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Original Article

Effect of a psychomotor program on the motor proficiency and self-perceptions of preschool children

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Abstract:
The training of young children's ability to move and interact in a proficient and intrinsically rewarding manner, increases the likelihood of their developing a physically active and emotionally balanced personality. On this premise, the integration of movement programs that nurture children's both actual and self-perceived skills within preschool education is warranted. The aim of the present study was to examine the effect of an 8-week psychomotor program on the motor proficiency (MP) and self-perceptions of preschool children. Twenty-nine children from Pallini, Greece, aged 3.5-5 years (Mean age=48.66 $\pm$ 6.043 months) volunteered to participate in the research. Participants were randomly assigned to the experimental (n_{EG}=14) and the control group (n_{CG}=15). The EG attended the psychomotor program, while the CG participated only in activities determined by the Greek kindergarten curriculum. Children's MP and self-perceptions were measured with the short form of the Bruininks-Oseretsky Test of Motor Proficiency – Second Edition (Bruininks & Bruininks, 2005); and the two subscales (physical competence; peer acceptance) of the Greek version (Makri-Botsari, 2001) of the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984), respectively. Data were analysed using 2(group) x 2(measures) analyses of variance (ANOVAs) with repeated measures on the second factor, while the Bonferroni test was used for post hoc analyses. The results revealed that in contrast to the CG, the EG improved significantly their MP between the two measurements ($p<.001$). However, neither of the two groups showed a significant improvement in their self- perceptions. It can be concluded that a period longer than eight weeks is needed in order for a psychomotor program to affect not only children's MP but also their self-perceptions.
Key words*:* early childhood, motor performance, self- concept, movement education

Introduction

Current literature in early childhood education emphasizes the importance of motor skill development towards children's lifetime participation in sport and physical activity (Certain & Kahn, 2002; Stodden et al., 2008; Venetsanou, Kambas & Giannakidou, 2015). Research carried in this field suggests that as children gain confidence in performing fine and gross motor skills and build a sufficiently diverse motor repertoire, they acquire a high level of motor proficiency (MP) that is positively associated with the quality of their psychomotor and cognitive health (Chaddock-Heyman et al., 2013; Gallahue & Donnely, 2003; Tomporowski, Davis, Miller & Niglieri, 2008; Zimmer, Christoforidis, Xanthi, Aggeloussis, & Kambas, 2008) and the formulation of robust personality traits (Il-Myeong, Sung-Jin, Woong-Soo, & Hong-Joong, 2013).

Nowadays there is evidence supporting the view that young children's movement experiences are important stepping stones not only for the development of their body awareness but also for the promotion of their self-image and perceptions (Ekeland, Heian & Hagen, 2005; Liu, Wu & Ming, 2015). Moreover, self-perceptions are determinant aspects of children's socio-cognitive and affective behavior; thus, their development within early childhood programs should be given great attention (Marsh, Craven & Debus, 1991).

Research has shown that children's participation in movement programs that are designed to promote various aspects of their fitness (Schmidt, Valkanover, Roebers & Conzelmann, 2013; Mayorga-Vega, Viciana, Cocca & De Rueda Villén, 2012) or motor abilities (Emmanouel, Zervas & Vagenas, 1992; Lobo & Winsler, 2006) is tied with significant changes and progress not only in their health but also in their self-image and social abilities. This progress seems to be further enhanced when game-like activities and elements of pretend- and drama-play are integrated in training programs (Landazabal, 1999; Spanaki, Skordilis & Venetsanou, 2010).

Among other movement programs, psychomotor ones are widely recognized as appropriate contexts for promoting young children's motor and socio-affective skills (Zimmer, 2006). Focusing on the psychological, affective and cognitive dimension of movement, the pedagogical approach of Psychomotor Education uses developmentally appropriate and individualized teaching methods to enhance the development of children's motor skills (Gallahue & Ozmun, 1998; Kiphard, 1994) and body awareness (Sherborne, 1990). According to

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Lorenz and Stein (1988), the emphasis of psychomotor training programs is given on principles like appropriateness of exercise protocol, program suppleness, self-determination and the use of previous experience, decision right and independence of action. These principles hold a strong impact on children's holistic development and ensure the improvement of their self-confidence and self-esteem (Zimmer, 2006). The benefits claimed for Psychomotor Education have been established by the results of intervention studies that have associated participation in psychomotor programs with improvements both in the MP (Kambas, Amoutzas, Makri, Gourgoulis & Antoniou, 2002; Campos et al., 2008; Spanaki et al., 2010; Zimmer et al., 2008) and self-perceptions (Ponce, Fernández, & Hernández, 2011) of young children belonging in typical populations, as well as with improvement in the motor abilities (Il-Myeong et al., 2013; Kouli et al., 2010) and affective ones (Spanaki, 2014; Spanaki, Skordilis & Lambropoulou, 2015) in special children populations. In Greece, even though the pedagogical value and practical relevance of Psychomotor Education have been increasingly recognized, the integration of psychomotor programs within the kindergarten curriculum is still limited, while there is a lack of studies that examine the effects of such programs on the MP and self-perceptions of preschoolers.

Therefore, the aim of the present study was to examine the impact of an 8-week psychomotor program on the MP and self-perceptions of Greek preschool children, assuming that the positive effects of such a program would further substantiate the need for the inclusion of Psychomotor Education as a fundamental aspect of early childhood education.

Material & methods

Participants

Thirty children (16 boys and 14 girls), aged 3.5-5 years (M= 48.66 months, SD= 6.04), participated in the study. All of them lived in Pallini, Attica, Greece, and were enrolled in a public kindergarten for the 2015-2016 school year. For the purposes of the study, participants were randomly divided into experimental (EG) (n=15) and control group (CG) (n=15). During the period of the research, children of the EG attended the psychomotor program, while children in the CG participated only in activities determined by the school curriculum.

From the above sample, one girl of the EG missed many lessons of the intervention program, due to health problems, and her data was excluded from the statistical analyses. Consequently, the final sample size was reduced to 29 participants (16 boys and 13 girls), aged between 3.5-5 years.

Motor Proficiency Measures

For the measurement of participants' MP, the short version of the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2 SF) (Bruininks & Bruininks, 2005) was utilized. The BOT-2 is designed to determine the level of MP in children and youth and detects potential deficits in their fine and gross motor skill performance (Bruininks et al., 2005).

The BOT-2 SF includes the following 14 items drawn from the 53 items of the BOT long form: drawing a line on a zig-zag path; folding a paper; copying a square; copying a star; transferring pennies; dropping and catching a ball; dribbling a ball; jumping in place; tapping feet and fingers; walking forward on a line; standing on a balance beam; one leg stationary hop; knee push-ups; sit-ups. The administration of the BOT-2 SF from expert users takes approximately 20-30 minutes.

A child's performance on the BOT-2 SF is recorded in raw scores (i.e. the number of seconds taken to complete a task, the number of dots made, etc.) which afterwards are converted into a numerical point score that compiles the total battery composite. The BOT-2 SF manual provides normative data according to children's age so that composite scores can be expressed in the form of percentile rank, z-score, T-score and age equivalent. In the present study, the total BOT-2 SF point score (battery composite) was used as an index of children's MP.

The psychometric properties of the battery are sufficiently supported (Bruininks et al., 2005; Lucas et al., 2013; Wuang & Su, 2009), while research findings support both the test – retest reliability (Mitsios, Voukias & Venetsanou, 2016) and the construct validity (Voukias, Zavolas, Mitsios, & Venetsanou, 2015; Voukias, Zavolas, Voukia, Venetsanou, & Karaiskos, 2014) of the BOT-2 SF in Greek population.

Self-Perception Measures

The Greek version (Makri-Botsari, 2001) of the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PSPCSA) (Harter et al., 1984) was used for the assessment of all participants' self-perceptions. The PSPCSA is used to measure self-perceptions both in typical young populations (De Koeyer, 2001; Hurmeric, 2010; Mantzicopoulos, 2006; Robinson, 2011; Spessato, Gabbard, Robinson, & Valentini, 2013) and in special ones (Campos, Ferreira, Gaspar, & Gorla, 2011; Campos, Fonseca, & Ferreira, 2006; Hertsberg, 2012; Scholtes, Vermeer & Meek, 2002),while the Greek version of the instrument has so far been used in several research projects (Bournelli, Makri, & Mylonas, 2009; Gounari, 2014; Katifori, 2003; Savala, 2002; Zavos, 2009).

The Greek version of the PSPCSA is a 20-item instrument that is designed to assess self-perceptions of children aged between 3-7 years and is made up of four subscales: cognitive competence, physical competence, peer acceptance, and maternal acceptance, with five items each. In the present study, the physical competence and peer acceptance subscales were used. The responses of the examinee in each item are recorded on a four-

point scale, ranging from one to four, with four denoting the highest degree of perceived acceptance or competence. The mean of all items on each subscale is computed to represent the average level of perceived competence within each domain, while the sum of all subscales (total score) can be computed to represent the global perceived competence across all domains. In the present study, mean scores of the physical competence and peer acceptance subscales were used.

Procedure

Pre-and-post measurements with the BOT-2 SF and the PSPCSA were administered in February 2016 and April 2016 respectively, with the pre- measurement taking place before the start of the psychomotor program and the post one immediately after its end. All measurements were conducted indoors, in the kindergarten, within the limits of the school timetable. Each child was tested individually by the first two authors, who were expertly trained to use both measurement instruments. Written parental consent and basic demographic information was obtained before children's participation in the study.

Exercise Program

Taking in mind preschool developmental characteristics, the design and the implementation of the present psychomotor intervention was based on the pedagogical approach of Psychomotor Education, and the basic principles of the Orff-Schulwerk method of rhythmic education. Particularly, all program activities were designed to meet preschoolers' short-duration attention spans and gave them multiple opportunities to interact positively with their teacher and classmates (Zimmer, 2006). Rhythmic movement training (e.g., clapping and stamping to the beat, moving in response to musical accompaniment, etc.) was used for the development of rhythmic awareness, while pretend and drama play were used as age-appropriate teaching contexts for the development of coordination and socio-affective skills (Bergen, 2001; Gallahue et al., 2003). Non-competitive team games were included in each lesson with a focus on group work, individual creativity and voluntary participation (Zimmer, 2006).

The program was applied for an 8-week period, twice a week (from February 2016 to April 2016) and each lesson lasted 40 minutes.

Data analysis

Data were analyzed with 2(group) x 2(measures) analyses of variance (ANOVAs) with repeated measures on the second factor. Total BOT-2 SF score, PSPCSA physical competence subscale score and PSPCSA peer acceptance subscale score, were set as dependent variables. The Bonferroni test was used for post hoc analyses, while the alpha level was set at .05.

Results

Means and standard deviations for the pre and post-test scores of both groups' MP and self-perceptions are depicted in Table 1.

Table 1. Means and Standard Deviations for BOT-2 SF Total Scores and Self Perceptions by Measurement and Group

Group	Pre Measurement		Post Measurement	
	MP	Self-Perceptions	MP	Self-Perceptions
	M± SD	M± SD	M± SD	M± SD
Control	26.20 ± 9.77	2.83± 0.65	27.47 ± 10.42	2.97± 0.67
Experimental	22.71 ± 8.96	2.53± 0.57	28.21 ± 9.92	2.84± 0.64
Total	24.52 ± 9.39	2.68± 0.62	27.83 ± 10.00	2.91± 0.65

Concerning MP, ANOVA revealed that both the effect of "group" by "measure" interaction and the main effect of "measure" were statistically significant ($F_{1,27}$= 4.732, p = .039, η^2= .149 and $F_{1,27}$= 12.091, p= .002, η^2= .309, respectively), while the main effect of the factor "group" was no statistically significant ($F_{1,27}$= 0.15, p= .69). Specifically, the EG showed a statistically significant improvement between the two measurements (Mean Difference = 5.5, p=.001), while the CG did not (Mean Difference= 1.2, p= .357) (Figure 1).

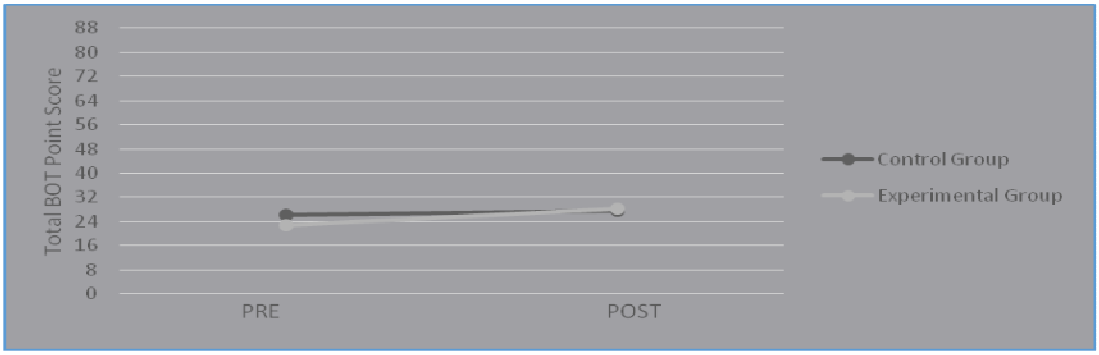

Figure 1. Total BOT Score of Experimental and Control Group in Pre and Post Measurements

With reference to children's self-perceptions, neither the interaction between the two factors or their main effects were significant. Regarding physical competence there was no statistically significant effect of the "group" by "measure" interaction ($F_{1,27}$= .58, p = .45), neither main effects of the aforementioned factors ($F_{1,27}$= 1.06, p = .31 and $F_{1,27}$= 4.35, p = .052, for "group" and "measure", respectively). Similar were the results for peer's acceptance ($F_{1,27}$= .001, p = .95 for the "group" by "measure" interaction, ($F_{1,27}$= 2.47, p = .13 for "group" main effect, and $F_{1,27}$= 0,76, p = .78 for "measure" main effect).

Discussion

The aim of the present study was to examine the effect of a psychomotor program on the MP and the self-perceptions of preschool children. Pre-and-post standardized measurements were administered to all participants, in order to determine whether the indices of MP and self-perceptions in the EG would be better than those of the CG, as a result of the program.

Regarding MP, it was revealed that the EG showed a statistically significant improvement in the post test, while the CG did not. This was a welcome finding, since at the beginning of the program the EG had lower MP scores compared to those of the CG. It seems that the present psychomotor program, even though having been applied only for a two-month period, brought positive changes to the MP of the EG. Similar findings are reported in relevant research projects that studied the impact of psychomotor programs on young children's fine and gross motor performance (Kambas et al., 2002; Ponce et al., 2011; Ruploh, Martzy, Bischoff, Matschulat, & Zimmer, 2013; Zimmer et al., 2008). Relative research has also proved that the use of psychomotor activities during early childhood lays the foundation for the development of MP not only in children of the typical population but also in children of poor socio-economic status (Campos et al., 2008); developmental disorders (Il-Myeong et al., 2013); low level of motor abilities (Spanaki et al., 2010) and cultural differences (Kouli et al., 2010).

A major conclusion drawn from the aforementioned studies is that the improvement of MP in preschool children depends on many personal and contextual factors (i.e. children's individual characteristics, type of the learning environment, relationship with the teacher), and therefore long time periods should be invested during the implementation of psychomotor programs in order for children to develop their fundamental motor skills and broaden their movement repertoire (Goodway, Rudisill & Valentini , 2002). This assertion is further confirmed by the present results. Although the EG presented a statistically significant improvement in their MP, they did not manage to surpass the CG at the post measurement, adding that a two-month period is a relatively short time period for great changes to occur in children's motor development.

As far as children's self-perceptions are concerned, our results showed that CG's scores were somehow stable between the two measurements, while in the EG, although there was an improvement, it was not statistically significant. The results of previous studies that have examined the changes in young children's self-perceptions and socio-affective skills after the implementation of psychomotor programs (Landazabal, 1999; Peens, Pienaar & Nienaber, 2008; Ponce et al., 2011; Shafir, Angulo-Barroso, Calatroni, Jimenez & Lozoff, 2006; Ruploh et al., 2013); physical education curricula (Ekeland et al., 2005; Emmanouel et al., 1992; Liu et al., 2015; Schmidt et al., 2013; Mayorga-Vega et al., 2012) and dance training programs (Lobo et al, 2006), confirm that statistically significant changes can occur in children's affective skills and attitudes, provided that pedagogically appropriate approaches, as the one of the present study, are used in practice. Once again, the most significant difference between the aforementioned studies and our study was the length of the intervention. Given the fact that in all previous studies the program duration was longer than two months, it seems that two months were not enough in order for statistically significant changes in children's self-perceptions to occur.

However, the above does not cancel the pedagogical validity and the in-depth preparation of our program's instructional design. Focusing on children's holistic development, the present psychomotor program was designed purposefully to support children's affective stance in relation to their engagement in movement activities that they perceived fun and intrinsically engaging. Far from competitive team games and low interest fitness training activities, the present psychomotor program was designed to challenge preschoolers' skills and abilities while taking into account their personal learning styles. Within an inclusive environment of opinion sharing and initiative empowerment, children were encouraged to generate alternative ideas and seek for movement solutions in order to solve divergent problems that occurred within play scenarios. Throughout this process, children in the EG had the opportunity to experience what it means to care for their needs while respecting the needs of others and how important it is to share, create and cooperate in order to achieve common purposes. According to Gallahue, Ozmun and Goodway (2012), the former levels of understanding are critical for young learners' positive social integration and personality development; thus, their integration within preschool curricula should be handled with great attention.

The small sample size of the present research is a limitation that should be taken into account when interpreting its findings that cannot be generalized before that psychomotor program is implemented in larger samples, across different populations and for longer time periods. Psychomotor Education can help young children to acquire a solid psychomotor base that will later allow them to climb up the mountain of motor and social development and achieve context specific skills and abilities (Clark & Metcalfe, 2002; Eccles & Wigfield,

2002; Harter & Connell, 1984). All children deserve equal opportunities to develop their self-effectiveness and social responsibility, while learning through and about movement. Considering that a child's perceptions of competence will influence the degree to which he/she will maintain engagement in a given task, it is important for preschool education specialists to acknowledge that no child will be willing to invest time and effort in an activity for which he/she is preoccupied with concerns of failure. Stimulating and active learning environments that can nurture all aspects of students' learning are needed. The creation of such environments will assist children to develop their actual and perceived psychomotor skills, while educating them to become efficient movers and emotionally balanced citizens.

Conclusion

This study confirmed that the implementation of psychomotor programs within preschool curricula, creates the circumstances for children's development, both in the motor and in the socio-affective domain. However, significant changes can only arise when the duration of the intervention is longer than two months, so that there is enough time for all the necessary psychomotor adjustments to occur smoothly and effortlessly.

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