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# The development of Russian heritage pupils' writing proficiency in Finnish and Russian

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## 1 Introduction

### 1.1 The aim and background of the study

James Cummins has stated that “a cognitively and academically beneficial form of bilingualism can be achieved only on the basis of adequately developed first language (L1) skills” (1979, p. 222). In this chapter we focus on bilingual writing development and its connections to learners' cognitive and linguistic skills in L1 and L2 and background factors. Our participants come from Russian-speaking immigrant families living in Finland. All participants go to Finnish schools and are either integrated into mainstream classes or have started a preparatory class specially designed for recently arrived immigrant children. The basic aim of this chapter is two-fold and thus, the study is introduced in two phases. In Phase 1 the aim is to follow the development of L1 Russian and L2 Finnish writing skills between two time points (T1 and T2). In Phase 2, we look for correlations and predictive relations between writing outcomes and the linguistic, cognitive and background variables to see what kind of factors may enhance bilingual writing development. In both phases of the study a special attention is paid to the relationship between the skills in the two languages.

The study introduced here is a part of a larger research project, Diagnosing Reading and Writing in a Second or Foreign Language (DIALUKI, 2010–2013; [www.jyu.fi/dialuki](http://www.jyu.fi/dialuki); Alderson et al., 2015; Alderson & Huhta, 2011: 45–48; Nieminen et al., 2011), funded by the Academy of Finland, the University of Jyväskylä and the UK Economic and Social Research Council (ESRC). The aim of the multidisciplinary project was to investigate how literacy skills normally develop in a second or foreign language so that diagnostic tools for assessing learners' literacy skills could be developed. In DIALUKI, we tested many measures originating from the fields of psychology, special education and language assessment to predict strengths and weaknesses in reading and writing. The participants of the project came from two language groups: Finnish learners of English as a foreign language (N = 637) and Russian learners of Finnish as a second language (N = 264). The pupils were recruited on a voluntary basis: pupils, their parents and the municipal authorities gave their written consents. In this chapter the focus is on a longitudinal subsample of 47 pupils from the Russian-Finnish group.

### 1.2 Participants

The Russian-Finnish subsample consisted of 47 pupils (29 girls and 18 boys) from 25 different primary schools around Finland. The subsample included only those pupils who had completed Russian and Finnish writing tasks during the first data collection round (T1), and again two years later at T2. The basic information about the participants' age, schooling, mother tongue and languages used at home is presented in Table 1.

All participants came from families with a Russian background. At T1 they were between 9 and 15 years of age. The Russian-Finnish population was the target in the DIALUKI project since Russian is the biggest immigrant language in Finland with 26 900 families and 70 000

individuals in 2014. This represents about 26% of all inhabitants of Finland who have a language other than Finnish, Swedish and Sami as their mother tongue (Tilastokeskus, 2014).

Table 1. Study participants

Age at T1 (Years)	N	Gender		School at T1		Mother tongue (Reported by child)				Home language (Reported by parents)			Home language (Reported by child)			
		M	F	P	MS	R	F	R&F	?	R	F	?	R	F	R&F	?
9	8	2	6	1	7	5	0	3	0	7	1	0	5	0	3	0
10	11	3	8	3	8	8	0	1	2	11	0	0	9	1	1	0
11	12	5	7	1	11	9	1	2	0	9	2	1	9	0	2	1
12	9	4	5	0	9	7	2	0	0	6	3	0	7	2	0	0
13	6	3	3	0	6	3	2	0	1	4	2	0	3	2	0	1
15	1	1	0	0	1	1	0	0	0	1	0	0	0	0	1	0
Total	47	18	29	5	42	33	5	6	3	38	8	1	33	5	7	2

*Note.* M = male, F = female; P = preparatory education, MS = mainstream education; R = Russian, F = Finnish, R & F = Russian and Finnish, ? = information not available.

Finnish and Russian are not related languages: Finnish belongs to the Finno-Ugric language family whereas Russian is an Indo-European language. Both languages have an alphabetic writing system, but Russian uses the Cyrillic and Finnish the Latin script. In terms of orthographic transparency both languages are situated towards the shallow end of the transparency continuum, Finnish being among the most consistent orthographies with a bidirectional one-to-one correspondence between sounds and letters. (For orthographic depth, see Seymour et al., 2003.)

Linguistically the participants form a heterogeneous group. For them Russian is their first language (L1) which they use mainly at home, and Finnish is their second language (L2) which is used at school and in their surrounding environment. A vast majority (70%) of the pupils considered Russian to be their mother tongue, with Finnish receiving 11% of the responses, and 13% categorised themselves as Finnish-Russian. Similarly, a majority (70%) of the pupils reported using Russian at home most often, 11% Finnish and 15% Finnish and Russian. The use of Finnish at home – in some cases even as the major language – can be explained by several factors. In the parents' questionnaire, 11% of the fathers reported Finnish as their mother tongue, indicating that some proportion of the families were actually bilingual. Second, there are studies that show how children especially in bilingual but also in monolingual families living in a majority language environment have a strong preference for the majority language also at home (Montrul, 2008: 101). Siblings may also use the majority language in their mutual conversation (e.g., Mäntylä et al., 2009). As can be seen in Table 1, the pupils and their parents differed slightly in their responses to the question about which language is mostly used at home.

At T1 data collection most of the children were already integrated into mainstream Finnish education but 21% studied in preparatory classes indicating that they had arrived in Finland quite recently. By T2 all pupils studied in Finnish mainstream classes. According to the Finnish Basic Education Act (628/1998), immigrant children between the ages of 6–17 have the possibility to participate in 12 months of preparatory education before integrating into Finnish schools. According to the Finnish National Board of Education, the aim of this type of education is to prepare recently arrived immigrant children with inadequate Finnish (or Swedish) language skills for basic education in a Finnish-mediated pre-primary or basic education group. Education in the preparatory class will promote Finnish (or Swedish) language learning, integration into Finnish society and acquisition of different school subject content (National Board of Education 2015). However, whether this facility is made available depends on the local authorities. When studying in Finnish-speaking mainstream classes, immigrant children have the possibility to participate in Finnish as a second language lessons, but these are not offered by all schools (Latomaa, 2007).

The background questionnaires revealed language diversity in the participants' educational background. 53% of the pupils had first learnt to read in Russian and 17% first in Finnish. Simultaneous learning to read in both languages was reported by 17% of the participants, and the remaining 13% did not answer the question. Participation in Russian lessons was reported by 64% of the pupils, and 47% said they had sometimes gone to a Russian-medium school in either Russia or Finland. In Finland, immigrant children can be offered lessons in their first language, but the lessons are not part of the curriculum for basic education. The pupils are not given grades or credits for these courses, which diminishes their motivation to attend L1 lessons (Latomaa, 2007). There are also other factors that negatively affect the motivation for attending the classes, such as parental pressure or the pupil's own desire to integrate into the Finnish-speaking environment and not to be identified as a Russian by others. All these factors related to language background, literacy learning and education make this group a heterogeneous

literacy learner population with unique challenges, which is a common feature of immigrant learners of language (Hedgcock & Lefkowitz, 2011: 209).

### **1.3 How do background variables, linguistic proficiency and cognitive abilities relate to development of bilingual writing proficiency?**

The level of bi- and multilingualism vary and so does the language dominance across contexts (Zecker, 2004). In addition, the style and genre knowledge as well as the level of accuracy may vary between the components. For example, stronger requirements for adequacy are set for writing in general than for speaking in informal contexts (Schoonen et al., 2009). According to Cummins's Developmental Interdependence Hypothesis (1979) the level of a child's L2 competence is highly dependent on the level of his/her L1 abilities. High levels of L2 can be achieved only if L1 is strongly supported and promoted by the child's linguistic environment. In his later work Cummins (e.g. 2010) separates Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP), which refer to conversational fluency in everyday situations and the ability to express and understand the language genre of the school respectively (cf. Chapter 1, this volume). In an L2, these proficiencies of an individual are commonly on very different levels. The situation is revealed when a student seems to have adequate conversational skills but performs at an unexpectedly low level in writing tasks. Cummins states (1979) that to create an effective educational program for minority language children, teachers should take into account the varying level and quality of the linguistic input the children are exposed to. This is, however, not enough. Also different background variables such as motivational factors and attitudes towards learning L2 and maintaining L1 need to be considered (Cummins 1979).

When multilingual people use a language it seems likely that all their linguistic resources are involved. Many studies (e.g., Hirose 2006; Kobayashi & Rinnert, 2012; Rinnert & Kobayashi, 2009) suggest that novice L2 writers tend to depend more on L1 knowledge but even at the early stage transfer occurs also in the opposite direction. Laufer (2003) drew the same conclusion in a study about the lexical knowledge of immigrants who had started to learn an L2 only as adults. Their collocation patterns and lexical diversity in the L1 changed as the L2 exposure time increased. Usually these findings are categorised as examples of transfer and manifestations of a multicompetence (Cook, 2002), the knowledge of several languages and especially use of that knowledge without language-specific boundaries. From this point of view Kobayashi and Rinnert (2012) argue that advanced multicompetent writers do not transfer writing features across languages. Instead, they rely on a merged source of knowledge which is non-language-specific by nature.

According to Manchón (2013: 104), becoming a skilled writer requires automatised access to linguistic knowledge needed for expressing intended meaning, genre specific knowledge, and the ability to pay attention to and solve all the relevant problems faced while composing a text. These also concern L2 writers who have to divide their attention between lower level processes such as spelling, finding suitable words and building accurate syntactic structures, and higher demands such as creating a cohesive text (Manchón, 2013: 105). Thus, writing in L2, when it is the weaker language, is a cognitively demanding task. Any writing is dependent on linguistic knowledge and processing speed but in the case of an L2 the dependence is found to be even stronger than in L1 (Schoonen et al., 2003), and the lower level processes of grammatical and orthographical encoding are directly related to linguistic knowledge and processing speed (Schoonen et al., 2009; see also Fitzgerald, 2006).

Working memory has also been found to have an essential role in literacy activities. For creating text, a writer needs to encode words into letters and ideas into sentences and text, and this process is constrained by the genre, audience, and the text itself (what is written before influences the following sentences and word choice). For all these purposes working memory is an important tool, which functions more efficiently as the writing fluency develops and improves (McCutchen, 2000). When writers use their weaker language the demands on working memory are obviously even greater and significantly influence the whole writing process (Manchón, 2013).

The borderline between language and cognition is very fine, if it even exists in the first place. While formal linguistic theories see cognition and language as separate modules, the functional theories treat language as an inseparable part of cognitive activities. From the functionalist view, the learning of several languages during childhood is a highly cognitive activity and must fundamentally affect the cognitive processes in general (Bialystok, 2002). The development does not happen in isolation. Bialystok lists, among other things, the following background factors that affect the development: the parents' education, the literacy environment around the child, the child's L1 (home language) proficiency, the purposes for which the second language is used, the degree and nature of support for that language, and the extent to which the child identifies with the group who speaks that language (Bialystok, 2002: 156). In the case of writing development, yet another factor has been emphasised in research, namely instruction in writing. For example, in Fitzgerald's (2006) meta-analysis of writing research it is concluded that writers must create a special knowledge of writing since most of the problems they encounter in writing are not language-specific, but more likely concerning text and paragraph structure or other phases in a composition process. Additionally, the writers' genre knowledge and beliefs about what is good writing affect their text production (Manchón, 2013). Thus the instruction writers have previously received in writing either in an L1 or an L2 is important (Hirose, 2006; Kobayashi & Rinnert, 2012): in addition to writing-to-learn also learning-to-write is needed (Manchón, 2011).

The interplay between linguistic proficiency, cognitive abilities, and demographic background information is complex, and every factor seems to be connected to others. To tease the factors apart we conducted a study on the writing development of bilingual Russian-Finnish pupils living in the Finnish environment. In Phase 1 of the study we concentrated on the development of writing proficiency both in Russian and Finnish, and aimed to answer the following research question:

- 1) How does the writing proficiency in Finnish and Russian develop in two years, assessed by a fine-tuned scale of the Common European Framework of Reference (CEFR)?

Phase 2 was dedicated to the investigation of the underlying background, linguistic and cognitive factors possibly explaining the development. The more precise research questions in Phase 2 are the following:

- 2) What kind of relationships can be found between background factors and development in writing proficiency in Finnish and Russian?
- 3) How do the linguistic and cognitive measures predict the writing performance at time 1 and time 2?

Based on previous studies we expected to find clear connections between the writing outcomes in the L2 and background, cognitive and linguistic variables. The development in L2 Finnish writing is likely to be more rapid than the development in L1 Russian, since the pupils are surrounded by Finnish language and go to Finnish-medium schools where writing is an important part of learning and expressing what is learnt. The relationship between L1 and L2

writing development within the time period of two years may then contribute to the discussion of transfer, multicompetence, and interdependence of linguistic skills in bilingual children.

## **2 Phase 1: The development of writing proficiency in Russian and Finnish**

### **2.1 Measures and data collection**

The Phase 1 data consisted of writing tasks completed both in Russian and Finnish at two time points. To avoid confusion, Russian will be labelled as the L1 and Finnish as the L2 throughout the study, despite the fact that not all participants named Russian as their mother tongue. The first round of data collection was arranged during the school year 2010–11 (T1) and the second round after two years' interval in the school year 2012–13 (T2). The tasks were administered during regular school hours at pupils' schools by trained researchers or research assistants with Russian language competence in case the participants needed more instruction in Russian.

The pupils wrote one L1 text and one L2 text, and the tasks were exactly the same at T1 and T2. The tasks originated from another research project (Topling; [www.jyu.fi/topling](http://www.jyu.fi/topling)), where they had been successfully used. In the L1 writing task the pupils were able to individually choose between the following two argumentative topics: “No mobile phones at school!” or “Parents should decide how children are allowed to use the internet”. The pupils were instructed to express their opinion about the topic and also validate their arguments. In L2 the writing task differed depending on whether the pupils were in preparatory education or integrated into a regular class. The pupils in preparatory education were asked to write a message to a Finnish friend and explain what food, colours or music they liked and why. The pupils in mainstream classes were asked to write about a funny or scary thing that had happened to them. They were instructed first to explain what had happened, and then why they found the incident to be funny or scary. An easier writing task for the pupils in the preparatory education was chosen to make sure that the beginning learners of Finnish were able to respond to the task. All the writing task instructions were provided in both Russian and Finnish.

### **2.2 Method of analysis**

Each essay was assessed by three qualified raters utilising the Finnish national curriculum scale for foreign languages. It is a fine-tuned version of the CEFR scale (2001), in which each CEFR level is divided into two or three sub-levels (e.g., A1.1, A1.2, and A1.3; for more detailed information about the scale, see National Board of Education, 2004: 278–295). The raters discussed the rating criteria as well as looking at samples of essays before starting the assessment. The rating data were analysed with the multi-faceted Rasch analysis programme Facets and the final score for each essay was based on item response theory analysis (Linacre, 2009). This analysis allowed for the determination of the final score for each essay more reliably than, for example, a mean or median would.

### **2.3 Results**



Figure 1 shows the pupils' performance in Russian L1 writing tasks at the two time points. The development in writing proficiency can be clearly seen in how the results at T1 and in T2 are centred in a different position on the scale. At T1, 39 pupils out of the group of 47 were graded at levels A1.3–B1.1 with a peak in A1.3 and A2.1 with 23 pupils. Two years later the centre had moved to levels A2.2–B1.2 including the outcomes of 30 pupils. Also the range of the outcomes of all 47 pupils changed from A1.1–B2.2 at T1 to A1.2–C1.1 at T2.

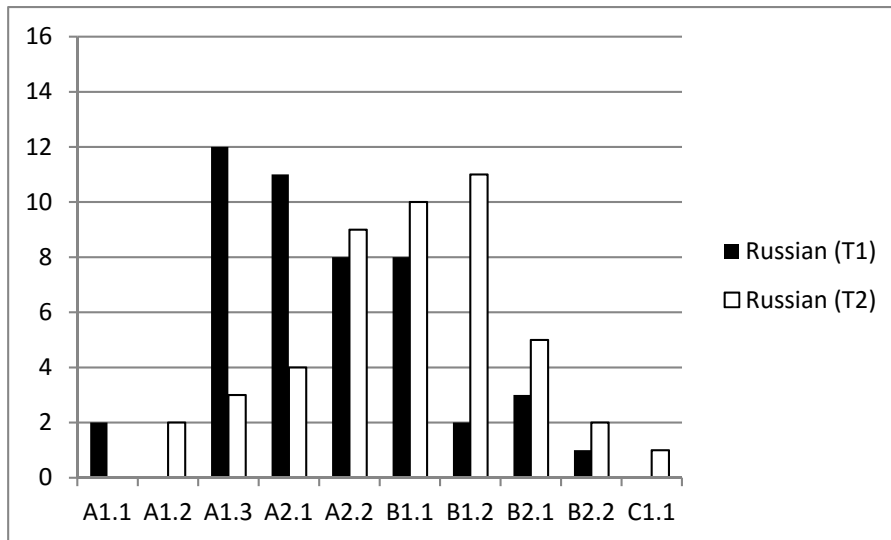


Figure 1. Writing outcomes in L1 Russian at T1 and T2: number of pupils reaching different proficiency levels on the Finnish national curriculum scale for foreign languages.

The outcomes and development in Finnish writing during the two year span is shown in Figure 2. In L2 Finnish the writing development can be seen more clearly than in case of L1 Russian. Although the peak of the outcomes at T1 is in A1.3–A2.1 (27 pupils), exactly as in Russian writing the range of all pupils is now much narrower (A1.1–B1.1). Again, at T2 the peak performances coincide with those in Russian writing, but the volume is different: as many as 38 pupils reached the levels A2.2–B1.2 in Finnish writing. While none of the pupils exceeded B1.1 at T1 in Finnish writing, at T2 there are a total of 17 pupils who reached B1.1 or a higher level.

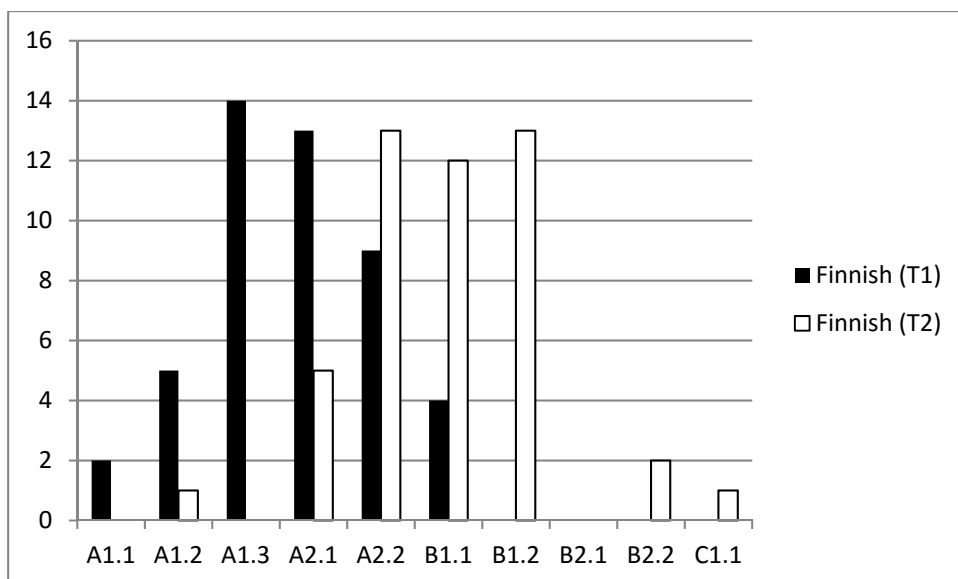


Figure 2. Writing outcomes in L2 Finnish at T1 and T2: number of pupils reaching different proficiency levels on the Finnish national curriculum scale for foreign languages.

The paired samples t-test confirmed what is already shown in Figures 1 and 2: on the group level the pupils had improved significantly in their writing in both languages during the two year period in Finland (L1 Russian writing:  $t(46)=6.61$ ,  $p<.001$ ; L2 Finnish writing:  $t(46)=9.99$ ,  $p<.001$ ). On the individual level, however, the picture was more complex. According to the gain scores (Table 2) most of the pupils improved their Finnish writing outcome by two (17 pupils) or three levels (14 pupils), the largest leaps being as much as five or seven levels. In L1 Russian most pupils improved their performance by one (15 pupils) or two levels (12 pupils). The largest improvement was by four levels (4 pupils).

Table 2. Comparison of individual results between T1 and T2 (gain scores) in L1 Russian and L2 Finnish writing tasks.

Gain	Difference in National Curriculum scales (time2 – time1)	L1 Russian	L2 Finnish
Negative gain	-1 level	5	2
No gain	0	7	4
Positive gain	+1 level	15	6
	+2 levels	12	17
	+3 levels	4	14
	+4 levels	4	1
	+5 levels		2
	+6 levels		
	+7 levels		1

The results also show (Table 3) that there are pupils who remain at the same level in writing and those whose performance is poorer in one of the languages after a two year period in Finland. This kind of performance is more common in L1 Russian (5+7 pupils) than in L2 Finnish (2+4 pupils) which is rather understandable for the low amount of exposure to Russian texts and practice in Russian writing in Finnish environment.

Table 3. Individual results (on the Finnish national curriculum scale) of those pupils whose performance did not improve between T1 and T2 in one or both languages.

ID	No progress in Russian writing (n=12)				No progress in Finnish writing (n=6)			
	Results in L1 RUS		Results in L2 FIN		Results in L1 RUS		Results in L2 FIN	
	T1	T2	T1	T2	T1	T2	T1	T2
6					A1.2	A2.2	A2.2	A2.2
<b>9</b>	<b>B2.1</b>	<b>B1.2</b>	A1.3	A1.2	B2.1	B1.2	<b>A1.3</b>	<b>A1.2</b>
10	B2.1	B1.2	A2.1	A2.2				
19					B1.1	B2.1	B1.1	B1.1
21					A1.3	B1.1	A2.1	A2.1
27	A2.2	A2.1	A2.1	B1.2				
31	A2.1	A2.1	A2.1	B1.1				
33	A1.3	A1.3	A2.1	B1.1				
34	A1.3	A1.3	A2.1	B1.1				
35	A1.3	A1.3	A2.1	B1.2				
36	B1.1	A2.2	A1.3	A2.1				
37	B1.1	B1.1	A1.3	B2.1				
40	B1.1	B1.1	A2.2	B1.2				
42	B1.1	B1.1	A2.1	B1.2				
45	B1.2	B1.1	A2.1	B1.2				
46					A2.1	B1.1	B1.1	B1.1
47					A2.2	B1.1	B1.1	A2.2

The results shown in Table 3 reveal that only one pupil (ID 9) has not progressed in either Russian or Finnish writing. In all other cases writing in the other language has improved 1–5 levels according to the CEFR. The interesting finding is that even if L2 Finnish writing does not seem to improve, those pupils are still progressing in their L1 Russian writing. Another finding is that seven out of twelve pupils not progressing in Russian and three out of six pupils not progressing in Finnish have already reached the level of B1 or B2 at the first evaluation point, indicating fairly good existing writing abilities prior to the study.

## 2.4 Discussion

The results in writing development showed that the development has been greater and reached higher levels in L2 Finnish, the language of the school and environment of the children, than in L1 Russian. However, in most cases writing skills in L1 Russian have also improved, although the progress is not as rapid as in Finnish. With one exception the participants showed progress in writing in at least one of the languages – usually in Finnish. It is not unexpected that literacy skills in the L1 are not developing if there is no education provided, literacy in L1 is not promoted at home or the pupils are not motivated to attend L1 classes. It is also common that bilinguals seldom need to use their various languages in writing (Manchón, 2013), but are

required to write in their L2 only. Thus, L2 writing is very likely to be improving at the expense of L1 writing skills, especially in genres which are practised at school. However, the six pupils who did not show progress in Finnish writing after a two year period in Finland were the exception to these overall findings.

### **3 Phase 2: The connections between writing performance and cognitive, linguistic, and background variables**

#### **3.1 Methods**

##### **3.1.1 Data collection**

During Phase 2, data of linguistic proficiency and cognitive abilities related to the L1 and the L2 literacy skills were collected. The tasks were administered in both languages although it is often argued that psychological abilities in particular should be assessed in a participant's L1 only, since the use of other test languages may skew the results (e.g., Lezak et al., 2004: 313). However, in case of bilingual pupils it is not always the language learned first that is the stronger language or what is thought to be the mother tongue by the pupils themselves. Therefore, it is justifiable and fair to use both languages in testing.

The participants and their parents filled in separate questionnaires focusing on various background information. The linguistic tasks consisted of paper-and-pencil tasks and were administered to all participants from the same school simultaneously during normal school hours. The same was done with the pupils' background questionnaire. All instructions as well as the questionnaires were provided in Russian and Finnish to avoid difficulties in understanding the tasks or questions.

The cognitive tests were individually administered to each pupil via Cognitive Workshop software which provided the stimuli and recorded the responses. Cognitive Workshop was originally designed for the purposes of Jyväskylä Longitudinal Study of Dyslexia (JLD; [www.jyu.fi/ytk/laitokset/psykologia/huippututkimus/en/research/JLD\\_main](http://www.jyu.fi/ytk/laitokset/psykologia/huippututkimus/en/research/JLD_main)) in collaboration with the University of Dundee. All the measures introduced here were used at T1 only.

##### **3.1.2 Background measures**

The background information was collected from both pupils and their parents. The background questionnaires included questions about child's mother tongue, parents' mother tongue, the language used most at home by the child, the length of the child's stay in Finland, the age of learning to read in Finnish and Russian, attitudes towards writing, and writing habits in Finnish and Russian. For more information about the background measures in the DIALUKI project, see Huhta et al. (2016).

##### **3.1.3 Linguistic measures**

*Vocabulary in Finnish and Russian.* The vocabulary test in Finnish was a Vocabulary Size Placement Test (VSPT) from DIALANG. The test contained a total of 75 verbs, 25 of which

were pseudo-words and the remaining 50 real words. The task used a yes-no format to a question “is this a real word in Finnish or not”. (Alderson, 2005: 79–81; Alderson et al., 2015: 120–121). The Russian vocabulary was tested using a VSPT created by the DIALUKI team, as the DIALANG did not include a Russian language version. The test was created following the same principles as the DIALANG VSPT.

*Reading comprehension in Russian and Finnish.* Two Russian reading comprehension tasks (*A lump of clay* and *Antarctica*) were chosen from the Progress in International Reading Literacy Study materials, (Foy & Kennedy, 2008; PIRLS, 2006). The test takers answered 10 multiple-choice and 11 open-ended questions based on the two texts, and the answers were scored according to the PIRLS guidelines. (Alderson et al., 2015: 92–93.) The Finnish reading task was based on a reading comprehension measure from DIALANG. Ten items were chosen from different proficiency levels to be done as a paper-and-pencil test and scored according to the DIALANG principles. (For more information about the reading comprehension measure in DIALANG, see Alderson, 2005: 119–137.) In most cases answering the questions required retrieving explicitly stated information in the texts. The multiple-choice questions also used rephrased expressions which the test-taker had to understand to be able to choose the right answer. A few of the questions required inference making as well.

*Segmentation in Russian and Finnish.* The segmentation tasks in Finnish and Russian were created for the purposes of the DIALUKI study. The Russian (51 words) and Finnish (40 words) text passages were chosen from school textbooks. The texts were manipulated by removing all spaces, punctuation and capital letters. The test taker had to re-segment the texts by finding and marking the word boundaries with a vertical line. The time to complete the task was measured and the number of errors calculated. Such tests have not been very frequently used in language testing, but in DIALUKI, this test type was shown to be successful in predicting second or foreign language reading comprehension. (Alderson et al., 2015: 106–107.)

*Dictation in Russian and Finnish.* In a dictation task, the pupils first heard a story as a whole, and then divided into short items which the pupils had to write down. The Russian task consisted of a story in two complex sentences which were divided into eight short items. In Finnish we had two different tasks. The task for pupils in preparatory education had six simple sentences divided into twelve items to be written down. The task for the pupils in mainstream classes consisted of five complex sentences divided into 14 shorter items. The pupils heard the stories from a DVD recording, and the pauses provided for writing between the items were included..

### **3.1.4 Cognitive measures**

The cognitive measures focused on literacy related skills and resources such as phonological awareness, working memory capacity, word recognition, and speed of lexical access. In the cognitive tasks, linguistic test items such as familiar words and pseudo- or non-words were used. However, the purpose of the tasks was to tap into cognitive skills that are needed for processing linguistic items and not linguistic skills such as vocabulary knowledge or phonological abilities.

The following tasks were administered in both languages, unless mentioned otherwise. Whenever a Finnish standardised test was available it was used, and a Russian counterpart was created based on it to make the tests as similar as possible although the tests can never be

identical when the stimuli are in two different languages. The same cognitive tasks were used regardless of the participants' age or language proficiency. Half of the pupils completed the Finnish tasks first and then the Russian tasks, and for the remaining participants the task order was reversed. The whole test battery took approximately one hour. (For more information about the cognitive tasks, see Alderson et al., 2015: 134–140.)

In the phonological awareness tests all sound stimuli were recorded beforehand to make sure that every test taker was provided with exactly the same stimuli. Phonological awareness was tested with the following five tests:

- *Non-word repetition.* A test taker hears ten non-words one by one and, immediately after hearing each word, repeats it aloud. The words became longer and phonologically more complex towards the end of the task. The Russian version has one practice item before the actual test items; the Finnish version has two. The task requires accuracy in receptive skills and phonological memory.
- *Phoneme deletion.* A test taker hears a pseudo-word and repeats it aloud. Then they are asked to delete a sound in the initial, middle, or final position of the word and to say aloud the resulting new pseudo-word. The Russian test includes three items for practising and 12 test items, and the Finnish version has two practice items before eight test items. The task requires the manipulation of items, together with good receptive and working memory skills.
- *Common unit in L1 Russian only.* A test taker hears pairs of pseudo-words and after each pair of words is asked to name the common phonemic unit in the words. The test includes two practice word pairs and ten actual test word pairs. The test requires good skills in segmentation, comparison, and working memory.
- *Pseudo-word spelling in L1 Russian only.* A test taker hears a pseudo-word twice and is then asked to write it down. The test includes 12 pseudo-words. The test requires skills in working memory and the ability to apply knowledge of letter-sound correspondence to unfamiliar items.
- *Pseudo-word reading in L1 Russian only.* A test taker is shown ten pseudo-words one by one on a computer screen and is asked to read them aloud. The test taker has to apply knowledge of letter-sound correspondence and decoding to unfamiliar items.

Working memory capacity was tested with a backward digit span test (Wechsler, 1997). A test taker hears a random series of digits and has to recall them in reverse order. The test starts with two items including two digits, continues to two items of three digits, all the way up to items of eight digits. The test is stopped if the test taker has failed in two consecutive items with the same number of digits.

Word recognition was tested with the following two tests:

- *Rapidly presented words (RPW).* Ten words are presented one by one on the computer screen, each flashing for 80 milliseconds. Immediately after each word a mask of non-letter characters (e.g., #&?□\* following a five-letter word) appears on the screen. The participant's task is to recognise and say aloud each word when they flash on the screen. The task requires good recognition skills and rapid access to lexicon.
- *Word list reading.* A participant is given a list of 105 words and the task is to read aloud as many of the words as possible in 60 seconds. The words become longer and more complex toward the end of the list. The Finnish word list was a standardised test from Lukilasse test battery created by Häyrynen, Serenius-Sirve and Korkman (1999). The

Russian word list was created based on the model of the Finnish task. To complete the task successfully, good decoding skills and speed of lexical access are required.

The speed of lexical access was tested with *Rapid Alternating Stimulus* (RAS; Wolf 1986). In the Russian task a test taker is given a matrix of 50 items representing letters, numbers, and colours, and the task is to name them as quickly as possible. In the L2 Finnish task there are 30 items representing numbers, colours and familiar objects. The time spent naming the stimuli is measured. The matrixes were based on those introduced in Ahonen et al. (2010). The task uses items which are very familiar to test takers to make sure that no time is needed to identify items themselves, so that words can be instead accessed from the lexicon as rapidly as possible.

## 3.2 Results

### 3.2.1 Correlations between the background variables and the writing outcomes

Spearman rank order correlations were computed between the writing outcomes in both languages at T1 and T2 and the following background measures: length of residence in Finland, attitude towards writing in general, time spent on writing during free time, age of learning to read in Russian and Finnish, frequency of writing in Russian and Finnish during free time, number of languages pupils reported to know, and frequency of overall use of Russian and Finnish (reading, writing, listening and speaking combined). The significant correlations are presented in Table 4.

Table 4. Statistically significant correlations between background variables and writing outcomes in Russian (RusW) and Finnish (FinW) at T1 and T2.

Background variables	RusW T1	RusW T2	FinW T1	FinW T2
Frequency of using Russian	.308*	.378**		
Frequency of using Finnish			.297*	
Number of languages a pupil knows		.296*		
Age of learning to read in Finnish		.398**		-.449**
Length of residence in Finland			.532**	

\* correlation is significant at . 0.05level

\*\* correlation is significant at minimum of . 01 level

The frequency of use of Russian in general had a moderate positive correlation with Russian writing outcome at both T1 ( $r_s = .308$ ) and T2 ( $r_s = .378$ ), i.e. the more the pupils used Russian across the four skills (reading, writing, listening and speaking), the better their writing performance. Similarly, the overall use of Finnish had a positive correlation ( $r_s = .297$ ) with Finnish writing performance at T1.

At T2, another two variables reached a significant correlation with Russian writing. Somewhat surprisingly, out of all possible background variables, the number of languages known by the pupil had a moderate positive correlation ( $r_s = .296$ ) with Russian writing. This may indicate that the more you report to know languages, the more you are interested in languages, including your own heritage language, which may then contribute to your writing skills as well. The age of learning to read in Finnish has a moderate correlation with both Russian ( $r_s = .398$ ) and Finnish ( $r_s = -.449$ ) writing at T2. This indicates that the later the pupils learnt to read in Finnish, that is, the longer they had been exposed to Russian literacy only, the better they were

in Russian writing, and the earlier they had become literate in Finnish the higher their writing outcomes were in Finnish.

The length of residence had a strong correlation ( $r_s = .532$ ) with writing in Finnish at T1. The same phenomenon has been found also in other studies with older students (Ullakonoja, Nieminen et al., 2012; Ullakonoja et al., 2012a). The correlation between these two variables was no more significant at T2, perhaps indicating that the interval between the testing points had been long enough to balance the differences in writing between those who were newcomers at T1 and those who had already resided longer in Finland.

In Phase 1 we found that the participants fell into two groups: those who had improved at least one level on the writing assessment scale between T1 and T2, and those who had not improved or had even gone downwards on the scale. To find out some common features within these subgroups, we looked at some additional background factors, especially focusing on the languages of the family, the length of residence in Finland, attitudes towards writing and writing habits.

Table 5. Background variables vs. the gain scores (T2-T1) in Russian and Finnish writing.

Background variables	L1 Russian writing				L2 Finnish writing			
	Positive gain (n=35)		No gain (n=7) Neg. gain (n=5)		Positive gain (n=41)		No gain (n=2) Neg. gain (n=4)	
Mother's L1	Rus	33	Rus	12	Rus	40	Rus	5
	Fin	0	Fin	0	Fin	0	Fin	0
	Other	2	Other	0	Other	1	Other	1
*Fathers L1	Rus	27	Rus	10	Rus	32	Rus	5
	Fin	4	Fin	1	Fin	5	Fin	0
	Other	1	Other	0	Other	4	Other	1
Pupil's L1	Rus	22	Rus	11	Ru	30	Rus	3
	Rus & Fin	6	Rus & Fin	0	Rus & Fin	6	Rus & Fin	0
	Fin	4	Fin	1	Fin	4	Fin	1
	Other	3	Other	0	Other	1	Other	2
*Language used most at home by the pupil	Rus	25	Rus	8	Rus	30	Rus	3
	Rus & Fin	4	Rus & Fin	3	Rus & Fin	5	Rus & Fin	2
	Fin	5	Fin	0	Fin	5	Fin	0
	Other	1	Other	0	Other	0	Other	1
Length of residence in Finland	T1 0–10 years T2 2–12 years		T1 1–8 years T2 3–10 years		T1 0–10 years T2 2–12 years		T1 2–8 years T2 4–10 years	
*Attitude towards writing	Don't like	3	Don't like	4	Don't like	5	Don't like	2
	Like a bit	23	Like a bit	4	Like a bit	24	Like a bit	3
	Like a lot	7	Like a lot	4	Like a lot	10	Like a lot	1
*Time spent on writing per day in free time	None	5	None	3	None	8	None	0
	≤30 min	16	≤30 min	4	≤30 min	18	≤30 min	2
	30-60 min	3	30-60 min	3	30-60 min	5	30-60 min	1
	1-2 h	4	1-2 h	0	1-2 h	2	1-2 h	2
	>2h	2	>2h	1	>2h	2	>2h	1

\* Information was not provided in the questionnaires by all participants or parents.



As the figures in Table 5 show, those who improve and those who don't do not clearly differ from each other in terms of the background factors. With only few exceptions, both mothers' and fathers' L1 is Russian. In pupils' L1 there seems to be a slight tendency towards bilingualism in the groups with a positive gain in writing in either language, whereas all participants in the groups with no progress identify themselves as monolinguals. The Russian language dominates in all groups when the pupils were asked which language they use most at home. However, some of the pupils in the groups of positive gain prefer Finnish over Russian, also when the positive gain was in Russian writing. The length of residence in Finland does not explain the differences either: those with clear development in writing in Finnish have not been much longer in Finland than the non-progressing pupils; and in those who progressed in Russian writing there are pupils who have been in Finland for up to 12 years at T2. Probably the clearest difference between the groups can be found in the attitudes towards writing. The pupils who progressed in either or both languages seem to like writing more than the pupils with no progress. The attitude may be either a cause or a result. If you like writing you may write more and with the help of the practice receive better outcomes. On the other hand, bad results may change attitude into negative direction. However, even here the difference is not very clear, and there are also pupils in the no-progress group who like writing a lot and, again, in the positive gain group pupils who do not like writing at all. According to the pupils' own reporting, the daily time spent on writing outside school unites these children. Most of the participants wrote less than 30 minutes per day, but surprisingly, it is in the no-gain groups where a bigger proportion of children claim to write more than that. The number of pupils is, however, very small, and thus, no far-reaching conclusions should be made based on this.

### 3.2.2 Linguistic variables predicting the writing outcomes at T1 and T2

To see how much the results in reading comprehension, vocabulary, dictation and segmentation tasks at T1 can predict the writing outcomes at T1 and T2 we conducted a regression analysis (Table 6). Only the variables with a significant correlation with the dependent variable were entered into the analysis. Therefore, for example, the segmentation and dictation tasks in Russian were not added to the model when Finnish writing at T1 and T2 was the dependent variable, and segmentation in Finnish was left out from the model explaining Finnish writing at T2. Finnish vocabulary and Finnish dictation strongly correlated with each other ( $r_s = .892$ ), which may indicate collinearity, and therefore we only used the dictation in the model.

Table 6. Time spent on segmentation, vocabulary, reading comprehension and dictation tasks at T1 predicting L1 Russian and L2 Finnish writing outcomes at T1 and T2.

Dependent variable (DV)	Variation explained by the predictors (Adjusted R Square converted into percentages)	Predictors	Correlation between the DV and the predictor
Russian writing T1	60%	Dictation RUS	.780**
		Reading comprehension RUS	.614**
		Segmentation (time) RUS	-.537**
		Segmentation (time) FIN	-.379**
Russian writing T2	71%	Dictation RUS	.847**
		Reading comprehension RUS	.661**

		Segmentation (time) RUS	-.362**
		Segmentation (time) FIN	-.699**
		Vocabulary FIN	-.320*
Finnish writing T1	63%	Segmentation (time) FIN	-.377**
		Dictation FIN	.763**
		Reading comprehension FIN	.596**
Finnish writing T2	28%	Dictation FIN	.476**
		Reading comprehension FIN	.484**

\* correlation is significant at .05level

\*\* correlation is significant at minimum of .01 level

The proportion of the variation in the writing results predicted with the chosen linguistic variables is considerably high, except for Finnish writing at T2. The results in dictation and reading comprehension in Russian are the best predictors of Russian writing at both T1 and T2. Time spent in completing the segmentation task in Finnish and Russian are good predictors, too. The less you spend time to complete the task the better you seem to be in Russian writing. Also Finnish vocabulary is among the predictors of Russian writing at T2. However, the negative correlation (-.320\*) indicates that the smaller the vocabulary is in Finnish, the better the writing outcomes are in Russian. 63 % of the Finnish writing outcomes at T1 are explained by Finnish segmentation, dictation and reading comprehension results. However, at T2 the prediction is much smaller (28%), and is based only on dictation and reading comprehension, which both are very close to the construct of writing. This is in line with the results in previous studies with a bigger Russian-speaking cohort (N = 183) in DIALUKI (Ullakonoja et al, 2012b).

### 3.2.3 Cognitive variables explaining the writing outcomes

To investigate how much of the writing proficiency can be explained with cognitive abilities we administered nine different cognitive tests, six of them in both languages and the remaining three only in L1 Russian. The results of the regression analysis are shown in Table 7.

Table 7. Cognitive measures explaining the writing outcomes in L1 Russian and L2 Finnish.

Dependent variable (DV)	Variation explained by the predictor (Adjusted R Square converted into percentages)	Predictors	Correlation between the DV and the predictor
Russian writing T1	46%	RPW Rus	.429**
		Word list reading Rus	.662**
		RAS time Rus	.528**
		NW repetition Rus	.348*
		PW reading Rus	.530**
		PW spelling Rus	.646**
Russian writing T2	73%	RPW Rus	.423**
		Word list reading Rus	.728**
		RAS time Rus	.627**
		NW repetition Rus	.307**

		PW reading Rus	.413**
		PW spelling Rus	.771**
Finnish writing T1	54%	RPW Fin	.542**
		Word-list reading Fin	.598**
		RAS time Fin	.314*
		NW repetition Fin	.471**
		Phoneme deletion Fin	.477**
Finnish writing T2	17%	RPW Fin	.420**
		Phoneme deletion Fin	.315*

RPW = Rapidly Presented Words; RAS = Rapid Alternating Stimulus; NW = Non-word; PW = Pseudo-word

As Table 7 shows, the variation in L1 Russian writing outcomes was explained by the cognitive variables for 46% at T1 and as much as 73% at T2. For L2 Finnish writing the proportions of prediction are 54% and 17% respectively. Although the percentages differ the trend in prediction is similar to the one with linguistic variables.

### 3.3 Discussion

Only a few background factors seemed to correlate with writing outcomes in either language, and the correlations were moderate except for the one between the length of residence in Finland and Finnish writing at T1. Background variables did not explain the difference between the writers making progress, and those who did not progress either.

Linguistic and cognitive measures seemed to be more efficient in predicting the writing outcomes. The first regression analysis showed differences in which linguistic measures predict the outcomes in L1 Russian and L2 Finnish writing and how they do it. At both time points, only Finnish variables explain the results of Finnish writing, whereas for Russian the predicting variables come from both languages. However, the Finnish linguistic variables are all negatively correlated with Russian writing, indicating that poor skills in Finnish are likely to be connected to good writing skills in Russian. The other observable difference is that Russian writing outcomes are strongly predicted by the linguistic variables at both time points, whereas for Finnish writing the prediction drops notably at T2.

The second regression analysis investigating how the writing results could be explained by cognitive measures shows a similar pattern: the predictions are fairly high except for Finnish L2 writing at T2 (17 %). For Russian writing the variables emerging from the prediction are the same at both time points. Three of them (RPW, Word-list reading, and RAS) tap into word recognition and speed of word retrieval, which are aspects of vocabulary knowledge (Alderson et al., 2015: 105). The remaining three variables have more to do with phonological awareness and especially letter-sound correspondence. For Finnish writing, five predictors emerge at T1, but at T2 only two of them are left. Also here the predicting variables tap into vocabulary knowledge and phonological awareness, but this time the focus is on the manipulation of phonological information. The predicting variables also created a clear language division. Although all cognitive variables in both languages were involved in the analysis, only Russian tasks explained Russian writing and Finnish tasks Finnish writing, respectively.

The backward digit span task measuring the working memory does not belong to the predicting variables for either of the languages. This does not, however, mean that working memory is not involved, since all phonological awareness tasks clearly require working memory

functions. Therefore, it can be stated that working memory is tightly intertwined with the prediction.

## 4 Conclusions

In Phase 1 we focused on the development in writing skills over a two year period in both L1 Russian and L2 Finnish. The comparison of the writing outcomes between T1 and T2 clearly showed that the majority of the pupils progressed in their writing skills, not only in L2 Finnish but also in L1 Russian, despite the fact that the children lived in a Finnish environment and went to Finnish schools. The tendency was detectable in data which covered only a small slice of the writing proficiency, with only one writing task in each language at T1 and T2. At school the pupils were instructed in Finnish and learned the language from their surrounding environment. They were all also instructed in Finnish writing skills, and thus they both wrote-to-learn and learnt-to-write (Manchón, 2011) in their L2. Thus, it appears very logical that most of them showed more improvement in L2 Finnish writing, especially when it was measured with writing tasks which resemble the typical school writing tasks. The development in L1 Russian writing proficiency needs an explanation, too. The progress was not as clear as in Finnish, but still some of the pupils had gone up as many as four levels on the evaluation scale. Many of the children had also participated in home language instruction in a school setting. This participation, for example, was once a week for an hour and therefore was not likely to markedly improve language skills, particularly considering that the time was not dedicated to improving writing skills alone. However, in two years all these children have matured in their thinking and cognitive abilities. They have had more experience with literacy, although not necessarily so much in Russian. It is possible that what they have learned about literacy in L2 Finnish has also widened their multicompetence repertoire and thus partly made their progress in Russian writing possible. Hedgcock and Lefkowitz (2011) have argued that to improve in their heritage language, children need to also develop also rhetorical skills, discourse knowledge and genre awareness. This is closely connected to the assessment criteria we used. The Finnish national curriculum scale for assessing foreign language skills follows the CEFR assessment criteria, which focus more on functional aspects of language than grammatical accuracy. Thus the progress of our participants indicates that they have developed the coherency of the texts they write, how well they can express and justify their opinions or thoughts, how well the text meets the genre criteria and how well they can tell a story. These things may have also been learned through the L2 (Rinnert & Kobayashi, 2009), especially when the literacy cultures of the L1 and the L2 are close.

If the results in writing development are looked against the Developmental Interdependence Hypothesis (Cummins 1979), no support for the hypothesis can be found. This is most evident in pupils whose writing skills did not improve in one of the languages. If the Interdependence Hypothesis would hold these pupils should not have improved in either language between T1 and T2. However, with only one exception (pupil ID 9), those who did not improve in L1 Russian did still develop their writing skills in L2 Finnish, and those who improved in L1 did not develop in L2 writing, although that would have been expected according to the Interdependence Hypothesis. Thus, our results do not give evidence about transfer from L1 to L2 or about straightforward connection between the writing skills in L1 and L2.

In Phase 2 our research interest was two-fold, including on the one hand connections of the background variables to the writing outcomes, and on the other hand the power of cognitive and linguistic variables to explain the variation in the writing outcomes. Only a few of the

background variables had a significant although only small or moderate correlation with the writing outcomes: use of Russian in general, number of languages a pupil knows and age of learning to read in Finnish correlated with Russian writing, and use of Finnish in general, age of learning to read in Finnish (negative correlation), and time of residence in Finland with Finnish writing respectively. The background variables were not able to shed light on why some of the participants progressed only in one language. The group was rather small and very heterogeneous for this kind of analysis.

For linguistic and cognitive variables the situation was different. Both factors turned out to be very good predictors of writing outcomes, except for Finnish writing at T2. Both analyses also gave very similar results: vocabulary and segmentation skills and equivalent cognitive skills (speed of lexical access, word recognition) were among the predicting variables. On top of this, various aspects of phonological awareness partly explained the variation in the writing outcomes. These findings are very much in line with the results of previous research (e.g., Shoonen et al., 2003; 2009). Together with the result that almost exclusively Russian tasks predicted Russian writing, and Finnish tasks Finnish writing, these outcomes also support the idea that language and cognition are inseparable and that they function together (Bialystok, 2002). At the same time, with the clear tendency towards language specificity, these findings do not support the Interdependence Hypothesis (Cummins, 1979). Neither do they give evidence about overt transfer of skills or abilities from L1 to L2. Instead, they show a picture of development, where many things other than just language proficiency in L1 create different learning paths in L2 and writing skills.

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