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Developing Resilience in Young Schoolchildren During the Transition Stage: The Effectiveness of a Structured Educational Program

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Abstract: *In the context of the early transition to formal schooling, the development of resilience skills becomes essential for students' emotional and cognitive adaptation. This study investigates the effectiveness of the educational program "I Can Become Strong!" in enhancing school resilience, analyzing its impact on three variables: personal resilience, relational resilience, and total resilience score. The study was conducted using a quasi-experimental design, incorporating assessments both before and after the intervention, applied to a sample of 42 primary school students, using the CYRM-R questionnaire to assess resilience. The results of the statistical analyses revealed significant progress across the three measured variables: personal resilience, relational resilience, and total resilience score, with effect sizes ranging from moderate ($d \approx 0.65$) to large ($d \approx 1.76$). The data highlight the relevance of educational interventions focused on developing children's adaptive skills, which in turn facilitate a smoother transition process throughout different stages of schooling. When interpreted in relation to current theoretical models of resilience, these findings support the importance of an integrated approach to socio-emotional education from a very early age.*

Keywords: *school resilience; educational intervention; primary education; socio-emotional development; prevention program.*

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Introduction

Given the rapid pace of change in the education system, the growing diversity of students' needs, and the constant pressure on academic performance—from schools, families, and students' own need for social validation—resilience development has begun to emerge as an important goal in primary education.

From the very first years of school, children face multiple challenges: separation from the family environment, adaptation to the demands of a formal learning system, the development of peer interactions, and the undertaking of age-appropriate responsibilities. For many, the absence of effective coping strategies may lead to adjustment difficulties, decreased school motivation, and emotional vulnerability (Pinto et al., 2021; Moll Riquelme et al., 2022).

In line with existing scientific evidence, resilience is increasingly recognized as an important factor in supporting children's adaptive processes when facing challenges and difficulties. Specialized studies show that developing resilience skills can positively influence academic performance (Hanson et al., 2003; Novotný & Kreménková, 2016), emotional well-being (Zolkoski & Bullock, 2012; Gheshlagh et al., 2017; Mesman et al., 2021; Luo et al., 2025), as well as the quality of children's social relationships (Noble & McGrath, 2011; Moreira et al., 2021). The importance of fostering these mechanisms from the early years of schooling is clear, as they help students stay motivated, show perseverance, and find solutions to the stressful situations specific to the school environment (Cassidy, 2015; Feraco et al., 2023; Gorghiu et al., 2024).

Despite the growing interest in early educational interventions in recent years, research in the field of resilience continues to focus primarily on adolescence, often overlooking children in the early stages of schooling. This imbalance is particularly difficult to justify given that the 6–8 age range is widely recognized as a sensitive period in children's development, characterized by the formation of school identity, the development of emotional self-regulation skills, and the establishment of the first meaningful social relationships within the educational environment (Cadima et al., 2015; Rademacher et al., 2022).

Building on the aspects mentioned above, the present study aims to contribute to a deeper understanding of the factors that support the development of resilience in primary school children. It seeks to highlight both the conceptual and theoretical foundations of this construct, as well as the importance of adopting educational strategies that are aligned with the developmental stage specific to early school age.

Literature review

Amid the rapid changes observed in both the social and educational spheres, interest in children's emotional well-being and academic success has increased significantly. Within this situational context, the concept of resilience has emerged as a key construct in the fields of psychology and education, as it has been shown to relate to the child's ability to cope constructively with difficulties and pressures within the school environment (Masten, 2014; Luthar et al., 2000). According to the specialized literature, resilience refers to the capacity of a system—whether individual, familial, educational, or community-based—to respond effectively to challenges that may threaten stability, continuity, or long-term development (Masten, 2014; Southwick & Charney, 2012). As noted by Masten & Barnes (2018), this systemic and flexible perspective reflects a complex understanding of the construct, in which resilience is not merely an internal trait but the result of dynamic interactions among biological, psychosocial, and contextual factors.

Beyond its theoretical foundations and explanatory models, the literature emphasizes the importance of a rigorous and coherent operationalization of the resilience construct. Connor and Davidson (2003) propose approaching resilience as an intrapersonal dimension, centered on traits such as perseverance, self-efficacy, and emotional self-regulation.

Using a structural equation model, Gorghiu et al., (2024) found in their study that perceived academic self-efficacy and intrinsic motivation play a key role in shaping school resilience. The study's findings highlight the importance of developing two fundamental elements in strengthening students' ability to cope with challenges in the educational environment: autonomous motivation and the formation of a positive self-image regarding their own competencies.

Sixbey (2005) proposes an expansion of the intrinsic model of resilience by introducing a relational perspective that highlights the importance of supportive social networks, empathy, and interpersonal relationships built on mutual trust. Zhang et al. (2021) concluded, at the end of their study, that the dynamics of social relationships and interpersonal support can significantly influence school adjustment, both directly and through their impact on resilience levels. These findings become particularly relevant in the educational context, offering, on one hand, a deeper theoretical understanding of the construct, and on the other hand, practical guidelines for supporting students in the process of developing and strengthening resilience.

Considering the findings presented in the specialized literature, resilience can be viewed as a continuously developing and adaptive ability that enables individuals to respond effectively and constructively to challenges,

obstacles, or stressful situations. According to Llistosella et al. (2022), this capacity unfolds within a complex ecological framework characterized by ongoing interactions between the individual and their environment, where personal resources—such as perseverance, emotional self-regulation, and self-confidence—intersect with relational ones, including social support, empathy, and trust-based relationships.

In the educational context, the concept of academic resilience refers to students' ability to cope with academic demands, remain engaged in the learning process, and maintain cognitive and emotional balance when faced with difficulties, including situations involving failure, change, or social pressure (Martin & Marsh, 2006; Martin & Marsh, 2008; Tudor & Spray, 2017). According to Gorghiu et al. (2024), the development of academic resilience is closely linked to students' individual traits, such as self-efficacy and intrinsic motivation. Their findings indicate that students who believe in their own potential and are guided by personal goals are more likely to respond positively and effectively to academic challenges.

Therefore, academic resilience involves not only the use of personal resources such as self-esteem, perseverance, and emotional self-regulation, but also the presence of a supportive educational environment, built on strong relationships and a positive school climate (Cassidy, 2015; Constantinescu, 2024). Empirical studies highlight that access to a nurturing environment during early childhood and the initial stages of schooling plays a crucial role in shaping and strengthening resilience mechanisms in children (Masten & Barnes, 2018; Zhang et al., 2023). In this context, both teachers and families play an important role by creating opportunities that stimulate and guide children's adaptive behavioral responses to the educational challenges they face.

The beginning of formal schooling represents a stage with strong emotional significance, often accompanied by major challenges such as separation from the family environment, adjustment to a new social setting, the assumption of school-specific responsibilities, and encountering the first external evaluations. According to the specialized literature, the absence of effective adaptive mechanisms can lead to emotional vulnerability, decreased interest in academic activities, or difficulties in interacting with peers (Pinto et al., 2021; Moll Riquelme et al., 2022).

Recent research in developmental psychology highlights that resilience is not a fixed trait limited to certain individuals, but rather a dynamic process resulting from the continuous interaction between a person's innate predispositions and environmental influences. This suggests that the

development of resilience is possible for anyone, being shaped by the context in which the individual grows and evolves (Moll Riquelme et al., 2022).

From a neurobiological perspective, research supports that stress regulation mechanisms, neuroplasticity, and the activity of the HPA axis (hypothalamic–pituitary–adrenal) play a fundamental role in shaping the capacity to cope with adversity (Southwick & Charney, 2012; Davidson & McEwen, 2012) and in supporting mental health (Luo et al., 2025).

This interpretation highlights that resilience should not be seen as a fixed trait, but rather as an adaptable skill that can be developed over time through a supportive educational environment and structured learning experiences (Rutter, 1995; Grotberg, 1995; Coronado-Hijón, 2017; Ansari & Iqbal, 2025).At the same time, specialized research highlights that certain environmental elements—such as supportive family relationships, a positive school climate, and community involvement—can significantly influence the development of resilience in children (Masten, 2014; Gorghiu et al., 2024).

For example, studies by Constantinescu (2024) and Guo et al. (2025) emphasize that educational programs focused on the development of socio-emotional skills can strengthen both personal and relational protective factors, with a positive impact on school adjustment.

The IERM (Individual and Environmental Resilience Model), proposed by Llistosella et al. (2022), offers an integrative perspective by combining individual factors—such as self-efficacy, motivation, and emotional regulation—with environmental ones—such as family, peer, and teacher support. To strengthen functional and long-lasting resilience in the school context, the proposed model emphasizes that educational interventions must simultaneously consider and integrate both involved dimensions.

In the same vein, meta-analyses conducted by Pinto et al. (2021), Moll Riquelme et al. (2022), and Zhang et al. (2023) show that early exposure to well-structured educational activities that support the development of emotional self-regulation and awareness of personal resources has a significant impact on children's ability to cope with academic and social challenges. The findings of these studies confirm that resilience can be nurtured and strengthened within supportive educational environments, while also emphasizing the need for an integrated approach that combines theoretical foundations, empirical validation, and age-appropriate adaptation.

This multidimensional approach justifies the need for structured educational programs that incorporate both intrapersonal and interpersonal components of resilience (Connor & Davidson, 2003; Sixbey, 2005; Cassidy, 2016). This ecological perspective is reinforced by the theoretical model

proposed by Grotberg (1995), one of the most widely used frameworks for early educational interventions in resilience. The "I Am – I Have – I Can" model provides a clear and practical framework for activities aimed at developing children's adaptive skills. It is structured around three categories of protective factors: personal identity and values ("I Am"), support from close relationships ("I Have"), and the ability to cope with challenges ("I Can").

This perspective is supported by the ecological model developed by Bronfenbrenner (1979) and later adapted to the field of resilience by Masten and Reed (2002), which emphasizes the dynamic relationship between the individual and their educational, familial, and social environment. Such models provide a solid theoretical framework for the design of educational programs that support the development of resilience in early childhood. In the same vein, the more recent Individual and Environmental Resilience Model (IERM), proposed by Llistosella et al. (2022), offers a valuable contribution by distinguishing between individual factors (such as self-efficacy, emotional regulation, and social competence) and environmental factors (including family support, positive relationships, and school climate), both categories playing a meaningful role in fostering children's adaptive abilities in response to academic demands.

Recent studies support the idea that educational interventions are particularly effective during the early school years, when children begin to build their academic identity and develop appropriate self-regulation mechanisms (Dray et al., 2017; Pinto et al., 2021). Findings from this research indicate that structured programs incorporating components of social-emotional learning, cognitive-behavioral strategies, and group activities foster improvements in children's adaptive capacity, particularly during their transition into formal schooling (Schonert-Reichl et al., 2015; Dray et al., 2017; Payton et al., 2000; Pinto et al., 2021; Liu et al., 2025).

Despite consensus on the critical role of cultivating resilience within learning environments and the recognized value of early interventions in this direction (Dray et al., 2017; Fenwick-Smith et al., 2018), there are still gaps in applied research concerning children at the beginning of formal schooling.

Numerous studies focus primarily on adolescence, which causes the early years of schooling to be overlooked, even though this stage involves children’s adjustment to the norms and rules imposed by the academic environment (adaptation to academic tasks, institutional regulations, and structured social relationships) (Moll Riquelme et al., 2022).

This omission is particularly notable given that the 6–8-year-old age range constitutes a crucial developmental period for consolidating school

identity, acquiring emotional self-regulation skills, and establishing functional and stable social relationships in an educational context (Moll Riquelme et al., 2022; Cui & Xie, 2022).

Therefore, it becomes necessary to develop and implement scientifically validated educational interventions that consider both the complexity of the resilience construct and the developmental characteristics of young schoolchildren. Building on theoretical frameworks established in the specialized literature, the present research aims to analyze how resilience can be supported and developed among primary school students, considering both the personal and interpersonal dimensions.

In this regard, the selection of Grotberg's model (1995) as the foundation for constructing the educational intervention is justified by its applicability, international validation, and compatibility with the psycho-pedagogical objectives specific to early school-age children. Thus, the proposed research topic seeks to identify an effective approach for supporting school resilience during the initial stage of primary education—an age segment that remains insufficiently investigated yet is essential for the child's transition to formal learning.

This study aims to clarify how the theoretical elements of resilience, as identified in the specialized literature, can contribute to shaping educational practices that are adapted to the realities of Romanian schools. The goal is to provide a useful framework for preventing school disengagement and supporting a positive educational path for students in the early stages of schooling.

Methodology

Participants

The research sample comprised 42 pupils enrolled in primary education, with ages ranging from 7 to 8 years ($M = 7.57$; $SD = 0.50$), all attending first grade, which marks the onset of formal schooling. Among them, 16 were girls and 26 boys. Participant selection was carried out based on pre-established eligibility parameters aimed at maintaining group homogeneity and ensuring the validity of the research findings.

The inclusion criteria were as follows:

- Age between 7 and 8 years.
- Enrolment in a public primary school, attending a regular study program.
- Participation throughout the entire duration of the program.

- Written consent from parents or legal guardians, in accordance with ethical standards.

Exclusion criteria:

• Known psychological or psychiatric diagnoses.
• Involvement in other personal development programs.
• Frequent absences or significant school adjustment difficulties.

Children's participation was organized in full compliance with all ethical standards applicable to research involving minors. Formal consent was obtained from parents or legal guardians, and children were given clear, age-appropriate explanations to help them understand the purpose and structure of the activities. It was clearly stated that their participation in the study was voluntary and that they could withdraw at any time without any negative consequences. Additionally, data collection was carried out with a strong emphasis on maintaining participants' confidentiality and anonymity.

The study complied with the ethical and deontological norms applicable to research in the fields of psychology and educational sciences.

Measures

To assess the participants' resilience levels, the *Child & Youth Resilience Measure – Revised (CYRM-R)* was used, specifically the version adapted for the 5–9 age group, developed by the Resilience Research Centre and revised by Jefferies et al., (2018). The instrument assesses the resilience skills of children and adolescents in relation to their specific environment, examining both personal and social mechanisms that influence the adaptation process in challenging situations (Resilience Research Centre, 2018). It uses a 3-point Likert scale as follows: "No" (1 point), "Sometimes" (2 points), and "Yes" (3 points).

The questionnaire consists of 17 items, organized into two dimensions: (1) The Personal Resilience Subscale (10 items), which includes aspects such as emotional self-regulation, perseverance, self-efficacy, and motivation; and (2) The Relational Resilience Subscale (7 items), which explores elements related to social support, relationship quality, and sense of belonging.

The questionnaire was administered in paper-pencil format in a structured setting. The teacher read each question aloud to ensure clear and correct understanding of the items, and students responded individually to each item.

Each subscale score was derived by computing the mean value of participants' responses to the corresponding items. As outlined in the CYRM-R manual (2018), elevated scores correspond to increased levels of resilience, whereas lower scores suggest diminished resilience capacity. However, the

authors note that setting a standard threshold for result interpretation is not recommended, as resilience is a contextual and dynamic construct influenced by multiple individual and social variables.

The CYRM-R instrument demonstrates good internal accuracy and consistency. Jefferies et al. (2018) reported high Cronbach's Alpha values: 0.87 for the total scale and 0.82 for each of the two subscales—Personal Resilience and Relational Resilience. According to the Resilience Research Centre (2018), the validation process was carried out using the Rasch model, which highlighted the instrument's strong ability to distinguish between individuals with varying levels of resilience.

Data processing was carried out using SPSS Statistics 24, employing both descriptive and inferential statistical analysis techniques. In the first stage, means and standard deviations were calculated for the two CYRM-R subscales (personal resilience and relational resilience) and the total score—before and after the implementation of the educational intervention. Subsequently, to evaluate the program's impact, a paired samples t-test was applied, with the significance level set at $p < 0.05$.

Additionally, Cohen's d coefficient was calculated to estimate the effect size. The normality conditions were checked using the Shapiro-Wilk test.

This methodology facilitated the assessment of meaningful statistical variations in resilience levels attributable to the implemented program

Procedure

To assess the impact of an instructional intervention designed to foster school-related resilience among early-age learners, a single-group quasi-experimental framework incorporating pre- and post-intervention assessments was employed.

The educational program titled *"I Can Become Strong!"* was developed based on well-established theoretical models on resilience development in children, particularly the Individual and Environmental Resilience Model (IERM) (Llistosella et al., 2022) and the conceptual framework proposed by Grotberg (1995) – "I Am, I Have, I Can." The intervention activities were carried out over 11 consecutive weeks during Personal Development classes, with a frequency of one 50-minute session per week. Each session included interactive and psychoeducational exercises carefully tailored to the children's age group (7–8 years) and developmental level.

The content of the activities was structured into two components: personal resilience and relational resilience. Activities designed to enhance personal resilience (e.g., emotional self-regulation, adaptability, motivation,

reflective thinking) included: personal resource identification exercises (*"Understanding Resilience!"*), thematic dramatizations (*"Actors in the World of Emotions"*), self-control games (*"Effective Management Leads to Problem Solving"*), reflection and planning activities (*"Resilience Plan"*), and self-assessment exercises (*"What Have I Learned?"*).

At the same time, a series of activities designed to strengthen relational resilience were carried out, emphasizing cooperation, empathy, effective communication, and support within the family. The themes addressed included accepting differences ("*We are wonderfully different*"), empathetic communication ("*Let's not forget the power of words*"), strengthening positive relationships ("*How much encouragement and appreciation matter*!"), and enhancing the parent–child relationship ("*Parent–Child communication*").

To ensure implementation validity, all sessions were conducted following a standardized activity guide, strictly adhering to the sequences proposed in the program. During the intervention, no additional systematic activities were introduced that could have influenced the development of participants' resilience skills.

Before the intervention began, the pretest (T1) was administered using the CYRM-R scale for ages 5–9, in a paper-and-pencil format. Students were assisted by the teacher, who read each question aloud to ensure that every student could respond authentically and independently. After completing the 11 weeks of activities, the same scale was administered as a post-test (T2) to evaluate variations in levels of personal and relational resilience.

Results

To test the research hypothesis that the systematic implementation of the educational program *"I Can Become Strong!"* leads to a statistically significant increase in school resilience levels (both personal and relational), data collected at two different time points—T1 (pre-test) and T2 (post-test)—were analyzed for a sample of 42 primary school students.

The data analysis focused on three variables: personal resilience, relational resilience, and the total resilience score (calculated by aggregating the two dimensions), measured using the CYRM-R. The statistical processing of the data was subsequently carried out using SPSS Statistics 24.

Descriptive analysis

To highlight the potential effect of the *"I Can Become Strong!"* educational program, the mean scores obtained at the two measurement points—before (T1) and after (T2) the implementation of the intervention—were compared. Tables 1 and 2 provide an overview of the obtained results.

Table 1. Descriptive Statistics – Pre-test Stage (T1)

Statistics				
		Personal resilience T1	*Relational resilience* T1	*Total resilience score T1*
N	Valid	42	42	42
	Missing	0	0	0
Mean		1.8548	2.1088	1.9594
Median		1.9500	2.2143	2.0882
Mode		2.00	2.29	2.12
Skewness		-.318	-.403	-.113
Std. Error of Skewness		.365	.365	.365
Kurtosis		-.767	-.627	-1.020
Std. Error of Kurtosis		.717	.717	.717

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

Table 2. Descriptive Statistics – Post-test Stage (T2)

Statistics				
		Personal resilience T2	Relational resilience T2	Total resilience score T2
N	Valid	42	42	42
	Missing	0	0	0
Mean		2.1071	2.4014	2.2283
Median		2.1000	2.4286	2.2059
Mode		2.50	2.14	2.53[a]
Skewness		.051	-.198	-.183
Std. Error of Skewness		.365	.365	.365
Kurtosis		-1.085	-1.117	-1.108
Std. Error of Kurtosis		.717	.717	.717
a. Multiple modes exist. The smallest value is shown				

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

A comparison of the mean values from Table 1 and Table 2 reveals a consistent increase in scores across all three measured variables. Specifically: personal resilience increased from 1.85 (T1) to 2.11 (T2); relational resilience increased from 2.11 (T1) to 2.40 (T2); and the total resilience score rose from 1.96 (T1) to 2.23 (T2). These increases suggest, at a descriptive level, a

potential positive effect of the *"I Can Become Strong!"* program on students' school resilience levels.

To determine the appropriate inferential statistical test, the distribution of the data was initially examined. Given the relatively small sample size (N = 42), the Shapiro-Wilk test was applied to assess normality.

Table 3. Shapiro-Wilk Test – Pre-test Stage (T1)

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Personal resilience T1	.161	42	.008	.959	42	.136
Relational resilience T1	.140	42	.038	.955	42	.100
Total resilience score T1	.160	42	.009	.952	42	.078
a. Lilliefors Significance Correction						

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

According to the Shapiro-Wilk test results for the T1 stage, presented in Table 3, the p-values associated with the three analyzed variables (personal resilience, relational resilience, and total resilience score) are greater than 0.05. This outcome suggests that the data distribution can be considered normal, which allows, with 95% confidence, the use of parametric statistical tests to compare the values between the T1 and T2 stages of the experiment.

Table 4. Shapiro-Wilk Test – Post-test Stage (T2)

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Personal resilience T2	.113	42	.200*	.953	42	.084
Relational resilience T2	.156	42	.012	.933	42	.016
Total resilience score T2	.157	42	.011	.947	42	.050
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

The Shapiro-Wilk test results for the T2 stage, presented in Table 4, indicate that only personal resilience maintains a normal distribution ($p > 0.05$). In contrast, relational resilience ($p = 0.016$) and the total resilience score ($p = 0.050$) do not meet the normality criterion, which necessitates the use of non-parametric tests for comparing T1 and T2 values.

Given the Shapiro-Wilk test results, which indicate a significant deviation from normality for two of the variables analysed at the post-test stage, the Wilcoxon signed-rank test was applied to assess differences between T1 and T2 scores.

Table 5. Wilcoxon Signed-Rank Test Results – Personal Resilience

Hypothesis Test Summary				
	Null Hypothesis	**Test**	**Sig.**	**Decision**
1	The median of differences between Personal resilience T1 and Personal resilience T2 equals 0.	Related-Samples Wilcoxon Signed Rank Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .05.				

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

The application of the Wilcoxon signed-rank test to the variable personal resilience (see Table 5) showed a statistical significance level of 0.000, which falls below the 0.01 threshold. This result confirms a statistically significant difference between the scores recorded at T1 and T2, suggesting that students' personal resilience levels were significantly influenced by their participation in the "I Can Become Strong!" educational program.

To assess changes in personal resilience between the two measurement points, the Wilcoxon test for related samples was used.

Table 6. Summary of differences between T1 and T2 scores for the variable "Personal resilience" based on Wilcoxon signed-rank test

Wilcoxon signed-rank test – Personal resilience	
Indicator	**Value**
Total N	42
Positive Differences (N)	33
Negative Differences (N)	2
Number of Ties	7
Test Statistic	611.000
Standard Error	60.813
Standardized Test Statistic	4.867
Asymptotic Sig. (2-sided test)	0.000

Source: author's own concept

Table 6presents the results of the Wilcoxon signed-rank test applied to the variable "personal resilience." Out of the total 42 participants, 33 showed higher T2 scores compared to the T1 (positive differences), while only 2 participants had lower scores (negative differences), and in 7 cases, the scores remained unchanged. The Wilcoxon test yielded a T value of 611.000 with an asymptotic significance of p = 0.000 (two-tailed), indicating a statistically significant difference between the two evaluation points. These results suggest a significant increase in personal resilience following participation in the *"I Can Become Strong!"* program.

To assess the impact of the intervention beyond the statistical significance obtained through the Wilcoxon test, effect size estimation was performed by converting the test results into Cohen's d coefficient. The calculation process was structured in four successive steps, as shown in Table 7.

Table 7. Steps for estimating effect size (Cohen's d) based on Wilcoxon Test Values – Personal resilience

Step	**Calculated Aspect**	**Formula**	**Result**
1	Theoretical mean of T (μ_t)	$\mu_t = N(N+1)/4 = 42\times43/4$	451.5
	Standard deviation of T (σ_t)	$\sigma_t = \sqrt{[N(N+1)(2N+1)/24]} = \sqrt{[42\times43\times85/24]}$	≈ 79.96
2	Z-value	$Z = (T - \mu_t) / \sigma_t = (611 - 451.5) / 79.96$	≈ 1.994
3	Coefficient r	$r = Z / \sqrt{N} = 1.994 / \sqrt{42}$	≈ 0.308
4	Cohen's d	$d = (2r) / \sqrt{(1 - r^2)} = 2\times0.308 / \sqrt{(1 - 0.095)}$	≈ 0.648

Source: author's own concept

In line with the obtained results, the Wilcoxon test revealed a statistically significant shift in personal resilience scores between T1 and T2 ($T = 611$, $Z \approx 1.99$, $p < .05$). A medium effect size ($d \approx 0.65$) indicates a moderate degree of impact attributable to the intervention.

Table 8. Wilcoxon signed-rank test results – Relational resilience

Hypothesis Test Summary				
	Null Hypothesis	**Test**	**Sig.**	**Decision**
1	The median of differences between Relational resilience T1 and Relational resilience T2 equals 0.	Related-Samples Wilcoxon Signed Rank Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .05.				

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

The results of the Wilcoxon test applied to the relational resilience variable, presented in Table 8, indicate a statistical significance value (p) lower than 0.01. This confirms a statistically meaningful change in participants' scores from T1 to T2, indicating that relational resilience levels significantly improved following participation in the educational program. To examine potential changes between T1 and T2 scores for the relational resilience variable, the Wilcoxon signed-rank test was conducted on related samples, with results illustrated in Table 9.

Table 9. Summary of differences between T1 and T2 scores for the variable "Relational resilience" based on Wilcoxon signed-rank test

Wilcoxon signed-rank test – Relational resilience	
Indicator	Value
Total N	42
Positive Differences (N)	32
Negative Differences (N)	5
Number of Ties	5
Test Statistic	609.000
Standard Error	66.169
Standardized Test Statistic	3.892
Asymptotic Sig. (2-sided test)	0.000

Source: author's own concept

According to the data presented in Table 9, out of the total 42 participants, 32 showed positive differences (higher post-test scores), 5 exhibited negative differences, and in 5 cases, the scores were equal (ties). The statistical results obtained—T = 609.000, with a standard error of 66.169, Z = 3.892, and a two-tailed significance value of p = 0.000—indicate that the differences between the T1 and T2 scores for the variable "relational resilience" are statistically significant, with an extremely low probability that this effect occurred by chance. In other words, the implemented intervention produced a clear and significant change in the participants' level of relational resilience.

To assess the impact of the intervention beyond the statistical significance obtained through the Wilcoxon test, effect size estimation was performed by converting the test results into Cohen's d coefficient. The calculation process was structured in four successive steps, as shown in Table 8.

Table 10. Steps for estimating effect size (Cohen's d) based on Wilcoxon test values – Relational resilience

Step	Calculated Aspect	Formula	Result
1	Theoretical mean of T (μ_t)	$\mu_t = N(N+1)/4 = 42\times43/4$	451.5
	Standard deviation of T (σ_t)	$\sigma_t = \sqrt{[N(N+1)(2N+1)/24]} = \sqrt{[42\times43\times85/24]}$	≈ 79.96
2	Z-value	$Z = (T - \mu_t) / \sigma_t = (609 - 451.5) / 79.96$	≈ 1.969
3	Coefficient r	$r = Z / \sqrt{N} = 1.969 / \sqrt{42}$	≈ 0.304
4	Cohen's d	$d = (2r) / \sqrt{(1 - r^2)} = 2\times0.304 / \sqrt{(1 - 0.092)}$	≈ 0.638

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

Analysis using the Wilcoxon signed-rank test revealed a meaningful statistical variation in relational resilience scores between T1 and T2 (T = 609, Z ≈ 1.97, p < .05). A moderate effect size was observed (Cohen's d ≈ 0.64), indicating that the intervention had a measurable influence on participants' relational resilience.

Table 11. Wilcoxon signed-rank test results – Total resilience score

Hypothesis Test Summary				
	Null Hypothesis	**Test**	**Sig.**	**Decision**
1	The median of differences between Total resilience score T1 and Total resilience score T2 equals 0.	Related-Samples Wilcoxon Signed Rank Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .05.				

Source: author's own concept. Table generated using SPSS based on the analysis of raw data collected by the authors.

As shown in Table 11, the Wilcoxon test yielded a p-value of 0.000, which falls below the 0.01 significance threshold and warrants the rejection of the null hypothesis. Accordingly, a statistically meaningful difference was observed in total resilience scores between the pre- and post-intervention phases, indicating that the intervention exerted a considerable influence on students' resilience development. To determine whether notable differences existed between T1 and T2 values for the total resilience score, the Wilcoxon signed-rank test was employed for dependent samples, with the corresponding data illustrated in Table 12.

Table 12. Summary of differences between T1 and T2 Scores for the variable "Total resilience score" based on Wilcoxon signed-rank test

Wilcoxon signed-rank test – Total resilience score	
Indicator	**Value**
Total N	42
Positive Differences (N)	35
Negative Differences (N)	5
Number of Ties	2
Test Statistic	794.000
Standard Error	74.311
Standardized Test Statistic	5.167
Asymptotic Sig. (2-sided test)	0.000

Source: author's own concept

The results of the Wilcoxon signed-rank test (Table 12) applied to the total pre- and post-intervention scores for a sample of 42 participants reveal the following data: 35 students showed positive differences, 5 showed negative differences, and in 2 cases, the scores remained unchanged. The test statistics are T = 794.000, with a standard error of 74.311 and a standardized

Z statistic of 5.167. The two-tailed significance value is p = 0.000, indicating a statistically significant difference between the total scores at T1 and T2, thus confirming a clear improvement in resilience following participation in the educational program.

To assess the impact of the intervention beyond the statistical significance obtained through the Wilcoxon test, the effect size was estimated by converting the test results into Cohen's d coefficient. The calculation process was structured into four successive steps, as shown in Table 13.

Table 13. Steps for estimating effect size (Cohen's d) based on Wilcoxon test values – Total resilience score

Step	Calculated aspect	Formula	Result
1	Theoretical mean of T (μ_t)	$\mu_t = N(N+1)/4 = 42\times43/4$	451.5
1	Standard deviation of T (σ_t)	$\sigma_t = \sqrt{[N(N+1)(2N+1)/24]} = \sqrt{[42\times43\times85/24]}$	≈ 79.96
2	Z-value	$Z = (T - \mu_t) / \sigma_t = (794 - 451.5) / 79.96$	≈ 4.283
3	Coefficient r	$r = Z / \sqrt{N} = 4.283 / \sqrt{42}$	≈ 0.661
4	Cohen's d	$d = (2r) / \sqrt{(1 - r^2)} = 2\times0.661 / \sqrt{(1 - 0.437)}$	≈ 1.76

Source: author's own concept

The application of the Wilcoxon signed-rank test identified a statistically significant variation in Total Resilience Scores between the pre- and post-intervention assessments ($T = 794$, $Z \approx 4.28$, $p < .001$). A substantial effect size was observed (Cohen's $d \approx 1.76$), suggesting that the intervention had a pronounced influence on the development of students' overall resilience.

Discussions

The results obtained in this study confirm the working hypothesis that the systematic implementation of the *"I Can Become Strong!"* educational program leads to a significant increase in school resilience—both in its personal and relational dimensions—among primary school students. The significant increases observed in the mean scores for all three analysed variables (personal resilience, relational resilience, and total resilience score) suggest a positive effect of the program on children's adaptive functioning in both scholastic and social contexts.

From a theoretical perspective, these findings align with the specialized literature, which highlights resilience as a fluid and adaptable capacity rather than an innate, immutable trait—one that can be cultivated through intentional and structured educational experiences. (Masten, 2014; Grotberg, 1995; Llistosella et al., 2022). The evaluated program explicitly targeted the development of personal resources (such as self-efficacy and perseverance) and relational resources (such as social support and trust-based relationships), in accordance with validated theoretical models (Connor & Davidson, 2003; Sixbey, 2005). This is supported by the observed effect sizes—moderate for the personal and relational dimensions, and large for the total score (Cohen's d ≈ 1.76)—indicating not only statistical effectiveness but also practical relevance of the intervention.

These findings are consistent with the conclusions drawn by Gorghiu et al., (2024), who emphasized the essential role of self-efficacy and intrinsic motivation in the formation of academic resilience. Moreover, the data support the systemic perspective proposed by Masten and Barnes (2018), which states that resilience development is influenced by multiple, interconnected factors, and that effective interventions must simultaneously address both the intrapersonal level and the educational context. The increase in relational resilience scores specifically highlights the importance of supportive relationships in mediating school adjustment—a key point also emphasized by Zhang et al. (2021) and Sixbey (2005).

Beyond the empirical confirmation of the program's effectiveness, these results also address a gap identified in the specialized literature—namely, the lack of applied research focused on children in the early years of schooling (Moll Riquelme et al., 2022; Pinto et al., 2021). The early school stage is critical for the formation of academic identity and emotional regulation mechanisms, and the current data confirm that early, structured, and theoretically grounded interventions may substantially influence children's adjustment to the school environment.

In this regard, the choice of Edith Grotberg's model (*"I Am – I Have – I Can"*) as the foundation for the intervention proves to be well justified, as it integrates personal and contextual dimensions of resilience within a framework that is easily translatable into educational activities for young children. Complementarily, the IERM model (Llistosella et al., 2022) provides additional validation for the intervention structure, emphasizing the interaction between internal resources and environmental factors.

Thus, the research findings support the idea that developing resilience at an early age requires an integrated, contextualized, and empirically supported educational approach. The identified positive impact on both

dimensions of resilience suggests that educational programs incorporating socio-emotional learning components and relational support can contribute to preventing school-related vulnerabilities and promoting a balanced and adaptive educational trajectory.

Beyond the positive results obtained in this research, it is necessary to discuss a series of methodological limitations that may influence both the generalizability of the conclusions and the interpretation of their validity.

A first limitation is the small sample size (N = 42), as well as the lack of randomization. These aspects restrict the ability to extrapolate the results to larger populations and reduce the causal validity of the observed effects. In the absence of a randomized control group, a direct relationship between the intervention and the results cannot be asserted with certainty. In this regard, future studies should employ controlled experimental designs—such as the inclusion of a waitlist control group—to more clearly highlight the specific impact of the educational program.

A second limitation lies in the exclusive reliance on self-reported data from students. Although the questionnaire was administered in a structured setting, there remains a risk of social desirability bias or partial understanding of the items, particularly at a young age. To gain a completer and more objective picture of the program's impact, data triangulation—by incorporating assessments from parents and/or teachers—represents an important methodological direction for future research.

Another notable limitation is the absence of a post-intervention follow-up stage (T3). While the immediate results are promising, the lack of evaluation at 3 or 6 months after the program's conclusion makes it impossible to assess the sustainability and stability of the benefits obtained. Including such a stage would allow for analysis of the long-term maintenance of the developed skills and would enhance the validity of the intervention.

Although the "I Can Become Strong!" program is based on validated models (Grotberg, 1995; IERM – Llistosella et al., 2022), it is not entirely innovative, as similar interventions already exist and have been validated internationally, such as PATHS (Greenberg et al., 1995) and MindUP (Schonert-Reichl et al., 2015). In this sense, comparing the program's effectiveness with that of existing interventions could highlight its specific value and contribute to its validation within the Romanian educational context and beyond.

Lastly, integrating a neurobiological perspective into the analysis—for instance, by considering the reactivity of the HPA axis (hypothalamic–pituitary–adrenal)—could offer a deeper understanding of the mechanisms

underlying resilience and add value to the interpretation of the phenomenon as a complex adaptive process.

Conclusions

The research findings highlight the effectiveness of the *"I Can Become Strong!"* educational program in developing school resilience among primary school children, supporting the hypothesis that well-structured early educational interventions can significantly enhance students' adaptive capacities. The analysis of statistically relevant variations across pre- and post-intervention assessments for the three measured dimensions—personal resilience, relational resilience, and the overall resilience score—confirms the positive impact of the program, with moderate effects on individual components and a strong effect on the aggregated total score.

These results align with the specialized literature, which conceptualizes resilience as a flexible, malleable competency that is strongly influenced by educational and relational contexts (Masten, 2014; Llistosella et al., 2022). Educational programs that target the development of both intrapersonal resources (such as perseverance, self-efficacy, and emotional regulation) and relational ones (social support, relationship quality, and empathy) are theoretically validated and, considering the data obtained, also demonstrate empirical effectiveness. The theoretical model proposed by Grotberg (1995), which served as the foundation for the applied intervention, proves to be a suitable framework for designing age-appropriate activities that foster the development of functional resilience in educational settings.

The research findings emphasize the real potential of early educational interventions to support school adjustment and resilience development in children. In this regard, the *"I Can Become Strong!"* program offers an applicable intervention model, demonstrating that activities aimed at strengthening socio-emotional skills and personal resources can generate meaningful changes in students' adaptive behaviours. From a practical perspective, these findings underscore the necessity of integrating emotional education programs into the primary school curriculum—not as isolated initiatives, but as an essential component of foundational education.

Therefore, the *"I Can Become Strong!"* program contributes to preventing emotional and behavioural vulnerabilities that may arise during the transition to formal schooling and provides a best-practice model for interventions targeting school adjustment and long-term educational success. The results obtained validate both the conceptual structure of the intervention and its potential for replication and adaptation in similar educational contexts.

However, the results should be interpreted in light of certain limitations, such as the small sample size, the absence of a control group, and the exclusive reliance on self-reported data, all of which may affect the validity and generalizability of the conclusions. The lack of a post-intervention follow-up also limits the ability to assess the sustainability of the effects. In this context, future research should incorporate controlled experimental designs, long-term evaluations, and multiple data sources, as well as comparisons with other validated interventions, in order to strengthen the robustness and relevance of educational programs focused on resilience development.

Statement on the use of Artificial Intelligence (AI):

In the preparation of this manuscript, artificial intelligence (AI), specifically ChatGPT, version 4.0. was used exclusively for an initial assessment of the text's coherence and of the key elements required to be included in each section of the manuscript. These analytical elements were defined by the principal author, in accordance with the relevant literature and international publication standards. The same AI tool was also used to verify the accuracy of the English translation. Subsequently, based on the recommendations provided by the AI tool, the content was fully revised, adapted, and validated by the author without any further automated assistance.

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