significance was set at .05. For all depended variables, the estimated marginal means ($\pm$ standard error) are reported.

Results

Participants' pre-and post-test scores in the TCAM and the BOT-2 by group are presented in Table 1 and Figure 1. According to the ANCOVA utilized on children's pre-test TCAM scores, age was found to be a significant covariate [$F(1,52)= 15.143$, $p<.001$, $\eta_p^2=.226$]. Also, a significant main effect was found for group [$F(1,52)= 6.19$, $p=.016$, $\eta_p^2=.106$], with EG presenting higher scores. On the contrary, neither the interaction between group and gender ($p=.125$) nor gender ($p=.120$) were associated with TCAM scores. Moreover, the post-test ANCOVA indicated that after controlling for age [$F(1,53)=2.85$, $p=0.97$, $\eta_p^2=.05$] and pre-test TCAM scores [$F(1,53)=7.6$, $p=.008$, $\eta_p^2=.12$], significant differences were revealed between the two groups [$F(1,53)=29.42$, $p<.001$, $\eta_p^2=.36$], with EG receiving higher motor creativity scores than the CG.

Table 1. Estimated marginal means ($\pm$ standard error) for TCAM and BOT-2 pre- and post-scores by group

		EG	CG
TCAM	pre-test	50.90 $\pm$ 2.42	43.17 $\pm$ 2.46
	post-test	70.82 $\pm$ 2.70	48.90 $\pm$ 2.75
BOT	pre-test	37.75 $\pm$ 1.9	40.10 $\pm$ 2.22
	post-test	44.19 $\pm$ 1.62	42.90 $\pm$ 1.90

Note. EG=Experimental Group, CG=Control Group, TCAM= Torrance's Thinking Creatively in Action and Movement, BOT-2= Bruininks-Oseretsky Test of Motor Proficiency-2 Short Form

Figure 1. Groups' scores in the TCAM (a) and the BOT-2 (b) during study period. EG indicates experimental group; CE, control group

As far as children's motor competence is concerned, the pre-test ANCOVA showed that age was significantly associated with BOT scores [$F(1,44)= 51.19$, $p<.001$, $\eta_p^2=.54$]. Nevertheless, there was neither a significant interaction between group and gender ($p=.13$) or a significant main effect of either factors ($p=.36$ for group and $p=.31$ for gender, respectively). Furthermore, according to the results of the post-test ANCOVA, it was found that after adjusting for age [$F(1,44)=3.09$, $p=0.09$, $\eta_p^2=.07$] and pre-test BOT-2 scores [$F(1,44)=49.51$, $p<.001$, $\eta_p^2=.53$], EG and CG were not statistically different ($p=.62$).

Discussion

The purpose of this study was to examine the impact of a two-month, educational intervention, which included activities in the form of creative play, creative dance and improvisation, as well as other various creative gymnastics activities. Our key finding was the significant improvement of preschoolers' motor creativity, accompanied with their motor competence development.

Starting with motor creativity, according to children's TCAM scores, the EG significantly outperformed the CG because of their participation in the program, a finding that is in line with the few previous studies in preschoolers (Wang, 2003; Zachopoulou et al., 2006). Specifically, in Wang's (2003) study, the EG after completing a six-week creative movement program with the same frequency as the present study had significantly higher TCAM scores than the CG, who participated in unstructured free play. Similarly, in the study of Zachopoulou et al. (2006), a significant effect of the creativity fostering PE program on young children's motor creativity was revealed. Consistent are the results of researchers who focused on older children. For example, in the study of Cleland (1994), second and third graders, after receiving a twenty-weeks PE program (one lesson per week) based on divergent production teaching style (Mosston & Ashworth, 1994) outperformed both the low-organized games group (with direct teaching styles) and the CG (with traditional lesson content) on divergent movement ability tasks. Similarly, in the recent study of Richard et al. (2018), the three months creative program (10 lessons in total) significantly influenced the ability of fourth-graders to produce creative movements. It seems that movement programs in typical, primary education settings (nursery, kindergarten, and elementary schools) focusing on the promotion of creativity significantly improves children's creative potential in motor domain and the present study strengthens the body of literature in this direction, especially for preschoolers.

As far as participants' motor competence is concerned, considerable development for the EG group was unveiled, though not statistically significant. Previous, relevant studies implementing creativity promotion programs in preschoolers (Tsapakidou et al., 2014; Tsompanaki, 2019; Wang, 2004) and older young children (Lykesas et al., 2014) evidenced their motor competence amelioration. In the study of Wang (2004), the EG of 3-5 year-old Taiwanese children after participating in a creative movement program improved their motor competence, which assessed with the Peabody Developmental Motor Scales-Second Edition (PDMS-2) (Folio & Fawell, 2000), more than their CG peers, who participated in unstructured, free play activities. However, significant differences were noticed only in locomotor skills and not in stability and object control skills. Wang (2004) attributed that finding on the design of the creative movement program, which focused on locomotor skills. Perhaps this provides an explanation for our findings. While locomotor and stability skills were practiced a lot, objects' manipulation was practiced only in one lesson and fine motor skills were not practiced at all. However, the motor competence assessment (BOT-2 SF) included both fine and gross motor skills, as well as locomotor, stability, and object control. In the study of Tsompanaki (2019), where the motor competence was assessed with the Test of Gross Motor Development-Second version (TGMD-2) (Ulrich, 2000), the EG of 4-5 year old preschoolers, who participated in the two-months creative dance and movement program significantly improved their locomotor skills, while children of the CG who followed their typical nursery program did not. Finally, in the study of Tsapakidou et al. (2014), after the implementation of a program partial-focused on motor creativity, a significant improvement in the locomotor skills was revealed for the EG of preschoolers (3.5-5 years old) but not for the CG (students tested with the subtest of locomotor skills with TGMD-2). The results of studies with older children are analogous. In the study of Lykesas et al. (2014), the majority of the first and second graders, who participated in the EG, after completing a creative playful-dancing program, made a great progress in their locomotor skills (assessed with TGMD-2), while their CG peers did not.

Proceeding, in terms of gender, no statistically significant differences were observed in motor creativity, confirming the results of a previous experimental study (Bournelli, 1998) and several other studies reporting that there are no statistical gender differences in divergent movement ability and in motor creativity of young children (Alsrour & Al-Ali, 2014; Cleland, 1994; Cleland & Gallahue, 1993; Kyriakou, 2015; Zachopoulou & Makri, 2005). A closer look at the statistics of the present study reveals a trend in favor of girls, a finding that is in agreement with the study of Kyriakou (2015). Contrariwise, a different trend, favoring boys, revealed in the non-experimental study of Alsrour and Al-Ali (2014); whereas, mixed were the results of Zachopoulou and Makri's (2005) study, where girls surpassed boys in motor fluency, but the opposite observed for motor flexibility. The non-statistical significant differences between the two genders in motor creativity, generally, was concluded from Baer and Kaufman (2008) in their effort to gather all related to gender creativity studies, from different fields, points of views and age groups. The authors concluded that the libra is probably tilt down to the side of women, without, though, believing in a statistical difference between men and women if a meta-analysis would have been applied. Furthermore, in the present study, no statistically significant differences were noticed for motor competence between boys and girls, a finding that is in line with existing literature for that age (e.g., Hardy et al., 2010; Venetsanou & Kambas, 2016).

Regarding age, our findings highlight that age should be taken under consideration when measuring children's motor creativity and motor competence, especially at young ages. A mean of nearly four months difference between CG and EG was proved to be a major influencing factor on motor creativity pre-test scores, with EG significantly outperforming CG. In several non-experimental studies, age was found to differentiate young children's motor creativity (Alsrour & Al-Ali, 2014) and divergent movement ability (Cleland & Gallahue, 1993; Zachopoulou & Makri, 2005). For example, in the study of Cleland and Gallahue (1993), young children exhibited differences across ages (4, 6 and 8 years old) in divergent movement ability, though the difference was significant only between the 4- and 8-yr-old children. This non-significant divergence performance of 6 years old children may be due to the first sudden decline (slump) of children's creative

thinking, as supported by the results of the longitudinal study of Torrance, who found that this slump is obvious at the approximately five years of age (Torrance, 1963, as cited in Hui et al., 2019, p. 71). From the cross-sequential study of Krampen (2012) this slump was also revealed, though a little bit later in age, on the verge of the first to the second elementary grade. Positive linear differences with age were also found for the participants' divergent movement ability in the study of Zachopoulou and Makri's (2005), with primary children producing significantly more quantitative (fluency) and qualitative (flexibility) movement responses than the preschoolers. However, the results of the study of Alsrour and Al-Ali (2014) provided mixed results on motor creativity criteria according to age differences. Only imagination score was significantly higher for five years old children compared with those of three- and four- years old. The contrary was observed for fluency scores, and for originality scores, where the youngest surpassed the oldest. In an effort to explain their results, Alsrour and Al-Ali (2014) supported that five-year-old children may feel pressure from environmental or social factors, which stressed them to become more aware of other directions, roles and the importance of meeting others expectations. However, factors such as the assessments (divergent movement ability vs. motor creativity) and their criteria (fluency and flexibility vs. fluency, originality and imagination) may have been responsible for the mixed results related to specific age categories in motor creativity.

Proceeding in experimental studies on motor creativity of preschoolers (Wang, 2003) and of primary school children (Richard et al. 2018), and another one on divergent movement ability of primary school children (Cleland, 1994), none of them took into account possible initial age differences in motor creativity. Thus, the present study adds a valuable piece of information to the existing body of literature, pointing out that in preschool children, an age difference of a few months may result in significant differences to their creative potential and a short-term creativity fostering program may substantially further differentiate children's creativity. Finally, as far as motor competence is concerned, age was significantly associated with the BOT-2 scores; thus, it is crucial to be taken under consideration both in statistical analyses and in the implementation of educational programs, even if age difference between groups seems minimal.

All the previous relevant studies that focused on the implementation of motor creativity programs and their impact, either on preschoolers' motor creativity or on their motor competence, provide some encouraging information. However, some of them show considerable limitations, such as not providing information about statistical analysis implementation (e.g., Lykesas et al., 2014), not taking into consideration possible age differences between EG and CG (e.g., Tsapakidou et al., 2014; Tsompanaki, 2019; Wang, 2003, 2004) or initial motor competence differences between the groups (e.g. Tsompanaki, 2019). These limitations may hide performance differences between the EG and CG. Furthermore, some studies assessed children's motor competence using only some subsets of the assessment tests and not the whole battery [e.g., only the gross- and not the fine motor skills included in the PDMS-2 (Wang 2003; 2004) or the locomotor skills included in the TGMD-2 and not the object control ones (Tsapakidou et al., 2014; Tsompanaki, 2019)]. This partial assessment of children's motor competence ignores important elements of the motor competence profile of preschoolers.

Contrariwise, in the present study, preschoolers' possible initial differences according to their age and gender were examined and controlled for; whereas two comprehensive assessment tools, such as the TCAM and the BOT-2, were used, providing the "whole picture" of the creative potential and motor competence profile of preschoolers. Moreover, this study is one of the extremely few experimental studies, in which the effect of a motor creativity-fostering program on both motor creativity and motor competence of preschoolers was examined. Nevertheless, the present study has some limitations that should be discussed. To begin with, during intervention implementation, significant difficulties were recorded. For example, in one of the private kindergartens, the venue of three sessions was changed and lessons took place in a space that was almost unsuitable for the educational objectives of the course, due to its hard floor surface and small size in relation to the number of children. Konstantinidou & Patsalidou (2021) in their systematic search and review on creative dance programs and interventions in primary school children noted that "a crucial element to programs' implementation is the dance space and environment". The environmental conditions should meet specific criteria, in order to predispose children kinetically express themselves the best they can and further cultivate their creativity. One more limitation of the present study is that the intervention did not include opportunities for object control training, while the motor competence assessment tool that was used included several object control items. This discrepancy between program's implementation and assessment may have contributed to the non-statistical differences on motor competence between the groups of the study. Finally, the present evidence should be interpreted with caution, due to the small size of the sample

Conclusions

The present study's findings confirm that a two-month creative movement and dance program can significantly improve preschoolers' motor creativity, and consequently some aspects of their creative thinking processes. Simultaneously, it can ameliorate preschoolers' motor competence; however, not significantly. Perhaps, this type of movement programs, focusing mainly on locomotor activities, does not provide children with enough opportunities to develop a wide range of their motor skills.

It seems that the development of motor creativity does not mean the concurrent development of motor competence. Motor experiences may play a significant role on children's exhibition of motor creativity. As

previous studies revealed (Milić, 2014; Scibinetti et al., 2011), some features of the expression of motor creativity may complement with some features of motor performance (e.g., coordination skills) and may not with some others (e.g. strength) and some creative movement aspects/criteria may not overlap with creative thinking dimensions (e.g. originality). Moreover, as Wang (2004) suggests, the kind of activities implemented in a motor creativity educational program may affect differently a variety of motor skills. For example, repetition of motor skills is thought a key-feature for motor development (Khudolii et al., 2020); however it is not a feature of creative dance and movement program. Additionally, not only practice but also other factors of the learning environment seem to have an effect in children's creativity, such as the learning processes (e.g. improvisation, movement exploration, embodied concepts' interpretations and representations, etc.), the formation in exercises (solo or group activities) and the environmental settings (Konstantinidou & Patsalidou, 2021). It should be a challenge for future research in the specific field and age to measure motor competence in specific motor skills and motor creativity aspects/criteria and test how specific elements of teaching practices might intervene and/or associate with these aspects. A well-designed and balanced program may substantially contribute to creativity properties and motor development of preschoolers and give them opportunities to enhance their total creative and motor potential and skills for further development, through their kinesthetic modality. Finally, during preschool years, a few months age difference may considerably affect the creative and motor potential of children. This should be taken under consideration when measuring children's motor creativity and motor competence.

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Appendix 1. Structure of the creative dance and movement program

Lesson	Subject/content	Body awareness	Space awareness	Quality awareness	Relationship awareness	Signal awareness
1-2	<ul style="list-style-type: none"> Animal movements (chickens, bunnies, cats, snakes, butterflies, fishes, etc.) Role playing Survivors on raft VS sharks with body parts Flowers/trees/cactus Improvisation and animation with body and body parts Scenes, role playing Acrobatic role playing Different people (e.g. aged, drunk, baby, model, soldier, etc.) Scenes, role playing, athletes, dancers, animal movements 	<ul style="list-style-type: none"> Basic movements Locomotion skills (walking, running, jumping on the spot, crawling, rolling) Body parts identification 	<ul style="list-style-type: none"> Space General/personal Levels Mobile/transferring Central Low, medium, high 	<ul style="list-style-type: none"> Flow Motion with pauses Continuous/legato Sudden/staccato 	<ul style="list-style-type: none"> With others Moving without disturbing others Initiating movements Moving with others in two groups Responding to others Changing roles in groups With others in pairs Assuming roles Assuming roles one after the other 	<ul style="list-style-type: none"> Moving to music Reaction to sound stimuli
3-4	<ul style="list-style-type: none"> Flowers/trees/cactus Improvisation and animation with body and body parts Scenes, role playing Acrobatic role playing Different people (e.g. aged, drunk, baby, model, soldier, etc.) Scenes, role playing, athletes, dancers, animal movements 	<ul style="list-style-type: none"> Body shapes With whole body or body parts Basic movements (circulars, flexions, extensions, sways, turns, rotations) Locomotor skills Walking 	<ul style="list-style-type: none"> Space General/personal Levels Low, medium, high 	<ul style="list-style-type: none"> Flow Motion with pauses 	<ul style="list-style-type: none"> With others as a group Moving without disturbing others Initiating movements Responding to others Forming a shape With others in pairs Forming shapes Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Moving to music Reaction to sound stimuli Reaction to verbal stimuli
5-6	<ul style="list-style-type: none"> Body parts Identification, recognition, connections Side lateral movements Improvisation and animation with body and body parts Scenes, role playing Acrobatic role playing Different people (e.g. aged, drunk, baby, model, soldier, etc.) Scenes, role playing, athletes, dancers, animal movements 	<ul style="list-style-type: none"> Locomotor skills Walking, crawling, creeping, rolling Basic movements with specific body parts 	<ul style="list-style-type: none"> Space General/personal Levels Low, medium, high Forward, backward, sideways (left-right) 	<ul style="list-style-type: none"> Flow Motion with pauses Continuous/legato 	<ul style="list-style-type: none"> With others as a group Moving without disturbing others Initiating movements Responding to others Forming a shape With others in pairs Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Moving to music Reaction to sound stimuli Reaction to verbal stimuli Reaction to kinaesthetic stimuli
7-8	<ul style="list-style-type: none"> Improvisation and animation with body and body parts Scenes, role playing Acrobatic role playing Different people (e.g. aged, drunk, baby, model, soldier, etc.) Scenes, role playing, athletes, dancers, animal movements 	<ul style="list-style-type: none"> Locomotor skills Emphasis in different walking skills (e.g. in heels, in toes, with straight or bending knees, etc.) Body parts: synchronous & asynchronous movements 	<ul style="list-style-type: none"> Space General/personal Levels Low, medium, high 	<ul style="list-style-type: none"> Flow Motion with pauses Continuous/legato Slow, fast Accelerating Decelerating One beat more/high than the others 	<ul style="list-style-type: none"> With others as a group Moving together Synchronizing Moving without disturbing others Initiating movements Responding to others Forming shapes (one leg and a train circle without assistance) With others in pairs Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Moving to different beat Rhythmic ability Moving to music Reaction to sound stimuli Reaction to verbal stimuli Reaction to kinaesthetic stimuli
9-10	<ul style="list-style-type: none"> Team work Stretching Jumping or passing over obstacles (lake, pond, river, etc.) Role playing Improvisation and animation with body and body parts Scenes, role playing Acrobatic role playing Different people (e.g. aged, drunk, baby, model, soldier, etc.) Scenes, role playing, athletes, dancers, animal movements 	<ul style="list-style-type: none"> Locomotor skills: Running, jumping, hopping Basic movements Stretching, bending, stabilization skills Take off – landing 	<ul style="list-style-type: none"> Space General/personal Levels Low, medium, high 	<ul style="list-style-type: none"> Tempo Slow, fast 	<ul style="list-style-type: none"> With others as a group Responding as a group Initiating movements Responding to others Forming a shape With others in pairs Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Reaction to sound stimuli Reaction to verbal stimuli Reaction to kinaesthetic stimuli
11-12	<ul style="list-style-type: none"> Looking for the enchanted forest Circus acrobats Airplanes Chasing game Scenes (Blue, red, black, yellow, green, etc.) Shadows, crescent, river, pond) 	<ul style="list-style-type: none"> Static stabilization skills Body parts: support in different body parts Dynamic stabilization skills Start / Take off: Stop / Landing Change of direction Locomotor skills Walking (on a line, beam, on the spot, etc.) Alternative feet, hopping, skipping 	<ul style="list-style-type: none"> Space General/personal Levels Low, medium, high Directions Forward, backward, sideways 	<ul style="list-style-type: none"> Flow Accelerating Decelerating Dynamic Crescendo, diminuendo 	<ul style="list-style-type: none"> With others as a group Responding as a group Initiating movements Responding to others Forming a shape With others in pairs Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Reaction to sound stimuli Reaction to verbal stimuli Reaction to kinaesthetic stimuli
13-14	<ul style="list-style-type: none"> Free music improvisation Story drama improvisation Emotions with hands Improvisation Acting roles, professions, etc. Bees and bees Leaves Cats Improvisation with body representations Animal movements 	<ul style="list-style-type: none"> Locomotor skills Object control Stabilization skills Support, turn, rolling 	<ul style="list-style-type: none"> General and personal space Levels Low, medium, high 	<ul style="list-style-type: none"> Tempo Emphasis on slow) Emphasis on piano 	<ul style="list-style-type: none"> With others in pairs Responding as a group Initiating movements Responding to others Forming a shape With others in pairs Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Reaction to sound stimuli Reaction to verbal stimuli Reaction to kinaesthetic stimuli
15-16	<ul style="list-style-type: none"> Bees and bees Leaves Cats Improvisation with body representations Animal movements 	<ul style="list-style-type: none"> Locomotor skills Object control Stabilization skills Support, turn, rolling 	<ul style="list-style-type: none"> General and personal space Levels Low, medium, high 	<ul style="list-style-type: none"> Tempo Slow, medium, fast 	<ul style="list-style-type: none"> With others in pairs Responding as a group Initiating movements Responding to others Forming a shape With others in pairs Forming shapes Mirroring Changing roles Assuming roles one after the other With others in pairs Moving together 	<ul style="list-style-type: none"> Reaction to sound stimuli Reaction to verbal stimuli Reaction to kinaesthetic stimuli