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Pixel
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Pre-Literacy Skills of Children from Socially Disadvantaged Background

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Abstract

Preliteracy skills are foundational competencies that prepare children for acquiring reading and writing in primary education. These include key skills such as oral language, phonological and phonemic awareness (awareness of sounds), knowledge of the alphabet, and an understanding of basic print concepts (e.g., that print runs from left to right and from top to bottom on a page). In this study, we present the results of a diagnostic assessment of children's preliteracy skills at the end of pre-primary education. The results showed that pupils from socially disadvantaged backgrounds (SDB) scored statistically significantly lower than their peers from the majority population. For this reason, it is essential to provide intensive educational support from the very outset of schooling. However, professional development is essential for teachers to be able to provide this kind of support.

Keywords: *preliteracy skills, children, socially disadvantaged background (SDB), teacher professional development, inclusive education*

1. Introduction

The term preliteracy encompasses a wide range of knowledge, skills, and attitudes that children acquire before formally entering school, serving as prerequisites for the development of literacy ([1], [2], [3]). In this context, the term *emergent literacy* is also frequently used ([4]). Key components of preliteracy skills include phonological awareness (the ability to distinguish and manipulate language sounds), alphabetic knowledge (recognizing letters and associating them with sounds), narrative skills (the ability to tell and comprehend stories), knowledge of print conventions (e.g., reading direction, distinguishing pictures from text), and, most importantly, a positive attitude towards books and reading ([1], [2], [3]). These skills are developed through interactions with written culture within the home environment and in pre-primary education [5].

1.1 Preliteracy Skills of Children from Socially Disadvantaged Backgrounds and the Roma Population

Despite the universal importance of literacy, children from socially disadvantaged backgrounds (SDB) often face specific challenges that can substantially affect their initial conditions when entering the educational process [7]. The social environment plays a fundamental role in the development of preliteracy skills. Families with low socioeconomic status often face limited resources, resulting in fewer books and educational materials at home, as well as a restricted range of cultural and educational activities [8]. The absence of a stimulating language environment, in which children are regularly engaged in conversation, read to, and told stories, results in a smaller vocabulary, weaker phonological awareness, and reduced motivation to read. Parents having a lower-levels of education themselves, may not fully appreciate the importance of literacy and may provide less support for the development of these skills in their children. Children growing up in socially disadvantaged environments are often exposed to various risk factors that can adversely affect their cognitive and language development, and consequently, the development of their preliteracy skills [8]. These factors are complex and interrelated, resulting in significant differences in school readiness compared to their peers from more stimulating environments. In addition to low socioeconomic status, children from disadvantaged backgrounds also encounter a range of specific challenges. These often include a language barrier. In 2004, approximately 60% of the Roma population used the Roma language in daily communication [9]. Communication within the family in a language other than the language of instruction at school can hinder the acquisition of the language of instruction [9], [10]. Many Roma communities face extreme poverty, segregation, and discrimination, which is reflected in limited access to pre-school education and literacy-supporting resources. Cultural specificities, such as a strong oral tradition and limited exposure to written culture at home, can also influence the development of preliteracy skills. A bilingual environment, in which many Romani children speak Romani as their first language and Slovak as a second language, presents an

additional challenge, necessitating targeted support for students from socially disadvantaged backgrounds and the Romani ethnic group in education. Several studies clearly proved that Roma pupils achieve significantly lower scores in literacy testing than their peers from the advantaged population [11]. In this study, we focus on comparing the results from a literacy predictor test of typically developing children and children from SDB attending kindergarten. The aim of the study is to identify potential risk areas associated with the transition of children from SDB into primary education, based on the differences observed. In this study, we addressed two research questions:

1. What differences exist in the results of the literacy predictor test between advantaged children and children from SDB?
2. What proportion of children from SDB fall within the risk zone, defined by the threshold of 16th percentile according to test standards?

2. Research Methods

The construct under research was the literacy predictors assessed by the Literacy Predictors Test [xxx] Mikulajová [3]. The test is grounded in a theoretical model of the linguistic-cognitive mechanisms underlying the development of reading and writing skills. It is focused on key linguistic-cognitive skills involved in literacy acquisition. It consists of 9 subtests divided into three factors:

- F1–Language factor (F1a - speech comprehension, F1b - grammatical awareness, and F1c - oral-verbal skills);
- F2–Preliteracy factor (F2a- letter recognition, F2b - word reading, and F2c - phonemic awareness); and
- F3–Speed factor (F3a- Rapid automatic naming, F3b - symbols).

The test is a standardized tool. The test standards provide percentile norms for typically developing (advantaged) preschool children, covering the period from January to June prior to school entry.
To ensure construct validity, we compared our test results with the factor loads reported by the test authors. Confirmatory factor analysis confirmed a three-factor model that was statistically significantly consistent with the data ($\chi^2 = 45.44$, $df = 17$, $p < .001$). The model fit indices indicated a very good approximation of the original structure, with a significant difference compared to the baseline model ($\chi^2 = 334.91$ vs. …).” 45.44).
In addition to the factor overlap analysis, we examined the concordance of percentile scores within the advantaged population. However, full replication of the percentile score distribution relative to the test norms was not achieved. In our testing, deviations from the norms were observed in five of the nine subtests, specifically in speech comprehension, grammatical awareness, phonemic awareness, and memory for numbers and symbols. In all cases, scores were overestimated—the results of advantaged children exceeded the values indicated by the test norms. The p-value ranged from 0.024 to 0.034. The effect size was verified using the Rank-biserial correlation, yielding values ranging from r = 0.83 to 0.88. The normality of the result distributions was analyzed separately for the advantaged group (n = 166) and the group with special educational needs (SEN; n = 34). The assessment was conducted using a combination of graphical methods (histograms, Q–Q plots) and formally via the Shapiro–Wilk test. The results indicated that six of the nine subtests exhibited statistically significant deviations from normality ($p < 0.05$), with the most pronounced deviations observed in the word reading, symbols, and oral–verbal skills subtests. For this reason, group comparisons were not restricted to parametric procedures only, but robust non-parametric alternatives were also employed.
Data evaluation regarding the research questions was performed using several descriptive, as well as inferential methods. Children’s performance on the subtests was expressed using the parameters of mean values and variance. We also summarized the performances through the median value. When calculating the mean values, we supplemented the calculations with interval estimates calculated at a significance level of 95%. The magnitude of intergroup differences was expressed using a standardized score measure, specifically Hedge’s g parameter score. Intergroup statistical differences were calculated using two-sample t-tests; in strongly nonparametric cases, the results were supplemented with the nonparametric Mann–Whitney U test.

2.1 Research Sample Attributes

The research was conducted on a sample of 200 participants. The participants were preschool-aged children attending kindergarten, including those with a delay in school entry. These children were seven years old at the time of testing. The sample was divided into two groups: advantaged children (N = 166) and children from socially disadvantaged backgrounds (N = 34). The sample was selected by convenience sampling. Students participated in the data collection, and the sample included children from various kindergartens. Data was collected from 2019 to 2023 annually from January to June in

accordance with the methodology of the literacy predictor test used [3]. No significant difference in age distribution between the two tested groups was observed, the test result was χ^2 (2, N = 120) = 7.84, p = .020.

Table 1. Characteristics of the Study Sample of Children by Age Distribution

	age (years)			
group	5 years	6 years	7 years	Total
advantaged children	61	101	4	166
children from SDB	11	21	2	34
Total	72	122	6	200

3. Results

We present the results in the order of the research questions posed. The first research question addressed the differences in literacy predictor test results between the two groups of children. The findings on intergroup differences are presented in two steps: (1) a comparison of children's performance on the test according to the test factors (Tables 2 and 3); and (2) a comparison of children's performance on individual subtests, presented further in the text through tables and charts (Tables 4, 5, 6 and Chart 1).

3.1. Comparison of Literacy Predictor Test Results Between Children from Socially Disadvantaged Backgrounds (SDB) and Advantaged Population

The results of descriptive (Table 2) and inferential factor analyses indicate significant differences between advantaged children and children from SDB across all three monitored factors.

Table 2. Performance of Advantaged Children and Children from SDB: Test Factor Perspective

	language factor (F1)		preliteracy factor (F2)		speed factor (F3)	
	advantaged children	children from SDB	advantaged children	children from SDB	advantaged children	children from SDB
Valid	166	34	166	34	166	34
Median	28.00	20.25	29.00	12.00	21.00	16.00
Mean	28.47	19.58	28.14	12.79	20.49	14.94
95% CI Mean Upper	29.45	22.27	29.73	15.10	21.04	16.64
95% CI Mean Lower	27.49	16.88	26.54	10.46	19.93	13.24
Std. Deviation	7.71	6.39	10.43	6.62	4.87	3.64
P-value of Shapiro-Wilk.	< .001***	0.433	0.004***	< .001***	< .001***	0.353

Note: The assumption of normality was not met in several tested subgroups, specifically in subgroup factor F1 – advantaged children; factor F2 – children from SDB, as well as advantaged children; and factor F3 – advantaged children. The skewness of the data was below 2 in all cases of deviation from normality, except for factor F2 – advantaged children, where the skewness value was 2.257. Kurtosis values were below 2 in all cases, except for factor F3 – advantaged children (kurtosis = 2.676) and factor F2 – children from SDB (kurtosis = 6.350).

On the language factor (F1), advantaged children achieved higher mean (M = 28.47) and median (Me = 28.50) scores than children from SDB (M = 19.57; Me = 20.25). The confidence intervals (95% CI [27.49; 29.45] for advantaged children vs. [16.88; 22.27] for children from SDB) prove that these differences are robust and not subject to overlap. A similar pattern was observed for the preliteracy factor (F2), with advantaged children achieving a mean score of M = 28.14, compared to M = 12.79 for children from SDB. The difference is also significant for the median values (Me = 29.00 vs. Me = 12.00) and is supported by 95% confidence intervals (95% CI [26.54, 29.73] vs. [10.49, 15.10]). The greatest dispersion of results was observed in the speed factor (F3), with advantaged children achieving a mean of M = 20.49 (Me = 21.00), compared to children from SDB, who achieved M = 14.94 (Me = 16.00). The confidence intervals (95% CI [19.93; 21.04] for advantaged children vs. [13.24; 16.64] for children from SDB) indicate statistically significant differences. These differences have been confirmed by inferential statistics (Table 3). A significant difference was observed in the language factor

(t(198) = -7.13, p < .001), with an effect size of Hedges' g = -1.34, indicating a very strong effect. Even greater differences were observed in the preliteracy factor, with t(198) = -8.24, p < .001 and Hedges' g = -1.55, indicating the strongest effect among the three factors. For the speed factor, the difference was again significant, t(198) = -7.60, p < .001, with an effect of Hedges' g = -1.43.

Table 3. Inter-Factor Differences Between Advantaged Children and Children from SDB: Comparison of Performance Using Standardized Scores

	t-test	df	p-value	Hedges´g
language factor (F1)	-7.125	198	< .001***	-1.336
preliteracy factor (F2)	-8.236	198	< .001***	-1.545
speed factor (F3)	-7.604	198	< .001***	-1.426

These results clearly demonstrate that advantaged children consistently outperform children from SDB across all monitored factors, with the largest differences observed in factor F2 – preliteracy skills. At the same time, analysis of standard deviations indicates greater variability in performance among children from SDB (e.g., SD = 7.71 for the language factor vs. SD = 6.39 with advantaged children), suggesting a more heterogeneous profile of their results. Overall, the differences between the groups are statistically highly significant and demonstrate a very strong practical effect.

3.2 Results of Data Analysis Based on Individual Subtests

In the second step, as part of addressing the first research question, we compared children's performance across the individual subtests of the test. Children's performance on the subtests is presented in Tables 4, 5, and 6. Intergroup differences are presented using the effect size parameter Hedges' g (Chart 1). This parameter represents the standardized magnitude of the difference between the compared groups and includes a correction for small sample sizes. Hedges' g is interpreted as the number of standard deviations by which the groups differ from one another. Based on the results presented in Tables 4–6, the differences in performance between advantaged children and children from SDB can be described across the three monitored factors: language (F1), preliteracy (F2), and speed factor (F3).

Within the language factor (Table 4), advantaged children achieved higher mean scores across all subtests. In the Speech Comprehension subtest, advantaged children achieved a mean score of 8.21 points (95% CI = 7.61–8.82), compared to 6.09 points (95% CI = 5.29–6.89) for children from SDB. Similarly, for the Grammatical Awareness subtest, advantaged children achieved a mean score of 6.62 (95% CI = 5.83–7.44), compared to 4.06 (95% CI = 3.43–4.68) for the SDB group. The most significant difference was observed in the Oral and Verbal Praxia subtest, with advantaged children achieving 12.57 points (95% CI = 12.17–12.97), compared to 9.76 points (95% CI = 9.57–9.97) for children from SDB.

Table 4. Performance of Advantaged Children and Children from SDB: Individual Subtests (Language Factor)

	speech comprehension		grammatical awareness		oral and verbal praxia	
	advantaged children	children from SDB	advantaged children	children from SDB	advantaged children	children from SDB
Valid	166	34	166	34	166	34
Median	8.00	4.00	8.00	4.00	13.00	12.00
Mean	7.91	4.21	7.98	4.63	12.57	10.74
95% CI Mean Upper	8.22	5.13	8.56	5.83	12.97	11.90
95% CI Mean Lower	7.61	3.29	7.40	3.43	12.17	9.57
Std. Deviation	2.00	2.64	3.97	3.44	2.61	3.33

In the preliteracy factor (Tab. 5) we see similar trends. In reading letters, the average score for advantaged children was 11.45 (95% CI = 10.37–12.52), while for children from SDB it was only 2.73 (95% CI = 1.18–4.27). In reading words, the difference was even greater – advantaged children achieved 8.79 (95% CI = 8.54–9.05), while children from SDB achieved only 0.09 (95% CI = –0.06–

0.24). In the phonological awareness subtest, the performance of advantaged children was 11.31 (95% CI = 10.86–11.76), while in children from SDB it was only 6.71 (95% CI = 5.87–7.55).

Table 5. Performance of Advantaged Children and Children from SDB: Individual Subtests (Preliteracy Factor)

	reading letters		reading words		phonological awareness	
	advantaged children	children from SDB	advantaged children	children from SDB	advantaged children	children from SDB
Valid	166	34	166	34	166	34
Median	11.00	1.50	0.00	0.00	12.00	6.00
Mean	11.45	2.74	0.79	0.06	11.31	6.71
95% CI Mean Upper	12.52	4.29	1.04	0.18	11.76	7.55
95% CI Mean Lower	10.37	1.18	0.54	-0.06	10.86	5.87
Std. Deviation	7.02	4.45	1.61	0.34	2.95	2.41

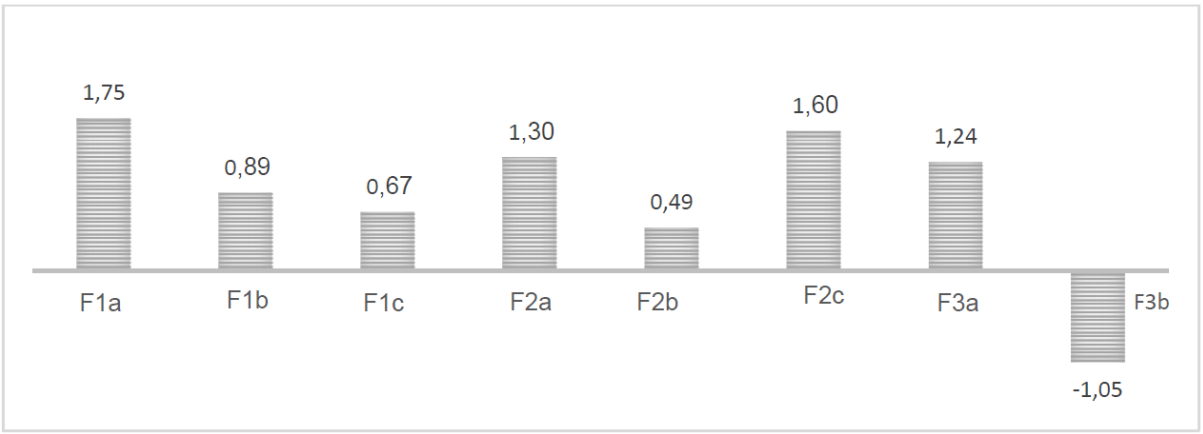
Speed factor (Tab. 6) highlighted the differences, especially in RAN. In the symbol subtest, advantaged children scored 15.93 points (95% CI = 14.79–17.07), while children from SDB scored 7.24 (95% CI = 6.18–8.31). On the reverse-scored RAN_R subtest, advantaged children achieved a mean score of 61.17 (95% CI = 58.13–64.21), indicating a shorter completion time and therefore better performance than children from SDB, who scored 84.91 (95% CI = 73.67–96.15).

Table 6. Performance of Advantaged Children and Children from SDB: Individual Subtests (Speed Factor)

	symbols		RAN (R)	
	advantaged children	children from SDB	advantaged children	children from SDB
Valid	166	34	166	34
Median	15.00	7.00	59.00	71.50
Mean	15.93	7.24	61.17	84.91
95% CI Mean Upper	17.08	8.62	64.21	96.16
95% CI Mean Lower	14.79	5.86	58.13	73.67
Std. Deviation	7.46	3.98	19.82	32.22

Note: The RAN (R) subtest was reverse-scored, with higher scores indicating poorer performance.

Overall, in all three factors the differences between the groups were significant, with advantaged children consistently achieving higher mean values and narrower confidence intervals, indicating their higher level of language, literacy and speed skills compared to learners from SDB. Intergroup differences between advantaged children and children from SDB were also confirmed using the Hedges' g effect index.



Legend: F1–Language factor (F1a - speech comprehension, F1b - grammatical awareness, and F1c -oral-verbal skills); F2–Preliteracy factor (F2a- letter recognition, F2b - word reading, and F2c - phonemic awareness); and F3–Speed factor (F3a- Rapid automatic naming, F3b - symbols).

Fig. 1. Differences in Subtest Performance between Advantaged Children and Children from SDB (Hedges' g)

The largest effect was observed in the speech comprehension subtest, with Hedges' g = 1.745 ($t = 9.306$, $p < .001$), indicating a highly significant difference between the groups. Similarly strong effects

were found for phonological awareness (g = 1.600, t = 8.534, p < .001) and reading letters (g = 1.303, t = 6.947, p < .001). High effect sizes were also observed in the symbols subtest (g = 1.237, t = 6.598, p < .001), confirming a significant difference in performance. Medium effect sizes were found for grammatical sense (g = 0.893, t = 4.762, p < .001) and for oral and verbal praxia (g = 0.666, t = 3.553, p < .001). The lowest effect was observed in reading words (g = 0.493, t = 2.628, p = .005), although it was still statistically significant. The RAN_R subtest has a specific position, as its reverse scoring means that a longer completion time indicates actually a lower performance. The effect in this subtest was in the opposite direction (g = –1.057; t = –5.638, p < .001), further confirming the significant disadvantage of the SDB group.
Overall, the effect sizes across the subtests ranged from medium to very large values, with all differences reaching statistical significance. These findings are consistent with, and further supported by, the graphical visualization of the Hedges' g index.

3.3 Results of Data Analysis in Relation to Percentile Norms

The second research question addressed the extent to which children from SDB lag behind advantaged children in their performance. In this analysis, we focused on the 16th percentile performance threshold in the subtests for advantaged children, examining how many children from SDB scored below this benchmark. We selected the 16th percentile because the authors of the Literacy Predictor Test regard it as the threshold distinguishing normative from subnormative performance.

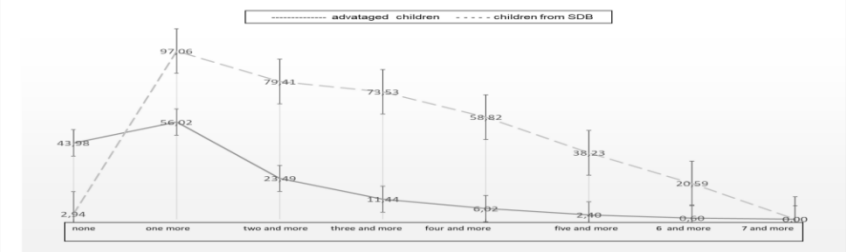


Fig. 2. Cumulative Percentages of Children in the Subnormative Range: Comparison of Advantaged Children and Children from SDB

Chart 2 compares advantaged children with those from SDB by the number of subtests scored below the 16th percentile. While 44% of advantaged children had no low scores, only 3% of SDB children did. Nearly all SDB children (97%) had at least one subtest below the threshold, compared with 56% of advantaged children. The gap widened with more deficits: two or more subtests (23% vs. 79%), three or more (11% vs. 74%), and at higher levels the difference was striking—four or more (6% vs. 59%), five or more (2% vs. 38%), and six or more (1% vs. 21%). Overall, impairments were rare among advantaged children, who mostly clustered in the zero or low-risk range, while SDB children showed widespread and systematic deficits, even at moderate risk levels.
Analysis of the cumulative risk index revealed statistically significant differences between advantaged children and children with SEN. The chi-square test results indicated that the distribution of the number of subtests below the threshold differed significantly between groups ($\chi^2(6) = 75.80$, $p < .001$), with an effect size of Cramer's V = 0.62, representing a strong association. While only 6.0% of advantaged children had test score impairments in four or more subtests, this proportion reached 58.8% among the children from SDB. The odds ratio analysis indicated that children from SDB were over twenty times more likely to fall into this risk category compared to advantaged children (OR = 22.3). This result is clearly illustrated in the graph, which shows that test score impairments among advantaged children are limited to individual subtests, whereas children from SDB exhibit a systematic accumulation of subnorm test scores. The combination of descriptive and inferential analysis data confirms that children from SDB experience more widespread and severe language-cognitive difficulties than advantaged children.

4. Discussion

Our findings corroborate the conclusions of several previous studies. Dolean [12] as well as McIntosh et al. [13] found that the phonological awareness of Romani children is significantly lower than that of their non-Roma peers. We agree with the recommendation of Dolean [12] that support for the development of phonological awareness in children from SDB should begin before the 1st grade. Our research also confirmed the findings of Melby-Lervåg and Lervåg [10, 14], showing that Romani children—who can also be considered as coming from a bilingual environment—exhibit a substantial deficit in language comprehension (aggregate effect size: d = −1.12). Our research showed that nearly 60% of children from SDB achieved statistically significantly lower scores in four or more of the nine

subtests. It is therefore essential to focus on the comprehensive development of linguistic and cognitive skills, as concentrating on a single area, such as phonological awareness, may not be effective at all. McIntosh et al. [13] refer to several studies [15, 16], which demonstrated that although phonological awareness improved significantly immediately after completing the intervention program, this did not translate into higher literacy levels two years later. Effective interventions for Romani children should consider these specificities and adopt integrated approaches that combine comprehensive language support, culturally sensitive pedagogical methods, and active involvement of parents and the community. Dolean et al. [12] emphasize the need for early educational interventions, and Heckman [17] reports that early interventions targeting the development of children from SDB yield much higher returns than interventions applied at a later age, such as reducing child–teacher ratios or providing tuition subsidies. His conclusions also indicated that society often underinvests in the early development of this group.

Currently, changes in Slovak school legislation since 2021 can also be seen as a form of support for the development of children from SDB. This includes, for example, the introduction of compulsory pre-primary education for all five-year-old children—one year before the start of formal schooling—as well as the implementation of support measures within school practice, which teachers are expected to provide to children and learners directly in the school environment.

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