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Oral language impairments as the main predictor for the onset of developmental dyslexia

AUTHOR'S ABSTRACT
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The dissertation contains 196 standard typewritten pages of text, of which 160 constitute the body of the work. 43 tables, 19 diagrams and 3 figures are included in the text. The bibliography contains 276 titles (27 in Cyrillic, 246 in Latin and 3 websites).

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The work is dedicated to my mother - my teacher, critic, friend and support!

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CONTENTS

INTRODUCTION

Communication plays an increasingly important role in the functioning of the modern service society. This also leads to the growing importance of the problem of communication impairments and the therapy to overcome them. In connection with this, even outside the framework of logopedic therapy, attention is increasingly turning to the issue of children's language development. Specific language impairments have been identified as one of the most common childhood disorders, but also the least detectable. With their varied manifestations in oral language, in which areas of particular difficulty are identified, they can lead to serious consequences for those affected and their families.

Oral language is a natural foundation for learning written language. Reading and writing skills are a critical foundation for educational achievement. And literacy is a universal goal and a necessary condition for ensuring competitive participation in society. Against this backdrop, the growing number of children who are struggling to master literacy is worrying. Specific dyslexia is among the most prevalent neurodevelopmental disorders and the most common learning disorder.

It is therefore crucial to assess cognitive skills that predict written language development. This allows early diagnosis of children at risk of dyslexia and adequate preventive therapy to reduce unintended consequences later in school development. For this reason, the timely identification of specific learning disabilities is a subject of discussion among specialists from different scientific fields.

Already at preschool age, a large number of children show some similar difficulties that foreshadow problems with learning material. Early signs of dyslexia include delayed language development with phonological functioning and expressive skills particularly affected. The mission of this paper is to point out the need for a universally valid analytical tool with diagnostic and predictive power for impending school problems. The focus is on the oral language status of upper preschool children and its role as a major predictor of developmental dyslexia risk.

In constructing the self-study, basic constructs, established on the basis of empirical data, about the characteristics of children's language development were taken into account. The specificity of language functioning, the processes and stages of its acquisition in the conditions of the Bulgarian language environment are taken into account.

The study is a longitudinal study and was conducted in two phases between January 2020 and December 2021. It was carried out on the basis of the following programme:

Leading hypothesis:

The high prevalence of disorders in written language acquisition and learning is the result of late recognition of the problem, and a major early marker of dyslexia risk is the oral language status in upper preschool.

The global goal of the study is to *contribute to the awareness of the need for early diagnosis and prevention of specific written language impairments, and the need to introduce a single standardized operational tool for its implementation.*

In order to achieve the global objective, the following **tasks** are set:

1. Establish the role of specific language impairment in upper preschoolers as a reliable predictor with strong predictive value for written language acquisition.

2. Formulation of conclusions from the study.

3. Outlining recommendations for Bulgarian logopedic therapy practice.

The idea of the present paper is to support, with objective evidence containing empirically verified results, the concept of the existence of predictors of developmental dyslexia. The identification of early indicators of developmental dyslexia in written language enables measures to be taken to reduce unintended consequences later in school development. Knowing the specifics of the problems affecting language functioning allows for the development of coping strategies and support mechanisms to enable the dyslexic child to reach his or her potential.

In line with the design of the theoretical-practical study, a critical analysis of literature on the topic was conducted prior to the implementation of the research. Basic concepts of language as a higher cognitive function are discussed. Aspects of the problem of language impairment and its role as a predictor of developmental dyslexia are discussed.

The structuring and shaping of the research design was done in the preliminary preparation, when the aims were formulated, the tasks were defined and the working hypotheses were derived; the language domains to be assessed were identified; the research instrument was developed; the participants were recruited and consent was obtained from the parents to include their children in the study.

CHAPTER ONE. Theoretical aspects

I. Language as a Higher Mental Function

As a higher cognitive function, language supports the transmission, collection and processing of information by encoding and decoding messages. Language interacts with every aspect of human life and can only be understood if considered in relation to society. Each person in childhood learns explicitly the ability to participate, as sender and receiver, in a communication system that includes a set of symbols (sounds, gestures, written or typed signs). These commonly accepted language, manual or graphic codes through which people express themselves as members of a social group and participants in its culture, and the norms for combining them, constitute language. It is used to convey information, express feelings and emotions, influence others, and demonstrate attitudes.

From the work of Vygotsky (1986) is derived the claim that language is the basis for the development of cognitive abilities in the adolescent child. The product of research activity are the theories and models of language developed, based on the whole spectrum of cognitive processes necessary from the generation of an idea for an utterance, through the extraction of words, to their arrangement in sequence according to the rules of language and finally the production of language, handwritten or printed text (Caramazza, 1997).

1. Organization of language processes

For many years, knowledge about the organization of language processes has for the most part come from studies of deviations from normative language functioning. In 1861, the French physician-pathologist and clinical surgeon Pierre Paul Broca discovered a brain region responsible for language generation, encoding, and production (along with controlling facial neurons). Broca was the first to associate the left hemisphere with language.

Ten years after Broca's findings, German neuropathologist Karl Wernicke discovered that damage to Broca's area was not the only place in the brain that could cause language deficits. Wernicke created a neurological model of language by delineating various language processes in the brain (Bogen and Bogen, 1976).

In the mid-twentieth century, reports from brain stimulation studies helped neurosurgeons understand more about the localization of language function in the brain. In recent decades, with the development of new neuroimaging technologies, insight into brain activity has gotten even better. It is known that there is a route through which language "travels" between Broca's and Wernicke's areas. Nowadays, with the change in the

conceptualization of neural systems underlying complex functions such as language and memory, language is no longer thought to be connected to multiple brain centers. Instead, it is viewed as the result of synchronized activity in vast neural networks composed of many functional regions in the cerebral cortex and subcortical nuclei, and numerous pathways that connect these regions to each other (Damasio and Damasio, 1989).

2. Oral and written language. Operants of the language

Language is a cognitive system of communication. Noam Chomsky calls this system *linguistic competence* (Chomsky, 1975). The study of oral language is based on knowledge of the physiological and physical nature of language and hearing, which are the primary means of oral communication. Apart from the audio channel, the flow of information between interlocutors also takes place through other routes - kinesthetic and visual. Oral language has additional resources as an expressive medium - paralinguistic elements of communication (prosody and pitch, volume, tone of voice). Oral communication (speaking and listening) involves several elements: message encoding, articulatory planning and execution, language acoustics and sound transmission, sound and language perception, message decoding.

Written language is another type of communication in which language is represented visually through graphic symbols. It is built on the basis of the functional systems on which oral language rests, and at the same time has its own neuropsychological and anatomical-physiological organization (Tsenova, 2019, p. 19). The tools of written language are writing and reading. Writing is made up of three components - graphic, orthographic and content (by Tsenova, 2019, p. 21). Reading is accomplished through two neural routes along which information usually runs in parallel and is complementary - sublexical and lexical.

Oral language is the foundation for literacy development. It provides a feel for words and sentences, and builds sensitivity to the sound system, which is the basis for acquiring phonological competence. Children who start school with poor verbal skills are predisposed to difficulties in acquiring written language. Furthermore, good access to phonemic units of language is the basis for forming effective reading and writing abilities.

In the development of oral and written language acquisition, atypical behaviors and difficulties are possible that are counterbalanced by nonverbal skills. Then there is a language impairment that affects linguistic use and/or processing.

II. Language impairments

According to the concept of Bloom and Lahey (in Tsenova, 2019, p. 40), the elements of the language system - form (phonology, morphology, syntax), content (semantics) and use (pragmatics) form the component structure of language. Deficits in any of these areas lead to language disorders. Pathology affects oral and written language respectively.

1. Oral language impairments

In contemporary logopedic therapy, there are conflicting opinions and theories regarding oral language disorders, both in terms of their global classification and in the distinction of individual subcategories of syndromes. In this paper, oral language disorders are considered as acquired (aphasia) and developmental (dysphasia).

1.1. Acquired oral language impairments

Acquired oral language disorders result from a breakdown of the bidirectional pathway that establishes the relationship between thought and language. Consequently, mental representations can no longer be accurately converted into codes with grammatical organization. The reverse process, the decoding of verbal messages and their conversion into internal conceptualization, is also disrupted. Not only is communication impaired, cognitive processes and the ability to perform computations are often compromised because they rely in part on inner language.

Modern science makes it clear that aphasia is not the result of praxis or gnosis disorders, although in some cases they accompany language disorders. From this point of view, the use of terms such as 'motor' or 'sensory', in the context of language impairments, is incorrect.

Acquired oral language disorders can be caused by virtually any neurological damage to the cerebral hemispheres, provided it affects the language areas. In most cases the cause is stroke, brain trauma or tumors, degenerative dementias. Correlations between different aphasias and damage to specific brain regions have been extensively validated and remain a staple of clinical neurology. From the history of knowledge of language pathology in adults, it is evident that two major aphasic syndromes have been distinguished, Broca's and Wernicke's type. The classification of aphasias in medical practice includes other forms with certain clinical parameters such as: global aphasia, transcortical motor aphasia, transcortical sensory aphasia, transcortical mixed aphasia, conduction aphasia, amnestic aphasia (anomia), childhood aphasia (Mavlov, 2000).

Aphasias are very often mixed. The forms and symptoms of acquired oral language disorders vary from case to case depending on the language area(s) affected, the severity and level of communication impairment, the age of the individual and the stage of language development.

1.2. Impairments of oral language development

Oral language developmental impairments, as the term implies, include linguistic deficits that refer to difficulties in using the language system or unformed skills in understanding verbal messages. They may affect the form (phonology and grammar), content (semantics) and function (pragmatics) of language; or the ability to decode, integrate and organise aurally perceived information.

Early-onset spoken language impairments result from underdevelopment or malfunction of cerebral areas involved in the generation or comprehension of verbal messages. The pathology results from the presence of a lesion in the dominant hemisphere, which may be a consequence of brain damage or trauma caused by a number of medical conditions in the pre-, peri- and postnatal period. In many cases, these disorders have no apparent cause, due to the fact that the functionality of the congenital or prelinguistic immature neuroregions in the cortex, by virtue of biological maturation, gradually increases or is compensated by healthy cells in other cerebral areas (Tsenova, 2019, p. 151).

Oral language development disorders may be primary or coexist with other pathological abnormalities. In the latter case, these impairments are marked by some authors (Tsenova, 2019, p. 151) as secondary. Primary, so-called specific language impairments, imply only a linguistic deficit that is not accompanied or caused by an intellectual, sensory, mental, pervasive, or other medical condition.

According to some authors, specific language impairments are highly prevalent and comprise 6-15% of children when identified by formal norm-referenced testing with population-based samples (Law et al., 2000).

1.2.1. Specific language impairments

According to the standard diagnostic tool for epidemiology, health management and clinical purposes - ICD-10 - specific disorders of language development are classified under heading F80 (ICD-10, 2008). Expressive language disorder is a category that is justified only if language expression is outside the range of typical for the mental age and functioning involved and nonverbal intelligence is within the range of normal. Receptive language

disorders, in addition to language decoding, also affect language encoding, and are characterized by deficits in verbal-auditory attention (Markova, Stankova, 2015, p. 80).

According to Tsenova (2019, p. 152), there are two theoretical models describing specific language impairments - medical and linguistic. In the *medical* model, attention is paid to the causes of the condition, using the terms dysphasia (in the French school and in our country) and alalia (in Russian logopedic therapy). Medical doctrine allows diagnostic evaluation to be carried out by assessing the presence of the two main types of language disorders - expressive and impressionistic. In the first subtype, it is mainly the form of language that is disturbed. Receptive deficiency is manifested primarily by affected content and use of language, which also affects the mastery of its form.

The linguistic model operates with the notions of specific language impairments (in the English-speaking logopedic therapy, recently also in Bulgaria) and general language underdevelopment (in the Russian logopedic therapy school and in Bulgaria). This treatment is not interested in etiology, but examines the child's language expression in terms of its age-related conditioning. The ontogenesis of language development proceeds in a universal sequence that reflects the general regularities of development. On the basis of a comparison of individual linguistic behavior with the typical norm for age, deficits in each of the domains of language are identified.

Many aspects of literacy depend on language knowledge and skills that are acquired prior to school entry (Catts & Kamhi, 2012). Learning disabilities and language disorders are closely related, although the exact relationship between the two is not fully understood. Estimates vary, but preschool children diagnosed with specific language impairments are at least four times more likely to develop reading disabilities than their unaffected peers (Pennington & Bishop, 2009). Language disorders have adverse effects on any age, but may be particularly severe in children because of their widespread impact on overall development and because they build over time.

2. Written language impairments

Written language impairments include significant difficulties with fluent written encoding and decoding - spelling and written expression, visual word recognition, comprehension of read text (Kamhi & Catts, 2012). There is a bidirectional relationship between writing and reading, such that difficulty or development in one area affects achievement in the other. Acquired inability to read due to brain damage should be distinguished from dyslexia (a developmental disorder in which an individual is unable to

learn to read) and illiteracy (which reflects poor educational attainment) (Sinanovic et al., 2011).

2.1. Acquired written language impairments

An adult individual may lose learned reading and writing skills following damage to brain regions directly responsible for storing or processing written images (Luzzatti & Whitaker, 2006). Causes of acquired written language disorders vary in the extent and localization of brain lesions caused by the same etiological factors that are implicated in aphasia (stroke, presence of a tumor or traumatic central nervous system injury, Alzheimer's disease or dementia, cerebral dysfunction in acute conditions of metabolic or toxic origin). Reading and writing are closely related to oral language, so alexia and hapraphy (acquired reading and writing disorders) are considered in conjunction with aphasia (Henderson, 2009).

The question of the forms of these violations is controversial. The theory of written information processing with a two-way decoding model predicts a possible impairment in each route, namely a selective impairment at the level of the sublexical or lexical reading procedure (Plaut, et al., 1996).

Alexia is traditionally classified according to the site of anatomical impairment and the presence/absence of deficits in written coding, and oral language. Disintegration in the written synthesis system can cause peripheral alexia (Bub, 2003). It is associated with a disturbance in the processes of converting letters into abstract written representation. A breakdown of the semantic and phonological processing mechanism leads to central alexia (Bub, 2003). In it, perceptual writing processing is preserved, but early visual areas that interact with more general language regions are affected (Leff & Behrmann, 2008). Symptoms of individual alexia and its subtypes are relatively straightforward, however clinical indicators vary considerably depending on the size of the lesions and the involvement of other cerebral areas in the reading process (Cherney, 2004).

Agraphia can result from impairment of the central cognitive processes that support oral language and reading, so it often co-occurs with aphasia and alexia. In addition, the ability to code in writing may be impaired due to impairment of peripheral processes required to plan and execute appropriate hand movements to generate or write letters. Again analogous to the dual route of reading, models have been developed that describe indicators of impaired written coding (Luzzatti & Whitaker, 2006). Different forms of agraphia are distinguished, each with its distinctive symptoms of manifestation.

Since in most cases alexia and apraphia do not occur in isolation but as symptoms in the picture of aphasia, the rehabilitation of written language is carried out in parallel with the restoration of oral language. At this stage, the treatment of acquired written encoding and decoding disorders is not seriously approached in our country. This is not the case with congenital or early acquired reading and writing disorders, which have become a problem of high social significance in recent decades.

2.2. Written language acquisition impairments

Interest in this type of disorder can be traced back to the early 19th century. Then, however, the research was mainly focused on the localization of brain functions and was carried out mostly by medical doctors. The doctrines that emerged in this period provided the vision of the so-called medical theoretical model with which the term *dyslexia* is associated. In this model, the causes of the disorder and the impact on them are of central importance.

Since the middle of the 20th century, the social-psychological model has increasingly come to dominate, largely excluding the causes of the disorder and focusing on individual needs and the support that is tied to them. The authors of the ideas in this theoretical model are specialists from different scientific fields. Labelling is avoided here by using the term *specific learning disability*, which is less intimidating for parents and does not discriminate against those affected in society. But this term, according to Matanova (2001, p. 13), may rather mark the range of problems without being a nosological entity outlining the therapy and prognosis of this disorder.

The labels *specific learning disability, learning disability, school skills development disorder* are used equivalently to *specific dyslexia*. In our country, this abundance of names for the same phenomenon causes some confusion. This is because the former interpret the English descriptive term specific learning disabilities, which summarises different types of learning difficulties associated with deficits in the acquisition and understanding of spoken and written language, with preserved intellectual functioning. However, there is debate around both the terms 'learning' and 'difficulties'. Whereas developmental dyslexia demonstrates dysfunction of one or more of the parameters of graphic decoding and/or encoding.

According to the International Classification of Diseases, *developmental disorders of school skills* manifest themselves during the early school years, characterised by significant and persistent difficulties in reading, writing or arithmetic. The child's performance in the affected area is significantly below expectations for the age and general level of intellectual

functioning, resulting in unsatisfactory academic performance. The disorder is not the result of a lack of learning ability and is not due to a mental disorder, sensory impairment, brain injury or disease, neurological or motor disorder, lack of education, lack of mastery of the language of instruction, or psychosocial disadvantage (ICD-10, 2008). The same source differentiates several groups of *learning disabilities*: reading disabilities, writing disabilities, numeracy disabilities, and combined learning disabilities.

Dysontogenesis in the predominance of one of the symptoms does not mean that an isolated manifestation of a developmental disorder of only one of the modalities of written language is possible, while the other is unaffected. For this reason, in logopedic therapy, in most of the world, disorders of mastery of writing, reading, and arithmetic skills are referred to by the widely accepted term developmental *dyslexia*. In this research paper, the use of the term dyslexia refers to a developmental disorder of both reading and writing (dysgraphia) and/or of mathematical ability (dyscalculia).

2.2.1. Developmental dyslexia - prevalence and etiology

Developmental dyslexia is a disorder of written language resulting from a specificity in the functioning of the cerebral cortex that demonstrates difficulty in mastering reading, writing, logical and mathematical thinking skills.

It is known that the disorder is a consequence of congenital or acquired in early childhood neurological pathology of primary or secondary type (Tsenova, 2019, p. 197). Developmental dyslexia is accordingly divided into specific (primary) in origin (non-formation of neuropsychic language or metalinguistic function related to written language) or secondary (refers to a more general syndrome with a previously known etiology - sensory, visual, intellectual, motor, kinetic, autistic disorder). There is also a third, more specific form (in children with developmental norm) - pseudo-dyslexia, which is a consequence of the action of psychosocial, economic or educational factors (they do not cause dyslexia in the definitional sense of the term, but lead to learning difficulties) (Tsenova, 2019, p. 203). The first group of written language impairments - the specific ones - is of intense interest and an area of active research.

Written language impairments are one of the most common neurodevelopmental disorders at 5-12% (Schumacher et al., 2007). According to a September 2012 study by the Ministry of Education and Science for the city of Sofia (Bulgaria), about 18% of students in the primary education stage have learning difficulties (Todorova, 2013). About 7% of these children demonstrate specific dyslexia.

Discussion about the prevalence of specific learning disabilities among both genders is controversial. According to research, the data range from 1.5 to 3 for boys to 1 for girls (Rutter et al., 2004). Biological sex differences in the nervous system may play a reinforcing or compromising role in child language development and school achievement.

The heterogeneity in manifestations and the diverse symptomatology are the reason for the existence of different models and hypotheses for the etiology of specific dyslexia. There are no less than four main theories of its origin and many variations of them, which can be grouped into two frameworks (Ramus, 2003). The first group of theories seeks neurobiological and genetic factors for its manifestation. Proponents of the antagonistic group of ideas argue that the disorder is a direct result of cognitive deficits.

The idea of a multifactorial basis for dyslexia is increasingly discussed. According to Pennington (2006), a full understanding of developmental disorders, such as the written language acquisition disorder, can be achieved by using multivariate methods to analyse genetic, neurological and cognitive factors simultaneously.

Both modal disorders and those at the higher symbolic language level play a role in the emergence and peculiar manifestation of the learning disorder (Tsenova, 2019, p. 223). The notion that not single but a complex of different causes lies at the root has its contribution both in clinical and correctional-therapeutic terms. This conceptualization facilitates the differentiation of different forms of developmental dyslexia according to the identified leading symptomatology and the specific pathogenetic features revealed.

2.2.2. Manifestations of developmental dyslexia

In the specialized literature one can find numerous opinions and proposed models for typology of specific written language disorders according to the dominant symptom. In 1965, Myklebust attempted to differentiate between different forms by suggesting the presence of "auditory" and "visual dyslexia". A few guidins later, Boder (1973) called these two forms "dysphonetic" and "dysidic dyslexia," and added the presence of a third subtype, which is a combination of the other two.

In the early 1980s, following a specially organized NATO conference, Marshall (1984) published a paper interpreting the forms of specific dyslexia in relation to the two principles of reading and writing. The author interpreted the subtypes of developmental dyslexia by analogy with adult alexia. Castles and Coltheart (1993) also conclude that phonological and vocabulary profiles are quite common among those affected.

According to Tsenova (2019, p. 214), dyslexics more easily master and use lexical reading (with a reliance on semantics) because their spelling and grapheme-phoneme mapping abilities are not efficient. Considering this and the type of errors made, she distinguishes and describes four forms of dyslexia: phonological-structural; phonmo-acoustic, visual-graphic and cognitive-linguistic forms.

The errors that pupils with specific learning disabilities make in their writing are no different from those reported for typical children, nor are they distinguished by particular features. What distinguishes them from physiological errors is their quantity and their varied nature (in relation to the same child). They are characterized by persistence over time, resistance to influence, and inconsistency with the requirements for the educational stage of the pupil concerned (Estienne, 1985).

The population of those affected by specific dyslexia is highly heterogeneous and those affected may exhibit many different reading and writing profiles. When discussing written language, it is also appropriate to address mathematical functions. Their presence in the clinical picture of specific dyslexia is not mandatory, but comorbidity is possible. Deficits in the ability to perform arithmetic operations are associated with the same pathogenesis as disorders of written encoding and decoding, but are seen more as an indicator of intellectual functioning and a criterion of differential diagnostic value.

The diagnosis of dyslexia is made on the basis of missing abilities. The ICD-10 notes that the severity of the disorder and the course of the disorder are taken into account when diagnosing dyslexia. Conventionally, the clinical picture includes general and specific features. The general ones are related to psychomotor, cognitive and emotional development, behavior. Specific deficits are related to sensory processing and language functioning. A group of signs - predictors of dyslexia - emerge.

3. Predictors of developmental dyslexia

The question of whether the presence of dyslexia can be established before literacy begins is much debated in logopedic therapy practice. Making an early diagnosis can highlight the areas in which a child has difficulties.

3.1. General description of the predictors

The discrepancy between potential ability and actual achievement is a major criterion in the recognition of dyslexia. It is important to distinguish specific learning disabilities from

conventional school performance problems in a timely manner in order to develop an adequate program to address the problem.

A characteristic indicator of dyslexia is perceptual disturbances associated with the inability to recognize, discriminate and understand stimuli from the environment. Perception is part of the cognitive domain and in this case it is a "cognitive deficit of the basic type - the *input level of language is affected"* (Tsenova, 2019, p. 225).

Nonverbal gnosis is extremely important for the development of *short-term auditory memory. Difficulties in repeating a particular rhythm indicate deficits in nonverbal memory*. This suggests problems with the retention of sounds, the development of an active vocabulary and the establishment of stable image-sound relationships. These difficulties are signs of a *predisposition to dyslexia*.

Visual gnosis is age and socially determined - it is acquired through learning and teaching. *Difficulties in naming optical stimuli can point to expressive failure*. In addition, visual processing affects reading achievement. Some authors emphasize the role of *visual attention* in reading development and consider it one *of the most important predictors of literacy acquisition* (Valdois et al., 2004).

Auditory and visual functions are the basis for *short-term and long-term memory* development. A delay in the development of short-term memory can be seen as a *predictor of the onset of subsequent learning and behavioural problems*. The ability to memorize and reproduce stimulus sequences is a supramodal higher cortical function. A child's ability to use language in communication is largely reflected in his or her ability to process coherent information. *Disorders in succcessive gnosis can point to active attention disorder and dyslexia.*

Disorders of spatial gnosis are usually associated with praxis and language difficulties. These manifestations of functional deficiency are associated with immaturity of neurological regions in the brain that underlies *cognitive abnormalities seen in developmental dyslexia* (Waldie & Hausmann, 2010) and dyscalculia (Rotzer et al., 2008).

Deficits in temporal gnosis are manifested as difficulties in forming notions of time (experienced, logical, astronomical, climatic) and the presence of errors in verb tenses. The described symptoms of problems in specific supramodal perception *point to a future diagnosis of dyslexia*.

3.2. Disturbances in comprehension of phonological structure as a predictor

The most frequently cited reasons for difficulties in the acquisition of reading and writing in preschool and then in school are deficits in: *phonemic gnosis, rapid automatic naming and phonological awareness*. Longitudinal studies of children from preschool to the end of Grade 3 indicate that specific phonemic deficits exist among a large proportion of dyslexia carriers even before starting school (Lundberg & Noyen, 2012).

Phoneme awareness, letter-sound knowledge, and rapid automatized naming are strong independent predictors of writing disorders, predicting both children's initial reading status and subsequent decoding development (Hulme & Snowling, 2014). These findings have been supported by numerous studies examining predictors of early reading development (Muter et al., 2004; Lervag & Hulme, 2009; Melby-Lervag et al., 2012).

A growing number of linguistic researchers have espoused the theory that early reading development depends on *phonological skills* (Fletcher, 2009) and that deficits in these skills are likely related to difficulties in decoding instruction. A number of key phonological language competencies have a predictive relationship with early reading development, and while rapid naming primarily predicts fluency, phonological awareness is an indicator of accuracy in reading (Kairaluoma et al., 2013).

A number of authors have pointed to the crucial role of phonological awareness in understanding dyslexia, and of phonologically based deficits in diagnosing the disorder (Melby-Lervag et al., 2012). According to other researchers, a powerful predictor of the presence of developmental writing disorders is processing speed (Wolf & Bowers, 1999). The dual deficit theory explains reading difficulties with *impairments in both phonological awareness and processing speed*. On this basis, *an indicator of difficulty in literacy acquisition* is the manifestation of a joint deficiency in both competencies.

The role of *phonological awareness* in the development of functional literacy is significant, and according to some authors, disorders in this linguistic-cognitive domain are entirely responsible for the manifestations of dyslexia. It is widely accepted that phonological language skills are a critical foundation for reading mastery. Metaphonological competencies and writing develop in parallel and are interdependent.

The levels of formation of metalinguistic ability follow general patterns and sequence. They play the role of a predictor for the acquisition and development of the processes of reading and writing (Shtereva, 2012, p. 28; Shtereva, 2018, p. 93). Knowledge of the phonemic organisation of language between the ages of 3.6 and 5 is the best predictor of literacy acquisition (www.thecommunicationtrust. org.uk).

3.3. Specific language impairments - a major predictor

Specific language impairments are often followed by related problems such as reading and spelling difficulties (ICD-10, 2008). There is empirical evidence that *early oral language difficulties are a strong predictor of the onset of writing difficulties*.

All the components of the language system develop in interaction and follow naturally the stages of evolutionary child language development. Lagging in any one area leads to a negative effect in the others. *The presence of disharmony in the individual development of the child*, in which deficits are found in some areas, while in others such deficits are absent, *is a distinctive feature of specific dyslexia* (Tsenova, 2019, p. 219).

Table 1 systematizes the major language deficits that are predictive of impending impairments in written language acquisition. The main, most frequently cited criteria for the identification of dyslexia, pointed out by various authors in the field of logopedic therapy, are described.

It is important to look for ways to promptly detect the indicators that suggest the onset of dyslexia. Theorists and practitioners continue to work in this direction, but more research is needed that will lead to the creation of operational and universally valid screening tools that not only indicate predictors of impending school difficulties, but also take into account their hierarchy.

Table 1.

The most frequently cited predictors of the risk of specific dyslexia

CHARACTERISTIC ORAL LANGUAGE MANIFESTATIONS INDICATING RISK OF SPECIFIC LEARNING DISABILITIES	
Phonological deficit	Difficulties in verbal analysis and decomposing the words into syllables; impaired phonemic gnosis (poor perception of phonemic contrasts of sounds with similar acoustic-articulatory features); unstable use of speech sounds (mainly from late ontogenesis) and paraphasias with constant substitution, as well as errors in sound articulation, mainly in multisyllabic words, of atypical and inconsistent nature; difficulties in rhyme detection and rhyming; the presence of a deficit in phonological knowledge (poor awareness of quantitative and qualitative sound composition and inability to separate, merge or change phonemes within words to make new ones).
Morphological disorders	Inaccuracies in linguistic encoding and decoding of word forms for gender and plurals; having difficulty in referring to categories of time, space and direction and in using concepts related to them; lack of mastery of the semantic prefixes of words.
Syntactic difficulties	Presence of incomplete sentences and incorrect word order; difficulties in coordinating words; shortened same-type utterances and lack of different types of sentences; unawareness of more complex grammatical constructions; difficulties in understanding and producing structured complex sentences; Inability to compose an extended retelling and narration of a text.
Semantic-pragmatic insufficiency	Disorders in the nominative function of the word; slower speed of perception and comprehension of graphically presented information, as well as serial naming of objects; limited contextual meaning and active vocabulary (use of a small number of words, inability to form generalised concepts, difficulty in grasping the multiple meanings of words and phrases with figurative or abstract meanings, lack or deficiency of synonyms and antonyms, difficulty in understanding and using prepositions); Deficient ability to understand and transfer the meaning of language in different situations; unwillingness and inability to maintain communication or a preference for gestural communication.

CHAPTER TWO. Programme of the study

The self-study was driven by the need for a generally valid analytical tool with diagnostic and predictive power for the impending mastery of written language. Early identification of such manifestations allows effective timely intervention to reduce risk and prevent dyslexia.

The focus is on determining the role of oral language impairments in upper preschool as a reliable predictor of future difficulties in acquiring reading, writing, and numeracy skills.

1. Objectives

The main aim of this study is to demonstrate the role of specific language impairment as a predictor of risk for developmental dyslexia. That is: to investigate the oral language status of upper preschool children and to reveal that those with language deficits are at high risk and subsequently manifest as students with learning disabilities.

The main objective of the study is realized through the following **sub-objectives**:

1. Study the state of oral language.
2. Analyzing the obtained results.
3. Determine the extent of oral language impairment as an indicator of developmental dyslexia risk.

2. Tasks

In order to achieve the main objective of the study, the following **tasks are** carried out in two phases **to the first phase:**

1. Collecting experimental data on the language development of one hundred upper preschool children by assessing three linguistic domains - prerequisites for language acquisition, impressionable language, expressive language.
2. Identification of symptoms of oral language disorders indicating the onset of specific dyslexia at primary school age.
3. Selection on the basis of identified deficiency in oral language of children at risk of dyslexia (experimental group); establishing the statistical significance of the difference between the experimental group and the rest - intact children.
4. Taking into account the features of the language deficit in the children of the experimental group and revealing its severity in the different linguistic areas.
5. Determine the frequency and gender distribution of specific language impairments.

Tasks towards the second stage:

1. Monitoring the reading and writing skills of children with identified language deficits after entering school, when they are already second grade students, by:

a/ revealing the status of written language of the selected students at the level of writing by taking into account three main indicators in written production - correct spelling/readability, speed of writing, number of errors;

b/ a study of their overall school performance based on information from the class teacher and the full-day teacher.

2. Indicating the frequency and gender distribution of specific dyslexia.

3. Research hypotheses

The main hypotheses are:

1. Some children in upper preschool have deficits in oral language, the severity of which is a reason to consider them at risk for dyslexia.

2. A key marker for early prediction of developmental dyslexia is the oral language status of the upper preschooler, with language generation (expressive language) playing a leading role in the overall picture of language impairment and therefore being the most reliable indicator of impending school difficulties.

4. Participants in the study

In the first quarter of 2020 was examined the oral language of one hundred kindergarten children of the fourth group. All of them were in the last months of upper preschool age (6-7 years old). 52 were boys, 48 - girls. The majority (85) of the children were from four kindergartens in the city of Lviv. Smolyan and few (15) - from kindergartens on the territory of the administrative district. There are no missing results; all 100 are valid.

In the second part of the study, it was found that one of the girls among the nineteen children (now in second grade) with specific language impairments identified in the first stage had changed her residence. For this reason, the experimental group now numbers eighteen pupils - 10 boys and 8 girls. A mirror sample of pupils without symptoms of language deficits was selected as a control group, in terms of number, age and gender.

Thus, thirty-six second-grade students aged 8-9 participated in the second phase of the study, conducted in the last quarter of 2021. Of these, 16 were girls and 20 were boys. Thirty-three of the pupils study in schools in the city. Three pupils study in the administrative

district. In all of them written language at the level of writing was studied. There were no missing or invalid results.

5. Methodology and procedure of the study

The research work in the **first stage** includes the validation of the research methodology, collection of experimental data on oral language deficits and consideration of their features.

As an instrument of the diagnostic study, a Protocol for the Assessment of Language Development of a Child in the 4th Preparatory Group of Kindergarten was developed, which includes 9 procedures. Each of them carries 10 points, and the maximum possible individual score is 90. The protocol is completed by the examiner. Each child is worked with independently and the average time to complete the examination is approximately 20 minutes. The main criterion in the quantitative data analysis is the number of correct answers of the child.

Experimental data are collected through procedures that examine three cognitive domains: prerequisites for language acquisition (phonemic gnosis and phonological competence), implicit language, and expressive language. The research samples are based on a scientific methodology for linguistic data collection. They have been created, approbated and tested in Bulgarian logopedic therapy practice by individual authors or collectives. Most of them are not standardized, but have proven their usefulness in logopedic therapy diagnostics. The procedures are as follows:

- Differentiate syllables containing similar sounding oppositional consonants and the same vowel sound;
- Determine the sound at the beginning and end of words;
- Rhyme recognition;
- Recognition of correct/incorrect sentence;
- Pointing out alternative answers to questions on a listened text;
- Pointing to a group of illustrated homogeneous objects after the investigator has pronounced their generalized name;
- Conversion from singular to plural of nouns;
- Compose a sentence from individual words;
- Naming an object by its description.

The writing condition in the **second stage of** the study was investigated by means of text dictation. The text used was "On the Circus" by R. Tankova (Teacher's Book, 2017). A

dictation sheet was prepared on which students wrote the text in dictation guided by the familiar graphic grids with narrow and wide lines. The examiner recorded the duration of the task. Approximately 15 minutes are required, including a pre-reading of the text for familiarisation and a post-dictation reading of the text for self-checking of the writing. For the purpose of the task, the text is read by the researcher. Three main indicators of written production are taken into account: correct spelling of letters and their elements/readability, speed of writing, number of errors in the text. Errors are typed and analysed according to type and range.

After the second stage of the study, the overall school performance of the participants in the experimental and control groups was monitored. This was achieved by collecting information from class teachers and full-day teachers about students' achievement and difficulties in reading and writing, mathematics, and other characteristics. The data is recorded in a Teacher Information Recording Protocol.

The first stage of the research was carried out within the framework of the statutory general support for personal development in kindergarten (NPO, 2017, s. 28(3), 2). For the second stage was prepared and distributed to the parents of the participants a Declaration of Consent for their child's participation in a pedagogical study.

6. Methods of statistical analysis

The data from the **oral language survey** underwent primary mathematical processing. Children's individual scores were calculated and equated to the maximum possible score to percentage values. An analysis was made of the overall picture of language status in all the children studied. Symptoms of oral language impairments indicating the onset at primary school age of specific dyslexia were identified.

A statistical check for normality of the distribution was performed. Limits of normality were determined. Based on the statistically calculated norm of language functioning, a group of children with scores below the lower limit was selected to represent the experimental group. A statistically significant difference was found between the performance of the experimental group and the intact children.

The coherence of the three language domains that form the total score was measured and checked for internal reliability. The contribution of each of the three linguistic domains was calculated to obtain:

-The pure influence of each of them;

-Their combined influence (two by two) on language functioning.

In relation to one of the hypotheses, the predictive role of the three investigated language domains for the risk of developmental dyslexia is compared.

The prevalence of specific language impairments was determined, as well as the gender distribution. A comparison between boys' and girls' scores was made to determine whether there were significant differences and features.

In the **second stage of the study,** the statistical procedures used to analyze the writing condition, in addition to primary mathematical processing, descriptive analysis, and statistical inference methods, included:

-Calculation of mean, standard deviation and error;

-Determine correlation coefficients between individual writing condition scores (calculate variance on the final score and find contributions to variance, and correlation);

-Measure the consistency of the three numerical indicators - execution speed, number of errors, number of misspelled words - on the final result;

-Comparing the results of the experimental and control groups, and checking the significance of the difference;

-Defining the limits of the norm;

-Drawing trends and selecting students with dyslexia;

-Calculating the frequency of specific dyslexia and gender distribution;

-Comparison of boys and girls results.

In the **final stage of the study,** the data from the tracking of students' overall school performance are summarized and systematized.

Statistical analysis and interpretation of the data obtained are comprehensively described. The information is illustrated by diagrams, tables are attached. Both after the first stage of the study and at the end of its second part, based on the quantitative and qualitative analysis, conclusions are drawn that support or refute the hypotheses.

CHAPTER THREE. Analysis of results - state of oral language

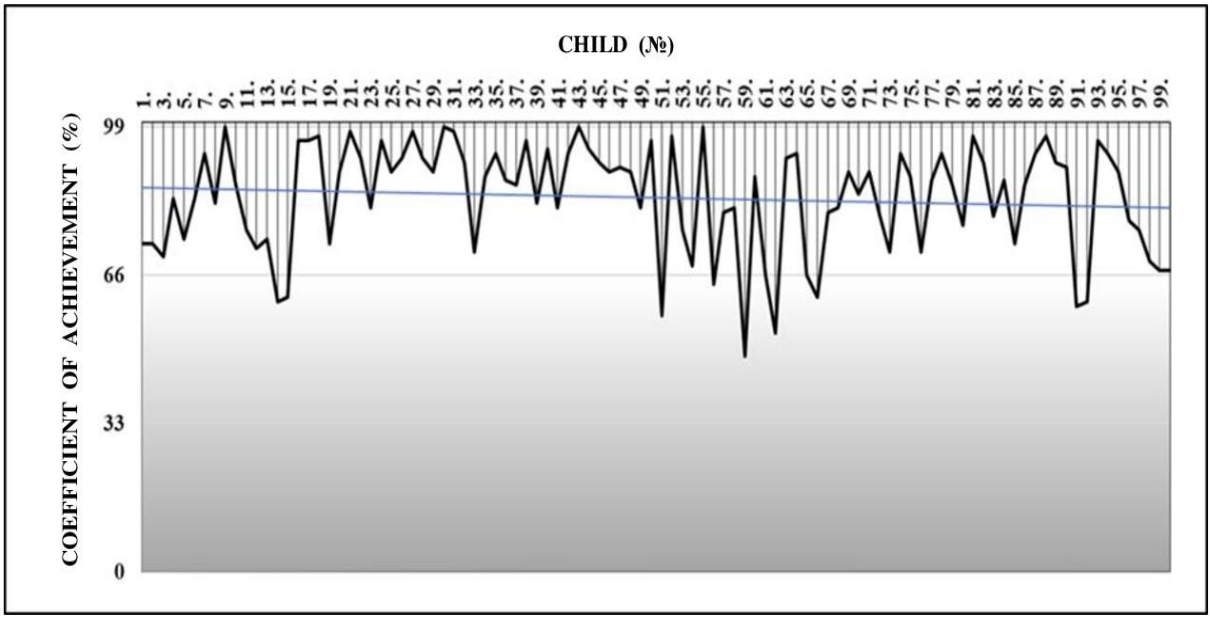
I. General presentation of results and primary mathematical treatment

In processing the results of the oral language survey, it is clear that children's achievement is very heterogeneous (Diagram 1). However, some trends emerge in terms of the dominant linguistic deficit. The analysis leads to the conclusion that the greatest margin between the maximum and minimum scores is shown by the prerequisites for language acquisition. In terms of expressive language, children realized the lowest scores among the three linguistic domains studied. For impressionistic language, quite high scores were achieved, indicating that it is relatively resistant to negative trends in cognitive development.

Diagram 1.

Results of the language development study

of children in the 4-preparatory group of the kindergarten



II. Limits of the norm of oral language development

Limits of the norm for oral language development have been defined, according to which all children with achievement coefficients up to and including 71% demonstrate atypical language functioning.

III. Selection of a group of participants - experimental group

After the first stage of the study, participants' achievements shaped the experimental group. It numbered nineteen children who demonstrated deficits in language development. Ten of them were boys, nine - girls.

IV. Frequency and gender distribution of specific language impairments

According to our results, nineteen out of every hundred children in upper preschool have specific language deficits. The available information in the international specialized literature on the prevalence of specific language impairments varies widely (between 8 and 19%, and for Bulgaria even up to 31% - found in 2010 by Mladenova in several schools in the city of Sofia). The margin is due to the fact that the data comes from studies at different stages of child development, using differentiated diagnostic tools and inclusion and exclusion criteria. The authors, however, agree that boys predominate.

There are also no clear-cut data regarding the gender distribution of children with language deficits. The figures range between just over 1 and 4 - for boys, versus 1 for girls. The authors agree, however, that males are more affected. The reason for this may be the overdiagnosis in boys because of their more frequent comorbidity of the disorders and referral to a specialist. It may also be due to the age studied or the methodology used, as well as the small statistical sample. It is a fact, however, that females more often have bilateral language representation in the cerebral hemispheres and they cope better with language tasks. Probably, the compensatory mechanism in terms of disturbances in linguistic functioning is also more adaptive in them.

In our own study, the results show that the gender distribution is almost even - 1 to 1.1 girls : boys.

V. Comparison of boys' and girls' achievements

When comparing the results of boys with those of girls, it is seen that they are comparable and no statistically significant difference is reported, which allows working with general limits of the norm.

After discussing the individual scores of the children with language deficits in terms of the linguistic domains studied, it is clear that in both genders, expressive language is the most affected and impressive language is the most preserved. In terms of prerequisites for language

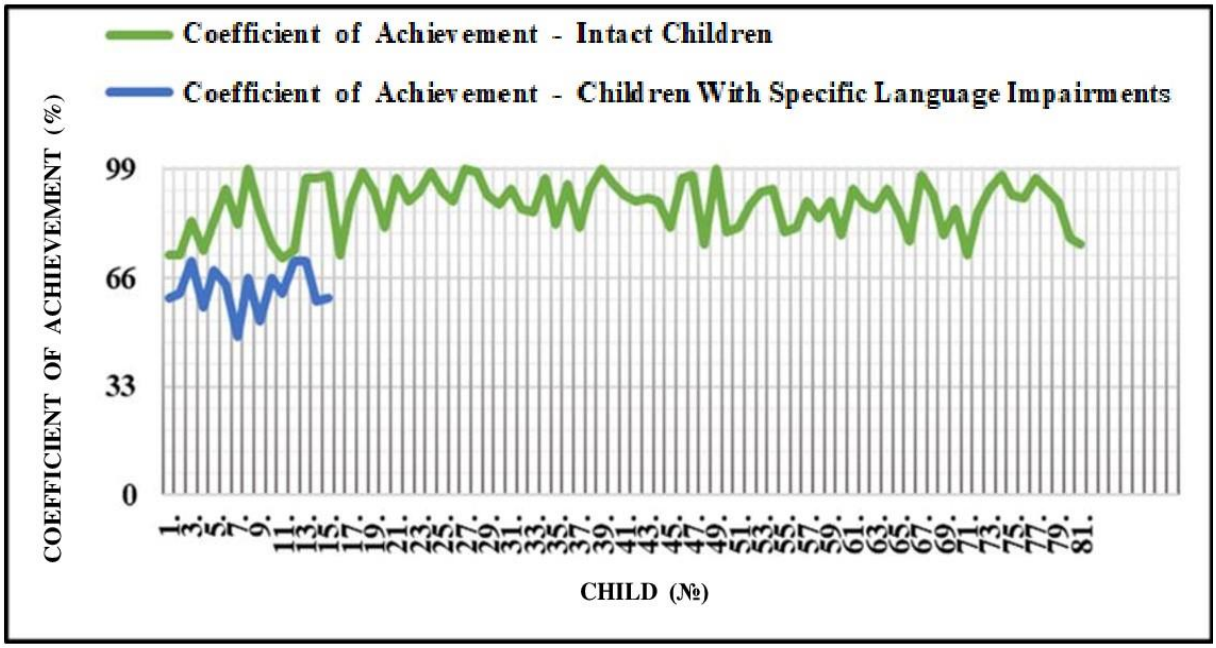
acquisition in the self-study, girls demonstrated a greater range of linguistic skills. Boys' achievements in phonemic gnosis and phonological knowledge were more similar to an average.

VI. Comparing the results of the experimental group with other participants

Comparison (Diagram 2) of the results of the experimental group with those of the intact children shows marked differences in terms of oral language development. The low achievements (the intensity of manifestation of linguistic difficulties) of the children identified as at-risk have a high identification and predictive value for impending difficulties in learning material acquisition.

Diagram 2.

Comparison between the total scores of intact children and the achievements of children with specific language impairments



It is concluded that there is a statistically significant difference between the two groups in terms of oral language functioning, which warrants language deficits being considered an indication of risk for developmental dyslexia.

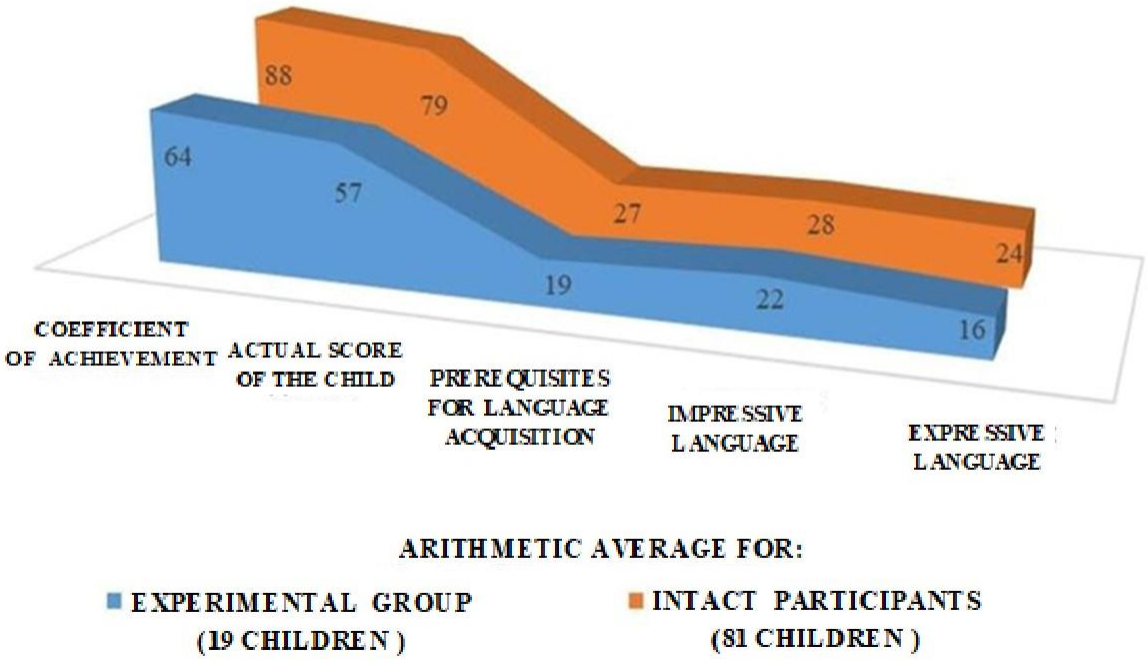
VII. Analysis of the language status of all participants

The overall data obtained from the investigation of the three linguistic domains for all children lead to the conclusion that the largest margin of mean standard deviation and the largest amplitude between the maximum and minimum scores indicate the prerequisites for language acquisition. It is important to note that in terms of expressive language, children realized the lowest scores among the three language domains studied. The mean value of the scores obtained in the study of expressive language, on the other hand, is quite high, indicating that it is relatively resistant to negative trends in cognitive development.

VIII. Results of the experimental group. Symptoms of oral language impairments indicating risk towards specific dyslexia

It becomes clear that in the experimental group the leading deficit is in terms of language production, and the prerequisites for language acquisition (phonemic gnosis and phonological knowledge) are one of the linguistic areas marking major difficulties in language functioning (Diagram 3). The impressionistic language (comprehension) study items were met in the highest percentage.

Diagram 3. Arithmetic averages of the obtained results



IX. Contribution of the three linguistic domains studied to the final result

The results of the one hundred children studied in terms of the contribution of each of the three linguistic domains studied on the final outcome showed that:

1. If the child is better in one language area, he/she is better in another.

2. The greatest influence on the actual score is the joint influence of the prerequisites for language acquisition (phonemic gnosis, phonological competence) and expressive language (morphology, syntax, vocabulary) (23.3%). In second place is the pure influence of the prerequisites for language acquisition (19.9%). Third was the pure influence of expressive language (19.4%). The first and third domains together and separately accounted for 62.6% of the variance of the actual scores.

3. The three linguistic areas studied are consistent. This means that the summation of the results of the study on the prerequisites of language acquisition, impressive language and expressive language to obtain the actual score is justified.

X. Comparing the Predicative Role of the Three Linguistic Domains Studied

The analysis clarifies that the most informative indicator of future difficulties in the acquisition of written language is expressive language skills, followed by the prerequisites for language acquisition (phonemic gnosis and phonological knowledge).

A drawback of the present theoretical-empirical study is the fact that the developed methodology does not allow comparing the state of phonemic gnosis with that of phonological cognition. The two competences are considered collectively - as a phonological component of language, and the general results of their study form a picture of the basic linguistic functioning.

It is clear from the shared experiences on this topic that phonemic gnosis is a predictor of the occurrence of written language disorders of lower value compared to phonological awareness and oral language. Phonological deficits alone, in turn, are not sufficient to predict developmental dyslexia. In this study, however, deficits in phonological competence were combined with deficits in expressive language, so there is reason to consider children found to have this combination as cases at risk for dyslexia. It is concluded by Carroll et al (2014) that early signs of dyslexia include a delay in language development with phonological awareness and expressive skills particularly affected.

A thorough analysis of the causal theories of the origin of dyslexia and the dominant deficit leads to the conclusion that it is hereditary and results from the complex action of

multiple risk agents, the focus of influence of which shifts at different age stages of child development. Delayed language development is a major marker in early childhood, which subsequently gives way to a leading role in phonological awareness, but in the preschool group and at the time of school entry it again takes over as the main indicator for predicting the development of reading and writing skills. There are dynamics in the manifestations of the pathology addressed in ICD-10 (ICD-10, 2008). There it is noted that in order to establish dyslexia, the severity of the disorder and the course of the course are taken into account.

XI. Findings from the first stage of the research

1. Despite the varied results of oral language research, some trends emerge regarding the dominant linguistic deficit, its influence as a risk agent for the onset of specific dyslexia, and its role as a marker for predicting the development of reading and writing skills.

2. According to our own research, 19 out of every 100 children in upper preschool have language deficits that, if left unidentified and not corrected (or at least mitigated) in a timely manner, portend negative consequences later in school development.

The prevalence between the sexes is almost even - 1 to 1.1 with a predominance of boys. Analysis of the survey data shows that the difference between girls' and boys' achievement is not statistically significant.

3. On the basis of the empirical data and their analysis, it is concluded that the main marker in upper preschool for impending difficulties in mastering written language are oral language disorders.

The analysis of the results of the oral language study gives grounds to consider as proven the first and partly the second main hypothesis of the study: some of the children in upper preschool age have a deficit in oral language, the severity of which is a reason to consider children at risk for dyslexia. Language generation plays a leading role in the overall picture of linguistic deficiency.

In the second stage, it should be established whether children who demonstrate language deficits also subsequently manifest themselves as students with learning disabilities.

CHAPTER FOUR. Analysis of results - state of written language

I. General presentation of results and primary data processing

The data from the writing study showed noticeable differences between the experimental and control groups in timing performance and amount of errors. In addition, peculiarities are reported in terms of the type of inaccuracies made. A distinction can also be made between the overall school performance of the participants in the two groups. Other distinguishing features related to pressure on the page, grip and control of the pen, and dominant hand were also found. Theoretically, the trends that emerged in the number and type of errors made when performing dictation on text prove or reject the presence of specific dyslexia.

II. Analysis of the state of writing skills of all students

In order to trace the relationship between the state of oral language and the process of mastering written language, the results of dictation performance are discussed in relation to structural linguistics and the hierarchical structure of language. Based on this, the incorrect manifestations in the written activity of all students are assigned to two levels of errors (after Tsenova, 2019, p. 215) - at the micro-level (the word composition is affected) and at the macro-level (the meaning at the level of morpheme/lexeme, word/sentence, text is compromised.

The theoretical part clarifies that the writing inaccuracies made by dyslexic students are not specific. What distinguishes them from physiological errors is their quantity and variety. The results of the performance of dictation of text in the second stage of the study unambiguously indicate the heterogeneous nature of the errors reported. The quantitative interpretation of the results discusses the three measurable indicators of writing status: speed of dictation performance, number of errors made, and number of misspelled words. Already in the summary analysis, the number of errors and misspelled words emerged as the leading indicators, at the expense of speed of performance. The difference between the experimental and control groups on the three numerical indicators is significant.

III. Contribution of the three numerical indicators to student performance

From the calculation of the variance and Cronbach's alpha it is clear that:

1. The correlation coefficients prove the logical conclusion that if a student makes multiple writing errors, the number of misspelled words is also large. Conversely.

2. The joint influence of the number of errors and the number of misspelled words on the overall linguistic performance at the graphical coding level is the greatest. The second is the pure influence of the number of errors. The third is the net influence of the number of misspelled words. That is, the number of errors and the number of misspelled words together and separately have the largest contribution to the variance of writing. It turns out that speed of performance is not of much importance in assessing writing status.

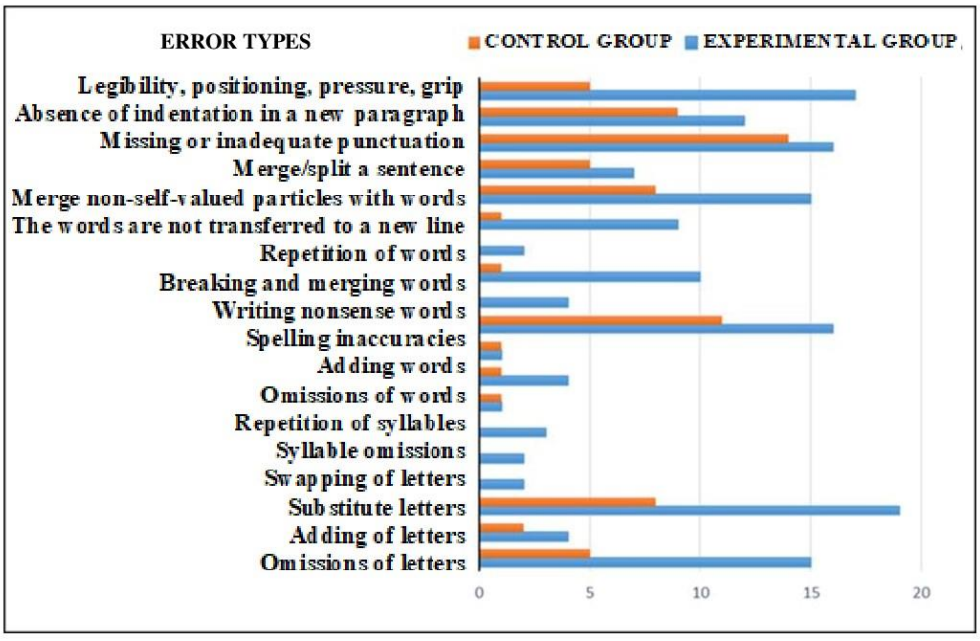
3.However, Cronbach's alpha has a very high value (0.707), indicating consistency of the three numerical indicators when superimposed to obtain a generalized picture of writing development.

IV. Comparing the results of the experimental and control groups

When comparing (Diagram 4) the results of the experimental group with those of the control group in the second stage of the study, it is evident the differences in the type and number of inaccuracies committed have a high identification value. It can be concluded that the quantity and varied nature of the errors (with respect to the same student) classifies them as dyslexic manifestations.

Diagram 4.

Comparing the results of the experimental and the control groups



V. Limits of the norm in mastering writing

The limits of the norm for each of the three numerical indicators outlined by the statistical calculations unambiguously identify results pointing to difficulties in the acquisition of written language. These are dictations completed in 12 minutes or more, with more than 10 errors and/or with 7 or more misspelled words. The estimated contributions of the three numerical indicators on writing, in turn, indicate the most significant joint influence of the number of errors and the number of misspelled words. All of these criteria highlight a group of 12 students scoring above the norm for number of errors and/or number of misspelled words, in addition, some of them are also above the acceptable range in terms of speed of performance. These students represent the population with atypical mastery of written language.

VI. Selection of students in the dyslexia group

The twelve students with developmental dyslexia comprised 61% of the experimental group (11 out of 18 total) and 6% of the control group (1 out of 18 total). These data could be interpreted in two ways. On the one hand, they support the notion that the picture of specific learning disabilities does not necessarily include the presence of deficits in oral language. It is possible that at the same time language deficits are demonstrated with writing skills intact.

On the other hand, studies of children with a family history of dyslexia have shown that mild language impairment may be somewhat corrected or compensated for and may not be as apparent, or even difficult to identify, when entering school (Snowling & Melby-Lervag, 2016). Later in the learning process, however, these difficulties may progress again because of the so-called Matthew effect (language competence develops more slowly and unstably than typical language functioning because of limited exposure to print) (Pfost et al., 2014).

Our results suggest that language deficits are in the majority of cases a precursor to specific dyslexia, as Scarborough (1990) also argues. But regardless of the relationship between oral language impairment and difficulties in the acquisition of written language, it is clear that dyslexia does not always follow preschool language difficulties (Catts et al., 2005). It is all too likely that our study did not cover a long enough period for learning problems to manifest and be identified.

There is another explanation for the presence of dyslexia cases without prior language disorders. A solid body of information is now available that distance learning in an electronic environment has its implications for the quality of education. Systematic gaps in literacy

acquisition and lack of a solid knowledge base, combined with adverse socio-economic and family conditions, are responsible for the phenomenon called pseudo-dyslexia. The affected student in the control group in our study could reflect this very phenomenon.

The theory that oral and written language problems go hand in hand has been confirmed in numerous research papers. Todorova (2016, p. 32) even considers this relationship the most unanimously accepted and rule in logopedic therapy. Her own research confirms the thesis that oral language is a strong predictor of future written language development. It unequivocally points to the role of early linguistic deficits (especially expressive language) as leading in the prediction of writing difficulties. The correlation, however, as Cenova (2020a) argues, between oral and written language impairments is strong but not unconditional. This is evidenced by the 7 students in the experimental group who demonstrated typical mastery of written language and the student in the control group who was reported to have dyslexia with no prior language deficits. That is, we arrive at the idea of a multifactorial basis of dyslexia, in which specific language impairments are a key but not absolute cause.

The most important generalization related to the second hypothesis of the present theoretical-practical study can be made: a major marker for the early prediction of developmental dyslexia is the oral language status in upper preschool.

VII. Incidence and gender distribution of specific dyslexia

It has been shown that disorders in the mastery of written language are among the most common neurodevelopmental disorders. According to Schumacher et al (2007), they affect about 5-12% of students worldwide. This is confirmed in their own study, which identified a group of twelve students with developmental dyslexia, i.e. the number affected by specific learning disorders represented 12% of all the 100 children initially studied. The figure is entirely comparable with global statistics. It *follows that twelve out of every hundred primary school age pupils have specific difficulties in mastering literacy.*

With regard to the distribution of the risk of dyslexia between the sexes, it should be noted that this is a controversial issue that has not yet been definitively clarified. It has been arrived at by highlighting the views of Rutter et al. (2004), who believe that it is possible that too high a number of boys with dyslexia is a consequence of overdiagnosis. This may be due to the greater prevalence in males of comorbidity with hyperactivity and attention deficit, and other behavioural characteristics which are likely to result in more frequent seeking of specialist support. The sex ratio, moreover, may be influenced by the severity of the disorder,

the IQ of those affected, and the cognitive profiles assessed (Olson, 2002). *In our case, the numbers of boys and girls affected were 8 and 4, respectively, i.e. the sex ratio was 2 to 1, boys : girls.*

VIII. Comparison of boys' and girls' achievements

No differences in symptom severity between boys and girls have been documented. However, biological sex differences in the nervous system may play a reinforcing or compromising role in children's linguistic functioning and school achievement.

The comparison at the end of the second stage of the self-study of the results of students affected by specific written language disorders by gender does not lead to the reporting of specificities. Despite the variations, the comparison *shows no statistically significant difference* between the results of the two *genders* .

IX. Findings from the second stage of the research

1. The data obtained from the writing test showed significant differences between the experimental and control groups in timing performance, amount of errors and number of misspelled words. In addition, peculiarities are reported in terms of the type of inaccuracies made. There is also a difference between the two groups in the overall school performance of the students. Other distinguishing features are also found.

2. The results show the heterogeneous nature of the reported errors. The number of errors and misspelled words emerged as the leading indicators of the state of writing, at the expense of speed of performance.

3. Oral language status in upper preschoolers is a major marker for early prediction of developmental dyslexia. The correlation between oral and written language disorders is strong but not unconditional.

4. Twelve out of every hundred primary school-age pupils experience specific difficulties in mastering literacy. The distribution of boys : girls is respectively 2 to 1.

9. There is no specificity and significant difference in the manifestations of dyslexia between genders.

The conclusions of the first and second stages of the own scientific research give grounds to consider the main hypotheses proven. It is concluded that some of the upper preschool children have deficits in oral language, the severity of which is a reason to consider

them at risk for dyslexia. Furthermore, language generation is a major indicator of impending school difficulties.

The global hypothesis underlying this paper is also confirmed: the high incidence of disorders in written language acquisition and learning is the result of late recognition of the problem.

FINDINGS FROM THE STUDY

1. Predictors of risk for specific learning disabilities exist even before school entry. Atypical oral language development is the earliest visible behavioral indication. It involves a lag in linguistic development with expressive skills and phonological competence particularly affected.

2. Specific language impairments are reported in 19% of upper preschool children. These occurred with approximately equal frequency among both sexes at the study age. At school, the number of girls whose disorder was compensated for decreased, while that of boys referred to a specialist and diagnosed increased.

3. The correlation between oral language disorders and written language disorders is strong, but not absolute. 61% of children with developmental language disorders show subsequent specific difficulties in mastering written language. Dyslexia, with no previous linguistic deficit, is reported in 6% of pupils.

4. Twelve out of every one hundred primary school-age pupils experience specific difficulties in mastering literacy. The gender ratio is 2 to 1 boys : girls.

5. There is a need for early diagnosis and timely therapy of specific language impairments as early as upper preschool age to reduce the risk and prevention of developmental dyslexia.

CONCLUSION

Despite the strong established link between oral language problems and difficulty mastering literacy, dyslexia does not always occur after preschool language disorders, and linguistic deficits are not necessarily associated with impending learning difficulties. Ultimately, the identification of children at risk of dyslexia provides an opportunity to uncover key cognitive factors and individual deeper deficits that may impede written language development.

The study of linguistic features at the end of the third - beginning of the fourth preparatory group allows identifying specific difficulties and optimal planning of logopedic

therapy work to overcome them. With timely support and the development of an adequate programme for dealing with language disorders - as early as upper pre-school age - a significant number of children have a chance of reducing their upcoming school problems. Therapy of communication disorders should address the strengths and weaknesses of those affected, regardless of diagnostic labels.

The need for more research on the mechanisms by which specific language impairments and developmental dyslexia manifest is evident. In addition, more in-depth studies are needed to comprehensively track language development in its various aspects before and after the onset of dyslexia.

The self-study provides answers to basic questions related to difficulties in mastering written language. At the same time it formulates scientific conclusions and outlines recommendations for Bulgarian logopedic therapy practice.

CONTRIBUTIONS

- Theoretical:

1. An empirical examination of the operation of one main predictor (specific language impairment) is made and the extent to which it affects the acquisition of written language is indicated.

2. The severity of three linguistic domains in their predictive role is revealed and it is shown that expressive language deficits have the greatest value as an indicator of risk towards developmental dyslexia.

3. Data on the prevalence and gender distribution of specific language impairment and developmental dyslexia are presented.

- Practical:

1. It points to the need to develop a standardized methodology for assessing language development as early as upper preschool age for early diagnosis and prevention of the risk of long-term school problems.

2. The study contributes to the detection of precursors of dyslexia in kindergarten.

3. The results of the study oriented the practitioners towards timely support, which would lead to a reduction in the growing number of students with specific learning disabilities, and thus of functionally illiterate people, who would have more chances for professional development and social adaptation.

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