

## **MEDICO - GEOGRAPHICAL ANALYSIS OF THE PREVALENCE OF THE SPECIFIC LANGUAGE IMPAIRMENT AMONG CHILDREN IN BULGARIA**

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**Neli Veselinova<sup>1</sup>**

**Liliya Yancheva-Velinova<sup>2</sup>**

<sup>1</sup> Sofia University, Department of Social and Economic Geography,  
Faculty of Geology and Geography, Sofia, **Bulgaria**

<sup>2</sup> South-West University "Neofit Rilski", Department of Speech therapy,  
Faculty of Public Health, Sofia, **Bulgaria**

### **ABSTRACT**

The development of cognitive sciences and in particular the language development of children has put on the agenda the issue of early diagnosis and intervention of language disorders. The aim of the article is to examine the frequency and prevalence of Specific Language impairment in Bulgaria and whether the specialists who support children are sufficient in quantity and quality. This goal is achieved by the detailed medical-geographical analysis of the prevalence of children's language impairments on the territory of the Republic of Bulgaria at NUTS III level for the period 2010-2020. The geographical analysis clearly shows the level of prevalence of language impairment among children by areas, accessibility to specialists, the presence or absence of policies to deal with the problem. It is very important for children with these specific needs and for the team of specialists to start working at the first markers of the impairment, because early diagnosis reduces the duration of therapy and further problems such as "Specific learning disability", "Dyslexia", "Dyspraxia", "Dysgraphia" and others. In Bulgaria, at the beginning of each school year, the Ministry of Education, as well as some private practices, provide free screening tests for children of preschool and school-age, which, however, does not always cover all children.

**Keywords:** Bulgaria, medico-geographical analysis, specific language impairments, screening

### **INTRODUCTION**

Medico-geographical research and analysis in the field of specific language impairments in children are of particular importance to determine the prevalence and where specialists are needed. Every child develops and learns the language differently and attention is needed, especially in cases when even a slight delay in speech development begins.

The XVIII century marked the beginning of the study of children's language by physicians and philosophers in Germany, and psycholinguistics gradually accumulated voluminous material. In the 1920s and 1930s, Jean Piaget's theory [2019, [22]] of cognitive development considered that "the main driver of language development is the adaptation of the child to the socialized way of thinking of the adult." [Tsenova, 2008, 181 p. [15]] The majority of children learn the language effortlessly and quickly and continue to do it during childhood and early adolescence. However, for about 7% of English-speaking children, this almost automatic language acquisition task does not follow a normal course. Specific language impairment (SLI) is a developmental disorder in which children lag

behind their peers in production and language comprehension for no apparent reason [Bishop, 1997, [17]]. SLI by definition is not secondary to factors that typically cause language problems, such as a local brain lesion or traumatic brain injury, hearing loss, or even environmental factors. In addition, in SLI, language problems occur without any other visible cognitive impairment, despite the relatively normal nonverbal intelligence. Therefore, SLI is diagnosed by its language specificity [Leonard, 1998, [19]].

Timely intervention is a key factor in bridging the lagging in the language formation and if the family has the necessary information to access specialists at national, regional, and municipal levels, the child has a chance for normal development and prevention of further impairments. Therefore, medical geography could help a lot in terms of providing specialists, clarifying the factors that would have an impact, and others.

## **THEORY AND METHODOLOGY**

In the theory of psycholinguistics two directions are emerging: the formalists [Chomsky, N., [18]], who speak of innate language ability mainly in linguistic universals, and the functionalists [Snow, C. E, M. Tomasello, DI Slobin, Bates, E., MacWhinney, [23], [24], [16]], who believe that language is mastered through learning. In the second half of the XX century in the field of psychology in neurology and psychiatry transferred the associative model of brain function, according to which "large-scale networks in the human brain are dedicated to specific functions such as language, face and object recognition, behavior, visual-spatial sense, spatial attention, memory and emotions [Mesulam, 2000, [20]; Kolev, 2019, 23 p., [6]]. There is still no single theory that fully explains the formation of language, and it is probably a combination of all of them.

The object of the study is children in the age range 0 -19 years in the Republic of Bulgaria, who show specific language impairments. In view of the volume constraints, the causes of language impairments will not be analyzed.

The purpose of this report is to analyze the medical-geographical situation in the frequency and prevalence of the specific language impairments in children in the country and at the district level and to pay attention to the small number of specialists who help the children.

Methods which are used are many. The descriptive is one of the most important. The medical-geographical description is a description of a certain territory with the necessary data on the natural, economic-geographical, medical-sanitary conditions and their influence on the human health condition and the spread of various diseases.

Other methods are historical, statistical, cartographic, method of analysis, and synthesis. Children are divided by the age factor of preschool and school-age, as at the end of the fifth year is considered completed the process of normal language development and by the beginning of first grade for most of them, it is overcome. When for one or another reason this does not happen, children develop secondary impairments such as dyslexia, dysgraphia and fall into another group of disorders.

For the present study, official data is taken from the National Statistical Institute and the Ministry of Education of the Republic of Bulgaria for the period 2010 - 2020 for children diagnosed with "Specific language impairments" and in that year were treated by specialists from the ministry. Data on children who visit private centers and organizations are not included here, as there are no statistics on this, and most of the children would be duplicated.

Geographers Veselinova [2021, [3]], Dimov and Angelova [2009, [5]], Boyadzhiev [2009, [1], 2011, [2]], Patarchanov [2011, [9]], Patarchanova [2010, [10]] and others pay

attention to issues related to the theoretical foundations of medical geography [Veselinova, 2021, [3]], the application of some spatial models in medical and geographical research [Patarchanov, 2011, [9]], the spread of various diseases in Bulgaria [Boyadzhiev, 2011, [2]], medical geography of Italy [Boyadzhiev, 2009, [1]] and others. Patarchanova works on issues related to human health and the environment [2010, [10]]. Veselinova [2021, [4]] also considers the problems related to medical-geographical cohesion.

The relationship between the quality of environmental components and human health has been studied by Staneva et al. [2016, [12], 2016, [14]]. The impact of geopathogenic zones on child development and learning abilities has been studied by Staneva and Marinov [2012, [11], 2015, [13]].

## **RESULTS AND DISCUSSION**

The population of the Republic of Bulgaria has been steadily declining since 1989, according to national censuses conducted in 1992, 2001, 2011, 2021.

Table № 1 shows the total number of children with specific language impairments and the total number of speech therapists, in Bulgaria and by district, for three selected years - 2010, 2015, 2020. The review is for a ten-year period, between two censuses in the country after the beginning of its membership in the European Union.

The presented data show that the age group 0-19 years decreased by 104 700 people for the period. The districts of Varna, Plovdiv, and Sofia have an increase in children by 594 people, 359 people, 28,317 people. In all other districts, their number is significantly reduced. The reasons for this decrease are many, but some of the main ones are the aging population and the high level of emigration of young people to the big cities of the country and abroad.

The number of speech therapists has increased significantly - almost 3.5 times or 246.25%. This suggests that with the reduction of children and the increase in the number of specialists, there will be more than the necessary time to work with children with specific language impairments. In 2020, the statistics report a low number of specialists in the districts of Razgrad, Kardzhali, Gabrovo, Vidin, Lovech, Kyustendil, Montana. The best-provided districts with speech therapists are the districts of Sofia - city, Varna, Plovdiv, Blagoevgrad, Burgas.

After the democratic changes in Bulgaria (1989), the deinstitutionalization of work for children with impairments began, which led to the establishment of small centers with specialists. These are the regional resource centers and the speech therapy centers in the cities of Sofia and Varna. Children with developmental problems have been served by auxiliary schools and specialized kindergartens, which are very few. Speech therapy centers in Sofia and Varna at that time were the only ones to offer services outside these institutions, in which children with specific language impairments fall. According to Mikhailova and Mitova: "Like any change in values, change in the broadest sense of the word is slower and more difficult. It still faces barriers in the thinking of some people, including politicians and managers. [Mikhailova [2010], [8]; Mitova [2016], [7]].

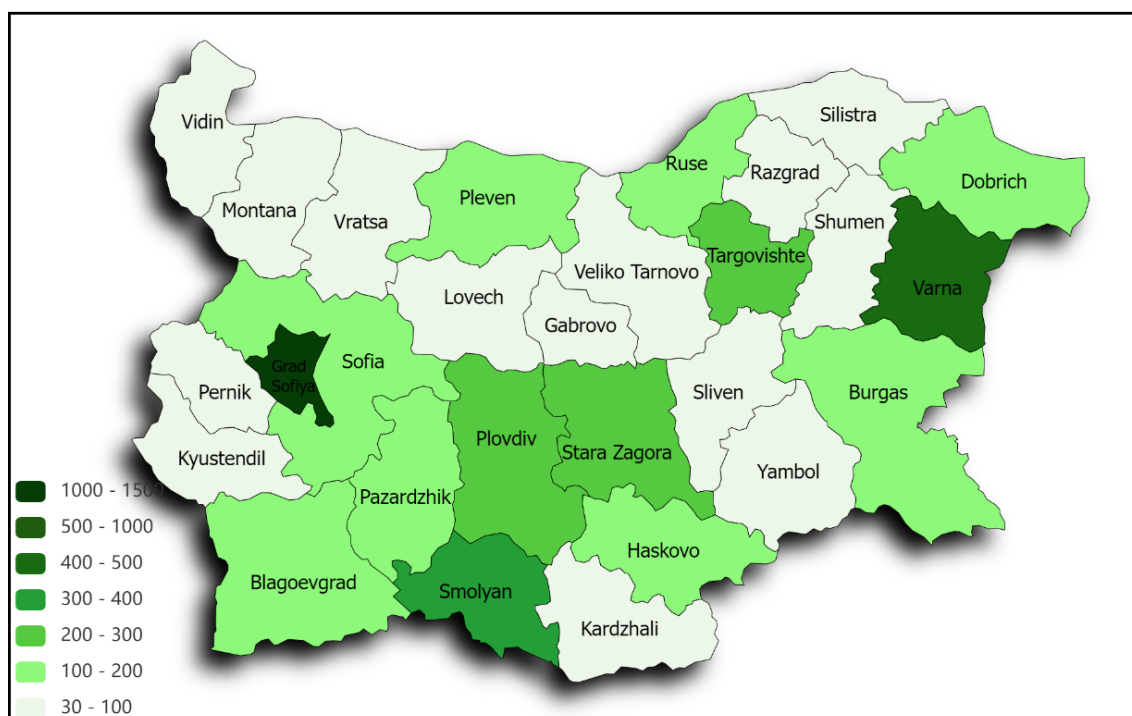
Tabl. № 1  
Number of children with specific language impairments and speech therapists by districts in Bulgaria, 2020

Year/Country	2010-2011						2015-2016						2019-2020					
	Population 0 - 19 years	Specific Language impairment Preschool age	Specific Language impairment School age	Speech therapists	Children per 1 speech therapist	Population 0 - 19 years	Specific Language impairment Preschool age	Specific Language impairment School age	Speech therapists	Children per 1 speech therapist	Population 0 - 19 years	Specific Language impairment Preschool age	Specific Language impairment School age	Speech therapists	Children per 1 speech therapist			
Bulgaria	1417952	1183	1650	240	11,80416667	1311257	1664	2049	465	7,9849462	1313252	2362	2704	831	6,0962696			
Blagoevgrad	65503	40	94	28	4,785714286	58947	28	70	30	3,2666667	58264	39	86	42	2,9761905			
Burgas	85581	45	97	12	11,83333333	82247	57	129	32	5,8125	83239	63	103	38	4,3684211			
Varna	92749	163	85	4	62	91129	283	110	49	8,0204082	93343	361	321	85	8,0235294			
Veliko Tarnovo	45799	29	59	14	6,285714286	40971	6	100	16	6,625	39366	16	75	26	3,5			
Vidin	18125	4	45	9	5,444444444	14779	16	22	10	3,8	13396	22	39	10	6,1			
Vratsa	37291	9	19	7	4	31203	10	48	12	4,8333333	29408	7	32	25	1,56			
Gabrovo	20818	19	21	6	6,666666667	17242	24	42	7	9,4285714	16468	19	23	9	4,6666667			
Dobrich	38315	12	23	8	4,375	33679	12	30	15	2,8	32182	45	56	19	5,3157895			
Kardzhali	31862	4	17	4	5,25	27694	8	31	6	6,5	29246	23	44	7	9,5714286			
Kyustendil	23831	6	54	7	8,571428571	19758	20	100	5	24	18835	21	68	11	8,0909091			
Lovech	27837	7	31	8	4,75	23280	10	33	7	6,1428571	22157	14	34	11	4,3636364			
Montana	28271	32	104	4	34	24653	14	53	9	7,4444444	22968	5	33	12	3,1666667			
Pazardzhik	59057	22	57	8	9,875	51765	68	75	13	11	50545	80	74	27	5,7037037			
Pernik	21379	13	27	2	20	19573	14	26	7	5,7142857	19632	40	51	12	7,5833333			
Pleven	53393	30	82	9	12,44444444	45158	46	95	9	15,6666667	43632	74	78	27	5,6296296			
Plovdiv	128903	83	94	19	9,315789474	124777	81	119	16	12,5	129262	99	150	43	5,7906977			
Razgrad	26896	8	32	1	40	21805	7	26	7	4,7142857	20215	9	31	7	5,7142857			
Ruse	42723	37	74	8	13,875	37437	43	29	9	8	36344	55	52	12	8,9166667			
Silistra	24128	16	29	4	11,25	20376	47	84	10	13,1	19659	50	46	16	6			
Sliven	48293	13	23	5	7,2	44953	29	26	0	0	44511	41	43	17	4,9411765			
Smolyan	21072	70	145	6	35,83333333	17140	103	102	6	34,1666667	15652	173	169	23	14,869565			
Sofia - city	223140	428	174	32	18,8125	235634	559	327	120	7,3833333	251457	788	502	219	5,890411			
Sofia - Province	46412	3	60	8	7,875	42667	32	93	12	10,416667	42687	33	129	20	8,1			
Stara Zagora	66694	25	79	10	10,4	61220	28	112	14	10	61473	73	142	24	8,9583333			
Targovishte	26939	16	39	4	13,75	22455	47	51	3	32,6666667	21505	99	157	14	18,285714			
Khaskovo	47234	24	32	3	18,66666667	43758	33	58	20	4,55	42668	45	68	29	3,8965517			
Shumen	39343	16	36	5	10,4	33308	16	29	17	2,6470588	31858	25	64	32	2,78125			
Yambol	26364	9	18	5	5,4	23649	23	29	4	13	23280	43	34	14	5,5			

Source: National statistical institute; Ministry of health

Data for some districts in the table show very few children with specific language impairments. It remains doubtful that a large proportion of children with such disorders have not been diagnosed and registered by speech therapists in the country. In some districts, such as Razgrad and Kardzhali, for some children, the mother language is not Bulgarian. These children do not fall into the clinical picture of the specific language impairments as a primary impairment.

The attached mapscheme shows the number of children with specific language impairments in districts in Bulgaria for 2020. The highest number of children is reported in the large regional centers, while the lowest number is observed in the border areas that are depopulated, areas with an aging population and deteriorating economic profiles. A complete change is needed in the early diagnosis of children with specific language impairments. It is very important for parents with lower education to be covered by the relevant structures, to be aware of the early signs of the impairments and where they can get the necessary help and understanding.



**Figure 1.** Mapscheme of the number of children with specific language impairments by districts in Bulgaria, 2020. Source: National statistical institute; Ministry of health

## CONCLUSION

Early diagnosis and initiation of speech-enhancing therapy are very important when there is a need to work with children with specific language impairments. The number of speech therapists, which work with children with impairments, is of great importance. The fewer children are allocated to an average speech therapist, the more time and resources the specialist will be able to devote to each child. Often children do not have individual therapy but are included in the programs of small groups, which do not always meet the individual needs of children. At the same time, speech therapists have therapeutic sessions once a week, and in some more severe cases or temporary absence of another child - twice a week, which is insufficient. Improvements are needed in the relation to the collection of data on children with language impairments. This includes families who decide to visit

a private speech therapist and do not register with the speech therapy center of the specific district and municipality where they live. Private speech therapists are not obliged to submit a number of children with language impairments to the Ministry of Health, the Ministry of Education and Science. In this way, the data are distorted, and the frequency of specific language impairments is in fact higher.

Medico-geographical analyzes are of particular help. In practice, they show the need for specialists and where it is necessary to focus efforts to improve the medical and geographical situation in a particular area.

## REFERENCES

- [1] Бояджиев, В. (2009) Медицинската география в Италия. Сб. Доклади, Симпозиум „Природа-здраве“, Българско дружество по медицинска география, Издателство на Съюза на учените в България, С.; Boyadzhiev, V. (2009) Meditsinskata geografiya v Italiya. Sb. Dokladi, Simpozium „Priroda-zdrave“, Bŭlgarsko druzhestvo po meditsinska geografiya, Izdatelstvo na Sŭyuza na uchenite v Bŭlgariya, S.
- [2] Бояджиев, В. (2011) Географска характеристика на туберкулозното заболяване сред донаторниците и сроднослужещите в армията в годините преди Балканската война. Сб. Доклади VIII национален конгрес по медицинска география с международно участие, Българско дружество по медицинска география, С.; Boyadzhiev, V. (2011) Geografska kharakteristika na tuberkuloznoto zabolyavane sred donabornitsite i srochnosluzhashtite v armiyata v godinite predi Balkanskata voŭna. Sb. Dokladi VIII natsionalen kongres po meditsinska geografiya s mezhdunarodno uchastie, Bŭlgarsko druzhestvo po meditsinska geografiya, S.
- [3] Веселинова, Н. (2021) Медицинската география – постижения и надежди. С.; Veselinova, N. (2021) Meditsinskata geografiya – postizheniya i nadezhdi. S.
- [4] Веселинова, Н. (2021) Медико-географската кохезия в България. Устойчиво развитие и социално-икономическа кохезия през XXI век – тенденции и предизвикателства, т. 2, издателство: Академично издателство „Ценов“ Свищов, стр.:335-342, ISSN (print):978-954-23-2069-2, ISSN (online):978-954-23-2070-8; Veselinova, N., (2021) Mediko-geografskata kokheziya v Bŭlgariya. Ustoŭchivo razvitie i sotsialno-ikonomicheiska kokheziya prez XXI vek – tendentsii i predizvikatelstva, t. 2, izdatelstvo: Akademichno izdatelstvo „Tsenov“ Svishtov, str.:335-342, ISSN (print):978-954-23-2069-2, ISSN (online):978-954-23-2070-8
- [5] Димов, Н., В. Ангелова. (2009) Затлъстяването на населението в Европа: регионален анализ и тенденции. Сб. Доклади, Симпозиум „Природа-здраве“, Българско дружество по медицинска география, Издателство на Съюза на учените в България, С.; Dimov, N., V. Angelova. (2009) Zatlŭstyavaneto na naselenieto v Evropa: regionalen analiz i tendentsii. Sb. Dokladi, Simpozium „Priroda-zdrave“, Bŭlgarsko druzhestvo po meditsinska geografiya, Izdatelstvo na Sŭyuza na uchenite v Bŭlgariya, S.
- [6] Колев, Д. (2019) Атлас Поведенческа и Когнитивна невроанатомия ISBN: 978-619-188-225-0; Kolev, D. (2019) Atlas Povedencheska i Kognitivna nevroanatomya ISBN: 978-619-188-225-0
- [7] Митова Ек. (2016) Ролята на екипа в преодоляване на медико-социални проблеми на лицата с умствена изостаналост живеещи в ЦНСТ”, списание „Асклепий” ISSN: 1310-0637; Mitova Ek. (2016) Rolyata na ekipa v preodolyavane na mediko-sotsialni problemi na litsata s umstvena izostanalost zhiveeshiti v TSNST”, spisanie „Asklepiŭ” ISSN: 1310-0637
- [8] Михайлова, Д., Р. Попова (2010) Опитът на България в процеса на деинституционализация и децентрализация на социалните услуги и ролята на

- гражданския сектор като инициатор и доставчик, Сдружение „Знание“ гр. Ловеч, 2010 г. по проект: “Partners for social societies” project under IPA Strengthening Serbia-EU Civil Society Dialogue (Reference: Europe Aid / 129362/L/ACT/RS Grand contract: 2010/243-468); Mikhaïlova, D., R. Popova (2010) Oпитüt na Bŭlgariya v protsesa na deinstitutionalizatsiya i detsentralizatsiya na sotsialnite usluzhi i rolyata na grazhdanskiya sektor kato initsiator i dostavchik, Sdruzhenie „Znanie“ gr. Lovech, 2010 g. po projekt: “Partners for social societies” project under IPA Strengthening Serbia-EU Civil Society Dialogue (Reference: Europe Aid / 129362/L/ACT/RS Grand contract: 2010/243-468)
- [9] Патарчанов, Пл. (2011) За приложението на някои пространствени модели в медико-географските изследвания. Сб. Доклади VIII национален конгрес по медицинска география с международно участие, Българско дружество по медицинска география, С.; Patarchanov, Pl. (2011) On the application of some spatial models in medical geographic research. Sat Papers VIII National Congress of Medical Geography with International Participation, Bulgarian Society of Medical Geography, S.
- [10] Патарчанова, Ем. (2010) Географска среда - алтернативен туризъм - човешко здраве: една добра практика. Сб. Доклади VIII национален конгрес по медицинска география с международно участие, Българско дружество по медицинска география, С.; Patarchanova, Em. (2010) Geografska sreda - alternativen turizŭm - choveshko zdrave: edna dobra praktika. Sb. Dokladi VIII natsionalen kongres po meditsinska geografiya s mezhdunarodno uchestie, Bŭlgarsko druzhestvo po meditsinska geografiya, S.
- [11] Станева, К., Маринов, Е. (2012). Влияние на геопатогенните зони върху детското развитие. Специална педагогика, № 1, 34-42.; Staneva, K., Marinov, E. (2012). Vliyanie na geopatogennite zoni vŭrkhu det'skoto razvitie. Spetsialna pedagogika, № 1, 34-42.
- [12] Станева, К., Маринов, Е. (2016). Приложение на антропометричните показатели като индикатор за екологично замърсяване. Издателски комплекс на НВУ „Васил Левски”, 169-178. ISSN 2367-7481.; Staneva, K., Marinov, E. (2016). Prilozhenie na antropometrichnite pokazateli kato indikator za ekologichno zamŭrsyavane. Izdatelski kompleks na NVU „Vasil Levski”, 169-178. ISSN 2367-7481.
- [13] Станева, К., Маринов, Е., Маринов, М. (2015). Скрининг на геопатогенни зони – възможности и решения за неутрализирането им. Геология и минерални ресурси, ISSN 1310-2265, 7, 32-35.; Staneva, K., Marinov, E., Marinov, M. (2015). Skrining na geopatogenni zoni – vŭzmozhnosti i resheniya za neutraliziraneto im. Geologiya i mineralni resursi, ISSN 1310-2265, 7, 32-35.
- [14] Станева, К., Цветкова, Е. (2016). Геомедицински предпоставки за повишаване качеството на живот в трансграничен район България – Сърбия. Сп. Управление и устойчиво развитие, ЛТУ, 18, vol. 54, 41-47. ISSN 1311-4506.; Staneva, K., Tsvetkova, E. (2016). Geomeditsinski predpostavki za povishavane kachestvoto na zhivot v transgranichen raion Bŭlgariya – Sŭrbiya. Sp. Upravlenie i ustoichivo razvitie, LTU, 18, vol. 54, 41-47. ISSN 1311-4506.
- [15] Ценова, Цв. (2008) Основи на Логопедията. София; Tsenova, Tsv. (2008) Osnovi na Logopediyata. Sofiya
- [16] Bates, E., MacWhinney, B. (1982) Functionalist Approach to Grammar. In E. Wanner & L.R. Gleitman (Eds.) Language Acquisition: The State of the Art (pp. 173–218). Cambridge, CUP
- [17] Bishop, D. (1997). Uncommon understanding: Comprehension in specific language impairment. Hove: Psychology Press
- [18] Chomsky, N. (1965) Aspects of the Theory of Syntax. Cambridge, Mass.
- [19] Leonard, L. (1998). Children with specific language impairment. Cambridge, Mass.: MIT Press.

- [20] Mesulam M. (2005) Imaging connectivity in the human cerebral cortex: the next frontier? *Annals of Neurology*, 57: 5e7
- [21] O'Grady, W. (2005). *How children learn language*. Cambridge University Press
- [22] Piaget, J. (2019) *The Child's Conception of the World*. ISBN 9786197037159
- [23] Snow, C.E. (1979) The role of social interaction in language acquisition. In: A. Collins (ed.). *Children's language and communication: 12th Minnesota Symposium on Child Psychology*. Hillsdale, NJ: Erlbaum
- [24] Tomasello, M., D.I. Slobin (Eds.) (2005) *Beyond nature-nurture: essays in honor of Elizabeth Bates*. Mahwah, NJ: Lawrence Erlbaum.
- [25] Yancheva-Velinova, L., Mitova, E. (2020). Frequency and prevalence of the specific language disorder in bulgarian children of preschool age. *KNOWLEDGE - International Journal*, 43(4), 819–824. Retrieved from <https://ikm.mk/ojs/index.php/kij/article/view/462> (05.02.2022; 12:30)
- [26] <https://paintmaps.com/>(08.02.2022; 17:20)
- [27] <https://nsi.bg/bg> (08.02.2022; 17:20)
- [28] <https://mon.bg/>(07.02.2022; 19:30)
- [29] <https://www.mh.government.bg/bg/>(05.02.2022; 07:40)