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The Relationship Between Cognitive Flexibility, Bilingualism and Language Production: Evidence from Narrative Abilities in Senior Preschoolers from the Republic of Sakha (Yakutia)

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Abstract. Bilingualism remains one of the key agents of influence on cognitive and language development of a child. Recently, this phenomenon became the focus of research attention. On the one hand, it can be explained by the active migration processes occurring on a global level. On the other hand, the influence of bilingualism over children's cognitive and language development is still quite a divisive issue. This study is aimed to explore, which phenomenon is more associ-ated with the language development, — the fact of a child's bilingualism or his/her level of execu-tive functions development. 380 children from a bilingual Russian region participated in this re-search. The final sample consisted of 279 6—7-year-old subjects without deviations in their cogni-tive and language development. There were 181 monolingual children and 98 bilinguals. Age, gender and non-verbal intelligence were controlled. Average age equaled to 6.65 years (SD = 0.37). The study demonstrated that the differences revealed in the language development of mono- and bilingual children were related mostly to lexical and grammatical aspects and didn't intervene with the macrostructure of the narrative. In regard to the influence of executive functions, the role of cognitive flexibility turned out to be an essential element from the perspective of the difference in mono- and bilingual children's language development. As a whole, the study results allow drawing

a conclusion that the development of cognitive flexibility contributes to a more efficient simultaneous mastering of two languages.

Keywords: narratives, bilingualism, language development, narrative's microstructure, narrative's macrostructure, executive functions, preschool age

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Взаимосвязь между когнитивной гибкостью, билингвизмом и порождением речи на материале нарративов старших дошкольников из Республики Саха (Якутия)

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Аннотация. Билингвизм остается одним из ключевых факторов, влияющих на когнитивное и языковое развитие ребенка. В последнее время это явление стало объектом пристального

внимания исследователей. С одной стороны, это можно объяснить активными миграционными процессами, происходящими на глобальном уровне. С другой стороны, влияние двуязычия на когнитивное и языковое развитие детей по-прежнему вызывает разногласия: насколько оно сильно и можно ли нивелировать отрицательное влияние билингвизма. Данное исследование направлено на изучение того, какой фактор больше связан с языковым развитием — факт двуязычия ребенка или уровень развития его регуляторных функций. В исследовании приняли участие 380 детей из двуязычного региона России. В окончательную выборку вошли 279 испытуемых в возрасте 6—7 лет без отклонений в когнитивном и языковом развитии. Респондентами стали 181 ребенок русскоязычный монолиингв и 98 русско-якутских билингвов. Факторы возраста, пола и невербального интеллекта также учитывались. Средний возраст детей составил 6,65 года (SD = 0,37). Исследование показало, что выявленные различия в языковом развитии одно- и двуязычных детей были связаны в основном с лексико-грамматическими аспектами и не влияли на макроструктуру нарратива. Что касается влияния регуляторных функций, роль когнитивной гибкости оказалась более важным элементом с точки зрения разницы в языковом развитии одно- и двуязычных детей. В целом результаты исследования позволяют сделать вывод о том, что развитие когнитивной гибкости способствует более эффективному одновременному овладению двумя языками.

Ключевые слова: нарративы, билингвизм, развитие речи, микроструктура нарратива, макроструктура нарратива, регуляторные функции, дошкольный возраст

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Introduction

Both the topic of the mutual influence of executive functions (EF) and language development, and the effect of bilingualism on children's speech and cognitive development, are of the utmost interest for contemporary psychology of education [1; 2]. The strongest results were obtained for the association of children's working memory (especially the verbal one) and language development [3; 4]. Some less obvious out-come was delivered on the effect of other components of executive functions, such as inhibition control and cognitive flexibility [5; 6].

Researchers focus on looking for specific factors that have a positive impact on the development of executive functions and speech development. Many phenomena may serve as such factors, for example, the features of the development of the emotional sphere affect the development of speech [7], and certain features and types of children's games are positively associated with the development of components of regulatory functions [8; 9].

At the same time, the question remains open as to whether there are any factors showing a negative impact on the development of self-regulation and speech in children. Even though bilingualism becomes a more and more influential factor for the entire system of preschool and junior school education [10], its effect on the language development within each mastered language remains a complex and yet, unsolved is-sue [11; 12]. For example, there is multiple data confirming the negative effect of bilingualism on vocabulary volume [11], but its relationship with other characteristics is still debatable [12]. Besides, it is important to keep in mind the diversity of bilingual-ism, in particular, when a child masters two languages belonging to different types and language families, for example, Russian and Yakut. Russian is a synthetic language where nouns, adjectives and verbs have three genders in the past tense [13]. Meanwhile, Yakut is an agglutinative language, and its grammar contains no category of gender whatsoever [14]. Therefore, due to these specifics, Russian-Yakut bilinguals often make mistakes in the agreement in gender when speaking Russian.

The Republic of Sakha (Yakutia) is a region of the Russian Federation where two languages, Russian and Yakut, coexist on the official level. Both communication and education is executed in two languages in a more or less equal proportion. Thus, in 32 kindergartens of the Republic there are both Russian-speaking and Yakut-speaking groups [15]. Capital residents have a slight preference for Russian, when in peripheral settlements (uluses) there are more monolinguals, speaking Yakut only. There are also kindergarten groups where children and adults prefer this or that language, along with totally bilingual groups, where everyone uses both languages.

The influence of bilingualism on executive functions

The influence of bilingualism on different EF was repeatedly studied by multiple researchers [16—18]. However, even our systematic review [18] demonstrated that this evidence is quite controversial, and more research is necessary in this area in order to clarify the conditions under which those effects show themselves. In general, there are both studies where bilinguals demonstrated better performance in cognitive flexibility and attention shifting [16], and where there was no difference at all [17]. We considered it important to include this aspect in our study, in order to ascertain the nature of this relationship.

Relationship of bilingualism and language development

The influence of bilingualism on language development was studied both in children with normal development, and the ones with different deviations [11; 12].

The outcome was also ambiguous. Generally speaking, one can claim that in children with developmental deviations, bilingualism often caused a negative effect on language development. We assume that the source of these ambiguous results lies in the extent of the difference of the languages mastered by the child, and with the aspect of language under study.

It has been proven that children narratives' analysis is a very precise language assessment tool for bilinguals [19]. It is common to distinguish macro- and microstructure in narratives [20, 21]. The macrostructure includes general narrative parameters, narrative structure when the microstructure covers lexical, grammatical, and syntactic specifics of speech [21]. According to previous research of narratives in bilingual children [21—24], switching between languages will affect in the first hand the volume of a child's vocabulary, as well as his/her grammar and syntax (in case those two vary a lot from language to language). At the same time, general ability to build narratives with a certain structure doesn't depend on the presence of bilingualism, as it undergoes the same process independently from the language.

Relationship of language development and executive functions

The relationship of executive functions (EF) and language development often became of research interest, both in children with typical and atypical development and showed the strong relationships between these indicators [25—27]. Yet, it is important to point out that in the majority of such works mainly vocabulary and syntactical assessments were taken into consideration in order to estimate the language development [25; 27; 28]. Working memory as one of EF components showed the best connection with language development [26]. Furthermore, some evidence was obtained as well, regarding the association of the language development with cognitive flexibility and inhibitory control [5; 6] or with several components of EF [25; 27]. Besides, it was shown that verbal abilities had a significant effect on the development of regulatory functions in preschool children [29].

Previously, we studied the intercorrelation of EF and narratives using the narratives by monolingual children from other region of Russia [30, 31]. The analysis demonstrated, that in general, the level of proficiency of working memory was highly and stably correlated with the narrative macrostructure parameters; when verbal working memory was in particular connected with lexical and grammatical specifics of children's language. In regard to cognitive flexibility, the results revealed that there was a strong correlation between it and macrostructure indicators of narrative production whereas there were much fewer microstructure indicators that have correlations with cognitive flexibility. The children who were able to complete the most difficult task of DCCS method (with borders), showed better results in narrative production [32]. It is also of importance, that above mentioned research did not include the effect of bilingualism, and this is why we consider it as a crucial variable in the current study.

Aims and Hypotheses

The goal of this study was to reveal the influence of both bilingualism and executive functions on the language development of 6—7-year-old children. The results of literature review and our previous research works allowed us making the following hypotheses:

1) Mono- and bilinguals demonstrate significant difference in the level of development of language and executive functions.

2) Advanced level of development of executive functions can counter-balance possible negative influence of bilingualism on the language development of preschool children. We expect cognitive flexibility to cause the highest compensating effect, comparing to the well-developed working memory (visual and audio-verbal) and inhibitory control.

Materials and Methods

Participants

Total sample for this study consisted of 380 participants. The data of 101 children was excluded from the analysis (see Data analysis for more details). The final sample size equaled to 279 6—7-year-old children with no cognitive or language development deviations (M = 6.65; SD = 0.37). There were 145 female and 134 male participants, all from the kindergartens of the Republic of Sakha (Yakutia). All subjects were divided in two groups. The first was monolingual (n = 181), i.e. consisted of children who, ac-cording to the educators' reports, spoke Russian only, and the educator spoke Russian to them as well. The second group was bilingual (n = 98); the children spoke Russian and Yakut, and the educator also addressed them in both languages.

Measures

Executive functions Assessment

Four subtests were used to assess different aspects of executive functions.

The subtest "Sentences Repetition" [33] aimed to assess verbal working memory. The child can receive from 0 to 34 points on it. The subtest "Memory for Designs" [33] aimed to assess visual working memory. There were four measurements available for children's visual working memory: a content score, a spatial score, a bonus score, and a total score (sum of previous three scores), in accordance with the NEPSY-II battery description.

The subtest "Inhibition" [33] aimed to assess inhibitory control as a component of executive functions which is the children's ability to inhibit automatized cognitive reactions. If there are no errors, the child receives two points for each five-second time interval; if there is one error, the child receives one point and 0 if there are two or more errors. The maximum number of points is 30.

The Dimensional Change Card Sort [34] is assessment of shifting or cognitive flexibility. DCCS implies children's sorting cards by different rules. One point is awarded for each correct sorting (the maximum of points is 24). Later each subtest was processed in accordance with the technique instruction [30].

Afterwards, a total score was calculated for each subtest, and it reflected the general level of development of a particular component of self-regulation system. For example, for the working memory subtest there was a "Total" score and the "Content", "Spatial", and "Bonus" scores. For audio-verbal memory subtest there was just the "Total score". Inhibitory control subtest had a total "Naming" score for all the tasks series with different stimuli, and a total "Inhibition" score, also for all the series. Physical inhibitory control subtest ("hot self-regulation") had a "Total" score and different measures for the mistakes of all types: "Movements", "Eye opening", and "Sounds". For the last subtest, the one for cognitive flexibility, there was also a "Total" score and the measures for each sorting stage "Shape", "Form", and "With shifting".

Language development assessment

We used elicited narratives for the assessment of language development. This technique is considered the most ecological [20; 21], because it allows taking into account not only the lexical and grammatical indicators of the child's language, but also his/her ability to compose structured coherent speech. However, despite all the advantages of this technique, the approaches to the collection, assessment, and the processing of narratives may still vary. In particular, the methods of the assessment of narratives, mostly applied in Russian psychology, include the following parameters: semantic completeness, semantic adequacy A and B [35], narrative type [36], and narrative structure [37]. In their aggregate, they represent the narrative macrostructure and lexico-grammatical parameters (lexical, grammatical and syntactical accuracy) that form the microstructure [31].

In the framework of the current study, we also distinguished complex parameters: 1) Narrative macrostructure that included semantic adequacy A and B, semantic completeness, narrative type, and narrative structure; and 2) Narrative microstructure (lexical, grammatical and syntactical accuracy).

In order to obtain more precise results, we used all types of elicited narratives: re-telling ("The jackdaw and the pigeons"), storytelling based on a single picture ("A broken cup"), and storytelling based on a series of pictures ("The cat and the dog"). All types of narratives were analyzed by the above listed parameters. All children were consequently presented with a picture, a series of pictures, and a story to be retold. All the narratives were recorded, and later these materials were written out by specially trained staff.

Strategy of Data Analysis

On the first stage, the initial sample of 380 6—7-year-old participants was reduced. We had to exclude the data of monolingual Yakut-speaking children (n = 101), as there was a possibility of misunderstanding the instructions, given that all the techniques were presented in Russian.

To confirm the first hypothesis, we used the method of comparison of averages for bi- and monolingual children by means of t-Student test and Mann–Whitney U test. The first test was used for cognitive flexibility "Total" score and "Shifting" score; for audio-verbal "Total" score, and some linguistic variables: semantic completeness, number of words, and macro- and microstructure (general). The second test was applied to the number of cognitive flexibility mistakes in "Color" and "Shape" category; inhibition (naming and inhibition), physical inhibitory control, visual working memory, and the rest of linguistic variables: semantic adequacy A and B, narrative type, narrative structure, and lexical, grammatical and syntactical accuracy.

We used HCA in order to verify the second hypothesis. It allowed finding the optimal number of clusters in the EF development. Then we applied k-means clustering to define the groups with different levels of development of 1) cognitive flexibility; 2) working memory (visual and audio-verbal), and 3) inhibition.

Results

Differences in the Development of EF and Oral Language in Bilingual and Monolingual Preschoolers

Our first assumption, that there was a significant difference in language development and executive functions of mono- and bilingual children, was verified through the comparison of averages (T-Student test and Mann—Whitney U test for independent samples). The following results were obtained for the relationship of self-regulation parameters. There were significant differences in audio-verbal memory of bi- and monolingual children, to the advantage of the latter ($t = 5.046$; $p = 0.000$). It meant that audio-verbal memory of bilingual respondents was less developed. In case of inhibitory control, the opposite significant differences were discovered, i.e., bilingual children had it on more advanced level (for the "Total" score, $U = 6744.500$; $p = 0.024$). The number of mistakes in that subtest also differed significantly: monolinguals made some sounds more often, even though the instruction to the task clearly prohibited it ($U = 5576.500$, $p = 0.001$). It can be explained with the fact that bilinguals have better skills of "hot" self-regulation. However, this conclusion is way too far-fetched, and clearly needs to be double-checked on a larger sample.

The next step was to analyze the differences between mono- and bilingual children in the level of their language development. Bilinguals demonstrated significantly lower score in all aspects of general narrative microstructure: lexical ($U = 2354.0$, $p = 0.001$), grammatical ($U = 1738.5$, $p = 0.0001$), and syntactical ($U = 2190.5$, $p = 0.0001$) accuracy. No significant difference was registered for narrative macrostructure. Thus, there were significant differences in bi- and monolingual children only with respect to lexical and grammatical accuracy of speech.

Language development in Bilinguals with High Level of Executive Functions

In our second hypothesis we assumed that bilinguals with advanced executive functions have the same level of language development as monolinguals.

Language development in Bilinguals with High Level of Cognitive Flexibility

We verified the second hypothesis regarding cognitive flexibility. For this, we de-fined the optimal number of clusters describing the values of cognitive flexibility, through hierarchic clustering. Two came out to be the best number. Next, we divided the whole sample in two groups by means of k-means clustering (medium and high level of development of cognitive flexibility, correspondingly). Significant difference between these two groups existed only for the following two parameters (T-Student test): "Total" score for cognitive flexibility (Total score Sorting: $t = -14.781$; $p = 0.000$) and shifting from one sorting rule to another (Sorting with Shifting: $t = -13.603$; $p = 0.000$). The difference between the high and medium CF for color and shape sorting were not significant (the Mann-Whitney test: $U = 1914.0$; $p = 0.595$ and $U = 1780.0$; $p = .166$).

Only monolingual (n = 84) and bilingual (n = 29) children with high level of cognitive flexibility development participated in the next stage of analysis. We performed the comparison of averages for linguistic variables with T-Student test and Mann—Whitney U test for independent samples. Obtained results can be found in Table 1.

Table 1 / Таблица 1

Comparison of Averages across monolinguals and bilinguals with High CF Level by linguistic variables /
Сравнение средних показателей монолингвов и билингвов с высоким уровнем CF по лингвистическим переменным

Linguistic Variables	Criterion	p-value	M		SD	
			Monolingual	Bilingual with High CF	Monolingual	Bilingual with High CF
semantic completeness	T = ,226	**,822**	34.95	35.71	12.148	13.745
semantic adequacy A	U = 423.5	**,580**	1.80	2.14	1.391	1.740
semantic adequacy B	U = 417.0	**,517**	2.66	2.57	1.346	1.630
number of words	T = 1.016	**,314**	55.52	60.52	23.261	19.992
narrative structure	U = 458.0	**,954**	1.25	1.24	,892	1.091
narrative type	U = 449.0	**,847**	2.02	2.00	1.210	1.304
macrostructure (general)	T = .224	**,824**	42.68	43.67	15.642	18.502
grammatical accuracy	T = –1.920	**,059**	7.20	6.14	2.041	2.175
syntactical accuracy	T = –1.310	**,195**	7.20	6.38	2.445	2.202
lexical accuracy	T = –1.519	**,134**	6.73	5.90	2.150	1.786
microstructure (general)	T = –1.673	**,099**	21.14	18.43	6.345	5.546

Note: only significant differences are noted.

The data, presented in Table 1 demonstrates that our second hypothesis regarding cognitive flexibility was confirmed. There was no significant difference between bilinguals and monolinguals with high CF Level for any of linguistic variables. If we take a closer look at the obtained scores, we can make yet another

conclusion. Bilinguals with high CF level the general macrostructure was developed even better than the one of monolinguals with medium CF level. One could observe the same pattern in particular, in semantic completeness, semantic adequacy A, and number of words. In relation to other variables, monolinguals did not differ from bilinguals with high CF level but demonstrated a slightly better score. This data also confirms that the general macrostructure and the variables it contains, such as grammatical, syntactical and lexical accuracy didn't differ significantly in bilinguals and monolinguals with high CF level, even despite the latter had them better developed.

Language development in Bilinguals with High Level of Visual Working Memory

We also checked the second hypothesis regarding visual working memory. For this, we defined the optimal number of clusters describing the values of this EF component, through hierarchic clustering. Two came out to be the best number. Next, we divided the whole sample in two groups by means of k-means clustering (medium and high level of development of visual working memory, correspondingly). Mann–Whitney U test revealed significant difference between medium and high level of development of this parameter under all criteria except "Spatial" visual working memory.

On the next stage we selected all monolinguals that performed this task (n = 90) and all bilinguals with high VWM level (n = 44). We performed the comparison of averages for linguistic variables with T-Student test and Mann–Whitney U test for independent samples. Obtained results can be found in Table 2.

Table 2 / Таблица 2

Comparison of Averages across monolinguals and bilinguals with High VWM Level by linguistic variables /
Сравнение средних показателей монолингвов и билингвов с высоким уровнем зрительной рабочей памяти (ЗРП) по языковым показателям

Linguistic Variables	Criterion	p-value	M		SD	
			Monolingual	Bilingual with High VWM	Monolingual	Bilingual with High VWM
semantic completeness	T = ,701	***,486***	34.83	37.03	10.71	17.03
semantic adequacy A	T = ,685	***,495***	1.90	2.14	1.31	1.77
semantic adequacy B	U = 612.0	***,301***	2.59	3.07	1.46	2.05
number of words	T = ,152	***,879***	57.43	58.34	23.89	28.54
narrative structure	U = 686.5	***,797***	1.94	1.86	1.07	1.27
narrative type	U = 620.0	***,329***	1.14	1.41	0.89	1.18
Macrostructure (general)	T = ,753	***,454***	42.41	45.52	13.98	22.52
grammatical accuracy	U = 464.0	,010	7.10	5.86	1.65	2.23
syntactical accuracy	T = –2.341	,022	7.10	5.90	2.15	2.27
lexical accuracy	T = –1.464	***,147***	6.55	5.90	1.74	2.16
Microstructure (general)	T = –2.374	,020	20.76	17.66	5.13	6.27

Note: no significant differences are marked in bold.

In reliance upon Table 2, one can state that our second hypothesis regarding visual working memory was only partially confirmed. Bilinguals with high VWM level didn't differ significantly from monolinguals by almost all the variables, except general microstructure, especially grammatical and syntactical accuracy. Based on the averages, one can draw a conclusion that such bilingual children have a better developed general macrostructure, than average monolinguals. It holds true for all the variables composing macrostructure as well, except narrative structure. When to microstructure (in particular, grammatical, and syntactic accuracy), bilinguals with high VWM level performed worse than monolinguals. The groups didn't really differ in lexical accuracy, but monolinguals demonstrated a tendency to higher score.

Language development in Bilinguals with High Level of Verbal Working Memory

We verified the second hypothesis regarding audio-verbal working memory. The hierarchic cluster analysis demonstrated that the optimal number of clusters equaled to two, like in previous cases. Then, we divided the sample in two groups by means of k-means clustering (medium and high level of development of audio-verbal working memory, correspondingly). T-Student test revealed significant difference between medium and high level of development of this parameter.

Further we selected all monolinguals that completed this task (n = 168) and all bilinguals with high level of development of this type of working memory (n = 53). The comparison of averages by linguistic variables was performed then, via T-Student test and Mann–Whitney U test for independent samples. Obtained results can be found in Table 3.

Table 3 / Таблица 3

Comparison of Averages across monolinguals and bilinguals with High AVbWM Level by linguistic variables /
Сравнение средних показателей монолингвов и билингвов с высоким уровнем слухо-речевой рабочей памяти (СРРП) по языковым показателям

Linguistic Variables	Criterion	p-value	M		SD	
			Monolingual	Bilingual with High AVbWM	Monolingual	Bilingual with High AVbWM
semantic completeness	T = 1.535	,***127***	38.02	41.63	14.07	14.07
semantic adequacy A	U = 1890.5	,***783***	2.25	2.37	1.52	1.65
semantic adequacy B	U = 1638.0	,***136***	3.03	3.51	1.65	1.65
number of words	T = ,553	,***581***	62.40	64.90	24.74	22.92
narrative structure	U = 1755.0	,***345***	2.14	2.34	1.06	1.24
narrative type	U = 1542.5	,045	1.35	1.71	0.97	1.03
Macrostructure (general)	T = 1.528	,***129***	46.79	51.56	15.84	18.60
grammatical accuracy	U = 1207.0	,000	7.47	6.27	1.84	1.75
syntactical accuracy	U = 1401.5	,009	7.66	6.66	2.26	1.92
lexical accuracy	T = –1.718	,***088***	6.87	6.29	1.88	1.65
Microstructure (general)	T = –2.785	,006	22.01	19.22	5.57	4.83

Note: no significant differences are marked in bold.

Table 3 demonstrates that the second hypothesis regarding audio-verbal working memory was confirmed partially. Bilinguals with high AVbWM level didn't differ that much from monolinguals by the majority of variables, except narrative type and general microstructure (in particular, grammatical and syntactical accuracy). Basing on the averages, we can see that those bilinguals possess a better developed macrostructure, than average monolinguals. In respect to the microstructure measures (including grammatical and syntactic accuracy), bilinguals with AVbWM level were less efficient than monolinguals. There was no significant difference between the groups, but monolinguals had higher scores.

Language development in Bilinguals with High Level of Inhibitory Control

Finally, we verified the second hypothesis about inhibitory control. Again, the optimal number of clusters was two, according to our hierarchic cluster analysis. Then, we divided the sample in two groups by means of k-means clustering (medium and high level of development of inhibitory control, correspondingly). Mann–Whitney U test revealed significant difference between medium and high level of development of this parameter.

Then, we selected all monolinguals (n = 154) and all bilinguals with high IC level (n = 50). Afterwards, we performed the comparison of averages by linguistic variables via T-Student test and Mann—Whitney U test for independent samples. Obtained results can be found in Table 4.

Table 4 / Таблица 4

Comparison of Averages across monolinguals and bilinguals with High IC Level by linguistic variables /
Сравнение средних показателей монолингвов и билингвов с высоким уровнем сдерживающего контроля (СК) по языковым показателям

Linguistic Variables	Criterion	p-value	M		SD	
			Monolingual	Bilingual with High IC	Monolingual	Bilingual with High IC
semantic completeness	T = –,034	,***973***	38.33	38.25	11.71	13.88
semantic adequacy A	U = 1467.5	,***401***	2.31	2.06	1.50	1.55
semantic adequacy B	U = 1544.5	,***678***	3.08	2.94	1.62	1.69
number of words	T = –,774	,***440***	62.42	58.67	23.85	26.41
narrative structure	U = 1515.5	,***558***	2.17	2.06	1.05	1.22
narrative type	U = 1554.0	,***707***	1.37	1.31	0.95	1.01
Macrostructure (general)	T = –,200	,***842***	47.26	46.61	15.53	18.17
grammatical accuracy	U = 803.5	,000	7.52	5.86	1.85	1.69
syntactical accuracy	U = 1048.5	,002	7.76	6.36	2.26	2.09
lexical accuracy	T = –2.372	,019	6.90	6.03	1.90	1.78
Microstructure (general)	T = –3.661	,000	22.18	18.25	5.62	4.95

Note: no significant differences are marked in bold.

From Table 4, we can see that the second hypothesis regarding inhibitory control was partially confirmed. Bilinguals with high IC level didn't differ significantly from monolinguals by all variables associated with the narrative macrostructure. Basing on the averages, we can draw a conclusion that monolinguals demonstrate a much more advanced narrative microstructure and higher score for macrostructure at a trend level.

Discussion

This study revealed that for the 6—7-year-old preschool children, residents of the Republic of Sakha (Yakutia), bilingualism was an important developmental factor both for executive functions and their language. The ambiguousness of the influence of this factor, previously outlined in various research works [38] was confirmed by this study as well. In general, Yakut-Russian bilinguals performed the speech-oriented tasks worse than Russian-speaking monolinguals. In particular, it was especially noticeable in their grammatical and syntactic scores. Most probably, it can be related to the effect of the interference of languages, because this phenomenon was much less present in the accuracy of vocabulary use. Moreover, when it comes to narrative macrostructure, there were no significant difference between monolinguals and bilinguals at all. Therefore, a preliminary conclusion may be drawn that microstructure of a child's narratives does depend on his/her mono- or bilingualism, while building of a coherent narrative rather depends on the level of development of cognitive functions. However, this assumption needs additional investigation because it is difficult to distinguish between effects. This is the effects of bilingualism itself or the effects of the socio-economic characteristics of the region of residence, which can affect cognitive functioning [39].

In respect to executive functions, there is also an uncertainty in their performance. Working memory score of bilinguals was lower than of monolinguals, but their inhibitory control was better, while in cognitive flexibility measures there was no significant difference at all. Yet, it's important to note that in the latter case the bilinguals' results were better than at a trend level. This outcome might be explained with the fact that verbal working memory tasks are based on the repeating of sentences, hence are indirectly related to language development and to worse understanding of instructions by bilinguals. Although their higher level of inhibitory control coincides with the conclusions made in other research works dedicated to the same phenomenon [6, 7]. Apparently, the case is that bilingual children have more experience in shifting between languages and inhibition of words usage from a certain language when communicating in another one.

Despite negative influence of bilingualism on language development discovered in this study, it can be reduced if more attention is paid to the development of children's executive functions. In particular, the obtained results demonstrate that bilinguals with high cognitive flexibility level didn't really differ from Russian-speaking monolinguals in language development. This may be due to the fact that well-developed executive functions allow children quick and efficient shifting from one language to another, and counter-balance the effect of interference

between languages (since Russian and Yakut grammatical system are quite distinct, children with low CF level are influenced by that interference to a great extent).

In fact, cognitive flexibility turned out to be the only component of executive functions that caused the highest effect on bilinguals' language development. Other components, such as working memory and inhibitory control, didn't affect language development that much; other bilinguals with high level of development of these parameters demonstrated significantly worse results in language development, than monolinguals. Thus, well-developed cognitive flexibility can be considered an advantage that can contribute to the mitigation of potential under achievements in bilingual's language development if compared to monolinguals. This met our expectations completely.

Conclusions

Thus, the analysis of the influence of bilingualism on the development of narratives in 6—7-year-old preschool children in dependence to the level of development of their executive functions revealed the following:

1. Yakut-Russian bilinguals of senior preschool age demonstrated lower level of development of such EF component as working memory, than monolinguals, but better inhibitory control.

2. Monolinguals obtained better results in lexical and grammatical aspects of language development, while no significant difference was registered between bi- and monolingual children in respect to the ability to compose coherent narratives.

3. Among executive functions, it is the cognitive flexibility that plays the crucial role, because bilinguals with well-developed CF not only didn't demonstrate lower results, but in some measures, were more successful than monolingual children.

4. Other executive functions, such as working memory and inhibitory control, cause less effect on language development.

5. To counter-balance negative influence of bilingualism on language development, it is important to pay more attention to executive functions development and prioritize cognitive flexibility in this context.

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