



## **DAP: Dyslexia Assessment Protocol**

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### **SCIENTIFIC SUBSTANTIATION REPORT**

Every education system has its transitions. Each person's educational biography begins with transition. The education obtained in the family which is the most important beginning of socialisation, is continued in educational institutions: preschool, primary school, basic school, further education levels, moving from the first one to the next. During the transition period, the previously acquired competencies are transferred and qualitatively transformed for successful continuation of education at the next level of education. (Bethere, 2013) Preschool education is the initial stage of general education - teaching, learning and upbringing a child - followed by systemic learning at school (VISC, 2011). What six-year-olds need to learn is set out in the preschool education guidelines and the sample program of preschool education. The sample program of preschool education also includes the curriculum or a list and number of play lessons needed for the implementation of the education program or an offer to implement the curriculum in the form of integrated play lessons. At the same time, the individual needs of each child are taken into account during the implementation of the study program.

One of the most important stages in the child's educational process is the transition from preschool to primary school. The beginning of school is a strong emotional experience for children, because in the first grade pupils start to develop understanding of how successful they are.

Traditionally, child's readiness for school is viewed from three aspects: physical, sociopsychological, and intellectual.

## **1<sup>st</sup> BLOC: MENTAL DEVELOPMENT**

The main groups of factors that influence the acquisition of reading skills and, in the future, also the child's effective learning process, are the following: phonemic perception, visual-spatial and time perception, as well as several areas of cognitive activity: attention, thinking, memory (Adams, 1995; Gorman, 2001; Snowling, 2004; Tübele, 2008; Корнев, 2003). When assessing a child's readiness to integrate into the learning process at school, all these aspects should be considered.

### **Perception**

The rapid growth of significant scientific research in recent decades on the specifics of information perception of children at the age of preschool and primary school clearly shows not only the constant topicality, but also the vital need for further practical and theoretical research in this area.

The importance of perception in a child's physical life can be seen even at a very early age, as perception is directly and inextricably linked to the ability to learn something new. Infants perceive the world as a whole, so adults must take care that the child's surroundings are not uniform and uninteresting. (Миллер, 2002) At the preschool age, the child's perception of life expands significantly, it loses its previous affective character, becomes conscious, purposeful and analytical (Burman, 2008).

At the age of primary school, the child's perception is sharp and bright, but it is not yet sufficiently differentiated: the pupil may have difficulties in differentiating smaller and similar details of objects. The child is able to perceive in detail bright, easily visible features of objects and phenomena. Children up to the age of 8-9 are characterised by analytical perception: the child transfers what is perceived. After the age of 8, children develop synthesising perception: the child is able to describe what he/she perceives. At this age children develop ability to connect the perceived elements into a single whole. In turn, after the age of 9, the perception of objects is supplemented with logical explanation of the perceived information. Thus, the formation of interrelationships between perception and thinking is manifested. (Shaffer, Kipp, 2013)

In countless scientific studies, perception is identified as a reflection of the totality of objects, phenomena, situations and events in consciousness, and there are three types of perception: visual, auditory and kinesthetic. The research carried out by the outstanding American professor V. Burke Barbe and his colleagues proves that, in terms of learning perception types, a child may have a dominant perception type or a mixed combination thereof. (Barbe, Milone, 1981)

For each type of perception, there are learning tools and materials that are more suitable for it, but there are tools that are suitable for all types of perception, such as digital spreadsheets - touch screen digital devices where thematic content can be downloaded and students can actively use all types of perception (visual - graphics, audio - sound, kinesthetic - touch screen).

Thus, one can fully agree with the statement that *visual perception* is one of the forms of perception through which we are able to see and understand everything around us. Visual perception can affect many areas of everyday life (Yu, Hastings, 2006), and it is an important source of information (Jung *et al.*, 2014).

Visual perception is the most common type in the world, a child who corresponds to this type easily perceives images, creates and analyses information from coloured objects, he/she likes drawing and often, in the process of learning, such a child is very neat, even pedantic. In order to explain the content of the study as effectively as possible, such a pupil should be offered visual tasks, e.g. videos, pictures, maps, illustrations, etc., allowed to observe the result of the work, mark the most important information, write notes, use colours, etc. Such a child can be confused by unexpected noises and sounds. In some studies, it has been found that visual perception is closely related to the ability to distinguish letters/words from others (Woodrome, Johnson, 2009) and to literacy (Baluoti *et al.*, 2012; Lipowska *et al.*, 2011; Bellocchi *et al.*, 2017). Scientific literature also suggests that children who experience vision problems at an early age are likely to face academic challenges and word recognition difficulty later on (Fraga González *et al.*, 2014; Johnston *et al.*, 2017).

Many studies have been conducted on vision problems in relation to their role in the context of literacy, which have led to the conclusion that many children and adults with dyslexia can have difficulties with various visual functions, ranging from the ability to perceive a moving stimulus to the ability to ignore distracting information and attend to pertinent information in a visual scene (Yeatman, 2016). Thus, one can agree with the statement, “As scientists, it is our job

to understand how motion processing deficits might emerge as (a) a symptom of limited reading experience, (b) an indicator of an inefficiency in the visual system, or (c) a factor that contributes to a difficulty in coordinating the network of visual and language processing regions that must flexibly collaborate to recognise a printed word (Yeatman, 2016).

The *audible type of perception* is, in turn, directly related to an easy memorisation of verbal instructions, comprehension of content through explanation and conversation, and memorisation of information if learned directly verbally. A child with the audible type of perception likes music, languages, discussions and conversations, he/she likes talking a lot, explains the activities to his/her peers effortlessly, listens carefully, talks about emotions, expresses opinions. Such a child has a good memory. He/she does not like to study or play in silence. For the learning process to be effective, it is advisable to allow such children to read, study, speak, discuss, etc.

Auditory and phonological perception provides the pupil with proper hearing and differentiation of sounds from other acoustically similar sounds, it develops along with the development of the child's speech. This type of perception needs to be practiced, as it is essential in the process of writing and reading.

In the context of acquiring writing and reading skills, it is important to note the problems associated with hearing and phonological impairments, which can lead to a child not perceiving sounds that are close or similar in terms of articulation, thus he/she can not improve the vocabulary or understand grammatical structure of words.

It is necessary to accentuate the views expressed in the scientific literature, which were defined by their authors in the process of studying the features of dyslexia and the most common causes of auditory and phonological perception, thus not only demonstrating the need to diagnose reading disorders as early as possible to plan and implement strategies for further work, but also by marking the preferred vectors for further research.

The core feature of dyslexia consistently and systematically found in case studies and study groups is the deficit of phonological awareness (Bogliotti *et al.*, 2008).

There is a large number of evidences that the domain of the relationship between graphemes and phonemes is crucial to successfully learn reading and writing. Main evidences are based on longitudinal studies that have found that individuals later diagnosed as dyslexic performed low in phonological awareness, even before starting the process of acquiring reading and writing skills;

studies that investigated the efficacy of training based on the grapheme-phoneme correspondence; and, studies that showed that dyslexics have serious difficulty of reading without assistance of the lexical knowledge (reading pseudo-words) (Bogliotti *et al.*, 2008).

The origin of the dyslexics' phonological deficit is an object of intense debate. Some authors suggest it is the primary picture of the dyslexia symptomatology. Other authors believe this deficit would be secondary to a more elementary (Regueira Dias Prestes, Guimarães Feitosa, 2017).

Understanding the picture that underlies this disorder, which is highly prevalent, is of utmost relevance because it allows early identification of individuals with indicators of risk factors for dyslexia. Moreover, it assists the diagnosis process and planning of early intervention strategies, based on scientific evidences (Regueira Dias Prestes, Guimarães Feitosa, 2017).

Dyslexia is a multifactorial disorder, with a wide range of associated behavioral symptoms that cannot be explained by one single deficit. The deficit presented by dyslexic individuals is neither uniquely linguistic, as advocated by the Phonologic Theory, nor directly caused by the auditory perceptual change as postulated by the Auditory Deficit Theory. Both factors interact and are inseparable to explain the symptomatology observed in reading and writing disorders. That points out the need for efforts towards building an integrative theory to explain dyslexia (Regueira Dias Prestes, Guimarães Feitosa, 2017).

Future studies investigating perception in children with dyslexia would benefit from including a comprehensive assessment of attention abilities in order to tease apart the role of extraneous factors from that of perception (Messaoud-Galusi, Hazan, Rosen, 2011).

The *kinesthetic type of perception* is based on the acquisition of applicable knowledge. It is difficult for kinesthetic learners to remember abstract knowledge. They remember well the content and activities learned in practice, they use their hands and fingers in the learning process. Kinesthetic learners like different games, they cannot stay calm for a long time. In order to effectively explain the learning task to children with this type of perception, teachers should allow them to engage in various activities as much as possible and be equal partners for such children.

Undoubtedly, preschool and primary school age is essential for the development of a child's basic skills, so the concept of all types of perceptions allows to bring abstract knowledge closer

to the child's perception, using the most appropriate learning tools for each type of perception. At the age of six, interaction between visual and kinesthetic perception becomes more coordinated and is not as separate as it was at an earlier age, as the child learns objects using the combination of both kinesthetic and visual senses.

Besides, it is very important for the child to understand why he or she succeeds or fails to acquire one of the basic skills, such as learning to read. Thus, the challenge is to ensure that teachers understand how to identify reading difficulties early, use data collected through the assessment process to make eligibility decisions, and link data to the development of the individualised education program (IEP). Early identification of dyslexia is essential so that the pupil not only learns to read but also understands why reading is hard, so that these social and emotional difficulties can be mitigated (Lindstrom, 2018).

According to pedagogical experience, children follow the instructions given by adults very differently. What one takes for granted can cause a great deal of resistance to another. Sometimes, when talking to a child, he/she does not seem to hear the adult's instructions at all. For children, this is often a way to check boundaries to understand what can potentially be achieved from adults. In such cases, adults need to understand that the requirements need to be clearly articulated, specific, understandable and realistic.

Children younger than 12 do not combine different sensory information to make sense of the world as adults do. This does not only apply to combining different senses, such as vision and sound, but also to the different information the brain receives when looking at a scene with one eye compared to both eyes (Nardini, Bedford, Mareschal, 2010).

Every child is special, different from others. Children's interaction depends on many aspects, including their previous life experience, temperament, character traits, emotional state, attention, perception, thinking, memory, etc. This statement can also be confirmed by scientific research carried out over many decades. Children begin to engage in pro-social or helping behaviors in their second year of life (Eisenberg, Fabes, 1998; Warneken, Tomasello, 2006) cooperating with adults and peers to achieve a goal (Brownell, Ramani, Zerwas, 2006; Warneken, Chen, Tomasello, 2006). While young children share more with parents than unknown adults (Rheingold *et al.*, 1976), children also are attentive to friendship relations (Costin, Jones, 1992).

Children observe parents and friends, however, there is always preference for close relations. (Olson, Spelke, 2008)

Studies with peers found that it was not until around the age of 5.5 that children began acting in a manner that depended on the choices of a peer partner; in some contexts, this development started even later, at 6–8 years of age. Therefore, the earliest age for which there is evidence that children look back on how their partner has treated them and adjust their cooperation accordingly is approximately 3.5 years and, in many cases, even later (Warneken, 2018).

To summarise, based on the findings of various researchers and educators, it can be concluded that the development of a child's literacy depends on how he/she perceives the world around him/her, what is the child's dominant type of perception, and how the child follows instructions given by adults and peers. Reading disorders are often detected late, and, given the specific characteristics of each individual child, it is necessary to develop all types of perception at an early stage of learning to read. Thus, it is vital to diagnose reading disorders as early as possible in order to plan and implement strategies for dealing with this type of problem as effectively as possible.

## References

1. Baluoti, A. R., Bayat, M. R., Alimoradi, M. (2012). *Relationship between visual perception and reading disability in primary students (first, second, third, grade) of Ahwaz city*. Int. Res. J. Appl. Basic Sci., 3 (10), pp. 2091-2096. Retrieved from <http://www.irjabs.com/en/archive.php?rid=24>
2. Bellocchi, S., Muneaux, M., Huau, A., Leveque, Y., Jover, M., Ducrot, S. (2017). *Exploring the link between visual perception, visual-motor integration, and reading in normal developing and impaired children using DTVP-2*. Dyslexia, 23 (3), pp. 296-315. Retrieved from <https://onlinelibrary.wiley.com/doi/epdf/10.1002/dys.1561>
3. Bogliotti, C., Serniclaes, W., Messaoud-Galusi, S., Sprenger-Charolles, L. (2008). *Discrimination of speech sounds by children with dyslexia: Comparisons with chronological age and reading level controls*. Journal of Experimental Child Psychology, 101 (2), pp. 137-155. Retrieved from <https://halshs.archives-ouvertes.fr/halshs-00468930/document>

4. Brownell, C. A., Ramani, G. B., Zerwas, G. (2006). *Becoming a Social Partner with Peers: Cooperation and Social Understanding in One- and Two-year-olds*. *Child Dev.* 2006 Jul-Aug; 77(4): 803–821. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3351034/>
5. Burke Barbe, W., Milone, M. N (1981). *What we know about modality strengths*. Educational Leadership. Association for Supervision and Curriculum Development: pp. 378–380. Retrieved from [http://www.ascd.org/ASCD/pdf/journals/ed\\_lead/el\\_198102\\_barbe.pdf](http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_198102_barbe.pdf)
6. Burman, E. (2008). *Deconstructing Developmental Psychology* (2nd ed.). East Sussex: Routledge, 368 pages.
7. Costin, S. E., Jones, D. C. (1992). *Friendship as a facilitator of emotional responsiveness and prosocial interventions among young children*. *Developmental Psychology*, 28(5), 941–947. Retrieved from <https://psycnet.apa.org/doiLanding?doi=10.1037%2F0012-1649.28.5.941>
8. Ebert, K. D., Kohnert, K. (2011). *Sustained attention in children with primary language impairment: a meta-analysis*. *JSLHR*, 54 (5), pp. 1372-1384. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4047633/>
9. Eisenberg, N., Fabes, R. A (1998). Prosocial development. In: Damon W, Eisenberg N, editors. *Handbook of child psychology: Vol 3. Social, emotional, and personality development*. 5. Hoboken, NJ: John Wiley; 1998. pp. 701–778.
10. Fraga González, G., Zarić, G., Tijms, J., Bonte, M., Blomert, L., Van der Molen, M. W (2014). *Brain-potential analysis of visual word recognition in dyslexics and typically reading children*. *Front. Hum. Neurosci.*, 8 (2014) 474. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4075352/>
11. Johnston, R., Pitchford, N. J., Roach, N. W., Ledgeway, T. (2017). *Visual perception in dyslexia is limited by sub-optimal scale selection*. *Sci. Rep.*, 7 (1) (2017). Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5529585/>
12. Jung, H., Woo, Y., Kang, J. W., Choi, Y. W., Kim, K. M. (2014). *Visual Perception of ADHD Children with Sensory Processing Disorder*. *Psychiatry Investig.* 2014 Apr; 11(2): 119–123. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4023084/>

13. Lindstrom, J. H (2018). *Dyslexia in the Schools: Assessment and Identification*. TEACHING Exceptional Children, Volume 51 (3): 12 – Jan 1, 2019. Retrieved from <https://journals.sagepub.com/doi/10.1177/0040059918763712>
14. Lipowska, M., Czaplewska, E., Wysocka, A. (2011). *Visuospatial deficits of dyslexic* Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3539530/>
15. Messaoud-Galusi, S., Hazan, V., Rosen, S. (2011). *Investigating speech perception in children with dyslexia: is there evidence of a consistent deficit in individuals?* Speech Lang Hear Res. 2011 December; 54(6): pp. 1682–1701. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3374927/>
16. Nardini, M., Bedford, R., Mareschal, D. (2010). *Fusion of visual cues is not mandatory in children*. PNAS September 28, 2010 107 (39) 17041-17046. Retrieved from <https://www.pnas.org/content/107/39/17041>
17. Olson, K. R., Spelke, K. S. (2008). *Foundations of Cooperation in Young Children*. Cognition. 2008 Jul; 108(1): 222–231. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2481508/>
18. Regueira Dias Prestes, M., Guimarães Feitosa, M. A. (2017). *Theories of Dyslexia: Support by Changes in Auditory Perception*. Psicologia: Teoria e Pesquisa, Vol. 32 n. esp., pp. 1-9. Retrieved from [http://www.scielo.br/pdf/ptp/v32nspe/en\\_1806-3446-ptp-32-spe-e32ne24.pdf](http://www.scielo.br/pdf/ptp/v32nspe/en_1806-3446-ptp-32-spe-e32ne24.pdf)
19. Rheingold, H. L., Hay, D. F., West, M. J (1976). Sharing in the second year of life. *Child Development*, Vol. 47, No. 4 (Dec., 1976), pp. 1148-1158. Retrieved from <https://www.jstor.org/stable/1128454?origin=crossref&seq=1>
20. Shaffer, D., Kipp, K. (2013). *Developmental psychology* (Childhood & adolescence). Wadsworth: Genage Learning.
21. Yeatman, J. D (2016). *What is the Role of the Visual System in Reading and Dyslexia?* Retrieved from <https://dyslexiaida.org/what-is-the-role-of-the-visual-system-in-reading-and-dyslexia/>
22. Yu, X., Hastings, S. K. (2006). *An Exploratory Study of Visual Perception in Relation to Levels of Meaning for Children*. Retrieved from <https://asistdl.onlinelibrary.wiley.com/doi/pdf/10.1002/meet.1450430145>

23. Warneken, F., Chen, F., Tomasello, M. (2006). *Cooperative Activities in Young Children and Chimpanzees*. Child Dev. 2006 May-Jun; 77(3):640-63. Retrieved from <https://srcd.onlinelibrary.wiley.com/doi/full/10.1111/j.1467-8624.2006.00895.x>
24. Warnaken, F., Tomasello, M. (2006). *Altruistic helping in human infants and young chimpanzees*. Science 311, 1301 (2006). Retrieved from <http://pdfs.semanticscholar.org/d97d/430f5de83661abdcff6a748ec9ea403d9a10.pdf>
25. Warneken, F. (2018). *How Children Solve the Two Challenges of Cooperation*. Annual Review of Psychology, 69(1), 205–229. Retrieved from <https://www.annualreviews.org/doi/pdf/10.1146/annurev-psych-122216-011813>
26. Woodrome, S. E., Johnson, K. E. (2009). *The role of visual discrimination in the learning-to-read process*. Read. Writ., 22 (2), pp. 117-131. Retrieved from <https://link.springer.com/article/10.1007%2Fs11145-007-9104-8>
27. Миллер, С. (2002). *Психология развития. Методы исследования*. Санкт-Петербург: Издательство “Питер”. 464 с.

## Attention

Peculiarities of mental development of some children observed in preschool (features that do not correspond to the generally accepted age norms) indicate that, without corrective developmental activity and special help, there might be learning difficulties or learning disorders at the school age. These children are characterized by underdeveloped hearing of speech (phonemic), poor and insufficient vocabulary, spatial perception disorders, time perception disorders, difficulties to perceive cause and effect relationships, easily distracted attention, switching difficulties, slow work pace, etc. In general, development of these children corresponds to the development of younger children. (Lüse, Miltiņa, Tūbele, 2012)

Looking at the manifestations of lack of maturity of mental functions from the pedagogical point of view, several areas can be described in which the child has certain difficulties. One of them is related to attention disorders that prevent the child from fully integrating into a group of peers.

**Attention** is the behavioural and cognitive process of selectively concentrating on a discrete aspect of information, while ignoring other perceivable information. Attention has also been

referred to as the allocation of limited processing resources (Anderson, 2004). The basic properties of attention concentration (ability to focus on the required object, its components, ability to understand the task), stability (the “duration” of voluntary attention), switching (the ability to re-focus the attention from one object or activity to another one when necessary), etc.

Attention is related to the development of perception. Attention is the arbitrary (intentional) or involuntary (unintentional) direction of human consciousness and focus on the reflection of the external or internal (mental or physical) world; attention is the basis of all mental cognitive processes (Lūse, Miltiņa, Tūbele, 2012; Kalvāns, 2018). Attention is individually conditioned and is related to the quality of will, self-control skills and abilities that develop in the process of socialisation. Attention and the closely related ability of self-regulation (ability to manage one’s thinking, emotions, behaviour) is an important skill at school and an integral basis for good academic achievement (Bierman *et al.*, 2008; Blair and Diamond, 2008; Denham *et al.*, 2009). At school, it manifests itself as the pupil’s ability to keep focus on a specific task and complete it for a certain period of time (Oxford dictionary of education, 2015). Good skills include the ability to control one’s attention, direct, switch and retain it using a variety of techniques or strategies. One cannot do a specific task if he/she cannot remember what the task was and how to do it.

Depending on the cause of the attention, there are three types of attention:

- unintentional, primary attention caused by a bright, unexpected, strong irritant; it is typical of young children;
- unintentional secondary attention - if a person is interested in something, his/her attention is attracted and maintained by objects and phenomena that satisfy this interest; unintentional secondary attention in children is manifested when they are busy in an attractive lesson, play, listen to an interesting fairy tale, story, etc.;
- intentional attention is attention that a person directs with the effort of will, recognising the need to be careful. (Lubļinska, 1979)

Attention is individually conditioned: it depends on the peculiarities of the central nervous system (CNS), on the physical and emotional state, it is related to the quality of the will, self-control skills and abilities in the process of socialisation (Svence, 1999).

Attention of various modalities (visual, auditory, tactile, etc. senses) is one of the basic processes of human mind and brain, without which one cannot survive or, in other words, without which nothing can be learned. Without proper attention, it is impossible to think effectively and act without mistakes (Vanags, 2019). Visual attention is needed to put letters and words together and understand what is written in the text. Without auditory attention, one cannot distinguish the voice of one person in the noise and hear what he/she is saying. Without tactile attention, one will not be able to notice the key in the pocket or the light switch on the wall in the dark.

The most characteristic signs of mental retardation are mentioned in pedagogy and one of them is difficulty concentrating (Freimanis, 2007; Liepiņa, 2008; Tūbele, Šteinberga, 2004). Preschool children with mixed developmental disorders have inconsistent attention and underdeveloped switching abilities. They get tired quickly and are unable to concentrate intentionally.

At the older preschool age, the amount of attention expands significantly, stability of attention increases, intentional attention is formed. It is rarely caused by internal conditions at this age, so it can be stated that the focus at the age of 5-6 is mostly unintentional. However, there is a transition from unintentional to intentional attention, which is necessary when starting school.

At the beginning of school, there is a transition from unintentional attention to intentional attention. Attention becomes more persistent, it is easier to concentrate. In the first grades, the child switches very quickly from one object of attention to another. Persistence of attention is often closely linked to the will and influence of technology.

## References

1. Anderson, J. R. (2004). *Cognitive psychology and its implications (6th ed.)*. Worth Publishers. p. 519.
2. Bierman, K., et al. (2008). *The Development of Cognitive Skills and Gains in Academic School Readiness for Children from Low-Income Families*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2856933/>

3. Blair C, Diamond A. (2008). *Biological processes in prevention and intervention: Promotion of self-regulation and the prevention of early school failure. Development and Psychopathology.* 20:899–911.
4. Denham, S., et al. (2009). *Modelling attention in individual cells leads to a system with realistic saccade behaviours.* Retrieved from <https://link.springer.com/article/10.1007/s11571-008-9073-x>
5. Freimanis, I. (2007). *Ieskats speciālās skolas darbā.* Rīga: RaKa.
6. Kalvāns, Ē. (2018). *Attīstības psiholoģija.* Rēzekne: Rēzeknes Tehnoloģiju akadēmija.
7. Liepiņa, S. (2008). *Speciālā psiholoģija.* Rīga: RaKa.
8. Lūse, J., Miltiņa, I., Tūbele, S. (2012). *Logopēdijas terminu skaidrojoša vārdnīca.* Rīga:Raka.
9. *Oxford dictionary of education, 2015*
10. Svence, G. (1998). *Personības attīstības psiholoģija.* Rīga: RPIVA.
11. Tūbele, S., Šteinberga, A. (2004). *Ievads speciālajā pedagogijā.* Rīga: RaKa.
12. Vanags, E. (2019). *Uzmanība – domāšanas “līme”* Retrieved from <https://www.skola2030.lv/lv/jaunumi/6/uzmaniba-domasanas-lime>

## Thinking

Thinking, language and speech are inextricably linked. In this sense, language is a system of verbal signs used by a person in communication and thinking. First of all, a word denotes an object, points to it, evokes its image in the consciousness. The highest logical forms of thinking are perfected on the basis of the elementary form of cognition, i.e. the child's practical acts. The process of development of a child's thinking is directed towards the child's social speech, going through egocentric speech. (Vigotskis, 2002)

Thinking is a mental process, in which the reflection of real-world objects and phenomena takes place in their essential features, relationships and connections. Thinking is a higher level of human cognition, which also allows one to acquire knowledge of real-world objects, their properties and relationships that cannot be directly perceived by the senses. (Lūse, Miltiņa, Tūbele, 2012)

For preschool children, activity plays an important role, but there are significant changes in the thinking process. Thinking develops particularly fast at this age. A 3-6 year old child participates in various activities that enrich his/her knowledge of objects and their properties. A preschooler increasingly chooses and uses different ways and techniques to perform his/her practical tasks.

At the preschool age, several types of thinking develop: visual-effective, visual-figurative, verbal-logical. Language-based thinking process uses existing concepts and logical constructions. (Lieģeniece, 1999)

Swiss psychologist J. Piaget's (Piažē, 2002) research has emphasized the inextricable link between speech/language and the processes of thinking. He has singled out several stages in the development of a child's thinking in relation to language:

- 1) sensorimotor stage (age of 1-2);
- 2) preoperational stage (age of 2-7);
- 3) concrete operational stage (age of 7-11);
- 4) formal operational stage (age of 11-15).

Language is a means and a result of thinking and also other mental processes, e.g. feelings, perceptions, memories, imagination, emotions, expression of will. And all these processes are interdependent. (Lublin, 1991) Language acquisition: perception of the meaning of the word is rooted in thinking; it is very important for a preschool child to develop thinking through play (Irbe, Lindberga, 2015).

Any developmental disorder affects thinking (Smita, Strika, 1998). All thinking processes affect successful acquisition of language and reading skills. Children with reading problems have underdeveloped logical thinking patterns. Thus, it can be concluded that the development of reading skills is closely related to the child's thinking. (Tūbele, 2008)

## References

1. Irbe, A., Lindberga, S. (2015). *Bērns runāt mācās ģimenē*. Rīga: RaKa.
2. Lieģeniece, D. (1999). *Kopveseluma pieeja audzināšanā*. Rīga: RaKa.
3. Lūse, J., Miltiņa, I., Tūbele, S. (2012). *Logopēdijas terminu skaidrojoša vārdnīca*. Rīga:

RaKa.

4. Ļubļinska, A. (1991). *Bērnu psiholoģija*, Rīga: Zvaigzne.
5. Smita, K. Strika, K. (1998). *Mācīšanas traucējumi: no A līdz Z*. Rīga: RaKa.
6. Piažē, Ž. (2002). *Bērna intelektuāla attīstība*. Rīga: Pētergailis.
7. Tūbele, S. (2008). *Disleksija vai lasīšanas traucējumi*. Rīga: RaKa.
8. Vigotskis, L. (2002). *Domāšana un runa*. Rīga: EVE.

## Memory

The ability to use language, apply specific knowledge and master body movements is provided by diverse and complex memory processes. They provide a person with a unified story of experience gained in life and thus also the basis of personality (Oxford Dictionary of Education, 2015).

Scientists consider that memory is closely related to children's language learning and language impairments. Indeed, many professionals in the field include memory as a part of their assessments and intervention in their professional practice; and parents frequently include memory as a concern when talking about their children's language difficulties. (Joffe, Clegg, 2017)

As is known, at preschool age, the main type of memory is imaginary memory. The child's memory is determined by his/her interest in what can be seen and what is happening, not by conscious memorisation. At this age, the child does not have a goal to remember anything, but nevertheless, interesting events, activities and images easily remain in the child's memory. A 3-6 year old child is able to remember a huge amount of information, easily learns poems, rhymes, if the method of teaching fascinates him/her, the child easily memorises letters. (Kalvāns, 2018) Thus, it has been stated that the child's memory influences and promotes the development of his/her reading and speaking skills. Reading requires an active cognitive activity from the reader: it is necessary to perceive the image of a word and compare it with the pattern stored in memory. It can be concluded that the development of reading skills is closely related to the child's memory. (Tūbele, 2006) The older the child becomes, the faster and more he/she is able to learn, which is due to the development of short-term and long-term memory processes (Sternberg, R., Sternberg, K., 2016).

It should not be forgotten that a child's language skills develop a little later and gradually, because preschool and primary school children are more characterised by non-verbal memory (Haden *et al.*, 2011).

Reading skills are mainly predicted by phonological awareness measured at the kindergarten stage and, subsequently, by phonological memory abilities measured at the end of first grade. More precisely short-term memory for serial order information seems to contribute to the development of decoding abilities, while phonological knowledge stored in long-term memory seems to influence word recognition (Nithart, Demont, Metz-Lutz, Majerus, Poncelet, Leybaert, 2011).

Scientists (Tübele, 2008; Auzuña, 2014) pay attention to a child's visual memory. It is considered that two aspects are important before learning to read: positive communication with the written word and the development of different skills (letter recognition, phonemic perception, visual memory, etc.)

**Visual memory** is the ability to remember for immediate recall the characteristics of a given object or form. It describes the relationship between perceptual processing and the encoding, storage and retrieval of the resulting neural representations. Visual memory is a form of memory which preserves some characteristics of our senses pertaining to visual experience. We are able to place in memory visual information which resembles objects, places, faces, etc. in a mental image. Sometimes the experience of visual memory is referred to as the mind's eye through which we can retrieve from our memory a mental image of original objects, places, animals or people. (Berryhill, 2008)

**Auditory memory** is the ability to process information presented orally, analyse it mentally, and store it to be recalled later. Unlike visual memory, in which our eyes can scan the stimuli over and over, it is impossible to do with the auditory stimuli. Auditory stimuli are received by the ear one at a time before they can be processed and understood. It can be said that the auditory memory is like a "holding tank" concept, because a sound is unprocessed (or held back) until the following sound is heard, and only then can it be made meaningful (Clark, 1987). This particular sensory store is capable of storing large amounts of auditory information that is only retained for a short period of time (3–4 seconds). If a child's auditory memory is poor, he/she cannot remember what he/she needs to do and cannot understand the purpose of the task. This manifests

itself in difficulty concentrating and dislike for learning. If a child listens poorly to oral instructions, has a small vocabulary that is inappropriate for his/her age, does not know how to express his/her thoughts and has difficulty remembering what has been said, the child often suffers from a lack of self-confidence because he/she cannot follow the teacher's explanations. (Žeigurs, 2015; Lieģeniece, 1999; Lieģeniece, Nazarova, 1999)

Regarding the development of a child's language, some studies show that **short-term memory** and analytical reasoning skills are two important components of language analytical skills, which are important in acquiring new vocabulary. For example, J. Paradis (2011) found that good phonological short-term memory and non-verbal intelligence (as an indicator of children's analytical reasoning) determine the amount of the child's receptive vocabulary, and short-term memory is a strong predictor.

Short-term memory is the ability to store information in mind in an active, readily available state for a limited period of time (Baddeley, 2018), such as visual images (i.e. shape or a face of a person) and/or aural/auditory information (i.e. phone numbers or sentences). Information can remain that way for a few seconds. The capacity of short-term memory is very individual, and when it is full, the stored information is partially replaced by the new one. Short-term memory is needed to be able to count in the mind, read a text, understand it and be able to retell it. It provides the ability to memorise, process and use information. E. Vanags claims that this type of memory is compared to the operation of a computer, when it can open several programs simultaneously without interrupting their operation. Short-term memory has a certain capacity, which can vary depending on a person's age and other biological factors. (Vanags, 2019)

**Long-term memory** determines a person's ability to retain information for longer periods of time. Long-term memories can last for just a few days, or for many years. The capacity of long-term memory is virtually unlimited, as the time for storing information in it. Access to information in long-term memory and ability to remember intentionally and unintentionally depends on how well it is organised. What we call "helpfulness of the memory" depends on how easy we can access the information stored in the long-term memory.

There are two major subdivisions of the long-term memory: explicit memory and implicit memory. Explicit memories are the ones we consciously remember (events in our life or some

particular facts). On the other hand, implicit memories are used to perform actions without thinking about them (like swimming or riding a bike).

**Semantic memory** is the ability to remember facts out of the context. For example, we remember that France is in Europe, water boils at 100 degrees C°, or dolphins are mammals but we do not need to know when we heard/read these facts for the first time. Semantic memory also represents our knowledge of words, symbols and concepts we use in a conversation or learn in any subject. It is used to recall the definitions of words and concepts. Thanks to it we can understand information we hear, instructions, school subjects, like maths and history, and the texts we read.

## References

1. Auziņa, U. (2014). *Kas ir laba lasītprasme un kā to sākt veidot?* Retrieved from <https://latviansonline.com/kas-ir-laba-lasitprasme-un-ka-to-sakt-veidot/>
2. Baddeley, A. (2018). *Exploring Working Memory. Selected Works of Alan Baddeley*. Routledge.
3. Berryhill, M. (2008). *Visual memory and the brain*. Retrieved from [http://www.visionosciences.org/symposia2008\\_4.html](http://www.visionosciences.org/symposia2008_4.html)
4. Haden, C. A., Ornstein, P. A., O'Brien, B. S., Elishchberger, H. B., Tyler, C. S., Burchinal, M. J. (2011). *The Development of Children's Early Memory Skills. Journal of Experimental Child Psychology*, 108(1): 44–60.
5. Joffe, V., Clegg, J. (2017). *Working Memory in Children with Speech, Language and Communication Needs*. Retrieved from <https://journals.sagepub.com/doi/full/10.1177/0265659017693143>
6. Kalvāns, Ē. (2018). *Attīstības psiholoģija*. Rēzekne: Rēzeknes Tehnoloģiju akadēmija.
7. Lieģeniece, D. (1999). *Kopveseluma pieeja audzināšanā*. Rīga: RaKa.
8. Lieģeniece, D., Nazarova, I. (1999). *Veseluma pieeja valodas apguvē*. Rīga: RaKa.
9. Nithart, Ch., Demont, E., Metz-Lutz, M., Majerus, S., Poncelet, M., Leybaert, J. (2011). *Early contribution of phonological awareness and later influence of phonological memory throughout reading acquisition*. Retrieved from

<http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=41&sid=ac3d2f08-d0d6-47cf-9f07-49f8af03fbc4%40sdc-v-sessmgr01> \_

10. Paradis, J. (2011). *Individual differences in child english second language acquisition: comparing child-internal and child-external factors*. Retrieved from [https://www.researchgate.net/publication/233541884\\_Individual\\_differences\\_in\\_child\\_English\\_second\\_language\\_acquisition\\_Comparing\\_child-internal\\_and\\_child-external\\_factors](https://www.researchgate.net/publication/233541884_Individual_differences_in_child_English_second_language_acquisition_Comparing_child-internal_and_child-external_factors)
11. Sternberg, R. J., Sternberg, K. (2016). *Cognitive psychology*, 7th edition. Wadsworth Publishing.
12. Tūbele, S. (2006). *Jaunāko klašu skolēnu runas un valodas traucējumu noteikšana un korekcijas iespējas*. Latvijas Universitāte.
13. Tūbele, S. (2008). *Disleksija vai lasīšanas traucējumi*. Rīga: Raka.
14. Vanags, E. (2019). *Atmiņa kā dzīvē lietojamu zināšanu pamats*. *Skola2030*. Retrieved from <https://www.skola2030.lv/lv/jaunumi/6/atmina-ka-dzive-lietojamu-zinasanu-pamats>)
15. Žeigurs, A. (2015). *Kāpēc ir svarīgi attīstīt bērna dzirdes uztveri līdz skolas vecumam*. Retrieved from <https://www.delfi.lv/calis/enciklopedija/kapec-ir-svarigi-attistit-berna-dzirdes-uztveri-un-atminu-lidz-skolas-vecumam.d?id=46780899>)

## Language development

There is an increasing tendency in preschool (in its last stage, during the compulsory preparation for primary education for children from the age of 5) where it is found that about 40-50% of children have language disorders: inaccurate pronunciation, indistinct speech, small vocabulary, inability to form related speech. These disorders may result in children's reluctance to communicate and in learning difficulties.

In the development of speech, there is interaction between the child's general development and the environment in which the child grows and develops. As early as at the preschool age, the child's speech is close to that of an adult, but it still develops phonetically, phonemically, lexically and grammatically. At this age, children are introduced to the basics of language, which can have a significant impact on their future (Miltiņa, 2005).

Language and speech are interconnected, but not identical. Language is considered to be a complex set that allows you to express your thoughts and experiences using words combined in hierarchical structures called sentences. People are born with the ability to learn the words and grammar of their local languages, i.e. the instinct to learn the language. (Fitch, 2011; Marler, 1991) In the language system, speech is a generally accepted and objectively existing part, common to all language carriers and it is a natural means of communication for the whole language, which means that the language system operates using the expressions of speech (Pesina, 2006).

L. Paramonova distinguishes the child's speech development periods: the so-called preparation period and the speech development period itself (Парамонова, 2009, 3).

A. Leontiev mentions four stages of children's speech formation:

- 1) preparatory – up to the age of 1;
- 2) initial stage language acquisition – up to the age of 3;
- 3) preschool – up to the age of 7;
- 4) school (Леонтьев, 2007).

Phonological memory plays an important role in the development of speech. Its functions are to remember the sequence of unfamiliar sounds, to perceive the word formed from these sounds, to understand its meaning. Modern psychophysiological and neurophysiological research shows that children's speech is an interconnected activity of several brain centres. The sensory speech centre is associated with speech perception and comprehension, the motor speech centre is related with speech-related muscles, as well as with articulatory organs that produce speech with direct participation of the respiratory system and hand movements (Kalmykova, 2009). The functions of the right hemisphere are related to early ontogenesis, focused on linking the sound of a word to an object, on the identification of a word based on its perceptual features, perception and ability of expression, production of specific content (sensual impressions, verbalisation of personal experience). The right hemisphere is responsible for the simplest language operations: perceiving and maintaining a connection with the perceived sound, perceiving the intonation and melody of the phrase. It is the sense of hearing the language.

The functions of the left cerebral hemisphere are related to the development of speech in older preschool children: word recognition and classification, expression, reasoning and

storytelling (word substitution, word formation, syntactic structuring, formation of complex syntactic structures), formation of language grammatical structures. It is also responsible for rapid switching and coding of speech signals. (Ahutina, 2014; Kalmykova, 2009)

Literacy is related to cognitive abilities such as visual and audio processing, information processing speed, memory, thinking, comprehension and knowledge (McGrew, Wendling, 2010).

**Auditory processing** is the ability to capture, analyse, and synthesise various audio information, such as speech sounds, music, and any other possible sounds (Schneider, McGrew, 2012). By listening, the child can determine which musical instrument is playing, which sound is missing in a word, say the sounds, say the correct word. Of the narrow auditory processing capabilities, phonetic coding is related to literacy, especially in the early stages of literacy (McGrew, Wendling, 2010).

The ability not only to hear, but also to listen, to focus on the sound, to distinguish its characteristic features is a unique ability characterising human beings only, which helps them in the exploration of the surrounding reality.

Auditory perception (or auditory processing) begins with acoustic (auditory) attention and promotes the understanding of the meaning of speech, through the recognition and analysis of speech sounds, which is supplemented by the perception of various other components (facial expressions, gestures, postures). Thus, acoustic perception is the basis of auditory perception and these processes are closely related to each other. The development of the hearing of speech depends directly on the development of children's out-of-speech hearing, since speech sounds also have all the features of out-of-speech sounds. (Захарова, Козлова, Обгаидзе 2013)

The process of auditory processing consists of various components, one of which is phonetic coding. It is the ability to hear individual phonemes (Schneider & McGrew, 2012). The easiest way to encode is to hear sounds, the hardest way is to distinguish sounds in words. Auditory perception and distinction of language sounds is ensured by phonological abilities (Kirby, Cornish, Smith, 2008).

Phonetic coding in literacy is progressing from the simplest to the most complex level. First stage of development is the ability to hear rhymes in spoken words, then words in spoken sentences, then syllables in spoken words. A higher level of development is the ability to hear the

first sound of the speech and the rest of the word, and finally individual phonemes in words. (Schneider, McGrew, 2012)

Disorders in the process of sound analysis affect the choice and verbalisation of the necessary words, the choice and articulation of the necessary sounds (Ahutina, 2014). However, it is not only the capacity of the hearing analyser that is important in the perception and acquisition of words. The first condition for speech perception is the separation of phonemes from speech flow, and the temporal lobe located in cerebral cortex of the left hemisphere plays the key role. Disorders in this zone cause inability to distinguish, structurise phonemes, causing speech-hearing underdevelopment (Lurija, 2006).

In order to acquire the skills of sound analysis and synthesis, the child must have anatomically healthy hearing, which allows the child to hear, differentiate and identify the exact pronunciation and perception of sounds (Blūmentāle u.c., 2014).

Phoneme awareness includes not only the aspect of phoneme perception, but also the ability to manipulate phonemes in different types of tasks, namely, to distinguish between different phonemes, to identify the hear words basing on the rhymes (Wager, 1994).

The phonological approach to vocabulary storage ensures retrieval of words from memory. This ability predicts the skills of decoding and is relatively independent of phoneme awareness and phonological memory. (Kirby, Parrila, Pfeiefer, 2003)

Phonological memory encodes information in sound unit systems for temporary storage (Baddeley, 2005) or it is verbal memory. It is usually measured by tasks in which verbal stimuli have to be called immediately after presentation, e.g. repetition of subject names, phrases, syllables, repetition of short sentences, repetition and memorisation of two-line poems.

Studies show that early phonological abilities predict later achievements in literacy (Gillon, 2004).

Literacy is a complex phenomenon in the human cognitive sphere that has been extensively and in-depth studied over the past forty years (Cain, Parrila, 2014; Vellutino *et al.*, 2004). There are five main components related to reading skills: phonology, alphabetical principle, reading fluency, reading comprehension and vocabulary (Snowling, Hulme, 2005).

Human language ability, which includes language comprehension and language production, is a prerequisite for the development of literacy (Wong, 2004). However, language skills only are not enough to acquire reading skills.

Alphabetical principle means linking particular letter to sound, and it involves two components: understanding the alphabetical principle and phonological decoding (Snowling, Hulme, 2005).

The child's understanding of the alphabetical principle and phonemic skills begins to develop when the child begins to use the principle of linking letters to sounds in order to segment and merge sounds of simple structure (e.g., ba-by), as well as to spell words and apply phonemic skills. The alphabetical principle can be assessed by offering a child to read non-existing fictional words (e.g., NEP, JUZ, etc.) where phonological decoding skills are applied, whereas the improvement of phonemic skills must be consciously taught (Ehri, 2002).

**Visual processing** is the ability to use graphic images. Visual processing includes the perception, generation and analysis of visual information (Schneider, McGrew, 2012). Visual processing in reading is orthographic processing (Grainger, Ziegler, 2011). During the reading process, the letters must be distinguished from the background, they have to be recognised because they are almost similar, only different in their spatial arrangement and size (Snowling, Stackhouse, 2006).

The relationship between cognitive and reading skills may vary at different ages.

Reading is based on phonological decoding, so it plays a very important role in the development of early phonological abilities. Children with underdeveloped phonological skills have a small vocabulary, pronunciation problems, and reading difficulties.

Language competence includes an organizational component and a pragmatic component that are interrelated. The organisational component of language competence includes the aspects of language structure: morphology, syntax, vocabulary and phonology. The pragmatic component of language competence, in turn, includes the language aspects related to the use of language in social environment according to the situation (performance of language functions, speech acts), developing more or less detailed interaction "scenario", which includes dialogic speech, monologue speech, storytelling skills. (Reichert-Garschhammer, Kieferle, 2011)

In the beginning, the child is only able to participate in a dialogue, and this too is more related to a specific situation and experience. Gradually, more and more detailed answers are formed, and afterwards he/she is able to form a narration.

Verbal communication occupies a central place in person's life "as a factor of his/her spiritual development, a condition of self-regulation", as "a means of attracting a personality to public knowledge and acquisition of social experience, as a condition for the development of thinking" (Урунтаева, 2013).

The acquisition of language sounds is based on two interrelated processes: the development of the perception of language sounds or, as it is called, the development of the child's phonological abilities, and the process of pronunciation of language sounds (Эльконин, 1998).

A full-fledged speech of a child is a necessary condition for successful schooling, therefore it is important to prevent sound pronunciation disorders in the preschool period. At this age, the child's speech is flexible enough, and all types of dyslalia can be overcome sooner or later. Timely attention should be paid both to correct articulation of sounds and to promotion of phonetic phonemic perception, auditory attention and auditory memory. (Miltiņa, 1997)

Pronunciation takes place in a process of communication and depends on the lexical, grammatical and intonational rhythmic development of the parties, i.e. on the development of the language as a whole.

The formation of a related speech for children is closely related to the acquisition of the grammatical structure of their mother tongue and is not possible outside the acquisition of the speech sound system. Its acquisition forms the basis for the acquisition of language as the main means of communication.

In a corrective developmental activity, the first thing to do is to improve phonological abilities, correct the pronunciation of sounds, enrich the vocabulary, correct the grammatical structure of the language; only then can the activity be started to improve the related speech. The tasks at this stage are the following: discussing a specific topic, extending, modifying and shortening sentences, working with a text and plan, as well as teaching extended reasoning. (Tübele, Lüse, 2012)

To teach a child to tell, to develop his/her storytelling skills means to form his/her related speech, to improve all aspects of the child's speech development: phonetic, lexical and grammatical (Акименко, 2011; Глухов, 2004).

In order to develop storytelling skills, it is necessary to provide children with a developing environment, extensive speaking practices and support each child's creativity. At preschool age, children need to learn different types of storytelling skills: retelling, narration and narration with elements of creative activity that promote the development of the child's related speech. Narrative skills need to be well developed as they are necessary for verbal communication. (Tūbele, Cupere, 2011)

## References

1. Ahutina, T., Zasypkina, K., Romanova, A. (2014). Predposylki I rannie etapy razvitiya rechi: novye dannye. *Voprosy psiholingvistiki*. Retrieved from <https://cyberleninka.ru/article/n/predposylki-i-rannie-etapy-razvitiya-rechi-novye-dannye>
2. Blūmentāle, I., Kalēja, I., Klatenberga, I., Kušče, S., Vabale, A. (2014). *Rokasgrāmata runas, valodas un dzirdes attīstībā un traucējumu izzināšanā*. Rīga.
3. Bradley, L., Bryant, P. E. (1983). Categorizing sounds and learning to read – a causal connection. *Nature*, 303, 419–421.
4. Cain, K., Parrila, R. (2014). Introduction to the special issue. Theories of reading: What have we learned from two decades of scientific research. *Scientific Studies of Reading*, 1, 1–4.
5. Cupere, I., Tūbele, S. (2011). *Stāstītprasmes veicināšana pirmsskolas vecuma bērniem ar valodas sistēmas nepietiekamu attīstību*. Retrieved from <https://dspace.lu.lv/dspace/handle/7/11358>
6. Gillon, G. T. (2004). *Phonological awareness: From research to practice*. New York: Guilford Press.
7. Ehri, L. C. (2002). Phases of acquisition in learning to read words and implications for teaching. In R. Stainthorp & P. Tomlinson (Eds.), *Learning and teaching reading* (pp. 7–28). London: British Journal of Educational Psychology Monograph Series II.

8. Grainger, J., Ziegler, J. C. (2011). A Dual-Route Approach to Orthographic Processing. *Frontiers in Psychology*, 2. doi: 10.3389/fpsyg.2011.00054.
9. Kirby, J. R., Parrila, R., Pfeiffer, S. (2003). Naming speed and phonological processing as predictors of reading development. *Journal of Educational Psychology*, 95, 453–464.
10. McGrew, K. S., Wendling, B. J. (2010). Cattell–Horn–Carroll cognitive-achievement relations: What we have learned from the past 20 years of research. *Psychology In The Schools*, 47(7), 651-675.
11. Miltiņa, I. (2005). *Skaņu izrunas traucējumi*. Rīga: Raka.
12. Pesina, S. (2006). *Разграничение языка и речи в свете прототипической семантики*. Retrieved from <https://cyberleninka.ru/article/n/razgranichenie-yazyka-i-rechi-v-svete-prototipicheskoy-semantiki>
13. Reichert-Garschhammer, E., Kieferle, Ch. (2011). *Sprachliche Bildung in Kindertageseinrichtungen*. Freiburg: Verlag Herder.
14. Snowling, M. J., & Hulme, C. (2005). (Eds.). *The Science of Reading: A Handbook*. Oxford: Blackwell.
15. Snowling, M. J., & Stackhouse, J. (2006). *Dyslexia, Speech and Language: A Practitioner's Handbook*. Wiley.
16. Schneider, W. J., & McGrew, K. (2012). The Cattell–Horn–Carroll model of intelligence. In D.Flanagan & P. Harrison (Eds.), *Contemporary Intellectual Assessment: Theories, Tests, and Issues (3rd ed.)*. New York: Guilford.
17. Tūbele, S., Lūse, J. (2012). *Ja skolēns raksta nepareizi...* Rīga: RaKa.
18. Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability: What have we learned in the past four decades? *Journal of Child Psychology and Psychiatry*, 45(1), 2–40.
19. VISC (2011). *Valodas (runas un rakstu) attīstība veicināšana bērniem vecumā no 5-8 gadiem* (ed. Ineta Upeniece); Atbalsta materiāls pedagogiem un bērnu vecākiem. Rīga: Valsts izglītības satura centrs.
20. Акименко, В.М. (2011). *Логопедическое обследование детей с речевыми нарушениями*. Ростов – на Дону: Феникс.

21. Волкова, Л. С., Лалаева, Р. И., Мاستьюкова, Е. М. (1989). *Предмет и задачи логопедии. Связь логопедии с другими науками. Методологические основы логопедии.*
22. Глухов, В. П. (2004). *Формирование связной речи детей дошкольного возраста с общим речевым недоразвитием.* Москва: АРКТИ.
23. Kalmykova, L. (2009). *Detskaja rech' kak mnogoternyj fenomen.* Retrieved from <http://www.ontolingva.ru/onto.pdf#page=34>
24. Леонтьев, А. А. (2007). *Вопросы изучения детской речи.* Детство-Пресс.
25. Парамонова Л. Г. (2009). *Логопедия для всех.* Питер.
26. Урунтаева, Г.А. (2013). *Детская психология.* Москва: Издательский центр Академия.
27. Захарова, Л.Ю., Козлова, М.В., Обгаидзе, М.Н. (2013). *Развитие слухового восприятия детей дошкольного возраста с ОНР в ДОУ.* Retrieved from <https://urok.1sept.ru/%D1%81%D1%82%D0%B0%D1%82%D1%8C%D0%B8/632206/>
28. Жукова, Н.С., Мастьюкова, Е.М., & Филичева, Т.Б. (2005). *Логопедия. Преодоление общего недоразвития речи у дошкольников.* Екатеринбург: ЛИТУР.

## **Mathematics**

In modern world, maths skills are no less important than reading skills. Although mathematics and language are two different topics, the relationship between them has been extensively studied for years and it is recognised that mathematics and language are interrelated. (Abedi, Lords, 2001; De Smedt, Taylor, Archibald, Ansari, 2010). Early mathematical skills in preschool are related not only to later mathematical abilities in primary school, but also to all other future academic achievements (Duncan, Dowsett, Claessens, Magnuson, Huston, Klebanov, 2007; Koedel, Tyhurst, 2012). Even small language disorders can interfere with learning maths (Gärnets, Keita, 1998). It is considered that there is also a link between the ability of preschool children to regulate behaviour and reading skills, vocabulary and maths skills (Abedi, Lords, 2001; Druval, 2006).

Mathematics itself is a specialised language (Druval, 2006). However, mathematical language is different from our everyday language (Šleppegrela, 2007). Mathematical skills, the

same as literacy, are related to forecasting (Duncan, Dowsett, Claessens, Magnuson, Huston, Klebanov, 2007; Koedel, Tyhurst, 2012).

Regarding the influence of oral language on the acquisition of mathematics, a strong relationship has been found between phonological processing and mathematical development. Phonological processing consists of three components: phonological memory, phonological retrieval and phonological comprehension. Each of them has been proved to be important for the development of mathematical skills (Hecht, Torgesen, Wagner, Rashotte, Hecht, Torgesen, Wagner, Rashotte, 2001).

Children's phonological memory is closely related to mathematical skills and to their ability to predict mathematical activities, use numerals (Anvari, Trainor, Woodside, Levy, 2002; Passolunghi, Vercelloni, Schadee, 2007; Stivensons, Pärkers, Vilkinsons, Hegions, Zivis, 1976; De Visscher, Noël, 2014). Both phonological understanding and solving mathematical problems require significant phonological memory (Hecht, Torgesen, Wagner, Rashotte, 2001).

Another aspect of phonological processing is phonological understanding, which refers to the ability to manipulate the sound structures of languages (McBride-Chang, Bialystok, Chong, Li, 2004). Phonological understanding is essential in the correlation of differences in individual mathematical abilities (Krajewski, Schneider, 2009; Hecht, Torgesen, Wagner, Rashotte, 2001). There are two possible relations between phonological comprehension and mathematical skills. Firstly, phonological comprehension can be related to mathematical skills through the acquisition of numerals (Krajewski, Schneider, 2009). Secondly, both phonological comprehension and solving mathematical problems require significant support from the central control and from the phonological memory (Hecht, Torgesen, Wagner, Rashotte, 2001).

Language skills are important for developing maths skills in children. The same as language skills, mathematical skills can be defined in two main areas: informal mathematics and formal mathematics. Informal mathematics refers to the whole composition of numbers and the basic concepts of numbers that children acquire before formal mathematics is officially taught at school. (Purpura, Ganley, 2014; Ramans, 2002) In addition, language skills are more related to informal mathematics than to formal mathematics (Abedi, Lords, 2001; Purpura, Napoli, 2015). To create vocabulary, children associate words with objects, events, and concepts. When they learn numerals, they need to understand that each numeral corresponds to a certain amount, and

young children with a richer vocabulary may have better results. (Purpura, Napoli, 2015). Preschoolers' general language skills can support their understanding of the meaning of terminology involved in informal mathematics, such notions as “bigger”/ “smaller”, “more”/ “less”/ “equal to”, “increasing”/ “decreasing” (Purpura, Napoli, 2015). Language skills are related to counting and understanding mathematical storytelling problems that are essential for performing formal mathematical operations. In fact, children’s understanding of the principles of addition and subtraction can also be measured by problems in manipulating specific objects and storytelling problems (Purpura, Lonigan, 2013).

D. Purpura and C. Ganley have suggested that the development of informal mathematics could be divided into three stages. In the first phase, children learn to compare the sizes of two sets or objects and start counting sequentially. In the second phase, they learn to associate numbers with corresponding quantities and numerals. The third phase involves simple operations with numerals (for example, understanding that the sum of two integers is greater than both separate numbers). Unlike informal mathematics, formal mathematics refers to skills or concepts that are taught at school and include basic arithmetic, such as addition and subtraction, and more complex calculations. (Purpura, Ganley, 2014; Libertus, Feigenson, Halberda, 2013; Purpura, Baroody, Lonigan, 2013)

Language skills are important for developing maths skills in children. Reading difficulties that appear in mathematics are related to verbal comprehension, processing speed, and memory (Pennington, 2006).

Dyslexia means much more than just reading difficulties and is often associated with other disorders. For example, dyscalculia, i.e. disorders of acquiring mathematical skills; dysgraphia, i.e. writing disorders, ADHD. In case of dyslexia, the following problems occur:

- hand-eye coordination problems and poor motor skills;
- inability to hold attention and focus;
- bad sense of direction (often confusing right and left);
- problems executing multi-level instructions;
- delayed reaction (it is often necessary to repeat);
- difficulties in making decisions (Buksa, 2016).

## References

1. Abedi, J, Lord, C. (2001). The language factor in mathematics tests. *Applied Measurement in Education*. 219–234. Retrieved from [https://www.tandfonline.com/doi/abs/10.1207/S15324818AME1403\\_2](https://www.tandfonline.com/doi/abs/10.1207/S15324818AME1403_2)
2. Anvari, S.H, Trainor, L.J, Woodside, J, Levy, B.A. (2002). Relations among musical skills, phonological processing, and early reading ability in preschool children. *Journal of Experimental Child Psychology*. 83: 111–130. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/12408958>
3. Buksa, F. (2016). *Uzveikt disleksiju*. Rīga: Zvaigzne ABC, 160 lpp.
4. De Visscher, A, Noël, M.P. (2014). Arithmetic facts storage deficit: The hypersensitivity to interference in memory hypothesis. *Developmental Science*. 17: 434–442. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24410798>
5. De Smedt, B., Holloway, I., Ansari, D. (2011). *Effects of problem size and arithmetic operation on brain activation during calculation in children with varying levels of arithmetical fluency*. Retrieved from [https://d1wqtxts1xzle7.cloudfront.net/39963976/Effects\\_of\\_problem\\_size\\_and\\_arithmeti\\_c\\_o20151113-27031-1okpt](https://d1wqtxts1xzle7.cloudfront.net/39963976/Effects_of_problem_size_and_arithmeti_c_o20151113-27031-1okpt)
6. Druval, R. (2006). A cognitive analysis of problems of comprehension in a learning of mathematics. *Educational Studies in Mathematics*; 61: 103–131. Retrieved from <https://link.springer.com/article/10.1007/s10649-006-0400-z>
7. Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., et al. (2007). School readiness and later achievement. *Developmental Psychology*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/18020822>
8. Garnett, D. K. (1998). *Mathematical learning disabilities*. CEC Disorder Division. Retrieved from <http://www.ldonline.org/article/5896/>
9. Hecht, S. A., Torgesen J. K., Wagner, R. K., Rashotte, C. A. (2001). The relations between phonological processing abilities and emerging individual differences in mathematical computation skills: A longitudinal study from second to fifth grades. *Journal of Experimental Child Psychology*. 79: 192–227. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/11343408>

10. Kauliņa, A, Tūbele, S. (2012). *Lasīšanas traucējumi*. Rīga: RaKa, 112 lpp.
11. Krajewski K., Schneider W. (2009). Exploring the impact of phonological awareness, visual–spatial working memory, and preschool quantity–number competencies on mathematics achievement in elementary school: Findings from a 3-year longitudinal study. *Journal of Experimental Child Psychology*. 103: 516–531. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/19427646>
12. Koedel, C., Tyhurst, E. (2012). *Math skills and labor-market outcomes: Evidence from a resume-based field experiment*. Retrieved from [https://econpapers.repec.org/article/eeeecoedu/v\\_3a31\\_3ay\\_3a2012\\_3ai\\_3a1\\_3ap\\_3a131-140.htm](https://econpapers.repec.org/article/eeeecoedu/v_3a31_3ay_3a2012_3ai_3a1_3ap_3a131-140.htm)
13. Libertus, L., Feigenson, M., Halberda, J. (2013). *Links Between the Intuitive Sense of Number and Formal Mathematics Ability*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3891767/>
14. Passolunghi, M.C., Vercelloni, B., Schadee, H. (2007). The precursors of mathematics learning: Working memory, phonological ability and numerical competence. *Cognitive Development*. 22:165–184. Retrieved from [https://www.researchgate.net/publication/223270098\\_The\\_precursors\\_of\\_mathematics\\_learning\\_Working\\_memory\\_phonological\\_ability\\_and\\_numerical\\_competence](https://www.researchgate.net/publication/223270098_The_precursors_of_mathematics_learning_Working_memory_phonological_ability_and_numerical_competence)
15. Pennington, B. F. (2006). *From single to multiple deficit models of developmental disorders*. Retrieved from <https://www.du.edu/ahss/psychology/dnrl/media/documents/Fromsingletomultipledeficit.pdf>
16. Purpura, D. J., Ganley, C. M. (2014). Working memory and language: Skill-specific or domain-general relations to mathematics? *Journal of Experimental Child Psychology*. 122 (1): 104–121. Retrieved from [https://www.researchgate.net/journal/0022-0965\\_Journal\\_of\\_Experimental\\_Child\\_Psychology](https://www.researchgate.net/journal/0022-0965_Journal_of_Experimental_Child_Psychology)
17. Purpura, D. J., Baroody, A. J., Lonigan, C. J. (2013). The Transition From Informal to Formal Mathematical Knowledge: Mediation by Numeral Knowledge. *Journal of Educational Psychology*. 105 (2): 453. Retrieved from

<https://www.researchgate.net/journal/0022->

[0965\\_Journal\\_of\\_Experimental\\_Child\\_Psychology](https://www.researchgate.net/journal/0022-0965_Journal_of_Experimental_Child_Psychology)

18. Purpura, D. J., Lonigan, C. J. (2013). Informal numeracy skills: The structure and relations among numbering, relations, and arithmetic operations in preschool. *American Educational Research Journal*. 50: 178–209. Retrieved from <https://www.jstor.org/stable/23319711?seq=1>
19. Purpura, D. J., Napoli, A. R. (2015). Early numeracy and literacy: Untangling the relation between specific components. *Mathematical Thinking and Learning*. 17:197–218.
20. Stevenson, H. W., Parker, T., Wilkinson, A., Hegion, A., Fish, E. (1976). Longitudinal study of individual differences in cognitive development and scholastic achievement. *Journal of Educational Psychology*. 68: 377. Retrieved from <https://psycnet.apa.org/record/1976-28729-001>
21. Raman, M. (2002). Coordinating informal and formal aspects of mathematics: Student behavior and textbook messages. *The Journal of Mathematical Behaviour*. 21: 135–150. Retrieved from [https://www.researchgate.net/publication/250726043\\_Coordinating\\_informal\\_and\\_formal\\_aspects\\_of\\_mathematics\\_Student\\_behavior\\_and\\_textbook\\_messages](https://www.researchgate.net/publication/250726043_Coordinating_informal_and_formal_aspects_of_mathematics_Student_behavior_and_textbook_messages)
22. Schleppegrell, M. J. (2007). The linguistic challenges of mathematics teaching and learning: A research review. *Reading & Writing Quarterly*. 23: 139–159. Retrieved from [https://www.researchgate.net/publication/247498853\\_The\\_Linguistic\\_Challenges\\_of\\_Mathematics\\_Teaching\\_and\\_Learning\\_A\\_Research\\_Review](https://www.researchgate.net/publication/247498853_The_Linguistic_Challenges_of_Mathematics_Teaching_and_Learning_A_Research_Review)

## Orientation

“Orientation in time” presents multiple perspectives framing perceptions of time, and these perceptions impact how people create boundaries between present and past and future. In other words, the ways we think of time directly affect our decision-making and the consequent action (Alavina, 2016).

Recent studies have shown that infants and young children are able to discriminate different durations, despite their limited conceptual capacities. This suggests that a basic internal clock system is functional at an early age. The main distortions in time judgements in children

are shown to be due to attention/executive functions that are not sufficiently developed to allow the correct processing of time whatever the context.

Young children are able to estimate time correctly only if they are forced to pay attention to it, to experience it on the basis of duration required to perform their actions, or through frustration when their needs are not immediately satisfied.

## References

1. Alavina (2016). *Orientation in time, place and space: inquiring into boundaries*. Retrieved from <https://mytoolbox.com/2016/09/26/timeplaceandspaceboundaries/>
2. Droit-Volet, S. (2012). *Children and time*. Retrieved from <https://thepsychologist.bps.org.uk/volume-25/edition-8/children-and-time>

## Creativity

The process of globalisation has created a rapid need for diversity in both the market and the workplaces, which has created a need for new relationship skills and flexibility, characterised by organisational systems, processes and people who can act in different situations. One of the most important challenges of the 21st century is creativity: one of the main resources in both economic and social development processes (Alijevs, 2005).

Creativity is the ability to create new ideas or concepts. From a scientific point of view, creative thinking results in both an original and a suitable idea. In everyday perception, creativity is simply the ability to create something new. (Pudane, 2011) Creativity is a long-lasting characteristic feature of individuality, characterised by innovation, originality, non-traditional solutions, anti-conformism, courage, productivity of creative activity in various fields: art, science, technology, pedagogy, etc., creative intuition, rich imagination, inspiration, mental plasticity, superconscious activity. Creativity can take many forms and manifest itself in various spheres (Bebre, 2010).

Creativity is the ability to imagine, create original, unusual ideas and implement them in action, the tendency to create new products (works of art, statements, etc.). The level of development of creativity provides an opportunity to predict person's achievements in a specific area of talent. Creativity means assigning new meanings to phenomena, constructing a new reality or searching for different solutions. (Ebert, 1994)

The common goal of any education system is to promote the formation of a knowledgeable, skilled and educated personality. The task of the preschool level in this context is to ensure the preparation of the child for the acquisition of basic education, which includes the child's mental, physical and social development; development of initiative, curiosity, independence and creativity, creative activity, which can be considered as a basis for the child's self-realisation (Alijevs, 2005).

At preschool age, creativity is most evident in the imagination skills and in the process of play (Hoff, 2003; Выготский, 1997). The beginning of creative activity and the sensitive period of development is the age of 3-5, which is called the age of play (Дружнин, 2000).

Promoting creativity, innovation and digital competences through early childhood education can be rewarded later, providing a basis for further education, enabling knowledge to be acquired at a much higher level and improving children's ability to develop creativity and critical thinking and to become responsible European citizens of future who can meet the challenges of an increasingly interconnected and globalised world (EC, 2015).

## References

1. Alijevs, R. (2005). *Izglītības filozofija. 21. gadsimts*. Rīga: Retorika A.
2. Bebre, R. (2010). *Kreativitāte un skolotāja personība*. Retrieved from [http://www.lvsa.lv/bebre\\_eng.html](http://www.lvsa.lv/bebre_eng.html)
3. Ebert II, E. S. (1994). The Cognitive Spiral: Creative Thinking and Cognitive Processing. *The Journal of Creative Behaviour*. 28.4: 275- 290.
4. European Council *Conclusions on the role of early childhood education and primary education in fostering creativity, innovation and digital competence*. Retrieved from [https://eur-lex.europa.eu/legal-content/LV/TXT/?uri=CELEX:52015XG0527\(04\)](https://eur-lex.europa.eu/legal-content/LV/TXT/?uri=CELEX:52015XG0527(04))
5. Hoff, E. (2003). *The Creative World of Middle childhood. Creativity, Imagination and Self-Image from Qualitative and Quantitative Perspectives*. Lund.
6. Pudane, I (2011). *Radošums/kreativitāte*. Retrieved from <https://pudane.wordpress.com/2011/10/21/radosumskreativitate>
7. Выготский, Л. (1997). Вопросы детской психологии. *Issues in Children's Psychology*. Санкт-Петербург: Союз.

8. Дружинин, В. Н. (2000). Психология общих способностей. *Psychology of Ability*. Санкт-Петербург: Питер.

## **2<sup>nd</sup> BLOC: PHYSICAL DEVELOPMENT**

Basic movements and their types also develop physical features: speed, coordination of movements, strength, endurance and flexibility, so they are very important. At the same time, during these activities, the child also develops thinking, perception, concentration, orientation in time and space. During the performance of basic movement exercises in a preschool educational institution, the child also develops moral qualities: purposefulness, courage, endurance, helpfulness, it increases the child's intellectual and physical working capacity. (Jansone, Fernāte, Bula –Biteniece, 2016)

Educators believe that it is important to include such parameters as the assessment of physical development (fine and gross motor skills, balance, activity) in the methodology of surveying a child's readiness for school, because according to preschool teachers, pedagogues, speech therapists, psychologists, successful development of fine and gross motor skills is very important in children's development, because it helps to promote their attention, thinking, speech, and language (Vigotskis, 2002.; Tūbele, 2002, 2004, 2008; Rīds, 2019; Irbe, Lindberga, 2015; Жукова, Мастюкова, Филичева, 2018; Szwedo, Abrams, 2017).

Physical readiness means the ability of a child's body to adapt to a new physical activity without a day sleep. The child's health condition can be the reason for insufficient readiness to learn: frequent illnesses weaken body, reduce functional possibilities, which can manifest itself at school as faster fatigue. Health is strengthened by swimming, various sports activities, fresh air, sun and activities in sand. In general, it makes the child's sleep calm and strong, has a beneficial effect on his/her nervous system. Causes of physical unpreparedness can be related not only to the child's state of health, but also to unfavourable conditions in which the child grows and develops.

The growth and development of certain muscle groups is uneven. Large muscles (e.g. back, shoulders) develop first, they are followed by small muscles (e.g. arms, legs). Muscle mass gradually increases. It should be noted that younger children find it difficult to make small,

precise movements, such as drawing and writing neatly, but over time, as the innervation develops, children become more and better able to perform precise movements. (VISC, 2011)

At preschool age, when assessing a child's readiness to attend school, the development of motor skills is definitely assessed. Gross motor skills require energy that is inexhaustible for preschool children and gives them the ability to move, walk, jump or swim. Fine motor skills require patience, allow better use of the small muscles that control the hand, fingers and thumb, and the level of development of fine motor skills is very important for learning. Fine motor skills are important in writing, drawing, painting, cutting, folding, tying, unfastening and fastening. (Boneva, 2020). The development of fine motor skills is an important stage in the process of child's intellectual growth (see Fig. 1).



Figure 1. Importance of fine motor skills (Vigotskis, 2002)

For an adult, finger activities are mostly automatic, whereas a child has to acquire these skills by learning to coordinate three body systems: nervous system, muscles and the skeleton. The child begins to develop fine motor skills of the wrist, which are needed to perform fine, precise actions using the fingers, at an early age and this process ends at around the age of nine. The child's movements develop the cerebral cortex and all this affects successful development of speech and language, as body movements and speech motility have unified mechanisms, the centres responsible for movement and speech in the brain are closely related. Areas affected by fine motor skills are also vision, coordination, memory, ability to concentrate, reaction speed. If the child has well-developed fine motor skills, then speech and language develop better. (Монтессори, 2016).

Dyslectic children often have disorders of fine and gross motor skills and problems with coordination (Rīds, 2019, Houston, 2004).

The development of the child's physical and musculoskeletal system is reflected in the posture. To help children to develop a normal posture, motivation is needed, as well as the interest of parents and teachers in the child's health. If, for example, a growing child sits in furniture that is not suitable for his/her body for a long time, or in front of a television set or

computer, it may result in disorders of the movement and support system. In turn, functional disorders of the musculoskeletal system delay the child's physical development, cause deterioration of the functional capacity of the cardiovascular, nervous, respiratory and digestive systems. Such children have reduced ability to adapt to stressful situations or to adverse ecological factors. When starting school, children carry out only 50% of the necessary movements. The most unfavourable posture is the sitting position. (VISCS, 2011)

Early detection of postural disorders and possible feet deformities is very important. Control of the posture in an upright position is necessary for the development of quality movement skills. When assessing a child's physical development, it is recommended to monitor the child's ability to perform activities that require coordination and great motor skills, such as jumping, running, balancing, climbing, controlled movement activities, playground activities, cycling and tricycle riding. (Boneva, 2020)

The development of movement coordination is closely related to the development of CNS functions. It is much more mobile and plastic in children, so they learn new movements faster and more accurately. Acquisition and improvement of new movements, in turn, leads to the development of many centres in the brain – not only centres responsible for movements, but also many other centres. The child is able to write only when his/her manual dexterity has reached such a level of development that the child is able to make small coordinated hand and finger movements. The development of movement coordination as such is not the final goal, it is needed to promote children's mental development. (Jansone, Fernāte, Bula –Biteniece, 2016)

## **Eye-hand coordination**

Eye-hand coordination begins to develop from the age of two to four months, starting a period of trials and errors by observing objects and approaching them. Visual and motor integration involves efficient communication between eyes and hands so that children can copy, open and close, unbutton and unbutton, open zippers, cut paper and fabric, draw or write what they see. Children are able to distinguish between left and right, get dressed, pour something somewhere, wash and brush their teeth. (Jansone, Fernāte, Bula –Biteniece, 2016) This requires the eyes to visually control the movement of the hand(s). Fine motor skills develop gradually: clumsy, inaccurate movements are replaced by purposeful and precise movements.

In order to have good eye-hand coordination, the child should also achieve a good level of visual skills (visual perception, visual tracking) and motor skills (both gross and fine). Only in this case we can expect that the child will have good eye-hand coordination sufficient to easily perform activities such as drawing, copying, painting, handwriting, but also catching a ball, hitting with a stick, etc.

## References

1. Boneva, D. (2020). *Prerequisites for developing good reading/writing/math skills*. ERASMUS+ K2 project “REF2” materials.
2. Houston, M. (2004). *Dyslexia: Good practice Guide*. Edinburgh: City of Edinburgh Council.
3. Irbe, A., Lindberga, S. (2015). *Bērns runāt mācās ģimenē*. Rīga: RaKa.
4. Jansone, R., Fernāte, A., Bula –Biteniece, I. (2016). *Sporta pedagogija vakar, šodien, rīt*. Rīga: RaKa.
5. Rīds, G. (2019). *Disleksija agrīna vecumā*. UK.
6. Szwedo E., Abrams F., C. (2017). *Association between fine motor skills and binocular visual function in children with reading difficulties*. Retrieved from <http://web.b.ebscohost.com/ehost/detail/detail?vid=10&sid=c17f537f-9faf-4d9e-90ac-d4f0c8553dd6%40pdc-v-sessmgr02&bdata=Jmxhbm9cnUmc2l0ZT1laG9zdC1saXZl#AN=29096178&db=cmedm>
7. Tūbele, S. (2008). *Disleksija vai lasīšanas traucējumi*. Rīga: RaKa.
8. Tūbele, S. (2002). *Skolēna runas attīstības vērtēšana*. Rīga: RaKa.
9. Tūbele, S., Šteinberga A. (2004). *Ievads Specialajā pedagogijā*. Rīga: RaKa.
10. Vigotskis, L. (2002). *Domāšana un runa*. Rīga: Eve.
11. VISC (2011). *Bērns sešu gadu vecumā: no rotaļām līdz mācībām. Informatīvs materiāls vecākiem*. Rīga: Valsts izglītības satura centrs.
12. Жукова, Н., Мاستюкова, Е., Филичева, Т. (2018). *Логопедия основы теории и практики*. Москва: эксмодетство.
13. Монтессори, М. (2016). *Школа Монтессори*. Москва: АСТ.

## **Balance**

Physical balance is the ability to keep the musculoskeletal system in a statistical state, to function effectively and to control posture while moving, while stabilising free movement and responding to external stimuli (Krauksts, 2003).

From a biological point of view, the function of balance is a complex mechanism of the body, regulated by the mechanism of visual, vestibular and proprioception. It is closely related to the coordinated action between the innervation of the central nervous system and response reactions. The balance of strength of the muscles involved in the activity and the response time to the irritation are essential for ensuring the control of balance. Sense of balance and space in the regulation of the central nervous system are in close interaction with movement, vision, psychomotor functions. (Bethere, D., Cupere, I., Kaupužs, A., et.al., 2016)

Balance disorders (signs: dizziness, instability, clumsiness, lack of balance control, motor developmental delay) in children can cause a number of developmental problems in the future, there may be abnormalities in the development of movement control.

Disorders of the child's sense of balance can be noticed if the child often stumbles, falls, movements are not coordinated, the child does not want to participate in games, is afraid of heights, does not like jumping and turning, is too mobile, the interaction with inventory is not coordinated, moving with legs widely apart, hunched back, head down, gazing at legs, running full feet, low self-esteem (Karlovskā, 2017). The primary cognitive process by which information is received from the inner and outer world is the senses. The physiological apparatus of the senses consists of several analysers, which form the whole sensory system. Sensory systems serve for the analysis of the external environment (provides sight, hearing, touch, smell, taste, temperature perception) and for the analysis of the internal environment (information about the body's condition in space or movement, provided by the vestibular apparatus, as well as the body's muscle condition). Development of all sensory systems is significant and equally important in improving the ability to maintain balance. With the development of all the sense organs, stable balance is formed. (Karlovskā, 2017)

At the age of 4 -5 (on average), children have a sensitive period regarding the development of the sense of balance: the ability to maintain balance develops the fastest, which should definitely be used.

## References

1. Bethere, D., Cupere, I., Kaupužs, A., Laganovska, E., Ļubkina, V., Marzano, G., Karlovska, R. (2017). *Līdzsvara attīstība pirmsskolas un jaunākā skolas vecuma bērniem pamatkustībās*. Rīga: Zvaigzne ABC.
2. Krauksts, V. (2003). *Biomotoro spēju treniņu teorija*. Rīga: LSPA.
3. Prudņikova, I., Reigase, M., Rižakova, L., Rozenfelde, M., Rubene, Z., Rutka, L., Strods, R., Tūbele, S., Ušča, S., Žogla, I. (2016). *Pusaudža fiziskā, emocionālā un sociālā līdzsvara attīstība iekļaujošajā izglītībā*. ISBN 978-9984-44-197-9. Rēzekne: Rēzeknes Tehnoloģiju akadēmija.

## Activity

Movements have been the driving force of evolution throughout human development, contributing not only to the development of the body but also of the psyche (Rubana, 2016). Physical activity is any type of body movement caused by skeletal muscles that consumes energy. Physical activity is characterised by low, high or medium intensity, duration, frequency, type and purpose. Physical activity is absolutely necessary for the maintenance of human health, because all human organ systems can function normally only if a person is physically active. The child needs to develop all physical characteristics (cardiorespiratory endurance for healthy heart; muscle strength for strong bones; flexibility for healthy joints; coordination). (Jansone, Fernāte, Bula –Biteniece, 2016)

Scientists have proved that there is a relationship between physical activity and cognitive (learning) abilities and learning success, because physical activity promotes brain functions: concentration, memory, verbal skills. Physically active children have better self-regulation of cognitive processes, which is expressed in the ability to set goals, plan, choose methods, use self-control and maintain attention. Studies show that physical activity has a positive effect on social development, behaviour, self-esteem, as well as emotional and cognitive development. (Rubana, 2016)

## References

1. Rubana, I.M. (2016). Fiziskās aktivitātes kā veselību sekmējošs factors sporta pedagoģijā. Krājumā *Sporta pedagoģija vakar, šodien, rīt*. Sastādītājas Jansone, R., Fernāte, A., Bula –Biteniece, I. Rīga: RaKa.
2. Jansone, R., Fernāte, A., Bula –Biteniece, I. (2016). *Sporta pedagoģija vakar, šodien, rīt*. Rīga: RaKa.

### 3<sup>rd</sup> BLOC: SOCIAL DEVELOPMENT

Children's readiness for school should be analysed as a whole, by assessing physical, intellectual, psychological readiness, as well as the child's social skills. Social skills are understood as the child's readiness to accept a new social environment, i.e. the role of the pupil. It is the child's attitude towards school and learning activities, towards teachers, peers and themselves. Children should know in advance that they will be among unknown children, that they will have to get used to spending some time without their parents, and that they will be required to have some independence. If necessary, it will be necessary to be able to ask for help, first of all from a completely foreign person - a class teacher. However, it must be understood that not all children are able to accept immediately the new environment and the new demands of the school.

A six-year-old child learns to understand what is good or bad, positive communication, learns to observe and distinguish emotions, connections, be aware of the consequences of actions and express emotions appropriate to the situation in everyday situations and practical activities. The child learns to tell about himself/herself, his/her feelings, to formulate and express his/her opinion. At the age of six, the child learns new social norms of expression, the role of emotions in the child's activities changes, emotional feelings develop, feelings become more conscious, general, less dependent on the situation, higher feelings are formed: moral, intellectual, aesthetic. (Makarevičs, 2008)

The child learns to interact with other children and adults. In various activities, the child forms the sense of belonging to a family, to a certain group. The child learns the safety rules that

must be followed inside and outside the educational institution, learns his/her way from home to the educational institution and does it together with parents. The child learns the norms of behaviour, learns to take care of his/her health and of the environment. He/she also learns information about healthy food. (VISC, 2011). All these things in general, ensure successful integration into the learning process at school.

School psychologists acknowledge that a six-year-old preschool child should be seen as a person in the process of change. There are periods in everyone's life when special help and understanding from others is needed, so that the tensions brought about by change do not stifle their belief in success, abilities and opportunities. The more ready the child is to accept the school system and its rules, the greater the readiness of the child as a whole. Many studies show that it is social, not intellectual, readiness that is the most important indicator of a child's success in the new life situation. (Vidnere, 2016)

Child's transition from pre-school to primary school is full of stress, as new demands appear, new skills are needed. This stage is difficult for children due to the new challenges. It is also complicated for parents because children need a lot of help to be able to meet these challenges and adapt to the new lifestyle.

Adults need to help children create healthy internal boundaries that will allow them to successfully meet the requirements, to defend themselves, to cooperate and communicate, and to be accountable for their actions, realizing that each action has its consequences.

Children around the age of 6 must already be able to do without the help of adults such things as getting dressed, must know and follow a number of existing rules. There must be rules and the child must follow them. In the future it will help him/her live with schoolmates, the teaching staff and not damage the school property. The child must be able to evaluate his/her actions. Discussing, inventing and following the rules is of great value in creating boundaries. Both when introducing new rules and when discussing their violation, it is important not to talk about prohibitions and violations, but about our feelings. If a child is allowed to take the initiative, for example, if one of the rules invented by the child is added to the list of common rules, it will make the child feel as a participant and he/she will not only responsibly perceive the rule he/she has invented, but he/she is also more likely to accept other rules too. (Zeļenko, 2016)

Before starting school, children must be able to behave politely. If such behaviour is not taught in the family, it may be too late to re-educate the child at this age. In any case, polite behaviour can significantly reduce the tension that can develop between the child and the teacher because of the teacher's perception or child's behaviour.

The child is still mainly dependent on adults, but at the age of seven the child must be able to be among others for a longer period of time, be able to communicate with people and also defend himself/herself. It is easier for a child who knows how to respect others, i.e. a child who has been respected by his/her parents, for example, the child has been allowed to defend himself/herself by answering "no" in case of necessity (Zeļenko, 2016).

### **Ability to organise oneself for work (self-directed learning)**

Self-directed learning is the ability to evaluate and organise one's own learning, it develops from the age of 3-4. As the child grows up, he/she implements and develops this skill, which will later help him/her to be productive in any area. Insufficient development of organisational skills is one of the specific signs of dyslexia, which should be addressed, because as early as in preschool it is possible to notice small children who constantly have difficulties in organising the materials and tools necessary for play. (Rīds, 2019)

The pupil will be able to actively participate in the process and manage his/her learning process well both in and out of school only if he/she has the skills to motivate himself/herself, plan his/her activities and evaluate his/her progress. If a child is able to motivate himself/herself to learn, manage his/her emotions, plan, analyse and evaluate his/her learning outcomes, the child has good self-directed learning skills. (Veenman *et al.*, 2004) Good self-directed learning skills, which are regularly used in the learning process, are the reason of up to 40% of learning achievements (Vanags, 2019).

A student is able to manage his/her learning process if he/she has the skills to manage his/her emotional, behavioural and thinking processes (e.g. attention, memory, problem-solving processes), not forgetting the skills to consciously analyse one's thinking and further learning activities. From preschool age, it is possible to develop self-directed learning skills by integrating such training in all areas where new knowledge and skills are being acquired (Vanags, 2019).

Self-directed learning is a key competence that children need to learn as quickly as possible (Council of the European Union, 2002; Dignath *et al.*, 2008), and it is one of the skill groups that are necessary to better achieve further educational and professional goals (Vanags, 2019).

Pupils who use self-directed learning skills are proactive in their learning efforts. They are aware of their strengths and weaknesses, they are guided by personal goals, and such learners use specific techniques related to the tasks (Zimmerman, 2002).

## References

1. Adams, M. J. (1995). *Beginning to Read: Thinking and Learning About Print*. Massachusetts: A Bradford Book.
2. Bethere, D. (2013). *Pārejas posms pirmsskola – pamatskola*. Rīga: RaKa.
3. Dignath, C., Buettner, G., & Langfeldt, H.-P. (2008). How can primary school students learn self-regulated learning strategies most effectively? *Educational Research Review*, 3(2), 101–129. Retrieved from <https://doi.org/10.1016/j.edurev.2008.02.003>
4. EU Council (2002). *Council resolution 27 June 2002 on lifelong learning*, in *Official Journal of the European Communities*, C 163, 09 July 2002. Retrieved from <https://publications.europa.eu/en/publication-detail/-/publication/ab179471-65eb-4c7b-b7d6-2d956a4fcc17/language-en>
5. Gorman, J. C. (2001). *Emotional Disorders & Learning Disabilities in the Elementary Classroom. Interactions and Interventions*. USA: Corwin Press, Inc.
6. Makarevičs, V. (2008). *Sešgadīgo bērnu psiholoģiskās īpatnības*. Pētījums metodisko materiālu “Obligātās pirmsskolas un sākumskolas izglītības izvērtējums un pilnveides iespējas” izstrādei. Retrieved from <https://www.izm.gov.lv/images/statistika/petijumi/09.pdf>
7. Snowling, M. (2004). *Dyslexia*. UK: Blacwell Publishing.
8. Tūbele, S. (2008). *Disleksija vai lasīšanas traucējumi*. Rīga: RaKa.
9. Vanags E., (2019). *Skola 2030*. Retrieved from <https://www.skola2030.lv/lv/jaunumi/6/pasvadita-macisanas-kas-tas-ir>

10. Veenman, M. V. J., Hesselink, R. D., Smeuwaegen, S., & Liem, S. I. E. (2014). *Assessing Developmental Differences in Metacognitive Skills With Computer Logfiles: Gender by Age Interactions*. Retrieved from [https://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=178355](https://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=178355)
11. VISC (2011). *Bērns sešu gadu vecumā: no rotaļām līdz mācībām*. Rīga: Valsts izglītības satura centrs.
12. Vidnere, M. (2016). Bērna psiholoģiskā gatavība skolai. Vecākiem. *Elektroniskais žurnāls pirmsskolas un skolas vecuma bērnu vecākiem*, 2016. gada 3. marts, Nr. 5 (66).
13. Zeļenko, A. M. (2016). Robežas 6–8 gadus veciem bērniem. Vecākiem. *Elektroniskais žurnāls pirmsskolas un skolas vecuma bērnu vecākiem*, 2016. gada 3. marts, Nr. 5 (66).
14. Zimmerman, B. J. (2002). Becoming a Self-Regulated Learner: An Overview. *Theory Into Practice*, 41(2), 64–70. Retrieved from [https://doi.org/10.1207/s15430421tip4102\\_2](https://doi.org/10.1207/s15430421tip4102_2)
15. Корнев, А. Н. (2003). *Нарушения чтения и письма у детей*. Санкт-Петербург: Речь.