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ASSESMENT OF PRELITEARACY COMPETENCE IN CHILDREN AGED 5-7 AND EARLY READING ABILITIES

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Abstract
Several authors claim that literacy competences and early reading abilities are correlated. Following the example of foreign and domestic established instruments or tools, developed to assess the preliteracy competence of children aged 5-7, a new Slovenian test of preliteracy competence (PPZ) have been developed. In this study we analyze the correlations between the early reading abilities, assessed with the test of early reading abilities (Jurišić, 2001), and the preliteracy competence, assessed with the instrument PPZ. The analysis was conducted on 307 children aged 5 to 7. The regression analysis showed that the abilities of phoneme deletion, identification of the first sound, phoneme analysis, recalling the words on a certain phoneme and the ability to discriminate similar phonemes gave the greatest predictive values for success in early reading abilities.

Keywords: preliteracy competence, dyslexia, early detection

Introduction

Reading is a fundamental ability in modern societies, yet many children and adults struggle with reading. This has far-reaching negative consequences for personal development and professional success. Children who can read well perform better at school, achieve a higher level of education, are less likely to suffer from illness, are less likely to be imprisoned or to be affected by poverty, are more likely to find employment and earn a higher average income as adults than children who cannot read (Cree et al., 2012).

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Reading is a complex process that requires the automatic integration of multiple cognitive and linguistic abilities. A child's success in reading also depends on the development of their preliteracy competences. The preschool period is a time of development of some general and specific abilities, e. g. visual abilities, phonological awareness, short-term memory, where we distinguish between visual-spatial short-term memory and auditory short-term memory, and rapid recall of words from the mental lexicon. Phonological awareness refers specifically to the ability to manipulate sounds in spoken language and has been repeatedly linked to success in early reading (Murphy et al., 2020, Saiegh-Haddad et al., 2020; Zugarramurdi, et al., 2022). The storage, processing, and use of phonological information while reading depend on working memory. Phonological working memory plays an important role in integrating new information into existing information. Lytinen (2009) mentions that early indicators of reading disability are atypical speech processing and impaired perception of speech signals (first year of life), slower development of phonological skills (third year), difficulty in recalling speech responses to visually familiar stimuli, and delayed development of and disinterest in memorising letter names (after age 5). While speech processing deficits are most consistently found in dyslexic individuals, is considered to be a heterogeneous condition that may also relate to other domains, such as vision or attention.

Early identification and support has been shown to improve both the academic and emotional well-being of individuals with or at risk for developmental dyslexia and may even prevent the onset of reading difficulties (e.g. Al Otaiba et al., 2009).

Purpose and aim of the research

We design a test battery to assess preliteracy competence in children aged 5 to 7 years. With our study we want to find out how preliteracy competences are related to early reading abilities and which variables of the preliteracy test best predict reading difficulties.

Methods

Participants

The sample consisted of 307 Slovenian speaking children attending the last year of kindergarten and the first year of primary school (155 boys and 152 girls). The age of the children ranged from 5 to 7 years.

Table 1 shows the proportions of children in four age groups. In the sample, we did not include children with special needs who receive special educational services.

Table 1. Proportion of children by age and gender.

Age group	Number of children	Number of boys	Number of girls
5,0–5,5	58	31	27
5,6–6,0	78	39	39
6,1–6,5	85	41	44
6,6–7,0	86	44	42
Total	307	155	152

Instruments

Test of preliteracy competence

We have developed a test of preliteracy competence comparable to well-established foreign and Slovenian instruments or tools containing variables related to literacy. The designed instrument has as models the Cognitive Profiling System (COPS) (Singelton, Thomas, & Leedale, 1996), the test of cognitive skills for preschool children (Prove di abilita' cognitive per la Scuola dell'infanzia (PAC-SI) (Scalisi, Pelagaggi, Fanini, Desimoni, & Romano, 2000), test of phonological awareness (Magajna, 1996), special needs assessment profile (SNAP) (Weedon & Reid, 2010) and Acadia test of develop mental abilities (Atkinskon et al., 1972). The test of preliteracy competence includes 16 subtests and covers seven dimensions of preliteracy abilities: a first level of phonological awareness (three subtests: identifying the rhymes, syllable synthesis and syllable analysis), a second level of phonological awareness (three subtests: identifying first sound, phoneme discrimination and phoneme analysis), a third level of phonological awareness (one subtest: syllable/phoneme deletion), rapid recall of verbal information (two subtests: rapid automatic naming and recalling words), auditory short-term memory (three subtests: auditory short-term memory with visual support, auditory short-term memory for digits and auditory short-term memory for sentences), visual discrimination abilities and memory (three subtests: visual discrimination, short-term visual memory and short-term visual-spatial memory). Table 2 shows a list of dependent variables and description of the measurement. The reliability of the test of preliteracy competence was tested with

Cronbach's alpha coefficient. The entire test of preliteracy competence showed good reliability: Cronbach's alpha coefficient was 0.87. The reliability of the dependent variables was good, with the exception of the speed of visual discrimination and recall of words to a given term, for which the person coefficient of discrimination was very low ($r \leq 0.20$), so we excluded these two variables from further analysis.

Table 2: Description of dependent variables of test of preliteracy competence.

Dependent variables	Symbols for variables	Description of the measurement
Subtest of preliteracy competence		
Identifying the rhymes	IDRHYM	Four words, presented with pictures, are given child. Only one word rhymes with the middle word. The child must find the word. The maximum score is 10 points. The subtest includes 10 items.
Syllable synthesis	SYNSYL	While listening, the child blend syllables together to form a word and pronounces it. The subtest includes 10 items: 1 word has one syllable, 4 words have two syllables, 3 words have 3 syllables and 2 words have four syllables. The maximum score is 10 points.
Syllable analysis	ANALSYL	The child divides each word into syllables. The subtest includes 10 items: 1 word has one syllable, 4 words have two syllables, 3 words have three syllables and 2 words have four syllables. The maximum score is 10 points.
Identifying first sound	IDFSOUND	The child must select one of four pictures that matches the picture shown above in the first sound. The subtest includes 10 items. The maximum score is 10 points.
Phoneme	PHONDIS	The child has to discriminate

discrimination		minimal pairs of words. The words are introduced with pictures. Then a fox and a bear appear one after the other, and try to repeat each word. The child must say which animal correctly repeats the word presented. The subtest includes 10 items. The maximum score is 10 points.
Phoneme analysis	PHONANAL	The child must break down given words into phonemes. The subtest contains 10 items: 5 words with one syllable and 5 words with two syllables. The maximum score is 10 points.
Syllable/phoneme deletion	DELSYPH DELSY DELPH	The child is told a word without meaning and is also told which syllable or phoneme is to be removed. The subtest includes 10 items: 4 items in which a syllable needs to be removed, and 6 items in which a phoneme needs to be removed. The maximum score is 10 points.
Visual discrimination: speed accuracy	VISDISS VISDIDA	From the 84 symbols, the child must find all the symbols that are identical to the 2 given symbols. Speed and accuracy are important for the solution: we count how many symbols can the child process in one minute, and how many lines are resolved appropriately.
Short-term auditory memory with visual support	STAMVS	For each group of animals, the child is told in which order they have arrived at their destination. From five animals, the child selects the corresponding animals and places them on the podium in the correct order. The subtest includes a row of two animals, a row of three animals, and a row of

		four animals. The maximum score is 6 points.
Auditory short-term memory - digits	AUSTMD	We pronounce a certain sequence of numbers in a row and the child has to repeat the sequence in the same order. The subtest includes 6 items: 3 sequences with three numbers, 2 sequences with four numbers, and one sequence with five numbers. The maximum score is 10 points.
Auditory short-term memory - sentences	AUSTMS	The child hears sentences. The child must give an answer to each sentence, true or false. After a series of sentences, the last word of each sentence must be repeated in the correct order. The subtest comprises 2 sets of two sentences and the same number of sets of 3 sentences. The maximum score is 10 points.
Short-term visual memory	STVISM	After the child has been shown a particular symbol, he or she must circle the one he or she has seen from the set of symbols. The difficulty increases with the number of symbols shown (from one to three) and the length of the symbols chosen. There are two examples for each sequence. There are 6 tasks in total. The maximum score is 12 points.
Short-term visual-spatial memory	STVSM	A computer presentation shows the path of a mouse. The child connects the holes in the correct order. The difficulty increases with the length of the mouse's route. At first it only reaches one point, in the eighth test it reaches four points. Each difficulty level has

		two tasks. There are 8 tasks in total. The maximum score is 20 points.
Rapid automatized naming	RAN	The child must name five different objects as quickly as possible, in different order and divided into 6 rows (30 objects repeated several times); the child must also name all the objects accurately. Meanwhile, the time is measured (in seconds).
Recalling the words on: - a certain phoneme - a certain term	REWPH REWT	The child has 1 minute to name as many words as possible beginning with the letter P. In the second part, the child has one minute to name all the foods he or she knows. Each word is worth 1 point.

Test of early reading abilities

The Test of Early Reading Abilities – TERA (Jurišić, 2001) was originally developed for children aged 5-6 years. S. Pečjak (2010) considers it suitable for testing the early reading abilities of children before they start school (from the age of 4) and for children under the age of 8. The test consists of 20 items that test the following abilities: reading speed, decoding of words, letter recognition, concept of print, environmental print in the community and at home. Table 3 shows the dependent variables and the measures described. The test has adequate measurement properties. The reliability coefficient for the entire test is 0.88.

Table 3: Description of dependent variables of test of early reading abilities.

Dependent variables	Symbols for variables	Description of the measurement
Environmental print in home	EPH	The child must identify the toy logo and the candy logo (task 6) and the Lego brick logo (task 1). Each task is worth 1 point, so a total of 2 points can be achieved.
Environmental print in community	EPC	The child must identify the name of the store (task 3) and the word 'stop' (task 12). Each task is worth 1 point, so a total of 2 points can be achieved.
Concept of print	CP	The child shows us the reading direction (task 4), shows us where the story begins and ends (task 8), tells us that the envelope has an address (task 7) and finds the same words in the text (task 10). Each task is worth 1 point, so a total of 4 points is possible.
Letter recognition	LR	The child must name the letters (tasks 5 and 16), recognise the words (task 9), identify the word in the picture (task 11) from the three printed words and distinguish letters from other graphic symbols (task 2). Each task is worth 1 point, so a total of 5 points is possible.
Decoding of words	DW	The child is tested on reading short sentences (task 19), reading short words without a picture (task 18), matching words to a picture (task 13), solving rebus puzzles (task 17), matching words to a picture (task 14) and identifying a word among three similar words (task 15). Each task is worth 1 point, so the total score can be up to 6 points.
Reading speed	RS	The child must read the words written in capital letters as quickly as possible and name the colours and numbers (task 20). The words are written in five

		lines, with each line containing four words, making a total of 20 words. In this task, the child receives the number of points corresponding to the number of words read in 10 seconds. If there are more than 4 words, the child receives 4 points.

The predictive power of the subtests of preliteracy competence

Regression analysis was used to test the predictive power of the individual subtests of the test of preliteracy competence on the overall score of the test of early reading abilities, which has a high discrimination coefficient of 0.94, which indicates that it discriminates well between children according to their level of early reading development. The stepwise method was used to select the predictive variables.

Table 4: Regression analysis model details

Model	R	R^2	F	p
1	0,776a	0,602	461,756	0,000
2	0,846b	0,716	383,633	0,000
3	0,872c	0,761	321,132	0,000
4	0,884d	0,781	269,238	0,000
5	0,887e	0,786	220,977	0,000

Table 4 shows that the inclusion of phoneme deletion in step 1 explains about 60% of the variance in the early reading ability of children aged 5-7 years (R^2 = 0.602). Better phoneme deletion is associated with better early reading abilities (multiple correlation coefficient R = 0.776). The inclusion of a second subtest, the identification of the first sound, increases the proportion of variance explained by 11%. A second regression model, which includes phoneme deletion and recognition of the first sound, explains about 72% of the variability in early reading ability (R^2 = 0.716). The third regression model, which includes the phoneme analysis subtest in addition to the first two subtests, explains 76% of the variability in early reading ability (R^2 = 0.761). The fourth regression model, which in addition to the first three subtests includes the subtest recalling words on a specific phoneme, explains 78% of the variability in early reading ability. The inclusion of the subtest phoneme discrimination to the above mentioned subtests explains 78.6% of the variability in early reading ability. The change in the explained variance is

statistically significant in all five models ($p \leq 0.05$). Therefore, the ability of phoneme deletion, identification of the first sound, phoneme analysis, and recalling the words on a certain phoneme can be used to predict children's early reading ability. Our prediction was (statistically significantly) better when we included the ability to discriminate similar phonemes in addition to the four abilities listed above.

Table 5: Table of regression model coefficients

Model		Non-standardised coefficients		Standard-ised coefficient	t	p
		Beta	Stand-ard error	Beta		
1	Phoneme deletion	0,776	0,036	0,776	21,489	0,000
2	Phoneme deletion	0,564	0,036	0,564	15,642	0,000
	Identifying first sound	0,399	0,036	0,399	11,051	0,000
3	Phoneme deletion	0,423	0,038	0,423	11,097	0,000
	Identifying first sound	0,280	0,037	0,280	7,604	0,000
	Phoneme analysis	0,311	0,041	0,311	7,508	0,000
4	Phoneme deletion	0,342	0,040	0,342	8,648	0,000
	Identifying first sound	0,237	0,036	0,237	6,562	0,000
	Phoneme analysis	0,280	0,040	0,280	6,977	0,000
	Recalling the words on a certain phoneme	0,195	0,037	0,195	5,285	0,000
5	Phoneme deletion	0,343	0,039	0,343	8,751	0,000
	Identifying first sound	0,223	0,036	0,223	6,162	0,000

	Phoneme analysis	0,264	0,040	0,264	6,571	0,000
	Recalling the words on a certain phoneme	0,196	0,037	0,196	5,349	0,000
	Phoneme discrimination	0,075	0,028	0,075	2,626	0,009

Based on the partial correlation coefficients (beta) and their significance level (p) (Table 5), it can be concluded that the ability to delete the phoneme of the word without meaning, to identify the first sound, to segment the word into phonemes and to recall a word on a certain phoneme are significantly related to the test of early reading ability. Our study shows that these subtests predict children's early reading ability. The more complex phonological abilities, awareness or recognition of phonemes and their manipulation have the highest predictive value for success in early reading. The values of the correlation coefficients show that children's early reading ability is also statistically significantly related to the ability to discriminate phonemes. The effect of this ability is smaller ($B < 0.10$), but statistically significant ($p < 0.05$) compared to the first four abilities. Based on the results of the study, it can be assumed that the above-mentioned abilities of phonological awareness and recalling words on a certain phoneme contribute to better early reading ability. Knowledge of the five subtests of the test of preliteracy competence can predict an individual's early reading ability.

Correlation between subtest of preliteracy competence

Table 6 shows the relationships between the variables of the test of preliteracy competence (together with the variables of the early reading abilities test).

As expected, most of the subtests of preliteracy competence are statistically significantly correlated with each other. The exceptions are visual discrimination speed and recalling the words on a certain term, which do not correlate statistically significantly with the other subtests of preliteracy competence, or these associations are extremely small (less than or equal to 0.23). Comparing the results by age, we find that there are no differences in the development of these two abilities between younger and older children. Our study

shows that the speed of visual discrimination has no influence on the accuracy of visual discrimination. We found that the retrieval of words related to a certain term from long-term memory was not significantly related to phonological awareness and short-term memory.

The highest correlations between the individual subtests of preliteracy competence were found for the subtest syllable/phoneme deletion of the non-word and phoneme deletion with phoneme analysis ($r = 0.66$) and recalling words to a certain phoneme ($0.65 \leq r \leq 0.63$). This suggests that awareness and manipulation of word components (phonemes and syllables) are associated with the recall of words on a particular phoneme. The child must be able to manipulate the phonemes and syllables in words in order to recall a word with a certain phoneme. In the phoneme analysis subtest, high correlations were found with identifying the first sound ($r = 0.63$) and with recalling words on a particular phoneme ($r = 0.57$). This means that the child must be able to identify the first sound in a word and break the word down into phonemes in order to remember the words on a particular phoneme. There are also high correlations for the subtest identifying first sound with recalling the words on a certain phoneme ($r = 0.54$) and with auditory short-term memory with visual support ($r = 0.53$). This shows that recognising the first sound in a word is a prerequisite for recalling a word on a certain phoneme, which in turn depends on the child's auditory short-term memory. Higher correlations were also found for auditory short-term memory with visual support with the subtest on auditory memory for digit sequences ($r = 0.47$), suggesting that auditory memory with visual support and memory for digits are linked through the function of phonological memory. The ability to remove a phoneme is more strongly associated with phoneme analysis and recalling a word on a certain phoneme than with deletion of syllables. The strongest correlation is between higher level phonological awareness abilities (which include phoneme analysis, first sound identification and phoneme/syllable deletion), recalling the words on a certain phoneme and auditory short-term memory for digits and words. Visual discrimination accuracy showed the highest correlation ($r = 0.47$) with the visual memory subtest. The subtest auditory short-term memory – sentences showed the highest correlation ($r = 0.50$) with the recall of words on a certain phoneme.

In our sample (Table 6), we found that syllable synthesis and analysis as well as phoneme discrimination are only weakly

correlated (r ≤ 0.32) with each preliteracy ability. Similarly, rapid automatic naming is weakly correlated (r ≤ -0.35) with the other preliteracy competences.

The link between the subtests of preliteracy competence and the test of early reading abilities

Table 6 shows the associations between the subtests of the preliteracy competence test and the early reading abilities test. In our sample, all subtests of the preliteracy competence, with the exception of the words on a certain term, formed statistically significant associations with the early reading abilities at the 5% risk level. Strong associations were found with phoneme deletion (r = 0.78), phoneme analysis (r = 0.76), syllable/phoneme deletion (r = 0.77), identifying first sound (r = 0.70), recalling the words on a certain phoneme (r = 0.70), and syllable deletion (r = 0.64). The test of early reading abilities in our sample formed moderate correlations with the following subtests of the test of preliteracy competence: auditory short-term memory - digits (r = 0.41), visual discrimination - accuracy (r = 0.50), identifying the rhymes (r = 0. 48), auditory short-term memory - sentence (r = 0.48), short-term auditory memory with visual support (r = 0.52), short-term visual-spatial memory (r = 0.42), short-term visual memory (r = 0.39) and rapid automatic naming (r = -0.40). The subtests of the preliteracy competence test that show strong and moderate associations with the test of early reading abilities are most strongly associated with word decoding and letter recognition. In addition to these abilities of the test of preliteracy competence, the phoneme/syllable deletion forms a strong correlation with reading speed.

Given the complexity of deleting phonemes or syllables from a non-word, it is understandable that the strongest correlation is with reading speed. To move from decoding words to reading faster, a child must master phonological awareness and have a good working memory. We found that the phoneme deletion variable has a stronger correlation with reading speed and total score on the early reading ability test than the syllable deletion variable. From this we can conclude that it is even more important for the child to be able to delete phonemes from words at the beginning of reading than to delete an entire syllable. This is because a syllable is a natural unit of articulation, whereas a phoneme is an abstract linguistic unit that is acquired through learning the language. Awareness and

manipulation of the smallest units of language is the most important ability in learning an automatic reading technique.

We found that syllable synthesis and analysis and phoneme discrimination were weakly correlated ($r \leq 0.35$) with the test of early reading abilities. The subtests speed of visual discrimination and recalling the words on a certain term form an insignificant ($r \leq 0.16$) correlation with the test of early reading abilities.

Table 6: Corelation matrix

	IDRHYM	SYNSYL	ANALSYL	IDFSOUND	PHONDIS	PHONANAL	DELSYPH	DELPH	DELSY	VISDISS	VISDIDA	STAMVS	AUSTMD
IDRHYM		417**	290**	524**	298**	466**	388**	369**	360**	110	392**	462**	302**
SYNSYL	417**		213**	255**	243**	261**	217**	200**	207**	094	256**	287**	208**
ANALSYL	290**	213**		257**	091	182**	219**	220**	235**	154**	212**	125*	100
IDFSOUND	524**	255**	257**		312**	625**	542**	531**	481**	101	443**	528**	355**
PHONDIS	298**	243**	091	312**		319**	248**	225**	237**	121*	267**	256**	203**
PHONANAL	466**	261**	182**	625**	319**		657**	658**	582**	120	422**	514**	451**
DELSYPH	388**	217**	219**	542**	248**	657**		958**	895**	098	457**	461**	429**
DELPH	369**	200**	220**	531**	225**	658**	958**		760**	097	470**	444**	424**
DELSY	360**	207**	235**	481**	237**	582**	895**	760**		093	392**	409**	377**
STAMVS	110	094	154**	101	121*	120*	098	097	093		081	147**	106
VISDIDA	392**	256**	212**	443**	267**	422**	457**	470**	392**	081		336**	240**
STAMVS	462**	287**	125*	528**	256**	514**	461**	444**	409**	147*	336**		469**
AUSTMD	302**	208**	100	355**	203**	451**	429**	424**	377**	106	240**	469**	
AUSTM	285**	164**	182**	425**	206**	450**	474**	495**	387**	158	346**	385**	367**

S	*	*	*	*	*	*	*	*	*	**	*	*	*
STVISM	319**	159**	139**	324**	220**	345**	378**	366**	349**	125**	451**	234**	191**
STVSM	264**	101	098	373**	200**	386**	314**	324**	250**	223**	352**	335**	297**
RAN	−243**	−178**	−152**	−316**	−263**	−327**	−351**	−348**	−309**	−136*	−259**	−317**	−298**
REWPH	370**	205**	203**	536**	208**	567**	649**	633**	556**	171**	340**	369**	328**
REWT	096	121*	021	139*	083	068	123*	108	109	097	052	081	114*
TERA	476**	265**	233**	698**	347**	764**	765**	776**	636**	163**	499**	518**	414**
EPH	238**	057	150**	267**	231**	230**	220**	213**	193**	081	169**	177**	122*
EPC	313**	164**	070	315**	208**	343**	270**	265**	233**	004	226**	226**	156**
CP	377**	264**	283**	551**	261**	468**	433**	419**	378**	142	386**	440**	166**
LR	407**	214**	168**	651**	356**	714**	634**	647**	514**	185**	477**	504**	404**
DW	453**	272**	203**	686**	335**	791**	761**	768**	644**	146	493**	511**	433**
RS	305**	169**	175**	435**	169**	507**	696**	729**	556**	086	323**	267**	317**

	AUSTMS	STVISM	STVSM	RAN	REWPH	REWT	TERA	EPH	EPC	CP	LR	DW	RS
IDRHYM	285**	319**	264**	243**	370**	096	476**	238**	313**	377**	407**	453**	305**
SYNSYL	164**	159**	101	−178**	205**	121*	265**	057	164**	264**	214**	272**	169**
ANALSYL	182**	139**	098	−152**	203**	021	233**	150**	070	283**	168**	203**	175**
IDFSOUND	425**	324**	373**	−316**	536**	139*	698**	267**	315**	551**	651**	686**	435**
PHONDIS	206**	220**	200**	−263**	208**	083	347**	231**	208**	261**	356**	335**	169**
PHONANAL	450**	345**	386**	−327**	567**	068	764**	230**	343**	468**	714**	791**	507**
DELSYP	474**	378**	314**	−35	649**	123*	765**	220	270**	433**	634**	761**	696**

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DELPH	495**	366**	324**	−348**	633**	108	776**	213**	265**	419**	647**	768**	729**
DELSY	387**	349**	250**	−309**	556**	109	636**	193**	233**	378**	514**	644**	556**
STAMVS	158**	125**	223**	−136*	171**	097	163**	081	004	142**	185**	146**	086
VISDIDA	346**	451**	352**	−259**	340**	052	499**	169**	226**	386**	477**	493**	323**
STAMVS	385**	234**	335**	−317**	369**	081	518**	177**	226**	440**	504**	511**	267**
AUSTMD	367**	191**	297**	−298**	328**	114**	414**	122**	156**	166**	404**	433**	317**
AUSTMS		294**	290**	−301**	416**	186**	481**	226**	227**	347**	421**	463**	358**
STVISM	294**		322**	−211**	302**	066	391**	128**	173**	350**	344**	347**	332**
STVSM	290**	322**		−215**	377**	150**	415**	186**	188**	340**	410**	406**	217**
RAN	−301**	−211**	−215**	−344**		−227**	−402**	−146*	−094	−274**	−350**	−396**	−347**
REWPH	416**	302**	377**	−344**		224**	698**	253**	275**	425**	605**	682**	597**
REWT	186**	066	150**	−227**	224**		107	138*	077	130**	088	093	071
TERA	481**	391**	415**	−402**	698**	107		385**	444**	658**	908**	947**	762**
EPH	226**	128**	186**	−146*	253**	138**	385**		387**	274**	307**	275**	178**
EPC	227**	173**	188**	−094	275**	077	444**	387**		366**	388**	341**	201**
CP	347**	350**	340**	−274**	425**	130**	658**	274**	366**		561**	531**	354**
LR	421**	344**	410**	−350**	605**	088	908**	307**	388**	561**		853**	549**
DW	463**	347**	406**	−396**	682**	093	947**	275**	341**	531**	853**		690**
RS	358**	332**	217**	−347**	597**	071	762**	178**	201**	354**	549**	690**	

Note: Correlation coefficients are shown without a decimal point.

** The association is statistically significant at the 1% risk level.

*The association is statistically significant at the

5% risk level.

Discussion

Our research has shown that higher level phonological abilities (phoneme deletion, phoneme analysis, identifying first sound), recalling the words on a certain phoneme and short-term auditory memory are most strongly correlated. Lower-level phonological abilities (syllable synthesis and analysis), phoneme discrimination and rapid automatic naming correlate only weakly with other preliteracy competences. We found that higher level phonological abilities are most strongly associated with early reading abilities. At the beginning, when decoding words, it is particularly important that the child is aware of the phonemes in the words and can handle them.

Children in kindergarten who perform poorly on tests of phonemic awareness and rapid automatized naming are more likely to become poor readers in future years (Carroll et al., 2016; Lonigan et al., 2011; Parrila et al., 2017). Phonological awareness and rapid automatic naming have been shown to be reliable predictors of children's reading ability across a wide range of languages. A longitudinal study (Powell and Atkinson, 2021) showed that phonological awareness (sensitivity to the sounds in words) and rapid automatic naming performance in preschool children predicted the first steps in alphabetic decoding ability. However, only rapid word naming was associated with fluent and accurate reading a further year later.

We found that syllable synthesis and analysis have a weaker relationship with early reading, as they only test the child's ability to perceive larger units of words, but not the ability to break words down into the smallest units, which is fundamental for decoding words. This result suggests that syllable awareness is a lower-level phonological awareness ability and is likely a prerequisite for the later development of phonological awareness. Pan et al. (2016), for example, investigated the relationship between syllable awareness and phonological awareness and showed that syllable awareness measured at the age of 4–6 years serves as a predictor of phonological awareness at the age of 7–9 years. Researchers Li et al. (2025) also found that children's phonological awareness and syllable awareness are two relatively interdependent phonological

processing units and that larger phonological awareness units (syllable) not only precede the development of smaller units (phoneme), but also influence them.

We also found a significant correlation between memory, both auditory and visuospatial, and early reading abilities. Visual discrimination accuracy and rapid automatic naming are also important for decoding words. Yang and Meng (2020) followed 108 preschool children longitudinally and found a strong correlation between visual processes in preschool and reading performance in first grade, supporting the concept that visual performance is critical for learning and especially for reading acquisition. Vernet et al. (2022) also found in a longitudinal study that impairments in visual processing at age 5 were significantly correlated with reading accuracy and speed at age 7. Researchers Arina et al. (2015) explain that in 5-year-olds, visual-spatial memory is a reliable predictor of access speed to orthographic representations, while verbal memory is the most reliable predictor of access speed, i.e. retrieval of verbal information. Access speed predicts both verbal ability and visuospatial processing. Speed and accuracy of word decoding therefore require the interaction of all three components of working memory.

Carroll et al. (2016) explain that children with dyslexia show difficulties in phonological awareness and verbal memory even before formal reading instruction. Weaker phonological awareness, in which both the phonological loop and phonological memory play an important role, influences difficulties in early reading learning. Weaker phonological awareness affects difficulties in decoding words. Lei et al. (2011) explain that deficits in phonological processing, which includes phonological awareness, phonological memory and rapid automatic naming, are universal indicators of reading difficulties. Kavale and Fornes (2000) state that visual memory and visual discrimination are the best predictors of overall reading ability. They found that individuals with reading difficulties show deficits in visual discrimination and visual short-term memory for sequences. In a longitudinal study, Carroll et al (2016) found that all struggling readers had difficulties in at least one area of preliteracy competence before starting school. The authors found that there is no single preliteracy abilities that predicts the likelihood of developing reading difficulties.

Conclusion

Based on the results of the study, it can be assumed that the five subtests of the test of preliteracy competence (i.e. phoneme deletion, identifying first sound, phoneme analysis, recalling the words on a particular phoneme, and phoneme discrimination) can predict an individual's early reading ability. This means that practitioners do not need to administer all subtests, but in most cases the abilities listed above can predict a child's success in learning to read early. For most children, these competencies are a good predictor of success in learning to read, but we need to be mindful of individuals who struggle with reading due to difficulties in other areas (e.g., visual processing) that also influence success in learning to read. Our results show that a preventive work based on phonological awareness is very important in order to prevent difficulties in early reading abilities.

Based on the results obtained in our study, we have confirmed that the instrument developed allows the identification of children who are at risk of developing reading difficulties when they enter elementary school. The test of preliteracy competence will enable special education teachers to assess the level of preliteracy competence development in children aged five to seven years and involve them in therapy at an early stage, which in turn will enable a better prognosis in terms of eliminating reading difficulties.

Resources

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