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From games to grit: Examining the impact of structured play activities on persistence development in early childhood settings

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Abstract

Introduction: *Persistence is recognized as a foundational skill for success in life, contributing significantly to the formation of a growth mindset in early childhood, enabling preschoolers to overcome obstacles and complete tasks. The current research is justified by an observed deficit in motivation and persistence among current young generations, who often tend to give up at the first obstacle or failure, and by a gap in applied studies within the Romanian context. The study's primary objective was to investigate how persistence, defined as the ability to maintain effort in the face of difficulties, can be developed in preschoolers through an intervention program based on interactive activities and board games.*

Methods: *The research utilized an experimental design involving two groups of large-group preschoolers (aged 4 to 5). The experimental group participated in a nine-week intervention program consisting of 13 structured activities, including seven board games and five different interactive activities. Persistence was evaluated using the Dimensions of Mastery Questionnaire (DMQ), tracking five specific subdomains: cognitive persistence, motor persistence, social persistence (with adults and children), and mastery enjoyment.*

Results *demonstrated that the intervention significantly improved total persistence in the experimental group when compared to both the pretest phase and the control group. Statistically significant increases were observed, particularly in cognitive persistence, motor persistence, and enjoyment of mastering new skills. The post-intervention differences between the experimental and control groups became even more pronounced and statistically significant for all subscales, sustaining the program's effectiveness. However, the study found no statistically significant influence based on gender or the quality of the relationship with the educator on persistence development.*

Conclusions: *These findings validate the effectiveness of game-based methods in early education, suggesting that integrating educational games that require patience, concentration, and task completion is a developmental capacity that supports success later in*

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life. The study underscores the role of parents and teachers in providing adequate support and showing children that constant effort is more valuable than immediate success. Future research should address methodological limitations, such as pre-existing group differences and subjective evaluation, by conducting longitudinal studies and implementing external pretest/posttest evaluation.

Keywords: early education, persistence, interactive activities, board games, intervention programs.

Introduction

Persistence is an essential skill for success in life, and its development during early childhood significantly contributes to the formation of a growth mindset (Dweck, 2006). At the preschool age, children begin to explore the world through play, discovery, and social interactions. Persistence enables them to overcome obstacles, complete tasks, and strengthen their skills. A persistent child is more self-confident and less likely to become frustrated or give up when faced with difficulties (Fortin & Picard, 1999; Negură, 2023). This aspect is particularly important in the current context, where the rapid pace of change and the challenges of academic and social environments demand increased adaptability and resilience.

The importance of research in the field of early education and the development of personal competences is underlined by the need to cultivate persistence as an essential quality from early childhood, as it has a significant influence on a child's future success. Parents and educators have an essential role to play, as it is essential to provide adequate support, to encourage children to try again when they fail, and to show them that constant effort is more valuable than immediate success. Activities involving problem solving, building games, and creative projects also contribute to the development of this trait.

The current research is justified by a gap observed in the literature, especially the lack of applied studies in the Romanian context. It has also been found that current generations of young children show a certain deficit in maintaining desire and motivation (Jipa et al., 2023), tending to give up at the first obstacle or failure (Chaudhuri, 2020; Hatos, 2014; Twenge, 2009; Young et al., 2018). Therefore, this study aims to shed light on how persistence can be developed in preschoolers through the implementation of an intervention program based on interactive activities and table games. This type of approach allows for applied educational experiments to be carried out, contributing educational, psychological, and practical value in the field of early childhood education.

Theoretical Background

Persistence can be defined as the ability to maintain effort and motivation in the face of obstacles to achieve long-term goals (Duckworth, 2016). It is often associated with the concept of "grit," which combines sustained passion with endurance (Duckworth et al., 2007). Key characteristics of persistence include determination—the commitment to overcome obstacles—self-discipline—the ability to stay focused on goals—and

resilience—the capacity to recover from setbacks (Duckworth, 2016; Duckworth et al., 2007; Duckworth & Quinn, 2009).

Persistence is frequently confused with *perseverance*, though the two constructs are distinct (Duckworth et al., 2007). While both involve sustained effort, *perseverance* generally refers to continued effort on a specific task, often without broader motivational or self-regulatory components (Duckworth & Quinn, 2009). Persistence, in contrast, represents a more comprehensive, trait-like ability to maintain motivation and engagement across challenges and over time (Cloninger et al., 1993; Eisenberg et al., 2010). Cloninger et al. (1993) define persistence as *the capacity to keep striving toward a goal despite fatigue or frustration* and characterize it as a temperamental dimension that is independently heritable and manifests early in life. This trait-like quality is further supported by research showing that individual differences in children's self-regulation and effortful control demonstrate fairly stable patterns after the first year or two of life (Eisenberg et al., 2010; Rothbart & Bates, 2006).

The overlap between the terms in both popular and academic usage has contributed to this confusion, as both involve determination, resilience, and goal-directed behavior (Duckworth et al., 2007). Clarifying this distinction is essential, particularly in research on early childhood, where interventions aim to foster not only repeated effort on individual tasks but also the general capacity to sustain motivation across diverse challenges (Lunkenheimer et al., 2019; Montroy et al., 2016). Lunkenheimer et al. (2019) conceptualize task persistence as *the capacity to sustain effort towards a task-oriented goal over time* as an important aspect of self-regulation in early childhood, emphasizing its broader developmental significance beyond simple task completion.

In this study, the development of *persistence* in preschoolers was examined across five subdomains of personality (Morgan et al., 2020). *Cognitive persistence* refers to the ability to stay focused and solve intellectual tasks despite difficulties. *Motor persistence* measures determination during physical activities, even when fatigued or challenged. *Social persistence with adults* captures preschoolers' capacity to maintain interactions with adults in less comfortable situations, while *social persistence with peers* assesses engagement and persistence in peer relationships. *Mastery enjoyment* reflects children's satisfaction and pleasure in improving skills and achieving proficiency in specific tasks. Each of these forms of persistence contributes substantially to a child's academic and social development.

Research indicates that children with higher persistence demonstrate improved academic habits, such as planning and completing tasks, and are more likely to achieve long-term educational goals (Duckworth, 2016; Duckworth et al., 2007; Duckworth & Quinn, 2009). Persistence also supports the development of healthy interpersonal relationships, enabling children to navigate social challenges effectively (Furlong et al., 2014).

Several developmental theories provide a framework for understanding persistence. Erikson's psychosocial stages theory (Erikson, 1963; Maree, 2022) emphasizes early childhood, particularly ages three to six, as a critical period for cultivating persistence,

with exploration and experimentation—without fear of failure—supporting self-confidence. (Piaget, 2003)'s constructivist theory highlights the importance of hands-on experiences and problem-solving challenges in fostering persistence (Waite-Stupiansky, 2022). Consistent with this, structured games should encourage children to push cognitive boundaries. Vygotsky (2024)'s socio-cultural approach further suggests that these challenges are most effective when guided by knowledgeable adults or peers, expanding the Zone of Proximal Development (Bernard, 2024; Vygotsky, 2024). Dweck (2006)'s growth mindset framework underscores the role of educators in framing failure as a learning opportunity and emphasizing effort over outcomes (Clifton et al., 2025; Dweck, 2024).

Empirical studies support these theoretical insights. Haber et al. (2022) found that exposing 4- to 5-year-old children to storybooks about scientists, particularly stories emphasizing challenges and failures, effectively enhanced persistence, demonstrating the value of learning from setbacks. Oeri et al. (2020) examined the relationship between executive functions and persistence in kindergarteners, showing that children with stronger cognitive flexibility and inhibitory control persisted longer in difficult tasks, whereas those with weaker executive functions were more likely to abandon tasks or cheat. Morgan et al. (2020) assessed mastery motivation using the Dimensions of Mastery Questionnaire (DMQ) and found that children scored highest on learning satisfaction and motor persistence, but lower on social persistence with peers, highlighting the need for parental and teacher support.

Although board games and interactive activities may seem promising at first glance as a method for developing basic skills, research shows that their effectiveness in developing persistence is heterogeneous, with mixed effects reported depending on context, population, and implementation. For example, Rotem and Arnon (2019) found that persistence is positively associated with difficulty in game-based learning, with the most determined learners being highly persistent across topics. E. Barton et al. (2018) showed successful board game interventions for children with disabilities, while J. Leonard et al. (2021a) acknowledged the critical need for more research on persistence interventions. Persistence is a malleable attribute, particularly during childhood, and can be significantly enhanced through targeted educational interventions (Alan et al., 2019). However, the overall researchers' results are limited, with most studies showing small to moderate effects and calling for more rigorous investigation.

Despite these contributions, there remains a lack of applied research on persistence in the Romanian context, justifying the present study. The proposed intervention builds on prior evidence demonstrating the effectiveness of games and interactive activities in fostering persistence. Such activities help children manage failure, develop problem-solving strategies, practice patience, and enhance key social skills, including cooperation, rule-following, and emotional regulation. Therefore, the intervention was designed to cultivate persistence and social-emotional skills through structured, engaging, and developmentally appropriate activities.

Research Methodology:

The specific objectives of the study were to: (1) examine the effectiveness of the structured play intervention program in enhancing persistence, both overall and across its subdomains, in the experimental group following implementation; (2) compare persistence development between the experimental group, which participated in the interactive activities and board games program, and the control group, which did not receive the intervention; and (3) investigate the influence of individual factors, specifically gender and the quality of the child-educator relationship, on the development of persistence among preschoolers.

Hypotheses:

We hypothesized that the implementation of an intervention program based on interactive activities and table games would lead to an improvement in persistence in the experimental group in the posttest phase compared to the pretest phase (H1) and in the experimental group compared to the control group (H2).

Additionally, we hypothesized that persistence would vary according to individual characteristics, specifically gender, with differences expected between girls and boys (H3), and the quality of the relationship with educators, with higher persistence expected in children who have a positive relationship with their educators (H4).

Variables:

Table 1.
Summary of Hypotheses and Corresponding Variables

Hypothesis	Independent Variable (IV)	Dependent Variable (DV)	Comparison / Notes
H1	Implementation of intervention program (pretest vs. posttest)	Level of persistence	Within the experimental group over time
H2	Group type (experimental vs. control)	Level of persistence	Between-group comparison after intervention
H3	Gender (girls vs. boys)	Level of persistence	Between-gender comparison
H4	Relationship with educators (poor vs. good)	Level of persistence	Within the experimental group, based on the relationship quality

Sample of participants:

The study was conducted in the school year 2024/2025, from November through December. The experimental and control groups were two groups of rural, large-group

preschoolers. The children in the two groups ranged in age from 4 to 5 years, with an age difference between them of a maximum of 1 year.

Table2.
Characterization of the Experimental and Control Groups

Aspect	Experimental group	Control group
Location	Location A (Rural Preschool 1)	Location B (Rural Preschool 2)
No. children	23	27
Girls	16 (69.6%)	12 (44.4%)
Boys	7 (30.4%)	15 (55.6%)
Description	A large preschool group with a predominantly female gender composition, children who may respond differently to interventions due to gender composition, and a smaller number of participants.	A large preschool group with a predominance of boys; a larger group from the same institution but a different structure, which may influence the dynamics and outcomes of the study.

Description of the intervention program

Thirteen activities were applied to the experimental group over an approximate period of 2 months (9 weeks): November and December 2024. The intervention program consisted of interactive activities and table games, on different themes and topics, under different forms of organization and implementation, as part of language education activities.
The intervention comprised 13 activities, each lasting approximately 20–30 minutes. These included seven board game activities, five interactive activities, and one concluding session for feedback and reflections, which was finalized with awards for the children. In the following, we describe each activity individually as follows:

Table 3
Intervention Program Overview: Purposes, Objectives, and Resources

Nr.	Purpose	Main objectives	Brief description	Teaching materials
	Puzzles – varied.			
1	Develop patience and persistence	Stimulating logical thinking, spatial orientation, persistence	Children assemble wooden jigsaw puzzles, starting at an easy level, then harder, in teams, with mutual support	Wooden or cardboard puzzles, 5 difficulty levels
	Unstable tower.			
2	Fine motor development	Develop self-control, creativity, and persistence	Building a stable tower out of Jenga cubes, in teams, with restorations after collapse	Wooden cubes, Jenga game
	Discover the picture.			
3	Developing logical thinking, attention	Concentration, route anticipation, persistence	Joining dots on cards of increasing difficulty, with peer help	Dotted sheets, graphing pencils
	Rings on the post.			
4	Developing persistence	Force and direction control, rehearsal for performance	Throwing hoops on poles in teams with encouragement and friendly competition	Plastic poles, colored hoops, and small tables
	A glass of hot "milk."			
5	Stimulating teamwork	Socialization, empathy, persistence	Passing a glass of hot water in a semicircle, carefully and collaboratively	Paper cup, warm water, small table
	Sorting colored balls.			
6	Developing visual perception	Sorting balls by color, persistence	Moving balls into teams for color grouping, cooperation, and support between children	Tables, paper cups, colored balls
	Draw the other half.			
7	Developing creativity and flexible thinking	Imagination, persistence in correcting drawings	Completing drawings on worksheets, with explanations and individual support	Cards with half drawn, colored pencils and graphs
	Don't drop the ball.			
8	Increase general motor coordination	Eye-hand-foot-eye coordination, persistence	Walking the course with the ball on the paddle, in teams, resuming if dropped	Tennis balls, paddles, and string for trail
	Card memory.			
9	Developing attention and visual memory	Card position memorization, patience, concentration	Memory game with picture cards, in small groups, with peer support	Memory cards set
	Mime emotions.			
10	Developing expressiveness and empathy	Recognizing and expressing emotions, non-verbal communication, and persistence	Mime emotions one at a time, team guessing, encouragement, and final discussion	Drawn emotion cards

	Map of Romania.			
11	Developing patience and persistence	Creativity, patience in crumpling and gluing paper, dexterity	Crumpling crepe paper and pasting it on the map of Romania worksheet without a time limit	Glue, colored crepe paper, a map sheet, bowls
	Christmas tree.			
12	Developing the aesthetic-creative sense	Hand muscles, hand-eye coordination, creativity	Knitting with colored yarn on a perforated Christmas tree, with multiple attempts and remakes	Perforated wicker, colored mohair yarn
	Children's awards - a festive moment.			
13	Appreciation of hard work	Awareness, motivation, pride, fair play	Individual and collective feedback, awarding diplomas and sweet prizes, encouragement and applause	Diplomas, sweets, blue thread

Research methods and tools:

The main instrument employed was the "Dimensions of Mastery Questionnaire" (DMQ), adapted from Morgan et al. (2020), which is organized into seven subscales, each corresponding to five items on the observation grid. However, two subscales (Negative Reactions to Challenges and General Competence) fell outside the scope of this research and were therefore excluded from the analyses.

The study examined the development of persistence across five subdomains of child personality. *Cognitive persistence* was assessed by children's ability to stay focused and solve intellectual tasks despite difficulties. *Motor persistence* measured the determination shown during physical activities despite fatigue or obstacles. *Social persistence with adults* tracked preschoolers' capacity to maintain interactions and relationships with adults, even in less comfortable situations, while *social persistence with peers* evaluated their engagement and persistence in relationships with other children. Finally, *enjoyment of mastery* reflected children's satisfaction and pleasure as they improved their skills and became more proficient in specific tasks.

Data analysis procedure:

Hypothesis testing was conducted using independent samples and paired samples t-tests, respectively. To provide a more concrete analysis of persistence development, we examined it across multiple variables. Specifically, the first hypothesis evaluated persistence levels for the entire experimental group through pretest-posttest comparisons. The second hypothesis entailed separate analyses of both groups at the pretest and posttest phases. The third hypothesis investigated the influence of gender on preschoolers' persistence development, while the fourth hypothesis assessed the impact of teacher-student relationships on persistence outcomes.

Analysis and interpretation of results:

Hypothesis 1: The implementation of an intervention program based on interactive activities and table games will lead to improved persistence in the experimental group in the post-test phase.

Table 4

Descriptive Statistics and t-test for the Experimental Group (Pretest vs. Posttest)

Persistence Subscale	$M_{Pretest}$	$SD_{Pretest}$	$M_{Posttest}$	$SD_{Posttest}$	t	df	p
Total Persistence	3.696	0.622	4.056	0.613	-6.001	22	< .001
Cognitive Persistence	3.452	0.798	4.261	0.834	-8.714	22	< .001
Motor Persistence	4.096	0.657	4.33	0.676	-2.677	22	.014
Social Persistence with Adults	3.357	0.615	3.409	0.665	-0.646	22	0.525
Social Persistence with Children	3.557	0.629	3.591	0.73	-0.569	22	0.575
Mastery enjoyment	4.017	0.721	4.687	0.447	-6.293	22	< .001

Results show a significant improvement in total persistence (p < .001) in the experimental group after the intervention, supporting Hs1. Notable and statistically significant increases were observed in cognitive persistence (p < .001), motor persistence (p = .014), and mastery enjoyment (p < .001). Social persistence with adults and children showed modest but not statistically significant increases (p > .05), which may be attributed to preschoolers' familiarity with the educator and the predominantly individual nature of the kindergarten activities aimed at autonomy.

Hypothesis 2: The implementation of an intervention program based on interactive activities and table games will lead to improved persistence in the experimental group.

Table 5.

Comparative Descriptive Statistics (Pretest and Posttest) for the Experimental and Control Groups

Persistence Subscale	$M_{GE\ Pretest}$	$SD_{GE\ Pretest}$	$M_{GC\ Pretest}$	$SD_{GC\ Pretest}$	$M_{GE\ Posttest}$	$SD_{GE\ Posttest}$	$M_{GC\ Posttest}$	$SD_{GC\ Posttest}$
Total Persistence	3.696	0.622	2.905	0.44	4.056	0.613	2.873	0.376
Cognitive Persistence	3.452	0.798	2.719	0.691	4.261	0.834	2.57	0.554
Motor Persistence	4.096	0.657	2.793	0.636	4.33	0.676	2.748	0.581
Social Persistence with Adults	3.357	0.615	2.822	0.737	3.409	0.665	2.719	0.601
Social Persistence with Children	3.557	0.629	2.941	0.697	3.591	0.73	2.822	0.638
Mastery Enjoyment	4.017	0.721	3.252	0.762	4.687	0.447	3.504	0.575

Table 6

t-test for Group Comparison (Pretest and Posttest)

Persistence subscale	$t_{Pretest}$	$p_{Pretest}$	$t_{Posttest}$	$p_{Posttest}$
Total persistence	-5.245	< .001	-8.36	< .001
Cognitive Persistence	-3.484	.001	-8.553	< .001
Motor Persistence	-7.109	< .001	-8.906	< .001
Social Persistence with Adults	-2.755	.008	-3.856	< .001
Social Persistence with Children	-3.255	.002	-3.976	< .001
Mastery Enjoyment	-3.63	< .001	-8.02	< .001

At pretest, the experimental group demonstrated significantly higher levels of persistence on all subscales compared to the control group (all $p < .05$). This initial difference is important to note. After the intervention, at posttest, the differences between the experimental and control groups became even more pronounced and statistically significant for all subscales (all $p < .001$). This indicates a significant positive impact of the intervention on the experimental group, sustaining Hs2. Even with a higher baseline in the experimental group, the significant increase over the control group supports the effectiveness of the program. The control group had relatively constant values between pretest and posttest, suggesting that without the intervention, persistence did not significantly improve.

Hypothesis 3: There are statistically significant differences in the level of development of persistence in preschool-age children in the high preschool group by gender.

Table 7

Descriptive Statistics by Gender (Whole Sample)

Persistence subscale	Gender	$M_{Pretest}$	$SD_{Pretest}$	$M_{Posttest}$	$SD_{Posttest}$	$t_{Pretest}$	$p_{Pretest}$	$t_{Posttest}$	$p_{Posttest}$
Total Persistence	Girls	3.353	0.691	3.536	0.774	1.017	0.314	1.233	0.224
	Boys	3.162	0.615	3.265	0.763				
Cognitive Persistence	Girls	3.193	0.81	3.55	1.118	1.339	0.187	1.489	0.143
	Boys	2.882	0.823	3.091	1.034				
Motor Persistence	Girls	3.536	0.949	3.621	1.045	1.259	0.214	1.153	0.254
	Boys	3.209	0.859	3.291	0.954				
Social Persistence with Adults	Girls	3.071	0.774	3.05	0.725	0.037	0.97	0.155	0.878
	Boys	3.064	0.683	3.018	0.717				
Social Persistence with Children	Girls	3.271	0.693	3.25	0.711	0.515	0.609	0.756	0.454
	Boys	3.164	0.785	3.082	0.863				
Mastery Enjoyment	Girls	3.693	0.808	4.207	0.741	0.851	0.399	1.64	0.107
	Boys	3.491	0.863	3.845	0.814				

Table 8

t-test for Gender Comparison (Control Group, Experimental Group)

Group	Control Group				Experimental Group			
Persistence subscale	Pre-test		Posttest		Pretest		Posttest	
	t	*p*	*t*	*p*	*t*	*p*	*t*	*p*
Total Persistence	-1.043	0.307	-0.642	0.527	0.772	0.449	0.195	0.847
Cognitive Persistence	-0.232	0.818	-0.444	0.661	1.122	0.274	0.548	0.589
Motor Persistence	-0.917	0.368	-0.916	0.368	1.014	0.322	0.337	0.739
Social Persistence with Adults	-1.667	0.108	-1.184	0.248	1.108	0.28	0.041	0.968
Social Persistence with Children	-0.267	0.792	-0.04	0.969	-0.073	0.942	-0.158	0.876
Mastery Pleasure	-0.211	0.835	0.502	0.62	0.321	0.751	0.009	0.993

The statistical analysis showed no statistically significant differences in the level of persistence development by gender, neither in the control nor in the experimental group, nor the whole sample, both at pretest and posttest (all $p > 0.05$).

Although girls had higher initial scores and maintained an advantage, these differences were not statistically significant. This refutes Specific Hypothesis 3, suggesting that the intervention program had a balanced impact on both genders and that persistence develops similarly in girls and boys, possibly due to the fact that the activities were not differentiated by gender.

Hypothesis 4: The implementation of an intervention program based on interactive activities and table games will lead to improved persistence in preschoolers who have a good relationship with their educators, compared to those who have a poor relationship with their educators.

Table 9.
Descriptive Statistics on Relationship with Educator (Control and Experimental Group)

Persistence Subscale	Group	Relationship	$M_{Pretest}$	$SD_{Pretest}$	$M_{Posttest}$	$SD_{Posttest}$
Total Persistence	Control	Good	2.969	0.427	2.899	0.363
		Poor	2.796	0.462	2.828	0.414
	Experimental	Good	3.711	0.57	4.009	0.566
		Poor	3.676	0.716	4.116	0.695
Cognitive Persistence	Control	Good	2.812	0.661	2.671	0.519
		Poor	2.56	0.747	2.4	0.596
	Experimental	Good	3.508	0.671	4.215	0.781
		Poor	3.38	0.973	4.32	0.939
Motor Persistence	Control	Good	2.765	0.593	2.718	0.566
		Poor	2.84	0.735	2.8	0.632
	Experimental	Good	4.154	0.53	4.323	0.656
		Poor	4.02	0.819	4.34	0.737
Social Persistence with Adults	Control	Good	2.941	0.793	2.8	0.64
		Poor	2.62	0.614	2.58	0.529
	Experimental	Good	3.415	0.551	3.338	0.574
		Poor	3.28	0.713	3.5	0.79
Social Persistence with Children	Control	Good	2.965	0.742	2.788	0.638
		Poor	2.9	0.648	2.88	0.668
	Experimental	Good	3.462	0.714	3.492	0.76
		Poor	3.68	0.509	3.72	0.707
Mastery Pleasure	Check	Good	3.365	0.732	3.518	0.592
		Deficient	3.06	0.811	3.48	0.575
	Experimental	Good	4.015	0.695	4.677	0.444
		Poor	4.02	0.791	4.7	0.474

*Note**: **Good** relationship with educator = 17
Poor relationship with educator = 10

Table 10

t-test for Comparison on Relationship with Educator (Control and Experimental Group)

Persistence subscale	Control Group				Experimental Group			
	Pretest		Posttest		Pretest		Posttest	
	t	*p*	*t*	*p*	*t*	*p*	*t*	*p*
Total Persistence	-0.989	0.332	-0.465	0.646	-0.13	0.898	0.406	0.689
Cognitive Persistence	-0.911	0.371	-1.238	0.227	-0.373	0.713	0.292	0.773
Motor Persistence	0.292	0.773	0.35	0.729	-0.475	0.639	0.058	0.954
Social Persistence with Adults	-1.098	0.282	-0.916	0.368	-0.515	0.612	0.569	0.575
Social Persistence with Children	-0.229	0.821	0.355	0.726	0.819	0.422	0.734	0.471
Mastery Enjoyment	-1.004	0.325	-0.161	0.873	0.015	0.988	0.12	0.906

Statistical analysis did not reveal statistically significant differences in persistence development according to the quality of the relationship with the educator (good or poor), both in the control and experimental groups (all $p > 0.05$). This disproves Specific Hypothesis 4. Although descriptive statistics initially suggested that the relationship with the educator might influence mastery enjoyment, statistical tests did not support this conclusion. An explanatory factor could be that the activities of the experimental program were not carried out by the children's familiar educator, which could have affected the preschoolers' concentration and motivation in the presence of an unknown person.

Discussion and Limitations

Hypothesis 1 was supported, indicating that the intervention program based on interactive activities and board games produced a significant increase in total persistence in the experimental group at posttest. The improvements are obtained in the *cognitive persistence* and *motor persistence* subscales, suggesting that the intervention positively influenced both mental and motor effort endurance. These findings align with Morgan et al. (2020), who found that children scored highest on learning satisfaction and motor persistence, but lower on social persistence with peers. Moreover, children who independently generate new

strategies, rather than simply following instructions, tend to display higher levels of persistence in challenging tasks (Clinic, 2024). At the same time, Dowsett and Livesey (2000) indicate that preschool children with language disorders may show lower levels of persistence compared to control groups, even in tasks matched for difficulty. This suggests that reduced persistence may be influenced by individual factors and is not necessarily specific to a type of task.

Hypothesis 2 was confirmed. The intervention had a significant positive impact on the experimental group compared to the control group. Although the experimental group showed significantly higher persistence scores on all subscales at the pretest compared to the control group, the post-intervention differences between the groups became even more pronounced and statistically significant across all subscales. This may indicate a potential bias in the selection of the control group, as ideally, no significant baseline differences should have been present. Research demonstrates that comparing groups against their own baseline is methodologically invalid and can produce misleading conclusions (Gulz & Haake, 2024). In non-equivalent control group designs, selection bias and differences between intervention and control sites can confound results, making it essential to establish balance in the distribution of known risk factors at baseline (Leonard et al., 2021b). Furthermore, adjusting for baseline characteristics that differ between treatment arms can control for selection bias only under specific conditions (Formanek & Spaulding, 2024).

In practice, achieving true baseline equivalence is challenging when working with intact student groups (Campbell & Stanley, 2015; Shadish et al., 2002). Classes are pre-formed and cannot be reorganized for research purposes, and they naturally vary in academic levels, temperament, prior experiences, and teacher practices (Trask & Cowie, 2022). Randomizing individual students is usually infeasible due to scheduling, curricular, and ethical constraints, and the small number of available classes limits both statistical power and the likelihood of achieving equivalence (Ballance, 2024; Cook & Hatala, 2015; Hedges & Rhoads, 2010). Differences in classroom resources, group dynamics, and teacher–student interactions also create substantial baseline variability that is difficult to control (Hatos, 2006).

Given these constraints, the activities may not have produced the intended improvement in persistence. The group differences observed at posttest might have emerged regardless of the intervention. This interpretation aligns with broader findings on early childhood interventions. Many preschool interventions targeting simple academic skills demonstrate fadeout patterns, with effects diminishing by 50% or more in the first year following intervention programme completion (Bailey et al., 2020). Most interventions aimed at children's cognitive, social, or emotional development fail to track subjects beyond program completion, and when they do, complete fadeout is common (Meloy, 2019). Even high-quality preschool curricular interventions show effect fadeout when followed by quality instruction in primary grades (Bailey, 2017). Therefore, activities of this type may function more as engaging or entertaining experiences rather than as genuine developmental mechanisms for enhancing persistence in preschool children. The baseline

values cannot control for subsequent changes over time (Jylänki et al., 2022), suggesting that the observed group differences may reflect pre-existing characteristics rather than intervention-induced improvements.

Hypothesis 3 was not supported. The statistical analysis demonstrated no statistically significant differences in the level of persistence development based on gender.

This finding appears to contrast with some established research on gender differences in early childhood. Boys and girls internalize traditional gender roles from society beginning in early childhood and continuing through school years, which decisively affects their academic development, perceptions of their own abilities, and personal and professional aspirations (Gulz & Haake, 2024). Additionally, girls aged 3-18 years were found to be significantly more altruistic but less risk-tolerant, less competitive, and less trusting than boys, with these differences emerging early in life and persisting (Vansteenkiste & Deci, 2003).

However, the absence of significant gender differences in persistence in the current study may reflect an important conceptual and methodological consideration. Persistence refers to the intrinsic motivation to master a task and improve personally, being oriented toward process and development, while competitiveness involves extrinsic motivation centered on comparison with others and attaining superior status (Duckworth et al., 2007). This distinction becomes problematic in research when competitive tasks are used to measure persistence. Studies on competitive contexts have demonstrated that persistence can reflect either intrinsic motivation or ego-involved persistence, where individuals persist not from enjoyment but from ego concerns, making it difficult to determine whether children persist out of a desire to solve the problem or out of competitive motives (Hao et al., 2025). This is a particularly relevant issue in the context of gender differences, since boys tend to be more competitive than girls from an early age (Lunkenheimer et al., 2019; Vansteenkiste & Deci, 2003), which means that studies measuring persistence in competitive contexts may confound gender effects on persistence with gender effects on competitiveness.

To avoid this confusion, research should use non-competitive tasks to measure pure persistence and statistically control for participants' individual competitive tendencies. The current study's intervention design deliberately incorporated predominantly non-competitive, cooperative tasks to assess and develop persistence authentically. Activities such as assembling puzzles with mutual team support, building unstable towers with collaborative restoration after collapse, passing a glass of warm water carefully in a semicircle, and sorting colored balls with peer cooperation emphasized teamwork and individual mastery rather than interpersonal competition. Even activities that included elements of friendly competition, such as throwing rings on posts, were structured to prioritize encouragement and collective achievement over defeating others. This approach is methodologically important because persistence measures in competitive contexts can reflect ego-involved persistence rather than intrinsic motivation, making it difficult to determine whether children persist from enjoyment of the task or from competitive motives

(Hao et al., 2025). The intervention's emphasis on process-oriented activities—such as crumpling and gluing paper without time limits, completing drawings with individual support and corrections, and memory games with peer assistance—created conditions where persistence could emerge from genuine task engagement rather than competitive pressure. This non-competitive assessment approach may explain why no gender differences emerged in the current study, suggesting that when persistence is measured independently of competitive motivation through collaborative and mastery-focused activities, boys and girls demonstrate comparable levels of persistence in preschool years. *Hypothesis 4 was not supported*. The statistical analysis did not reveal statistically significant differences in persistence development based on the quality of the child's relationship with the educator (good or poor), although the means of motor persistence and mastery pleasure were higher (but not statistically significant) in children who had a good relationship with the educator.

Fiorilli et al. (2022) demonstrates that the teacher-student relationship quality positively affects persistence and effort, with these outcomes being more affected by the relational aspect of teacher support than by the instructional component. Social motivation theorists posit that children who experience social support from teachers will construct a positive sense of school membership and academic self-concept that will promote greater effort and persistence as well as commitment to school rules and norms (Byrnes et al., 1999). More specifically, behavioral engagement, defined as students' effortful and cooperative involvement in the classroom (working hard, persisting in the face of failure, and complying with classroom rules), is influenced by teacher-student relationship quality (Sutter et al., 2016). Close relationships with teachers are predictive of persistence in tasks, taking the initiative, and cooperative participation, while conflictual relationships lead to lower classroom engagement (Brooks & Goldstein, 2008; Zhang et al., 2023).

The lack of statistically significant differences may be due to the imbalance between the two groups (17 vs. 10), as the unequal group sizes reduce the statistical power of the comparison. The smaller group (weak relationship) can introduce greater variability, making it harder to detect real effects. In addition, the overall sample size of 27 participants limits the sensitivity of the statistical analyses. Internal variability within the groups may also contribute to these findings, as children in both the "good" and "weak" relationship groups can differ considerably in temperament, cognitive development, level of autonomy, and prior experiences.

Despite de evidence of the efficacy of these types of activities, the primary limitation constraining broad adoption is the paucity of longitudinal data demonstrating the long-term retention and generalized transfer of persistence skills (Akbarieh et al., 2025; Korteling et al., 2021). This is particularly important because persistence is a malleable attribute, especially during childhood, and can be significantly enhanced through targeted educational interventions (Alan et al., 2019). These interventions have been shown to increase students' willingness to choose challenging tasks and reduce their propensity to abandon effort after initial failure (Alan et al., 2019). However, most studies evaluate effects over a short duration,

and the literature on cognitive training strongly suggests that generalized effects across dissimilar contexts are statistically rare (Korteling et al., 2021). This gap raises questions about whether persistence learned in a specific game context can reliably transfer to high-stakes, real-world effortful tasks.

Beyond these concerns about generalizability, the methodological analysis of the current research identified several limitations that could influence result interpretation. First, the sample size and gender distribution may have constrained statistical power and the ability to detect nuanced effects. Second, pre-existing differences between groups present a fundamental validity concern: the experimental group demonstrated significantly higher persistence levels at pretest compared to the control group, potentially reflecting pre-existing factors that complicate exclusive attribution of improvements to the intervention. Third, the reliance on educator-completed questionnaires introduces subjectivity, as teachers' perceptions may not objectively capture children's actual behavior. Finally, the study did not account for potentially confounding variables such as competitiveness, intrinsic motivation, self-efficacy, or risk-taking propensity, any of which could moderate or mediate the observed effects. Collectively, these limitations underscore the need for methodologically rigorous designs with equivalent baseline groups, objective behavioral measures, and comprehensive assessment of individual difference variables to more definitively establish the causal impact of persistence interventions in early childhood.

Conclusions

This study set out to examine the effectiveness of a structured play intervention program in enhancing persistence among preschoolers, compare persistence development between experimental and control groups, and investigate the influence of individual factors such as gender and child-educator relationship quality on persistence levels. The findings partially supported the initial hypotheses, revealing a complex picture of intervention effects. The experimental group demonstrated significant improvements in overall persistence and its subdimensions—particularly cognitive persistence, motor persistence, and mastery enjoyment—when comparing their pretest to posttest scores. These improvements suggest that the intervention's focus on cooperative, non-competitive activities such as collaborative puzzle assembly, tower building with mutual support, and creative tasks without time constraints created conditions that engaged children in process-oriented learning experiences. The program's emphasis on teamwork, mastery orientation, and peer support appeared to foster environments where children could develop persistence through authentic task engagement rather than competitive pressure.

However, the interpretation of the results is complicated by pre-existing baseline differences between groups. The experimental group showed significantly higher persistence scores on all subscales at pretest compared to the control group, and although post-intervention differences became more pronounced, this pattern may reflect selection bias rather than genuine intervention effects. Research demonstrates

that comparing groups against their own baselines can produce misleading conclusions and that baseline values cannot adequately control for subsequent changes over time (Altman & Bland, 2011; Moser, 2019). The maintained differences at posttest could have occurred regardless of whether the activities were applied, aligning with broader evidence that many preschool interventions demonstrate fadeout patterns, with effects diminishing substantially after treatment completion (Bailey et al., 2020; Duncan & McKeachie, 2010). Regarding individual factors, neither gender nor child-educator relationship quality demonstrated statistically significant effects on persistence development. The absence of gender differences may reflect the study's deliberate use of non-competitive, cooperative tasks that measure persistence independently of competitive motivation—an important methodological consideration given that boys tend to be more competitive than girls from early ages (Sutter & Glätzle-Rützler, 2015; Sutter et al., 2016), and that persistence measures in competitive contexts can confound intrinsic task motivation with ego-involved competitive motives (Vansteenkiste & Deci, 2003).

Despite these methodological limitations, the study provides a foundation for understanding how structured play interventions might be applied in early childhood educational contexts. The tension between observed improvements within the experimental group and the challenges in attributing these changes solely to the intervention underscores the importance of both exploring practical applications and refining research methodologies. Moving forward, it is essential to consider both what these findings suggest for current educational practice and how future investigations can address the interpretive challenges identified in this study.

Practical Implications and Future Research Directions

The findings from this study offer valuable insights for both educational practice and future research directions. Understanding how structured play interventions may influence persistence development in early childhood has important implications for curriculum design, teacher professional development, and home-based learning environments. At the same time, the methodological challenges encountered in this study highlight important areas where future research can employ more rigorous designs to strengthen the evidence base for persistence-enhancing interventions in preschool settings.

The observed improvements in cognitive persistence and mastery enjoyment suggest that integrating educational games and activities that involve patience, concentration, and task completion may be valuable in early education settings. Such programs can serve dual purposes for both teachers and families. *For educators*, the study supports game-based methods as a foundation for developing robust teaching strategies that explicitly expose preschoolers to situations requiring task completion despite obstacles, integrating interactive activities and board games specifically chosen to help children manage failure, discover problem-solving strategies, and practice persistence in

supportive contexts. *For parents,* the findings highlight opportunities to integrate similar activities at home, as board games and cooperative tasks provide attractive ways to spend quality time with children while supporting persistence development. However, both educators and families should recognize that the causal relationship between such activities and persistence remains uncertain and that sustained developmental benefits may depend on continuous, systematic implementation rather than time-limited interventions.

To deepen understanding of the effects obtained from this intervention program, future research should address several important gaps. A longitudinal study evaluating the maintenance and transfer of persistence over extended time periods is essential, particularly one comparing intervention outcomes with and without direct educator involvement to clarify the role of the child-educator relationship in moderating persistence development. Future studies would benefit from employing gender-balanced samples, implementing external pretest/posttest evaluations conducted by trained assessors blind to group assignment to reduce potential bias from teacher ratings, and establishing rigorous randomized controlled designs with baseline equivalence between groups. Additionally, to strengthen the causal inference of persistence interventions, future research would benefit from randomized controlled designs, using objective behavioral measures, and systematically measuring and reporting implementation fidelity to confirm that the program is delivered exactly as designed.

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