Bulletin of the *Transilvania* University of Braşov
Series IX: Sciences of Human Kinetics • Vol. 19(68) No. 1 – 2026
https://doi.org/10.31926/but.shk.2026.19.68.1.6

MOBAK-KG-BASED ASSESSMENT OF THE EFFECTS OF MOVEMENT GAMES ON GROSS MOTOR SKILLS IN PRESCHOOL CHILDREN

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Abstract: *The aim of this study was to assess, using the MOBAK-KG test, the effects of a movement games-based programme on gross motor skills in preschool children. The research was conducted on two groups of children aged 5–6 years: an experimental group and a control group, each consisting of 20 participants. The experimental group followed an 18-lesson programme based on movement games, while the control group carried out the usual activities included in the preschool curriculum. Assessment was performed before and after the intervention using the MOBAK-KG test. The results showed significant differences between the two groups in terms of recorded progress. The conclusions support the use of movement games as a methodological means for developing gross motor skills at preschool age.*

Key words: *gross motor skills, movement games, preschool children, MOBAK-KG, motor competencies.*

1. Introduction

The preschool period represents an essential stage in children's motor, cognitive, and socio-affective development, as an important part of active behaviours and basic motor skills is structured during this interval [6], [11]. The World Health Organization emphasizes that the early years of life are a period of rapid physical and cognitive development, during which habits related to lifestyle and physical activity are formed [21]. In this context, physical education in preschool should not be regarded merely as a recreational activity, but as a formative component that contributes to children's harmonious development and creates the premises for active participation in physical activities during later stages of schooling [17], [19].

Gross motor skills include movements that engage large muscle groups and involve fundamental motor actions such as running, jumping, throwing, catching, balancing, rolling, or moving in different forms [1], [6]. These actions provide the foundation for children's participation in games, educational activities, and movement-based social contexts.

In the literature, fundamental motor skills are commonly associated with the

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concept of motor competence, understood as a set of abilities that enables children to respond effectively to motor demands across different contexts. The model proposed by Stodden et al. (2008) highlights the role of motor competence in supporting participation in physical activity, in relation to perceived competence, physical fitness level, and health indicators [19]. In the same direction, Robinson et al. (2015) emphasize that the development of motor competence may contribute to positive trajectories of health and physical participation throughout childhood [17].

Recent studies show that the level of basic motor competencies is related to social integration, health-related quality of life, physical fitness level, and children's participation in physical activities during different segments of the school day [2], [11], [12], [14]. Thus, the development of motor skills should be analysed in relation to the concrete movement opportunities provided by the educational environment. Moreover, the international literature supports the view that fundamental motor skills facilitate children's involvement in physical activities and contribute to their holistic development. [1], [17], [19].

At preschool age, movement games represent one of the most appropriate means of stimulating gross motor skills, as they respond to children's natural need for movement, curiosity, and desire to explore the environment through action [5], [6]. From a methodological perspective, play allows motor tasks to be integrated into an attractive, motivating framework adapted to age-specific characteristics. At the same time, movement games can support the development of attention, cooperation, rule-following, and confidence in one's own abilities [3-5], [15]. Due to their playful and adaptable nature, movement games can become an effective means of educational intervention in kindergarten. Recent research confirms that structured physical activity interventions, especially those aimed at developing fundamental motor skills, have favourable effects on motor competence in young children [9], [13], [16].

An important issue in physical education at preschool age is the objective assessment of children's motor level. In this regard, the MOBAK-KG test represents a relevant instrument for assessing basic motor competencies in children aged 4–6 years [7], [8]. It includes two main areas: object movement, assessed through tasks such as throwing, catching, bouncing and catching a ball, and dribbling; and self-movement, assessed through tasks such as balancing, rolling, jumping, and running. The instrument allows for a standardized, economical, and applicable assessment in educational contexts, providing useful information both for identifying the initial level of motor competencies and for monitoring progress following interventions [7], [8].

In addition, recent research shows increasing interest in assessing basic motor competencies in young children, including cross-sectional and longitudinal studies examining the relationship between motor competence, physical fitness, and executive functions in preschoolers [11], [12].

Although the specialized literature highlights the importance of fundamental motor skills and the role of structured interventions in their development, further applied studies are still needed to analyse the effects of movement games-based programmes in specific educational

contexts. In this regard, the use of the MOBAK-KG test may contribute to a more objective assessment of results and to the identification of children's progress following participation in an intervention programme.

Starting from these considerations, the aim of the present study was to assess, using the MOBAK-KG test, the effects of a movement games-based programme on gross motor skills in preschool children aged 5–6 years.

To achieve the proposed aim, the following specific objectives were established:

1. to identify the initial level of basic motor competencies in the preschool children included in the research, by applying the MOBAK-KG test;
2. to design and implement a movement games programme aimed at stimulating gross motor skills in children aged 5–6 years;
3. to analyse the motor progress recorded by the children in the experimental group after completing the intervention programme;
4. to compare the evolution of the experimental group with that of the control group, in order to highlight the effects of the movement games-based programme.

Research Hypothesis

It was hypothesized that the implementation of a structured programme based on movement games would lead to improvements in gross motor skills among preschool children aged 5–6 years, as assessed by the MOBAK-KG test. This hypothesis is grounded in previous research showing that interventions aimed at developing fundamental motor skills can contribute to increased motor competence and facilitate children's participation in various physical activities [9], [13], [16].

2. Materials and Methods

2.1. Participants and Research Context

The research had a longitudinal experimental design and was conducted between October 2024 and June 2025 in Brașov, at Kindergarten No. 31. The study included children from the senior preschool group, aged between 5 and 6 years, organized into two samples: an experimental group and a control group. Each group consisted of 20 children. The experimental group included 10 girls and 10 boys, while the control group included 9 girls and 11 boys. The research was carried out after obtaining access approval from the educational institution, and, in order to protect data confidentiality, the participants were coded.

The experimental group completed a movement games-based intervention programme, carried out within the physical education and sports activities included in the preschool curriculum. The control group carried out the usual activities according to the preschool curriculum, without the inclusion of the specific intervention programme proposed in the research.

2.2. Instruments and Analysed Variables

The MOBAK-KG test was used to assess the children's motor level, as it is designed to evaluate basic motor competencies in preschool children. The instrument enables the assessment of motor competencies through specific tasks grouped into two main dimensions: object movement and self-movement [7]. In the present research, the test consisted of eight motor tasks. The structure of the tasks used, the number of repetitions, and the general scoring procedure are presented in Table 1.

Structure of the MOBAK-KG Tasks Used in the Research Table 1

Assessed dimension	MOBAK-KG tasks	Number of repetitions	Score
Object movement	Throwing	6	0–2 points
	Catching	6	0–2 points
	Bouncing and catching the ball	2	0–2 points
	Dribbling	2	0–2 points
Self-movement	Balancing	2	0–2 points
	Rolling	2	0–2 points
	Jumping	2	0–2 points
	Running	2	0–2 points

The score for each task was awarded on a scale from 0 to 2 points. For the tasks with six repetitions, namely throwing and catching, the score was established as follows: 0–2 successful attempts = 0 points, 3–4 successful attempts = 1 point, and 5–6 successful attempts = 2 points. For the other tasks, assessed on the basis of two attempts, the scoring was as follows: 0 successful attempts = 0 points, 1 successful attempt = 1 point, and 2 successful attempts = 2 points.

The total score for each participant was calculated by summing the results obtained in the eight tasks. Thus, the maximum possible score for one child was 16 points, while the maximum possible score for each group, consisting of 20 children, was 320 points. This assessment system allowed the comparison of the results obtained by the experimental group and the control group, both at the initial and final assessments.

The independent variable of the research was represented by the movement games-based intervention programme applied to the experimental group. The dependent variable was represented by the level of gross motor skills, operationalized through the scores obtained by the children in the MOBAK-KG test.

2.3. Research Procedure

The motor assessment was carried out at two distinct moments. The initial assessment took place between 28 and 29 November 2024 and consisted of administering the eight MOBAK-KG tasks to both groups of participants. After the initial assessment, the experimental group followed the movement games-based intervention programme, while the control group carried out the usual activities included in the preschool curriculum. The final assessment was conducted on 2 June 2025, after the completion of the intervention programme applied to the experimental group.

For each task, the children performed the attempts required by the structure of the test. The tasks were administered under similar conditions for both groups, following the same sequence of tasks and the same scoring criteria. The data obtained were centralized separately for the experimental group and the control group, both at the initial and final assessments. This procedure allowed the comparison of each group's evolution and the identification of the differences occurring between the two assessment moments.

2.4. Intervention Programme

The intervention programme applied to the experimental group consisted of 18 lessons

based on movement games, aimed at developing gross motor skills in preschool children. It was integrated into the physical education and sports activities included in the curriculum and targeted the stimulation of the main motor skills involved in the MOBAK-KG test: throwing, catching, bouncing and catching the ball, dribbling, balancing, rolling, jumping, and running.

The activities were organized as games adapted to the age of 5–6 years, with an emphasis on children's active involvement, rule-following, cooperation, and maintaining the playful character of the tasks. Examples of games included in the programme involved various forms of movement, forward and backward running, changes of direction, obstacle avoidance, balance tasks, throwing and catching games, as well as coordination and spatial orientation tasks. The selection of games aimed at the progressive practice of the skills assessed through MOBAK-KG, so that the motor tasks would be accessible, attractive, and appropriate to the children's developmental level.

Through its content, the programme aimed not only to practise isolated motor skills, but also to integrate them into playful contexts, close to the natural way in which preschool children learn. In this way, the intervention combined motor objectives with the educational dimension of play, promoting active participation, cooperation, and children's adaptation to varied rules and motor tasks.

2.5. Data Analysis

The data obtained from the initial and final assessments were centralized and analysed both descriptively and inferentially. For each group, the arithmetic mean, standard deviation, minimum and maximum values, as well as the total scores and corresponding percentages relative to the maximum possible score, were calculated. The descriptive analysis allowed the identification of the initial and final levels of basic motor competencies, as well as the differences in evolution recorded between the two assessment moments.

To verify the initial comparability of the two groups, the scores obtained at the initial assessment by the experimental group and the control group were analysed. The evolution of each group was examined by comparing the results obtained at the initial and final assessments. In this regard, a progress score was calculated for each participant as the difference between the final score and the initial score.

For the analysis of intra-group differences, namely between the initial and final assessments within the same group, the paired-samples Student's t-test was used. For the analysis of inter-group differences, namely the comparison of the progress recorded by the experimental group and the control group, the independent-samples Student's t-test was used. When the dispersion of the results was unequal, the Welch version of the t-test was used for interpretation.

The threshold for statistical significance was set at $p < 0.05$. To assess the practical relevance of the differences obtained, effect size was calculated using Cohen's d coefficient. The interpretation of the results was performed by relating statistical significance to the differences in progress observed between the two groups.

3. Results

The results obtained in the MOBAK-KG test were analysed comparatively for the two groups, both at the initial and final assessments. The maximum possible score

for each participant was 16 points, while the maximum possible score for each group was 320 points.

At the initial assessment, the two groups recorded similar values. The experimental group obtained a total of 77 points, representing 24.06% of the maximum possible score, while the control group obtained 76 points, representing 23.75%. At the final assessment, the experimental group accumulated 236 points, representing 73.75% of the maximum possible score, whereas the control group accumulated 149 points, representing 46.56%. The differences between the initial and final assessments are summarized in Table 2.

Results Obtained by the Two Groups at the Initial and Final Assessments Table 2

Group	Initial assessment	Initial percentage	Final assessment	Final percentage	Difference
Experimental group	77 points	24.06%	236 points	73.75%	+159 points
Control group	76 points	23.75%	149 points	46.56%	+73 points

For a more detailed analysis, the results were processed at the level of individual mean scores. Thus, the arithmetic mean, standard deviation, and mean progress were calculated for each group, as presented in Table 3.

The descriptive data indicate similar initial values between the two groups, followed by more evident differences at the final assessment and in terms of mean progress.

To observe the distribution of progress according to the two dimensions of the MOBAK-KG test, the results were analysed separately for object movement and self-movement. The values obtained are presented in Table 4. The results by dimension show that score evolution was present in both object movement and self-movement, with greater differences observed in the experimental group.

Descriptive Values of the Results Obtained in the MOBAK-KG Test Table 3

Group	Initial assessment M ± SD	Final assessment M ± SD	Progress M ± SD
Experimental group	3.85 ± 2.25	11.80 ± 2.12	7.95 ± 1.79
Control group	3.80 ± 1.54	7.45 ± 1.82	3.65 ± 2.01

Evolution of Results According to the Dimensions of the MOBAK-KG Test Table 4

Group	Object movement – initial	Object movement – final	Difference	Self-movement – initial	Self-movement – final	Difference
Experimental group	28	110	+82	49	126	+77
Control group	29	76	+47	47	73	+26

To verify the statistical significance of the differences between the initial and final assessments, as well as to compare the progress recorded by the two groups, inferential statistical tests were applied. The results are presented in Table 5.

Statistical Analysis of the Results Obtained in the MOBAK-KG Test Table 5

Analysis performed	Analysed value	Statistical test	p	Cohen's d
Experimental group: final vs. initial assessment	mean progress = 7.95	t(19) = 19.85	<0.001	4.44
Control group: final vs. initial assessment	mean progress = 3.65	t(19) = 8.13	<0.001	1.82
Comparison of progress: experimental vs. control group	mean difference = 4.30	t(37.52) = 7.15	<0.001	2.26

The statistical analysis showed significant differences between the initial and final assessments in both groups. In addition, the comparison of progress scores indicated a significant difference between the experimental group and the control group, $t(37.52) = 7.15$, $p < 0.001$. The effect size, expressed by Cohen's $d = 2.26$, indicates a large-magnitude difference between the two groups regarding the progress recorded in the MOBAK-KG test.

Overall, the results indicate a positive evolution of MOBAK-KG scores between the initial and final assessments, with relevant differences between the two groups both in the total score and in the two dimensions analysed.

4. Discussion

The results obtained indicate that the movement games-based programme was associated with improvements in MOBAK-KG scores among the preschool children included in the experimental group. At the initial assessment, the two groups presented similar values, indicating a comparable level of basic motor competencies before the intervention was applied. At the final assessment, the differences between the two groups became more evident, both in terms of the total score and the mean progress score.

This result suggests that movement games, when organized systematically and oriented towards clear motor objectives, can contribute to the development of gross motor skills in children aged 5–6 years. The playful character of the activities seems to have facilitated children's involvement in motor tasks, transforming the practice of skills such as running, jumping, balancing, rolling, throwing, or catching into an attractive activity adapted to age-specific characteristics. In this sense, the results support the idea that, at preschool age, movement games have not only recreational value, but also formative value, representing an effective means of stimulating basic motor competencies.

The differences observed between the initial and final assessments are consistent with research on interventions aimed at developing fundamental motor skills. Previous studies show that structured, planned, and age-appropriate interventions can have favourable effects on motor competence in young children, especially when they include varied and progressively organized tasks [9], [10], [13], [16], [20].

The results of the present study are also close to those reported in intervention studies conducted in early educational contexts, which showed improvements in motor competence following the implementation of structured physical activity programmes [13], [18]. In relation to these findings, movement games may be considered an accessible form of motor intervention in kindergarten.

In the present study, this approach was applied through an 18-lesson programme based on movement games, in which the tasks targeted both object movement and self-movement. The analysis of the MOBAK-KG dimensions showed that the evolution of the scores was present in both assessed components. In the experimental group, the increase was visible both for object movement and for self-movement, indicating a relatively balanced development of the targeted motor competencies. This aspect is important because gross motor skills are not limited to a single category of actions, but involve the integration of several forms of body control and motor coordination. Therefore, an effective programme for preschool children should include varied tasks that require both body movement and object manipulation.

The results are also relevant from the perspective of using the MOBAK-KG test as an assessment instrument. Unlike a general or observational appraisal of motor behaviour, MOBAK-KG allows the quantification of basic motor competencies through specific tasks and a standardized scoring system. In this study, the use of the test made it possible not only to identify the children's initial level, but also to monitor their progress after completing the intervention programme. This approach is consistent with studies supporting the use of MOBAK-KG for assessing basic motor competencies in educational contexts [7], [8].

Another aspect worth emphasizing is that the development of basic motor competencies has broader implications than performance in isolated motor tasks. The literature shows that fundamental motor skills are associated with children's participation in physical activities, social integration, physical fitness level, and indicators of health and quality of life [2], [14], [17], [19]. From this perspective, stimulating gross motor skills in kindergarten may contribute to creating favourable premises for children's later involvement in physical and sports activities.

The results obtained should nevertheless be interpreted with caution. The study was conducted on a relatively small sample, consisting of 40 children from a single preschool institution. In addition, the intervention was analysed over the course of one school year, without a follow-up assessment to show whether the progress is maintained over time. Another limitation is related to the fact that the analysis focused mainly on total scores and on the two MOBAK-KG dimensions, without a detailed exploration of progress for each individual motor task.

Despite these limitations, the study provides an applied contribution through the use of a standardized assessment instrument and the integration of movement games into a programme aimed at developing gross motor skills at preschool age. By combining a playful intervention with objective assessment through MOBAK-KG, the research offers a methodological model that can be used in kindergarten physical education activities.

5. Conclusions and Recommendations

The results of the study support the value of movement games as an effective educational means for stimulating gross motor skills in preschool children. Their integration into a structured programme, adapted to age-specific characteristics, allowed the practice of various motor skills in an attractive and accessible framework for children aged 5–6 years.

The use of the MOBAK-KG test provided the possibility of an objective assessment of

basic motor competencies, both at the global level and across the two analysed dimensions: object movement and self-movement. By applying this instrument, the children's progress could be monitored in a clear and comparable manner between the two assessment moments.

From an applied perspective, the study highlights the importance of systematically designing motor activities in kindergarten. Movement games should not be used only as recreational activities, but also as methodological means through which basic motor competencies, motor autonomy, cooperation, and children's readiness for active participation in physical activities can be developed.

The constant inclusion of movement games in preschool physical education activities is recommended, with an emphasis on diversifying motor tasks, adapting the difficulty level to the children's abilities, and periodically using age-appropriate assessment instruments, such as MOBAK-KG.

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