

Phonological Awareness in Polish-American Child with Dyslexia. Case Study

The case study is focused on phonological awareness in Polish and English of a bilingual child with a diagnosis of dyslexia. The choice of this topic was dictated by a paucity of studies focusing on Polish-other bilingualism in Polish literature. The theoretical portion of the article includes information regarding phonological awareness and its relationships with dyslexia and bilingualism. The empirical portion contains the methodology, assessment instruments, data analysis, and their interpretation chosen by the authors. In addition, information on the subject's language use was included. There were 3 research questions formulated: 1) What are the qualitative and quantitative characteristics of syllable segmenting and blending in Polish and English in a bilingual child with SRD? 2) What are the qualitative and quantitative characteristics of phoneme segmenting and blending in Polish and English in a bilingual child with SRD? 3) What is the phonological memory capacity in both languages in a bilingual child with SRD? The "unknown language" test was used to collect data, while the language biography method and the classification of errors made by persons with dyslexia were used for the analysis. The data were analyzed qualitatively and quantitatively. They revealed deficits in segmenting and blending of sounds and syllables in both languages. The errors made by the subject on the segmenting and blending of phonemes tasks were syntagmatic – they indicated deficits in the linear evaluation of auditory stimuli. This type of errors is typical for dyslexia defined as a disorder of linear processing of linguistic information. In addition, the subject presented with significant difficulties with his phonological memory across languages. These results are indicative of the need to enroll the boy in speech-language therapy and reading interventions focusing on the deficits common in dyslexia. The therapy should be in both languages and address phonological and neurobiological skills. Additionally, reading training in Polish and English should also be conducted.

Keywords: dyslexia, bilingualism, phonological awareness, errors, linear evaluation

Phonologisches Bewusstsein bei einem polnisch-amerikanischen Kind mit Legasthenie. Eine Fallstudie

Die Arbeit widmet sich dem phonologischen Bewusstsein eines zweisprachigen Kindes mit Legasthenie und wird aus der Perspektive des Polnischen und Englischen analysiert. Die Wahl des Forschungsgegenstandes wurde durch die Forschungslücke in polnischen Analysen der polnisch-ausländischen Zweisprachigkeit bestimmt. Der theoretische Teil enthält Informationen zum phonologischen Bewusstsein und seinem Zusammenhang mit Legasthenie und Zweisprachigkeit. Der methodische Teil stellt das von der Forschung ausgewählte Fallstudienparadigma, das Datenerfassungsinstrument und die Datenanalysemethoden vor. Auch sprachliche Fakten aus dem Leben des untersuchten Jungen wurden präsentiert. Die Forschungsfragen waren: 1. Was sind die quantitativen und qualitativen Merkmale der Silbenanalyse und -synthese in Polnisch und Englisch bei einem zweisprachigen Kind mit Dyslexie?, 2. Was sind die quantitativen und qualitativen Merkmale der Phonemanalyse und -synthese in Polnisch und Englisch bei einem zweisprachigen Kind? 3. Welchen Umfang hat das phonologische Gedächtnis in beiden Sprachen bei einem zweisprachigen Kind mit Dyslexie? Zur Datenerhebung wurde der Test „Unbekannte Sprache“ eingesetzt, zur Analyse kamen die Methode der Sprachbiographie und die Fehlerklassifikation Legastheniker zum Einsatz. Die Datenanalyse war qualitativer und quantitativer Natur. Die Untersuchung ergab Defizite

bei der Analyse und Synthese von Phonemen und Silben des Jungen im Polnischen und Englischen. Die Fehler, die er machte, als er versuchte, Phoneme und Laute zu analysieren und zu synthetisieren, waren syntagmatischer Natur – sie wiesen auf Defizite in der linearen Bewertung von Hörreizen hin. Derartige Defizite sind typisch für Legasthenie und werden als Störungen der linearen Verarbeitung sprachlicher Informationen verstanden. Der Junge hatte auch große Schwierigkeiten mit dem phonologischen Gedächtnis, das in beiden Sprachen getestet wurde. Die Ergebnisse der Studie weisen auf die Notwendigkeit hin, dem Kind eine Sprachtherapie und das Erlernen des Lesens mit Methoden anzubieten, die die Art der legasthenen Defizite berücksichtigen. Die Therapie sollte in beiden Sprachen durchgeführt werden – auf der einen Seite phonologisch, auf der anderen Seite neurobiologisch. Zusätzlich sollten auch Lesetrainings in Polnisch und Englisch durchgeführt werden.

Schlüsselwörter: Dyslexie, Zweisprachigkeit, phonologisches Bewusstsein, Fehler, lineare Auswertung

Authors: Rafał Młyński, Jagiellonian University, ul. Romana Ingardena 3, 30-060 Kraków, Poland, e-mail: rafal.mlynski@uj.edu.pl

Agata Guzek, Chicago Public Schools, 42 W. Madison St., Chicago, IL 60602, USA, e-mail: agataguzekslp@gmail.com

Received: 25.10.2024

Accepted: 16.11.2024

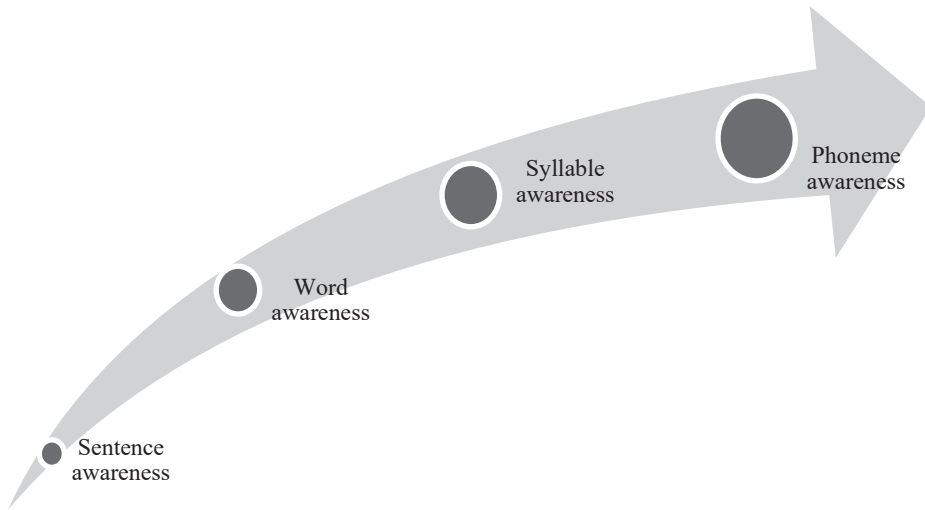
1. Introduction

The case study is focused on phonological awareness in Polish and English of a bilingual child with a diagnosis of dyslexia. In a broader perspective, the article discusses language disorders related to Polish-other bilingualism. There is a paucity of this topic in Polish literature on the subject; therefore, it is paramount to continue researching communication deficits in children who use Polish and other language/s (see Młyński 2016; Błasiak-Tytuła 2018, 2019; Kuć 2018; Krawczyk/Lorenc 2019). This will allow to expand theoretical knowledge on the subject and its application in diagnosing and treating bilingual children with speech and language disorders. This is especially important due to the lack of official guidelines on assessing and treating bilingual individuals.

2. Phonological Awareness

Phonological awareness is also called a skill or competence. Lipowska (2001) defined it as the ability to perceive sounds that make up a word and manipulate them. Phonological awareness consists of the following elements: a) phoneme awareness, the ability to perceive and discriminate sounds that make up a word, b) syllable awareness, the ability to perceive and manipulate syllables that make up a word, c) rhyme awareness, the ability to recognize and produce rhymes and alliteration, d) word awareness, the ability to perceive words and manipulate them in the sentence, e) sentence awareness, the ability to recognize and formulate sentences (Raźniak 2016: 66).

The development of phonological awareness begins with the identification of broader structures to single structures, which is depicted in the Graph. 1.



Graph. 1. Model of the development of phonological awareness in children developed by the first author based on Raźniak (2016: 67)

The development of phonological awareness is a sequential process in which an individual gradually moves between the phases as research indicates (Philips et al. 2008: 5). From the perspective of this article, the findings of Aleksandra Raźniak (2016) based on the research by Lipowska (2001) and Krasowicz-Kupis (2008) are very important. Raźniak indicated that Polish children acquire the abilities to perceive and discriminate syllables, rhyme awareness and alliteration at the age of 4. These tasks are performed at the unconscious, epilinguistic level. The ability to manipulate phonemes, including segmentation and blending, develops between the ages of 5 and 6. The identification of initial, medial, and final phonemes may be developed at the age of 7 (see Krasowicz-Kupis/Wiejak 2016). Developmental norms for English-speaking children are important to mention here. The ability to segment and blend syllables may develop around the age of 3; however, these skills together with rhyme recognition and alliteration are fully developed at the age of 5 (Stanovich 1984).

The correlation between phonological awareness and the acquisition of reading and writing skills in the first language is an interesting issue. According to Alicja Maurer (2007), the research recognizes three distinct approaches. The first one indicates that the phonological awareness development is dependent on the development of reading and writing. For example, Ehri's (1989) analysis indicated that existing knowledge of letters and their sounds is necessary to manipulate phonemes. The second view indicates that phonological awareness precedes the development of reading and writing. Children who participated in a phonological awareness training performed better in the initial stages of reading and writing acquisition compared to those who did not participate in such trainings (Goswami/Bryant 1990). The third approach is the most commonly mentioned in research and it indicates that

phonological awareness and the development of reading and writing influence each other (Lundberg/Hoien 1991, McGuinness/McGuinness/Donohue 1995, Perfetti/Beck/Bell/Hughes 1987). This correlation may be so strong that the assessment of phonological awareness does not provide additional information to the prediction of the reading level (Hogan/Catts/Little 2005). Despite the existence of these distinct approaches in research, phonological awareness has been identified as a strong predictor of the quality of reading abilities in children. It was confirmed through research on preschool and early school age children (Adams 1990, Lonigan/Burgess/Anthony 2000). Catts/Fey/Zhang/Tomblin (2001) showed that a measurement of phonological awareness in preschool was one of the 5 predictive factors of reading difficulties in the 2nd grade. A plethora of research documented a strong relationship between earlier phonological awareness and later reading development (Calfee/Lindamood/Lindamood 1973, Lonigan et al. 2000, Torgesen/Wagner/Rashotte 1994, Wagner et al. 1997).

2.1 Specific Reading Disorder

The term dyslexia has been used for many years in Polish psychological-pedagogical terminology to denote specific reading difficulties (Bogdanowicz 1996). In the current classifications, the DSM-5, ICD-10, and ICD-11, dyslexia is included in the neurodevelopment disorders. The DSM-5 proposes the term “specific learning disabilities”; the ICD-10 includes the category F81 – “specific developmental disorders of scholastic skills” with a subcategory of a “specific reading disorder” (F81.0). The authors of the ICD-11 have chosen the term “developmental learning disorder with impairment in reading”. Due to the fact that the code F81.0 had been included in the neuropsychological report of the subject, the authors of this article used the term “specific reading disorder” (SRD).

Specific reading disorder is a phenomenon with various etiologies. The recent research has indicated several concepts explaining its cause. The oldest suspected cause is genetic in nature, which was reported by, among others, Polish researchers (Wysocka/Lipowska 2010, Wysocka/Lipowska/Kilikowska 2010). The international discussion also emphasizes neuroanatomical (unusual folds and location of neurons located in the sulcus of Sylvius, lack or reduction of asymmetry of the Planum temporale, anomalies in the location of cells in the structures of the thalamus – Habib 2004) and neurofunctional basis of SRD (no activation of the temporal gyrus, left temporo-parietal, and occipital cortex – Kamhi/Catts 2005). Other popular explanations are the magnocellular theory (a weakening of the activation of specific parts of the neural pathways running from the retina to the brain – Stein 2004), the cerebellar deficit hypothesis (the cerebellum of individuals with diagnosed dyslexia functions abnormally and has atypical anatomy – Nicolson/Fawcett/Dean 2001), and hormonal hypothesis (prenatal testosterone as a factor disturbing the maturation of cerebral asymmetry – Geschwind/Behan 1982).

2.2 SRD and phonology

Neurological disorders are associated with cognitive deficits. When related to SRD, the following deficits are commonly mentioned: naming speed, sensory, working and short-term memory, attention (Krasowicz-Kupis 2019). The most dominant theory is the phonological deficit hypothesis. Bruce Pennington (1991) was the first one to indicate that SRD is a **phonological processing disorder**. This term includes all operations in which speech sounds and their cognitive representations are manipulated. Phonological processing takes place when phonemes are information carriers – it can be unconscious (phoneme awareness) and conscious (phonological awareness) (Krasowicz-Kupis 2008: 272). Phonological processing happens not only at the sound/phoneme level, but also at the syllable or speech unit (onset and rime) levels (Goswami/Bryant 1990). It should be noted that phonological processing deficits affect many processes. Grażyna Krasowicz-Kupis (2019: 136) emphasizes the following processes: phoneme and syllable segmentation, phoneme awareness/hearing, phonemic awareness, nonword decoding, phoneme and syllable blending, phonological memory, rhyme awareness and rhyming, phonological awareness, rapid automatic naming. Isabelle Liberman concluded that difficulties with reading acquisition in individuals with SRD are related to understanding that words are made up of a sequence of sounds. This may be problematic because sounds cannot be separated into a simple sequence (Liberman et al. 1967). Liberman's conclusion about linear processing in SRD fits into Jadwiga Cieszyńska's concept that defined dyslexia (Cieszyńska recognizes it as a broad spectrum of symptoms), among other symptoms, as a linear disorder of speech and language processing (2010). Liberman's later research confirmed the existence of phonological deficits in all individuals with reading difficulties (Liberman et al. 1971). It was broadly accepted that the cause of phonological deficit lies in decreased lexical representations (including phonological) and short-term memory deficits. Numerous studies have proven the concept of phonological deficits is evident through difficulties with phonemic abilities and awareness, phoneme segmentation, and naming speed (Snowling 1995, Pennington/Lefly 2001, Swan/Goswami 1997).

The concept of decreased phonological awareness is associated with Margaret Snowling's hypothesis of the phonological representation deficit (1987, 2000). Elliott and Grigorenko's research (2014) confirmed Snowling's hypothesis, as children with SRD had limited phonological representations, ie. less fluent, less specific, with lower abilities to discriminate when compared to others; therefore, they performed poorer on the phonological awareness tasks and had difficulties with their reading and writing development. The decrease in phonological representations creates the strong connections between the sounds and letters in the word and may lead to difficulties with orthographic representations of the word (Krasowicz-Kupis 2019).

Referring to the neurobiological causes of SRD, it must be mentioned that phonological deficits lie in the left hemisphere dysfunction near the sulcus of Sylvius, which

is responsible for the formation of phonological representations and their connections with orthographic representations (Shaywitz et al. 2002). Other analyses indicated a connection between the left planum temporale and phonological processing (Ramus et al. 2018).

2.3 Phonological awareness and bilingualism

In the recent years, there have been numerous studies conducted which addressed cognitive and linguistic development of bilingual children. Ellen Bialystok (1986, 2001) claimed that an early exposure to a second language in children leads to a higher awareness of the arbitrariness of language and the separation between the form and content when compared to children exposed to a single language. Bilingualism is also a phenomenon that makes children more aware of similarities and differences between languages, allowing them to establish stronger language representations (Kuo/Anderson 2010). In addition, there is a plethora of research demonstrating increased metalinguistic knowledge of semantics, syntax, morphology, and phonology (Bialystok et al. 2014, Melloni/Vender 2020, Vender et al. 2014).

Phonological awareness and its associations with reading and writing skills in bilingual children have been discussed in research for many years (Mann 1991, Blachman 2000); however, it is difficult to establish the unequivocal nature of these relationships due to inconsistent conclusions of the completed studies. A positive influence of bilingualism on phonological awareness was noted by Campbell/Sais (1995), bilingual, English-Italian, children performed better on phoneme and syllable manipulation tasks than the control group. The more regular syllabic structure of Italian was hypothesized to be a factor in the established positive relationship. Bruck/Genesee (1995) achieved comparable results, as English-French children performed better on syllable manipulation tasks compared to English children. The authors suspected that French has a greater clarity of syllables which positively influenced the skills and was transferred into English. Bruck/Genesee confirmed the findings of Rubin/Turner (1989) who observed that English children in a French immersion program performed higher on phoneme segmentation tasks compared to their English-speaking peers. Chen et al. (2004) reported similar findings in Cantonese-Mandarin children who had stronger tonal awareness. The cited research adds to cross-language transfer theory indicating that learning one language supports a second language acquisition if: a) both languages share a linguistic unit/structure, for example a phoneme or a phonological structure, and b) the first language's structure is more complex than the second languages structure. In addition to cross-language transfer theory, recent research on phonological awareness and bilingualism also drew on structural sensitivity theory (Kuo/Anderson 2012). This paradigm argues that an individual's access to two languages allows for heightened sensitivity to similarities and differences between the languages leading to a language development at a more abstract level. Cross-language transfer theory and

structural sensitivity theory have been validated in meta-analyses (Branum-Martin et al. 2012, Branum-Martin et al. 2015, Melby-Lervag/Lervag 2011) proving that phonological awareness is a universal construct across languages. In the bilingual perspective, the findings of Durgunoglu et al. (1993) and Erdos et al. (2014) are important as they both determined that phonological awareness skills in one language can aid reading skills in a second language. These outcomes are aligned with results indicating that one's ability to read in the minority language positively influences reading skills acquisition in the majority language (Clyne 2005).

3. Methodology

The present study is qualitative in nature and contains elements of a case study. This methodology was dictated by the fact that SRD in bilinguals (Polish-other) is insufficiently described and relatively recent (Młyński 2016, Błasiak-Tytuła 2023). The case study strategy also allows for a formulation of individual theory of a general phenomenon (Konarzewski 2000: 78). Further, it allows to focus on a narrow issue and its educational and/or social context and to describe its nature (Wilczyńska/Michońska-Stadnik 2010: 154). The studied phonological awareness (focused on phonemes, syllables, and phonological memory) in a child with SRD raised bilingually (Polish-English) may be viewed as such an issue.

3.1 Data collection instruments

The main data collection instrument was the “Nieznany język” test by Marta Bogdanowicz (2008). It allows for assessment of phonological skills of a 3rd grade student, i.e., phoneme discrimination (phoneme hearing), phonological manipulation skills (segmenting and blending) of phonological units, and phonological memory. The following portions were used: segmenting and blending of syllables, segmenting and blending of phonemes. In addition, the subtest measuring phonological memory, consisting of 4 trials, was chosen. Based on these subtests, the second author, a bilingual (Polish-English) speech-language pathologist, developed an analogous English version including segmentation and blending of syllables and sounds, and phonological memory. The completion of these tasks in both languages depended on the subject's emotional status as he required constant verbal encouragement to participate. It should be noted that the child has a diagnosis of ADHD, which affects his focus. The LEAP (Language Experience And Proficiency) questionnaire was completed to collect information regarding the subject's linguistic background. It was developed by Viorica Marian, Henrike K. Blumenfeld, Margarita Kaushanskaya in 2007 to allow for a self-assessment of bilingual language status in an effective, efficient, valid, and reliable manner, also, to determine dominance and proficiency of bilingual speakers (Marian et al. 2007). In its original form, the LEAP-Q was intended to be used with adults (Marian et al. 2007);

however, the authors modified it to allow for use with children through parent report (Kaushanskaya et al. 2020). The measure focuses on the following factors contributing to the bilingual speaker's language status: competence, age of acquisition, modes of acquisition, prior exposure, and present language use (Marian et al. 2007).

3.2 Methods of data analysis

Due to the use of only selected portions of the „Unknown language test”, the analysis of responses could be completed qualitatively, this was confirmed by Grażyna Krasowicz-Kupis (2019: 245). The data collected in Polish and English were first analyzed separately, and later were compared.

Information from the LEAP-Q questionnaire was obtained and analyzed using a portion of a language biography method. The language biography method is one of the instruments to assess bilingualism in an individual created by Władysław Miodunka (2016). The language biography method is used not only in glottodidactics, but also in speech-language pathology (Młyński 2023). It contains two sections: narration and analysis. According to Miodunka, the narrative section details „basic life events and the process of becoming and being a bilingual individual, focusing on one's childhood and the family language use, together with the language of formal schooling [...]” (Miodunka 2016: 81); the analysis depicts linguistic contacts in verbal and written communication. The narrative section will be used in the current case study.

3.3 Background information

The boy E. was 8 years old at the time of this study. He was born in the USA into a Polish family (both parents are Polish). Polish language is his primary; however, English became his dominant language (language exposure was judged to be 60 % (English) to 40 % (Polish) by the parent). The boy communicates in English more often and identifies more with American culture. The parent reported deficits in learning and speech production in the questionnaire. Polish was identified as E.'s heritage language and it had developed typically. On a scale of 1–10, the parent rated comprehension and expression in Polish as 7 and reading as 3. The linguistic contexts for Polish are family, Polish school, and TV; the highest exposure to Polish is through his Polish family. E. began developing English at age 2, achieved fluency at age 5, and started reading at age 6. The parent rated comprehension and expression in English as 9 and reading as 3. The linguistic contexts for English are interactions with friends and individuals at school. The language development is supported by reading per parent report. E.'s highest exposure to English is through school, peers, TV, and reading.

E. underwent a neuropsychological evaluation by an English-speaking clinical psychologist. He was diagnosed with ADHD, combined type (F90.2), specific reading disorder (F81.0), and developmental disorder of speech and language, unspecified (F80.9). He was not evaluated in Polish.

4. Research Questions

For the purpose of this case study, the following research questions were formulated:

1. What are the qualitative and quantitative characteristics of syllable segmenting and blending in Polish and English in a bilingual child with SRD?
2. What are the qualitative and quantitative characteristics of phoneme segmenting and blending in Polish and English in a bilingual child with SRD?
3. What is the phonological memory capacity in both languages in a bilingual child with SRD?

4.1 Data analysis

English phonological test: E. had been administered the Comprehensive Test of Phonological Processing 2. His phonological awareness and phonological memory had been in the average range for his chronological age.

4.2 Completed Measures

4.2.1 Polish

Syllable segmenting: The boy correctly divided into syllables 4 out of 5 pseudowords. The first pseudoword was a CVC word, the other three words were made up of open syllables: CVCV, CVCVVCV, CVCVCVCV. The fifth nonword (ŁANAKOSZYREK) was correctly divided into four syllables (ŁA NA KO SZY); however, the fifth syllable REK was segmented into phonemes. Because of this, the subject concluded that the pseudoword ŁANAKOSZYREK has seven syllables.

Syllable blending: The boy correctly blended two CVCV and CVCVVCV nonwords. He also correctly blended a CCVCVVCVCV pseudoword. He correctly judged the word KECZOZALAKAR as a 5-syllable word; however, he produced it as KECZOZALA omitting the CVC syllable KAR. He did not blend a 6-open syllable nonword.

Phoneme Segmenting: The boy correctly segmented a 3-phoneme (CVC), 4-phoneme (CVCV) and 5-phoneme (CVCVC) word. He was unable to correctly segment 6-, 7-, 8-, 9-, 10-phoneme words. He segmented the words with significant difficulties in maintaining the linear phoneme order; for example, SATELO produced as SATLEO later as SCALEO, MALOSOT as MALOSTOT, JEDNOKAT as JENTOKAT, LETEWIZAR as LETWIZAR, NALIZATORA as NALZ later as NALZITORA.

Phoneme blending: The subject blended the nonwords KRU and ZORA. He was unable to blend pseudowords of 5–10-phonemes.

Phonological memory: E. correctly repeated a sequence of 3 nonwords.

4.2.2 English

Syllable segmenting: The subject was asked to segment pseudowords, he correctly segmented 2 out of 5 words (CVC and CVCCV). In the 5-syllable word WISUJANOVER,

he added and transpositioned phonemes and produced the nonword as WIFSUN-JANOVER. The other 2 pseudowords were incorrectly segmented; for example, PHANDILY was divided into 2 syllables PHAN-DILY.

Syllable blending: E. was asked to blend pseudowords. He correctly blended 3 out of 5 nonwords (CVCVC, CCVCVCVC and CVCVCVCVC). He struggled with 5- and 6-syllable words. His difficulties included, but were not limited to, epenthesis and syllable deletion. For example, UNDETRANSFIBLE as DENTRENTIBLE and TEMPERFICTIONABLE as TERDEFICIBLE.

Phoneme segmenting: E. correctly segmented 4 out of 8 pseudowords. He correctly segmented two words, but incorrectly counted their phonemes as 8. The following errors were noted: vowel addition (ERVIST as ERVIAS), sound substitution (LISUSHRUL as LISHUSHRUL), sound deletion (REEPORIFULL as REEPOIFUL), metathesis, and sound deletion (TIPNIKADISH as TNIPKADISH).

Phoneme blending: E. correctly blended 2 out of 8 nonwords (CVC and CCVC). His errors included, but were not limited to: sound deletion: FRINTI as FINTI and SNEEN as SNEE; sound deletion and sound addition: NINPIFT as NIFITY; sound deletion and sound substitution: TINMINDER as NIFINTER.

Phonological memory: E. did not correctly repeat any sequences of nonwords.

4.3 Conclusion

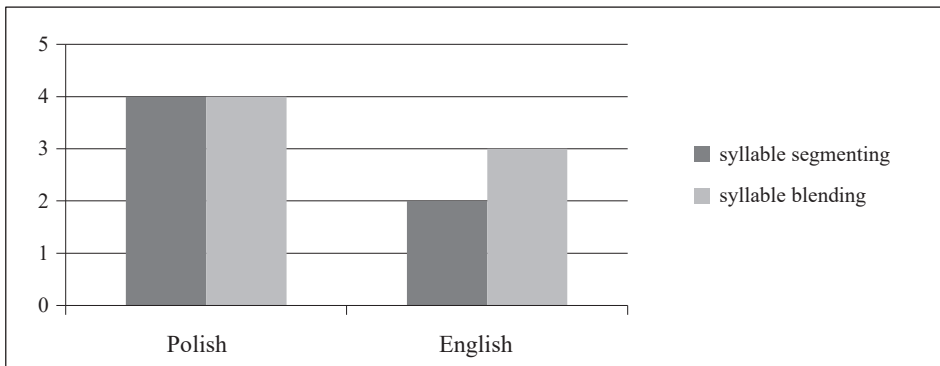
The completed measures allowed for answering the research questions. In Polish, E. correctly segmented 4 out of 5 words. It should be noted that the words were made out of open syllables. He struggled with a word made up of a single closed syllable (CVC). He treated every phoneme in the syllable as a separate syllable. On the syllable blending task, he correctly blended 2-, 3-, 4-, and 5-syllable words; he was unable to blend the other two nonwords. Comparable to his performance on the segmenting task, the subject had no difficulties with open syllables. He struggled with a closed syllable (CVC) and, as a result, omitted it. The phoneme segmentation task was more challenging for E. A sequence of 5 phonemes was the highest number of sounds acceptable for analysis. E. struggled with pseudowords containing more than 5 sounds. The subject's attempts to segment phonemes should be noted, as they resulted in difficulties with maintaining the correct sequence of sounds in words. The phoneme blending task was difficult for E. to complete, as he managed to correctly blend 2 pseudowords. The boy was unable to blend more than 4 phonemes. In the task measuring phonological memory, E. correctly completed one item requiring him to memorize and repeat three pseudowords. Memorization and repetition of more than 3 nonwords was impossible and often led to E.'s reluctance and frustration.

In English, E.'s difficulties were comparable to his performance in Polish. On the syllable segmentation task, E. exhibited more difficulties than in Polish, which may have been related to the length of the stimulus nonwords and the order of consonants and vowels in them. Similarly to Polish, the subject struggled with counting syllables.

On the syllable blending task, E. struggled with multi-syllabic words, as he deleted sounds/syllables and deleted/added sounds. The task of phoneme segmentation was characterized by difficulties with longer words and the correct sequence of phonemes. Similar errors were observed on the phoneme blending task. The boy did not repeat any sequences of nonwords on the phonological memory task.

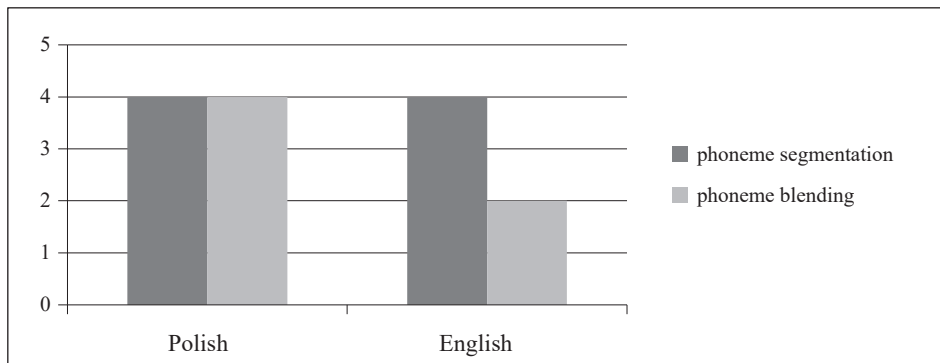
5. Discussion

The applied quantitative and qualitative analysis allowed to answer the research questions. Ad.1: on the tasks of syllable segmentation, the boy correctly completed 4 items in Polish and 2 in English out of the total of 10 items. In both languages, he struggled with counting syllables and added a vowel sound in English. On the syllable blending tasks, he correctly completed 4 words in Polish (5 in total), and 3 out of 5 in English. He added sounds and deleted syllables.



Graph 2. Syllable segmenting and blending

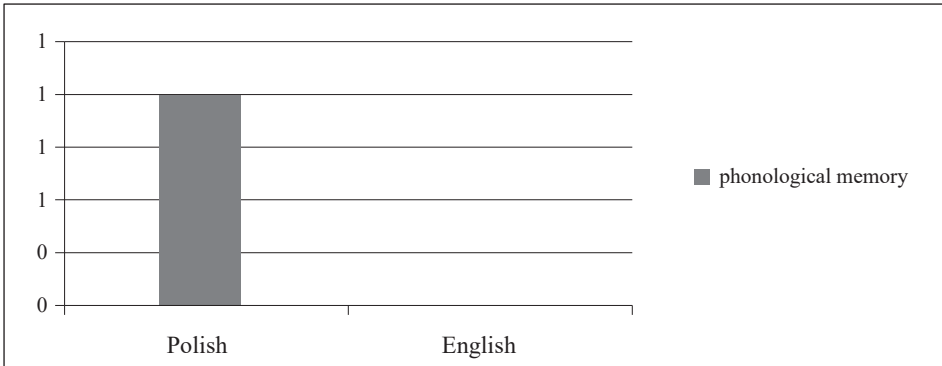
Ad. 2. Quantitative data from the phoneme segmentation and blending tasks are illustrated in the graph #2. There were 8 items administered in both languages.



Graph 3. Phoneme segmentation and blending

Metathesis, addition, deletion, and substitution of sounds were noted on the phoneme segmenting and blending tasks.

Ad. 3. On the phonological memory tasks, the boy correctly completed one item (3-nonword sequence) in Polish (4 items in total). In English, he did not complete any items correctly (4 items in total).



Graph 4. Phonological memory in Polish and English

The obtained results indicated significant deficits in the subject's phonological awareness skills. E exhibited difficulties in both of his languages indicating the difficulties are neurological in nature due to their biological components and not related to the boy's bilingual status (Lieberman 1967, Pennington/Lefly 2001, Shaywitz et al. 2002, Ramus et al. 2018). E. exhibited slightly more difficulties on the tasks in English, which might be due to the CV syllable structure in the majority of items in Polish. E. presented with significant problems with his phonological memory, which is a typical difficulty for individuals with dyslexia (Carvalho et al. 2014).

The qualitative analysis emphasized the type of errors made by the subject in the syllable and phoneme segmenting and blending tasks in both languages. The type of errors, such as epenthesis, sound and syllable deletion, and metathesis, clearly indicate E.'s difficulties with linear processing of language signals. This concept was initiated by Cieszyńska who wrote that dyslexia is, „difficulties with linear processing of language inputs associated with problems with linear processing of symbolic, temporal, and motor information” (2010: 40). The previously mentioned errors can be considered syntagmatic, which were also recognized by Cieszyńska (2005). The sporadic substitutions made by the subject can be characterized as paradigmatic interferences (Cieszyńska 2005).

The presented results are interesting not only from a cognitive perspective, but also from a therapeutic point of view. A bilingual child with this level of phonological awareness deficits should participate in interventions targeting phonological skills in both languages, as well as neurobiological therapy. This type of stimulation includes cognitive training consisting of memorization, categorization, segmenting

and blending, and phoneme awareness (Cieszyńska 2013). Considering the fact that phonological awareness is a strong predictor of reading and writing, it is important to support the development of the child in the dominant language and to facilitate reading development in the home language. In Polish literature, it was recommended by Marzena Błasiak-Tytuła and Agnieszka Ślęzak (2018) in addition to Agnieszka Rabiej, Robert Dębski and Magdalena Szalc-Mays (2016).

Literature

- ADAMS, Marylin, Jager. *Beginning to read: Thinking and learning about print*. Cambridge, MA: The MIT Press, 1990. Print.
- BIALYSTOK, Ellen. „Factors in the Growth of Linguistic Awareness”. *Child Development* 57 (2) (1986): 498–510. <https://www.jstor.org/stable/1130604>.
- BIALYSTOK, Ellen. *Bilingualism in Development: Language, Literacy, and Cognition 1st Edition*. Cambridge: Cambridge University Press, 2001. Print.
- BIALYSTOK, Ellen, Kathleen F. PEETS and Sylvain MORENO. „Producing bilinguals through immersion education: Development of metalinguistic awareness”. *Applied Psycholinguistics* 35 (1) (2014): 177–191. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3987956/>.
- BLACHMAN, Benita A. „Phonological Awareness”. *Handbook of Reading Research* 3. Ed. Michael L. Kamil, Peter B. Mosenthal, P. David Pearson and Rebecca Barr. United Kingdom: Lawrence Erlbaum Associates Publishers, 2000, 483–502. Print.
- BŁASIAK-TYTUŁA, Marzena. „Terapia logopedyczna dwujęzycznego dziecka z autyzmem”. *Studia Pragmalingwistyczne* 10 (2018): 197–208. Print.
- BŁASIAK-TYTUŁA, Marzena. *Mowa dzieci dwujęzycznych. Norma i zaburzenia*. Kraków: Uniwersytet Pedagogiczny Kraków, 2019. Print.
- BŁASIAK-TYTUŁA, Marzena. „Specyficzne trudności w nabywaniu dwóch języków: na przykładzie dwujęzyczności angielsko-polskiej”. *Wielojęzyczność jako wyzwanie społeczne, kulturowe i edukacyjne*. Ed. Anna Żurek. Kraków: Universitas, 2023, 111–123. Print.
- BŁASIAK-TYTUŁA, Marzena and Agnieszka ŚLĘZAK. „Nauczanie języka polskiego jako odziedziczonego dzieci zagrożonych dysleksją”. *Neurologopedia. Glottodydaktyka i logopedia z perspektywy neurobiologicznej*. Ed. Marzena Błasiak-Tytuła, Zdzisława Orłowska-Popek and Anna Siudak. Kraków: WIR, 2018, 101–117. Print.
- BOGDANOWICZ, Marta. „Specyficzne trudności w czytaniu i pisanu u dzieci – nowa definicja i miejsce w klasyfikacji międzynarodowej”. *Psychologia Wychowawcza* 1 (1996), 13–23. Print.
- BOGDANOWICZ, Marta. *Nieznany język*. Gdańsk: Uniwersytet Gdański, 2008. Print.
- BRANUM-MARTIN, Lee, Sha TAO and Sarah GARNAAT. „Bilingual Phonological Awareness: Reexamining the Evidence for Relations Within and Across Languages”. *Journal of Educational Psychology* 107 (1) (2014): 111–125. <https://psycnet.apa.org/record/2014-24841-001>.
- BRANUM-MARTIN, Lee, Sha TAO, Sarah GARNAAT, Ferenc BUNTA, and David J. FRANCIS. „Meta-Analysis of Bilingual Phonological Awareness: Language, Age, and Psycholinguistic Grain Size”. *Journal of Educational Psychology* 104 (4) (2012): 932–944. <https://psycnet.apa.org/record/2012-09267-001>.
- BRUCK, Maggie and Fred GENESEE. „Phonological Awareness in Young Second Language Learners”. *Journal of Child Language* 22 (2) (1995): 307–324. <https://pubmed.ncbi.nlm.nih.gov/8550725/>.

- CALFEE, Robert C., Patricia LINDAMOOD and Charles LINDAMOOD. „Acoustic-phonetic skills and reading: Kindergarten through twelfth grade”. *Journal of Educational Psychology* 64 (3) (1973): 293–298. <https://pubmed.ncbi.nlm.nih.gov/4710951/>.
- CAMPBELL, Ruth and Efsia SAIS. „Accelerated Metalinguistic (Phonological) Awareness in Bilingual Children”. *British Journal of Developmental Psychology* 13 (1) (1995): 61–68. <https://psycnet.apa.org/record/1995-28628-001>.
- CATTS, Hugh W., Marc FEY, Xuyang ZHANG and J. Bruce TOBLIN. „Estimating the Risk of Future Reading Difficulties in Kindergarten Children: A Research-Based Model and Its Clinical Implementation”. *Language, Speech, and Hearing Services in Schools* 32 (1) (2001): 38–50. <https://pubmed.ncbi.nlm.nih.gov/27764435/>.
- CHEN, Xi, Richard C. ANDERSON, Wenling LI, Meiling HAO, Xinchun WU and Hua SHU. „Phonological Awareness of Bilingual and Monolingual Chinese Children”. *Journal of Educational Psychology* 96 (1) (2004): 142–151. <https://psycnet.apa.org/record/2004-11358-012>.
- CIESZYŃSKA, Jagoda. *Nauka czytania krok po kroku. Jak przeciwdziałać dysleksji*. Kraków: Wydawnictwo Naukowe Uniwersytetu Pedagogicznego im. Komisji Edukacji Narodowej, 2005. Print.
- CIESZYŃSKA, Jagoda. „Dwujęzyczność – rozumienie siebie jako Innego”. *Nowe podejście w diagnostyce i terapii logopedycznej – metoda krakowska*. Ed. Jagoda Cieszyńska, Zdzisława Orłowska-Popek and Marta Korendo. Kraków: Wydawnictwo Naukowe Uniwersytetu Pedagogicznego im. Komisji Edukacji Narodowej, 2010, 18–55. Print.
- CIESZYŃSKA, Jagoda. *Metoda Krakowska wobec zaburzeń rozwoju dzieci. Z perspektywy fenomenologii, neurobiologii i językoznawstwa*. Kraków: Centrum Metody Krakowskiej, 2013. Print.
- CLYNE, Michael G. *Australia's Language Potential*. Sydney: University of New South Wales Press, 2005. Print.
- DE CARVALHO, Carolina A. F., Adriana DE SOUZA BATISTA KIDA, Simone APARECIDA CAPELLINIET and Clara Regina BRANDAO DE AVILA. „Phonological working memory and reading in students with dyslexia”. *Frontiers in Psychology* 5 (2014): 1–8. <https://pubmed.ncbi.nlm.nih.gov/25101021/>.
- DĘBSKI, Robert, Agnieszka RABIEJ and Magdalena SZELC-MAYS. *Czytam, bo lubię!: program wczesnej nauki czytania wraz z poradnikiem dla rodziców i nauczycieli dzieci dwujęzycznych*. Kraków: Avalon, 2016. Print.
- DURGUNOGLU, Aydin Y., William E. NAGY and Barbara J. HANCIN-BHATT. „Cross-Language Transfer of Phonological Awareness”. *Journal of Educational Psychology* 85 (3) (1993): 453–465. <https://psycnet.apa.org/doiLanding?doi=10.1037%2F0022-0663.85.3.453>.
- EHRI, Linnea C. „The development of spelling knowledge and its role in reading acquisition and reading disability”. *Journal of Learning Disabilities* 22 (1989): 356–365. <https://pubmed.ncbi.nlm.nih.gov/2738469/>.
- ELLIOTT, Julian G. and Elena L. GRIGORENKO. *The Dyslexia Debate*. United Kingdom: Cambridge University Press, 2014. Print.
- ERDOS, Caroline, Fred GENESEE, Robert SAVAGE and Corinne HAIGH. „Predicting Risk for Oral and Written Language Learning Difficulties in Students Educated in a Second Language”. *Applied Psycholinguistics* 35 (2) (2013): 371–398. https://www.mcgill.ca/psychology/files/psychology/erdos_et_al._predicting_risk_ap_2014.pdf.
- GESCHWIND, Norman and Peter BEHAN. „Left-handedness: Association with immune disease, migraine, and developmental learning disorder”. *Proceedings of the National Academy of Sciences* 79 (16) (1982): 5097–5100. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC346835/>.
- GOSWAMI, Usha and Peter BRYANT. *Phonological skills and learning to read*. United Kingdom: Lawrence Erlbaum, 1990. Print.

- HABIB, Michel. „Zaburzenia nabywania zdolności językowych i pisania: najnowsze osiągnięcia w neurobiologii”. *Dysleksja od badań mózgu do praktyki*. Ed. Anna Grabowska and Krystyna Rymarczyk. Warszawa: Instytut Biologii Doświadczalnej im. M. Neckiego, 2004, 185–216. Print.
- HOGAN, Tiffany P., Hugh W. CATTS and Todd D. LITTLE. „The Relationship Between Phonological Awareness and Reading: Implications for the Assessment of Phonological Awareness”. *Language, Speech and Hearing Service in Schools* 36 (4) (2005): 285–293. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2848754/>.
- KAMHI, Alan and Hugh W. CATTS. *Language and Reading Disabilities*. United States of America: Pearson Education, Inc., 2005. Print.
- KAUSHANSKAYA, Margarita, Henrike BLUMENFELD and Viorica MARIAN. „The Language Experience and Proficiency Questionnaire (LEAP-Q): Ten years later”. *Bilingualism: Language and Cognition* 23 (5) (2020): 945–950. Print.
- KONARZEWSKI, Krzysztof. *Jak uprawiać badania oświatowe. Metodologia praktyczna*. Warszawa: Wydawnictwo Szkolne i Pedagogiczne S.A., 2000. Print.
- KRASOWICZ-KUPIS, Grażyna. *Psychologia dysleksji*. Warszawa: Wydawnictwo Naukowe PWN, 2008. Print.
- KRASOWICZ-KUPIS, Grażyna. *Nowa psychologia dysleksji*. Warszawa: Wydawnictwo Naukowe PWN, 2019. Print.
- KRASOWICZ-KUPIS, Grażyna and Katarzyna WIEJAK. „Jak badać sprawności fonologiczne dzieci na starcie szkolnym?”. *Języki obce w szkole* 1 (2016): 57–65. <https://jows.pl/artykuly/jak-badac-sprawnosci-fonologiczne-dzieci-na-startie-szkolnym>.
- KRAWCZYK, Anna and Anita LORENC. „Diagnoza artykulacji u dzieci dwujęzycznych wychowujących się w środowisku polsko-amerykańskim”. *Logopedia* 48 (2) (2019): 307–334. <http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-2bed7caf-90f7-4a11-b8c9-6aeb5d5ba152>.
- KUĆ, Joanna. *Bilingwizm i mutyzm w kontekście opóźnionego rozwoju mowy*. Kraków: Aureus, 2018. Print.
- KUO, Li-Jen and Richard C. ANDERSON. „Beyond Cross-Language Transfer: Reconceptualizing the Impact of Early Bilingualism on Phonological Awareness”. *Scientific Studies of Reading* 14 (4) (2010): 365–85. <https://www.tandfonline.com/doi/full/10.1080/10888431003623470>.
- KUO, Li-Jen and Richard C. ANDERSON. „Effects of early bilingualism on learning phonological regularities in a new language”. *Journal of Experimental Child Psychology* 111 (3) (2012): 455–467. <https://pubmed.ncbi.nlm.nih.gov/22169351/>.
- LIBERMAN, Alvin M., Franklin S. COOPER, Donald SHANKWEILER and Michael STUDDERT-KENNEDY. „Perception of the Speech Code”. *Psychological Review* 74 (6) (1967): 431–461. https://www.researchgate.net/publication/18994638_Perception_of_the_Speech_Code.
- LIBERMAN, Isabelle J., Donald SHANKWEILER, Charles ORLANDO, Katherine S. HARRIS and Fredericka BELL-BERTI. „Letter Confusions and Reversals of Sequence in the Beginning Reader: Implications for Orton’s Theory of Developmental Dyslexia”. *Cortex* 7 (1971): 127–142. <https://pubmed.ncbi.nlm.nih.gov/5136185/>.
- LIPOWSKA, Małgorzata. *Profil rozwoju kompetencji fonologicznej*. Kraków: Oficyna Wydawnicza „Impuls”, 2001. Print.
- LONIGAN, Christopher J., Stephen R. BURGESS and Jason L. ANTHONY. „Development of Emergent Literacy and Early Reading Skills in Preschool Children: Evidence From a Latent-Variable Longitudinal Study”. *Developmental Psychology* 36 (5) (2000): 596–613. https://www.researchgate.net/publication/12344851_Development_of_Emergent_Literacy_and_Early_Reading_Skills_in_Preschool_Children_Evidence_From_a_Latent-Variable_Longitudinal_Study.

- LUNDBERG, Ingvar and Torleiv HOIEN. „Initial enabling knowledge and skills in reading acquisition: Print awareness and phonological segmentation”. *Phonological awareness in reading: The evolution of current perspectives*. Ed. Diane J. Sawyer and Barbara J. Fox. New York: Springer-Verlag, 1991, 74–95. https://link.springer.com/chapter/10.1007/978-1-4612-3010-6_3.
- MARIAN, Viorica, Henrice BLUMENFELD and Margarita KAUSHANSKAYA, ”The Language Experience and Proficiency Questionnaire (LEAP-Q): Assessing Language Profiles in Bilinguals and Multilinguals”. *Journal of Speech, Language, and Hearing Research* 50 (2007): 940–967. Print.
- MANN, Virginia. „Phonological Awareness and Early Reading Ability: One Perspective”. *Phonological Awareness in Reading. Springer Series in Language and Communication*. Ed. Diane J. Sawyer and Barbara J. Fox. New York: Springer-Verlag, 1991, 191–215. Print.
- MAURER, Alicja. „Świadomość fonologiczna jako predyktor postępów w nauce czytania i pisania”. *Annales Academiae Paedagogicae Cracoviensis. Studia Psychologica* II 41 (2007): 119–141. <https://rep.up.krakow.pl/xmlui/bitstream/handle/11716/7485/AF041--08--Swiadomosc-fonologiczna--Maurer.pdf?sequence=1&isAllowed=y>.
- MCGUINNES, Dianie, Carmen MCGUINNES and John DONOHUE. „Phonological training and the alphabet principle: Evidence for reciprocal causality”. *Reading Research Quarterly* 30 (1995): 830–852. <https://www.jstor.org/stable/748200>.
- MELBY-LERVAG, Monica and Arne LERVAG. „Cross-linguistic transfer of oral language, decoding, phonological awareness and reading comprehension: A meta-analysis of the correlational evidence”. *Journal of Research in Reading* 34 (1) (2011): 114–135. <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-9817.2010.01477.x>.
- MELLONI, Chiara and Maria VENDER. „Phonological Processing and Nonword Repetition: A Critical Tool for the Identification of Dyslexia in Bilingualism”. *An Anthology of Bilingual Child Phonology*. Ed. Elena Babatsouli and Martin J. Ball. Bristol: Multilingual Matters, 2020. Print.
- MIODUNKA, Władysław. „Biografia językowa jako jedna z metod badania dwujęzyczności”. *Bilingwizm polsko-obcy. Od teorii i metodologii badań do studiów przypadków*. Ed. Robert Dębski and Władysław Miodunka. Kraków: Księgarnia Akademicka, 2016, 49–87. Print.
- MŁYŃSKI, Rafał. „Lingwistyczne objawy dysleksji i dwujęzyczności. Próba analizy różnicowej zachowań językowych”. *Bilingwizm polsko-obcy. Od teorii i metodologii badań do studiów przypadków*. Ed. Robert Dębski and Władysław Miodunka. Kraków: Księgarnia Akademicka, 2016, 119–131. Print.
- MŁYŃSKI, Rafał. „Biografia językowa jako metoda badania dwujęzyczności polsko-obcej i zaburzeń kompetencji komunikacyjnej. Przegląd badań logopedycznych”. *Wielojęzyczność. Wyzwanie współczesnej logopedii*. Ed. Sofia Kamińska. Siedlce: Uniwersytet Przyrodniczo-Humanistyczny, 2023, 141–156. Print.
- NICOLSON, Roderick Ian, Angela J. FAWCETT and Paul DEAN. „Developmental dyslexia: The cerebellar deficit hypothesis”. *Trends in Neurosciences* 24 (9) (2001): 508–511. <https://pubmed.ncbi.nlm.nih.gov/11506881/>.
- PENNINGTON, Bruce F. *Diagnosing Learning Disorders: A Neuropsychological Framework*. New York: The Guilford Press, 1991. Print.
- PENNINGTON, Bruce F. and Dianne LEFLY. „Early Reading Development in Children at Family Risk for Dyslexia”. *Child Development* 72 (3) (2001): 816–833. <https://pubmed.ncbi.nlm.nih.gov/11405584/>.
- PERFETTI, Charles A., Isabel BECK, Laura C. BELL and Carol HUGHES. „Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children”. *Merrill-Palmer Quarterly* 33 (3) (1987): 283–319. <https://psycnet.apa.org/record/1987-33995-001>.

- PHILLIPS, Beth M., Jeanine CLANCY-MENCHETTI and Christopher J. LONIGAN. „Successful Phonological Awareness Instruction with Preschool Children”. *Topics in Early Childhood Special Education* 28 (1) (2018): 3–17. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4450148/>.
- RAMUS, Franck, Irene ALTARELLI, Katarzyna JEDNORÓG, Jingjing ZHAO and Lou SCOTTO DI COVELLA. „Neuroanatomy of developmental dyslexia: Pitfalls and promise”. *Neuroscience & Biobehavioral Reviews* 84 (2017): 434–452. <https://pubmed.ncbi.nlm.nih.gov/28797557/>.
- RAŻNIAK, Aleksandra. „Rozwój świadomości fonologicznej w języku ojczystym i obcym”. *Języki Obce w Szkole* 1 (2016): 66–74. <https://jows.pl/artykuly/rozwoj-swiadomosci-fonologicznej-dziecka-w-jezyku-ojczystym-i-obcym>.
- RUBIN, Hyla and Anne TURNER. „Linguistic awareness skills in grade one children in a French immersion setting”. *Reading and Writing* 1 (1989): 73–86. <https://link.springer.com/article/10.1007/BF00178839>.
- SHAYWITZ, Bennett, Sally E. SHAYWITZ, Kenneth R. PUGH, W. Einar MENCL, Robert K. FULBRIGHT, Paweł SKUDLARSKI, Robert Todd CONSTABLE, Karen MARCHIONE, Jack M. FLETCHER, G. Reid LYON and John C. GORE. „Disruption of Posterior Brain Systems for Reading in Children with Developmental Dyslexia”. *Biological Psychiatry* 52 (2) (2002): 101–110. <https://pubmed.ncbi.nlm.nih.gov/12114001/>.
- SNOWLING, Margaret J. *Dyslexia: A Cognitive Developmental Perspective*. Oxford: Basil Blackwell, 1987. Print.
- SNOWLING, Margaret J. „Phonological Processing and Developmental Dyslexia”. *Journal of Research on Reading* 18 (2) (1995): 132–138. <https://psycnet.apa.org/record/1996-08507-001>.
- SNOWLING, Margaret J. *Dyslexia, 2nd Edition*. Hoboken, NJ: Blackwell Publishing, 2000. Print.
- STANOVICH, Kieth E., Anne E. CUNNINGHAM and Barbara B. CRAMER. „Assessing Phonological Awareness in Kindergarten Children: Issues of Task Comparability”. *Journal of Experimental Child Psychology* 38 (2) (1984): 175–190. <https://www.sciencedirect.com/science/article/abs/pii/0022096584901206>.
- STEIN, John. „Wielkokomórkowa teoria dysleksji rozwojowej”. *Dysleksja od badań mózgu do praktyki*. Ed. Anna Grabowska and Krystyna Rymarczyk. Warszawa: Instytut Biologii Doświadczalnej im. M. Neckiego, 2004, 7–42. Print.
- SWAN, Denise and Usha GOSWAMI. „Phonological Awareness Deficits in Developmental Dyslexia and the Phonological Representations Hypothesis”. *Journal of Experimental Child Psychology* 66 (1) (1997): 18–41. <https://pubmed.ncbi.nlm.nih.gov/9226932/>.
- TORGESEN, Joseph K., Richard K. WAGNER and Carol A. RASHOTTE. „Longitudinal Studies of Phonological Processing and Reading”. *Journal of Learning Disabilities* 27 (5) (1994): 276–286. <https://pubmed.ncbi.nlm.nih.gov/8006506/>.
- VENDER, Maria, Shenai HU, Federica MANTIONE, Silvia SAVAZZI, Denis DELFITTO and Chiara MELLONI. „Inflectional morphology: evidence for an advantage of bilingualism in dyslexia”. *International Journal of Bilingual Education and Bilingualism* 24 (2) (2014): 155–172. https://www.researchgate.net/publication/323803747_Inflectional_morphology_evidence_for_an_advantage_of_bilingualism_in_dyslexia.
- WAGNER, Richard K., Joseph K. TORGESEN, Carol A. RASHOTTE, Stephen A. HECHT, Theodore A. BARKER, Stephen R. BURGESS, John DONAHUE and Tamara GARON. „Changing Relations Between Phonological Processing Abilities and Word-Level Reading as Children Develop From Beginning to Skilled Readers: A 5Year Longitudinal Study”. *Developmental Psychology* 33 (3) (1997): 468–479. <https://pubmed.ncbi.nlm.nih.gov/9149925/>.
- WILCZYŃSKA, Weronika and Anna MICHONSKA-STADNIK. *Metodologia badań w glottodydaktyce: wprowadzenie*. Kraków: Avalon, 2010. Print.

WYSOCKA, Anna and Małgorzata LIPOWSKA. „Genetyczne podłoże współwystępowania ADHD i dysleksji rozwojowej”. *Psychiatria i Psychologia Kliniczna* 10 (3) (2010): 189–194. <https://www.psychiatria.com.pl/index.php/wydawnictwa/2010-vol-10-no-3/genetyczne-podloze-wspolwystepowania-adhd-i-dysleksji-rozwojowej#>.

WYSOCKA, Anna, Małgorzata LIPOWSKA and Adrianna KILIKOWSKA. „Genetics in solving dyslexia puzzles: the Overview”. *Acta Neuropsychologica* 8 (4) (2010): 315–331. https://www.researchgate.net/publication/245023974_Genetics_in_solving_dyslexia_puzzles.

ZITIERNACHWEIS:

MŁYŃSKI, Rafał, GUZEK, Agata. „Phonological Awareness in Polish-American Child with Dyslexia. Case study“, *Linguistische Treffen in Wrocław* 26, 2024 (II): 401–418. DOI: 10.23817/lingtreff.26-24.